Explorer

Grade 5 | Term 1

Revised

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Introduction

Explorer is an integrated term course for primary (1 to 5) levels. The revised edition comprises three books: Term 1, Term 2 and Term 3. Each book covers the curriculum of all the core subjects taught in these classes – English, Mathematics, Environmental Studies, Science, Social Studies and General Knowledge, integrated together for an all-in-one approach.

This series is designed to help facilitate 'learning without burden', as it eliminates the need for separate text books to be carried by young students every day.

The content is well-graded, beautifully illustrated and visually engaging. In addition to the hands-on activities, there are many value-based tips and suggestions for inculcation of moral and ethical values.

The books in the series are structured in the following way:

English

The English section is a comprehensive course aimed at developing an understanding and appreciation for prose and poetry. The course aims to develop communication skills in students by integrating the concepts with essential language skills of listening, speaking, reading and writing. It has well-graded grammar and vocabulary sections to help students grasp the core language structures and enrich their creative expression.

Mathematics

The Mathematics section consists of carefully-graded and activity-based mathematical concepts. It links mathematics to the everyday life of the students and makes it enjoyable.

Environmental Studies

The Environmental Studies section, for grades 1 and 2, helps learners understand the environment around them in totality and develops sensitivity towards environmental issues that we are faced with.

Science

The Science section, for grades 3, 4 and 5, involves students as participants in the journey towards scientific exploration. The subject gives students an opportunity to construct their own knowledge through activities and projects, enabling them to connect their learning to the real world.

Social Studies

The Social Studies section, for grades 3, 4 and 5, introduces the young learners to the basic concepts of history, geography and civics. The series attempts to make learners understand the evolution of human society and its fast-changing paradigms.

General Knowledge

The General Knowledge section includes an assortment of topics dealing with general awareness and life skills.

We hope the learners and teachers find the course apt for their learning-teaching needs.

Acknowledgements

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The Statue by James Reeves*; The Boy*, *the Dog and the Spaceship* by Nicholas Fisk; *The Clothesline* by Charlotte Druitt Cole;*The Post Office* by Rabindranath Tagore, translated by Devabrata Mukherjee.

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Contents

English

1 First Day at School

Warm-up

Do you remember your first day at school? Were you scared/ excited/curious? What happened when you left your parent/parents and entered the classroom? How did your day go? Share your thoughts.

Ragini wouldn't get out of bed. Birds were chirping in the garden, Granny was halfway through her morning *bhajans*, Grandpa was huffing through his breathing exercise, but Ragini wouldn't stir from bed. Today was her first day at school, and she was scared to death.

Her mom reminded her for the sixteenth time that she was getting late for school. She lay huddled up; her eyes screwed shut, and said, "Please, Mom, I'll go tomorrow, promise... promise."

Her mom came and sat at her bedside. She held Ragini's hand and said, "Come now, you are a big girl, aren't you? Go and wash up fast. Your breakfast is getting cold."

Ragini held on to her mom's hand and kept moaning, "No, I won't go there... I don't know anybody there... please, Mom... I won't... I can't."

huffing: breathing loudly, especially because you've been exercising
huddled up: holding your arms and legs close to your body

Then Granny came, and Grandpa. They took turns, trying to change her mind.

"It's a lovely school. It has a huge grassy playground and a flower garden bigger than ours," they told her.

"But what about the children?" Ragini whined. "What if they stick chewing gum to my hair? What if they draw funny pictures of me on the whiteboard? They'll all laugh at me."

"Don't be silly. You'll make friends with the kids just like that," Granny snapped her fingers. "You'll have loads of fun together," Grandpa said.

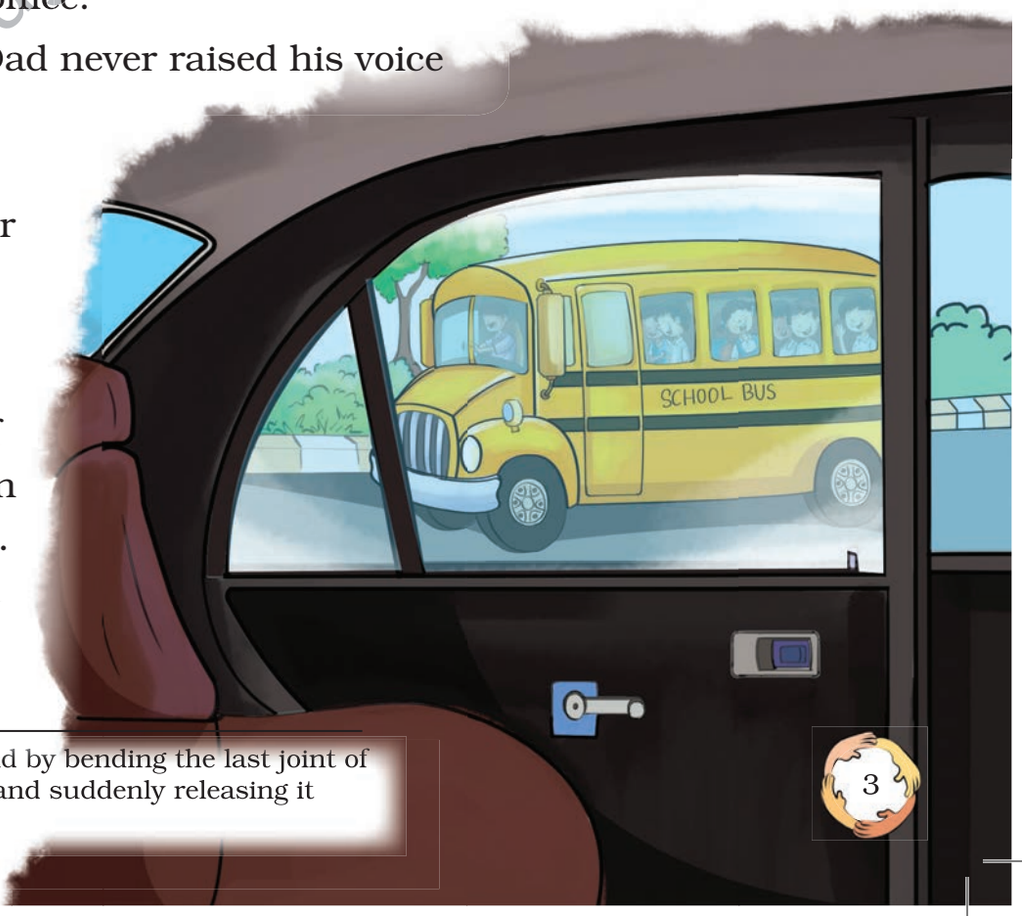
But Ragini was still scared. It was she who would be facing the children, not them. What if they put a lizard inside her bag? Ragini shivered at the thought.

Ragini was not silly. She didn't hate kids either. In fact she was quite intelligent. And popular. But every time she had to face strangers on her own, she would get very nervous.

The big clock in the hall suddenly began to strike. It was nine. Mom, Granny and Grandpa had long gone. Ragini's dad came into her room. Seeing him enter, Ragini shut her eyes as if she were asleep. Dad said in a firm voice, "I want you to be ready in ten minutes. I'll drop you at the school. I'm getting late for office."

Ragini had no choice left. Dad never raised his voice or spoke harshly. But you didn't argue with Dad.

In the car Dad smiled at her and said, "Things will be just fine, trust me, Rags." Ragini said nothing. All the way she kept looking out of the window. School children in pool cars, school buses… happy, noisy. None of them looked as if they could bite her. And yet…



snapped: made a sharp clicking sound by bending the last joint of the middle finger against the thumb and suddenly releasing it

They were standing in front of the bright green school gate. The doorkeeper let them in. They walked up a tree-lined pathway, past an enormous lush green playground. But it was so quiet all around. Where was everybody?

They had to wait at the office for the assembly to end. They had arrived late. The principal was an elderly lady with the smile of an angel. "Never mind that you are a bit late. No harm's done. It's your first day at school after all."

Ragini smiled a nervous smile at her father and bade him goodbye. The walk along the corridor seemed endless. Classes had already begun. It would be her turn any moment now. Her heart went pit-a-pat. How would she manage?

"This is your class." The principal's words broke her thought. "Come."

She followed the principal into the classroom, her head bowed. The noise dropped to a whisper as the kids rose on their feet and greeted the principal. Ragini heard her say, "Children, this is your new class teacher, Miss Ragini."

"Good morning, Miss," their voices rang out.

Ragini looked up. The kids were looking at her with bright smiling eyes.

They were faces of friends, not strangers.

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enormous: extremely large
lush: having a lot of healthy grass, plants and trees

Comprehension

A. Say whether the following are true or false.

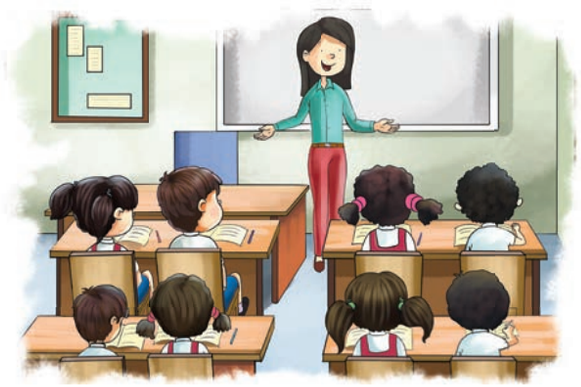
1. Ragini wouldn't get out of bed as she was feeling sleepy. .....
2. Her mom was annoyed with her because her breakfast was getting cold. .....
3. She was scared of lizards. .....
4. The principal was annoyed with Ragini for being late. .....

B. Choose the correct options.

1. Ragini didn't want to go to school because
   a. she was feeling sleepy and didn't want to go to school. ☐
   b. she felt nervous about meeting strangers at a school. ☐
2. Granny was sure Ragini would make friends with the children easily because
   a. most people liked her. ☐
   b. she knew many funny stories. ☐
3. Ragini shut her eyes when she saw her father enter the room because
   a. she was scared of him and wanted to avoid him. ☐
   b. she wanted to avoid going to school. ☐

C. Read the lines and answer the questions with reference to the context.

1. *"But what about the children?" Ragini whined.*
   a. Which children was she talking about?
   b. What were Ragini's fears concerning the children?
   c. Do you think her fears were real or imaginary?
2. "*Things will be just fine, trust me Rags.*"
   a. Who said this?
   b. What did he mean by **things will be just fine**?
   c. Did Rags feel reassured by his words?



D. Think and answer.

Suppose there is a new person in class who finds it difficult to make friends. How would you help her/him overcome her/his shyness and feel comfortable?

Language in Use

The Comparative Form of Adjectives

Read the sentences.

- It has a flower garden **bigger** than ours.
- The corridor was **darker** than the room.
- Amit is **more intelligent** than Varun.

The words in bold are adjectives in the comparative form.

We use the **comparative form of adjectives** to compare two nouns in terms of a common quality, which one possesses in a higher or lesser degree than the other.

The comparative degree of a one- or two-syllable adjective is generally formed by adding **-er** to the positive form (base form) of the adjective.

Examples:

light ➔ lighter heavy ➔ heavier thin ➔ thinner

For adjectives with three or more syllables, we add **more** to their positive forms to make their comparative forms.

Example:

enthusiastic ➔ more enthusiastic

The Superlative Form of Adjectives

Now, read these sentences.

- The attic was **the darkest** room in the house.
- The yellow rose is **the prettiest** of all the flowers in the bouquet.
- Manan is **the most intelligent** boy in school.

We use the **superlative form of adjectives** to compare one noun with all others in a group, to show that it possesses a quality in the greatest or smallest degree compared to the others.

Superlative adjectives are always written with **the** before them.

The superlative degree of a one- or two-syllable adjective is generally formed by adding **-est** to the positive form (base form) of the adjective.

Examples:

light ➔ lightest heavy ➔ heaviest thin ➔ thinnest

For adjectives with three or more syllables, we add **most** to the positive forms to get the superlative forms.

Example:

enthusiastic ➔ most enthusiastic

Read this sentence.

I am **good** at chess, but my **best** friend is **better**.

As you can see from the words in bold above, a few adjectives with comparative and superlative forms do not follow the **-er/-est** rule.

Examples:

good ➔ better ➔ best

bad ➔ worse ➔ worst

far ➔ farther/further ➔ farthest/furthest

Fill in the blanks using suitable forms of adjectives from the box.

far bumpy interesting tall easy
smart big good clean expensive

1. This is the ..... stadium in the country. It can accommodate many people.
2. Nakul is ..... than his brother and can reach the top shelf of the cupboard.
3. My house is ..... from school.
4. He has the ..... car in the neighbourhood. It cost a lot of money.

5. This game is ..... than the previous one. That one was rather dull.
6. Ayesha is ..... at basketball than her sister Rubina.
7. This poem is ..... to memorise than the other one.
8. It is difficult to tell who is the ..... of the twins.
9. The road that we took was ..... than the one you took. It was full of potholes.
10. This village is ..... than before; people know that garbage breeds disease.

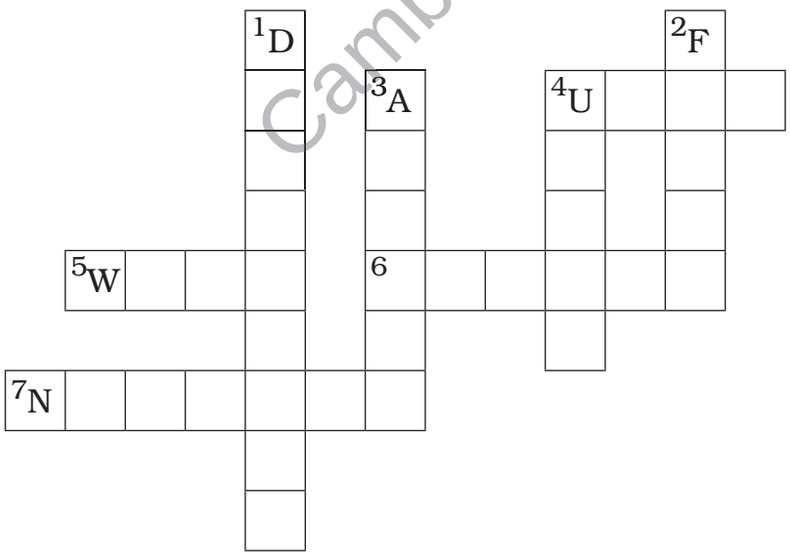
Remember not to use a double comparative or superlative. Never say **more better** or **most prettiest**.

We add **more** or **most** only to the positive form of adjectives.

Word Power

Antonyms are words which mean the opposite of other words.

A. Find the antonyms to the clues given below and solve the puzzle.



Clues

Across	**Down**
4. pretty	1. safe
5. foolish	2. sink
6. present	3. never
7. calm	4. over

B. Fill in the blanks using words from the crossword.

1. Some stones are so light, they ..... on water.
2. Haven't you heard the story of the ..... duckling?
3. It's too ..... to climb this mountain.
4. Those who drive at night should ..... remain cautious.
5. The tree bent ..... the weight of the fruits.
6. He was ..... as he had to perform in public.
7. It was a ..... decision not to play in the rain.
8. The teacher asked how Rimi was as she had been ..... in class for quite long.

Spelling

Add bl, cl or fl to complete the words and answer the riddles. Read the words aloud.

1. I am a wooden toy that you can stack. .....ock
2. I am a very small jumping insect. .....ea
3. I am a piece of cloth attached to a pole, usually representing a country. .....ag
4. I am a hint to help you solve a mystery. .....ue
5. I am a fat, round drop, usually of something gooey. .....ob

Listening and Speaking

A. Say the pairs of words aloud. Pay attention to the sounds of the letters f and p.

fast	past	felt	pelt	fill	pill	file	pile
fuss	plus	frail	pale	fair	pear	fence	pence

B. Sumit couldn't come to school yesterday as he missed the school bus. Rishav wants to know how he missed it. Listen to their conversation.

1. Say whether the following are true or false.
   a. Sumit did not want to get up in the morning as he was having a wonderful dream. .....
   b. He broke the alarm clock. .....
   c. Sumit had slept late the previous night as he was reading a storybook. .....

d. Mom marched Sumit off to the washroom because she wanted him to wash up fast. .....

2. Answer **yes** or **no**.

a. Sumit had a scary dream in the washroom. .....

b. Rishav really meant it when he told Sumit he should keep pillows in the washroom. .....

c. The lines *I wish something like this happened to you. You'd realise how it feels.* suggest Sumit was angry with Rishav. .....

d. Sumit's shoelaces had come undone because they were not of good quality. .....

e. Rishav felt sorry for Sumit. .....

C. Sit in groups. Discuss the occasions when you were late for school. Was it always the fault of someone else? Did you blame others for this? What could you have done to avoid being late?

Writing

A. Write about your first day at school.

Were you nervous/excited? Who took you to school? What did you see as you entered the school gate? Who guided you to the classroom? What did the classroom look like? What happened during recess? Did you make any friends? Did something particularly exciting happen? You may add other details as well if you think they are important.

B. Ragini was scared of lizards. Are you also scared of anything in particular? Write about it.

Activity

Write the script of a small skit called 'My first day at school' based on what you have noted in the writing exercise. The characters of your skit may be a child, mother/father/any other guardian, the school gatekeeper, the class teacher, other teachers and classmates. Playing all the characters yourself, practise and act it out in front of the class. Or, alternately, your classmates could be assigned roles in your skit, while you play the role of the child.

2 To a Butterfly

William Wordsworth

Warm-up

How do you feel when you see a flock of beautiful butterflies hovering over brightly coloured flowers on a pleasant sunny morning? Share your thoughts.

Butterflies warm themselves in the sun on cold mornings. They need to do this to raise their body temperature so that they can fly easily. Let us read this poem about a butterfly basking in the sun.

I've watched you now a full half-hour,
Self-poised upon that yellow flower;
And, little Butterfly! indeed,
I know not if you sleep or feed.
How motionless!—not frozen seas,
More motionless! And then
What joy awaits you, when the breeze
Has found you out among the trees,
And calls you forth again!

self-poised: confident

This plot of orchard-ground is ours;
My trees they are, my sister's flowers.
Here rest your wings when they are weary;
Here lodge as in a sanctuary!
Come to us often, fear no wrong;
Sit near us on the bough!
We'll talk of sunshine and of song,
And summer days, when we were young;
Sweet childish days, that were as long
As twenty days are now.

About the Poet

William Wordsworth (1770 – 1850) is one of the most well-known English poets. He is said to have started the Romantic movement in English Literature. This was a movement in the late eighteenth and the early nineteenth century when importance was given to the beauty of nature and human emotions. Wordsworth grew up in the Lake District of England and was greatly influenced by nature since his childhood.

Can you find the poet's picture? Paste it here.

Comprehension

A. Say whether the following are true or false.

1. The speaker had been watching the butterfly for half an hour. .....
2. The orchard belongs to the speaker and his sister. .....
3. The speaker cannot make out if the butterfly is feeding or sleeping. .....

B. Choose the correct option.

1. The speaker compares the butterfly to frozen seas
   a. as it is frozen stiff with cold. ☐
   b. as it sits more still than the frozen seas of the cold regions. ☐

weary: very tired
lodge: (here) come to rest
sanctuary: a safe place; a place where people or animals are given shelter

2. When the breeze finds the butterfly

   a. it is happy to fly about in the breeze. ☐

   b. it is annoyed at having been awakened from deep sleep. ☐

C. Answer with reference to the context.

1. *Here rest your wings when they are weary;*

   Here lodge as in a sanctuary!

   Come to us often, fear no wrong;

   Sit near us on the bough!

   a. What does the speaker ask the butterfly to do when it gets tired?

   b. How does he reassure the butterfly that it will not be harmed?

   c. Where does he want the butterfly to sit?

2. *We'll talk of sunshine and of song,*

   And summer days, when we were young;

   Sweet childish days, that were as long

   As twenty days are now.

   a. What will the speaker talk about with the butterfly?

   b. Which words in the lines show that the speaker wants to talk about his childhood days with the butterfly?

   c. Which phrase shows that his childhood days were happier than his present days?

D. Think and answer.

1. Butterflies dancing among flowers are such a lovely sight. Do you see many butterflies around where you live? What could be the possible causes of its presence or absence?

2. What can we do in our little ways to make sure that the number of butterflies increase?

Appreciation

Rhyming words are words or endings of words that have the same sound. Poems are said to rhyme when the words at end of the lines are rhyming words.

A. Pick out the rhyming words in the poem.

Sometimes, in poems and stories, things are described as larger, better, worse, etc., than they actually are. Such use of language is called **hyperbole**.

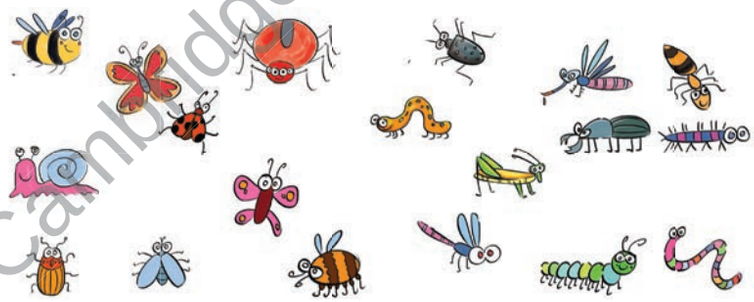
Examples:

- I'm so hungry I could eat an elephant.
- Rumana could have knocked me over with a feather.

B. Find an example of hyperbole in the poem.

Writing

A. The poet has written about a butterfly he observed sitting quietly on a yellow flower. Try and observe a bird or an insect from a distance. Describe what you notice and try to guess why the creature behaves in the way it does.



B. Suppose you were the butterfly in the poem. Write a letter to a butterfly friend of yours, inviting it to the orchard. Tell your friend how beautiful the orchard is and why it is safe to visit it.

Activity

Butterflies go through a life cycle. There are four stages in the life cycle. Make four groups. Each group will find out about a stage in the life cycle of a butterfly. Write about the stage and draw pictures on chart paper. Display them in the right order.

3 The Railway Children

Edith Nesbit

Warm-up

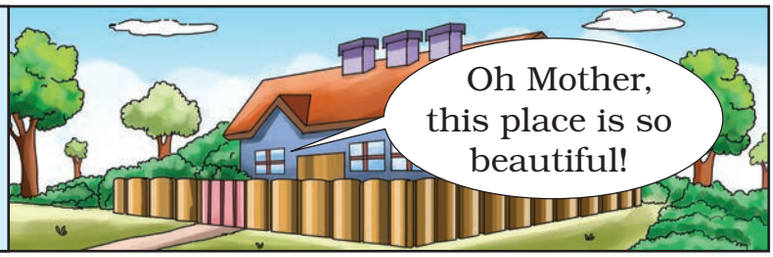
Look at the title of this Unit. It is the name of a very famous children's book written by Edith Nesbit. It is considered to be a classic. Look at the pictures and say which might be from the story. Discuss in groups. Share with the teacher. Give reasons for your choice.

Three children along with their mother move from London to 'The Three Chimneys', a house near the railway line in Yorkshire. Their father was imprisoned but the children did not know for what. The children could not attend school but they didn't complain. This story is about how the children get used to their new home and their adventures in the new place.

Mother was always locked up in her room upstairs, writing stories.

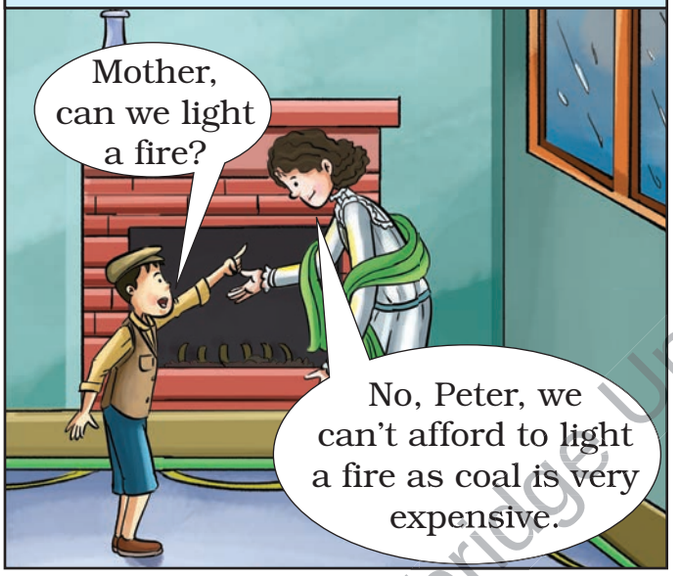
She read out wonderful stories that she had written to the children at teatime.

Their new surroundings were so beautiful, with rocks, trees, hills, valleys, canals and the new railway, that the children forgot about their villa in London.



From time to time, Mother reminded them that they were poor. But the children did not seem to mind that. They always had enough to eat and they still had their clothes.

In June, it rained very hard for three days. It was very cold and the family faced a hard time.



Peter was silent all day and then he suddenly had a brilliant idea.

Two days later, Peter called his sisters: Bobbie and Phyllis.

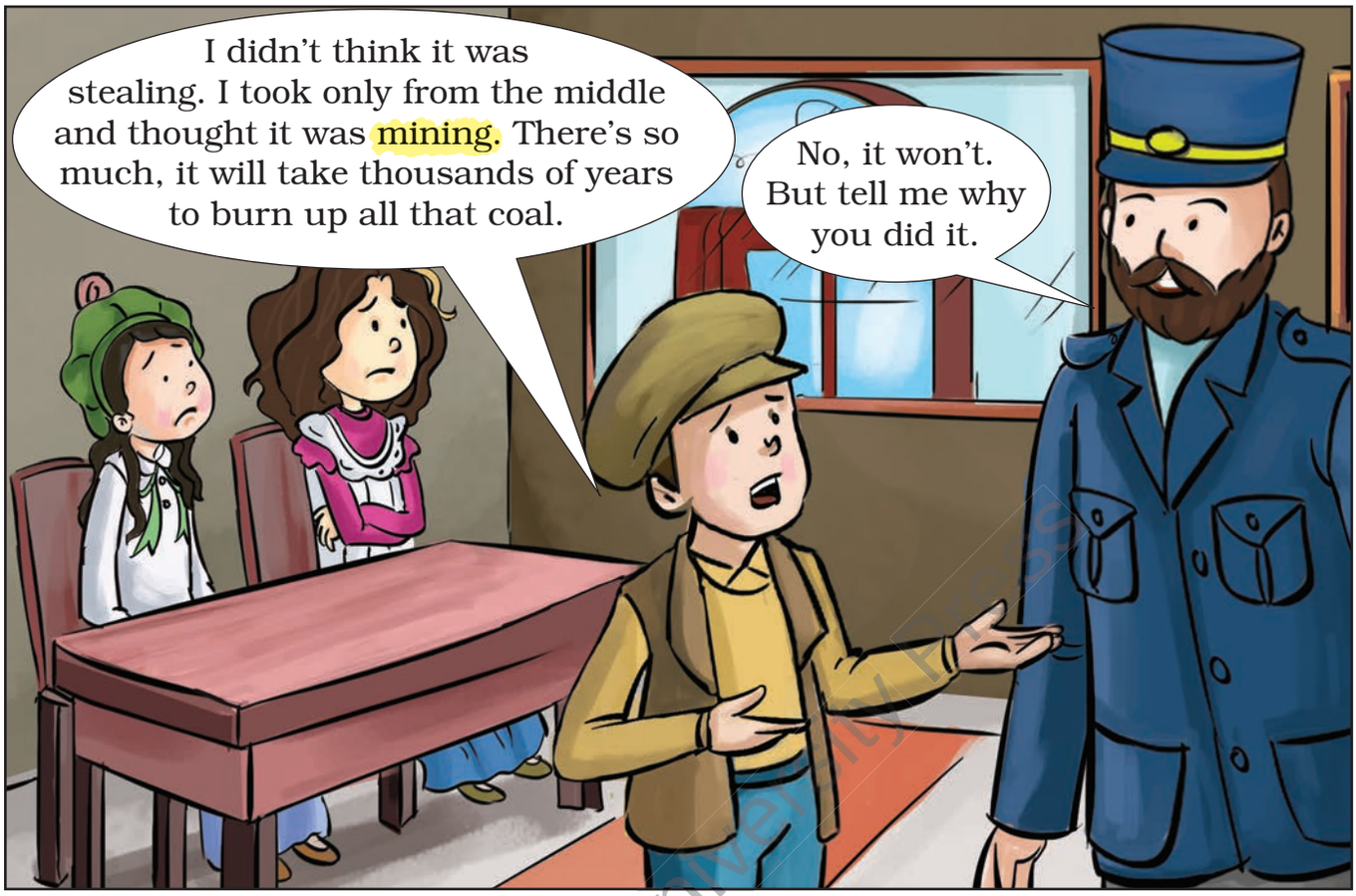
The Roman Chariot was a very old pram they had found in the loft.

Peter led them down the hill to the station.

Just above the station, some rocks had been pushed aside and in a little hollow between them lay heaps of coal.

The chariot was so heavy that all of them together could not push it up the hill. They had to make three trips before the coal from Peter's mine could be added to the heap of Mother's coal in the cellar.

But on a dreadful night, the stationmaster crept out quietly to the yard where the heap of coal was. He hid himself in the shadows.



mining: the activity of removing substances such as coal or metal from the ground by digging

But then the girls were quite sure. And they knew that Peter was quite sure too, though he would not admit it.

Comprehension

A. Say whether the following are true or false.

1. Peter had two sisters. .....
2. They were born in The Three Chimneys. .....
3. Their mother scolded them for wasting food. .....
4. Peter wanted to help his mother. .....

B. Answer briefly.

1. Where did the children live before coming to Yorkshire?
2. What kind of life do you think they had in London?
3. Were the children happy in their new house? Why?
4. What idea did Peter have one day?

C. Read the lines and answer the questions with reference to the context.

1. *Mother, can we light a fire?*
   a. Who asked this and why?
   b. What kind of a sentence is this?
   c. What is meant by **light a fire**?
   d. Did Mother agree to light a fire? Why?
2. *Don't tell anyone. If Mother asks, tell her I am playing at mines.*
   a. Who said this and to whom?
   b. What does the speaker mean by **If Mother asks**...?
   c. What kind of activity is referred to here as **playing at mines**?
   d. Why do you think the speaker does not want anyone to know about his adventure?

D. Think and answer.

Did Peter know that what he was doing was wrong? Give reasons for your answer.

Language in Use

Adjectives

We have learnt that adjectives, or describing words, are of many kinds.

Qualitative adjectives describe the qualities of a person, place, thing or idea.

Example:

A **brilliant** idea for climbing **high** mountains occurred to me on a **quiet** day.

Quantitative adjectives talk about the number or quantity of something, place, person or idea.

Example:

I have **some** money, but not **enough**.

Demonstrative adjectives modify a noun and point out the noun that is being talked of.

Example:

These shoes are one size small.

Possessive adjectives modify a noun to show some form of possession.

Example:

My shoes are nice, but **his** shoes are as good.

A. Underline the adjectives in the following sentences and identify the types.

1. This house was built by Jack.

   .....

2. Jack was an excellent architect.

   .....

3. My granny is a unique woman.

   .....

4. My grandfather is strict and often becomes furious.

   .....

5. The shocking news of the plane crash left us dumbfounded.

   .....

Interrogative Adjectives

Read the following sentences

- **Which** road must we take to reach the camp?
- **What** business do you recommend?
- **Whose** turn is it to pay for the food?

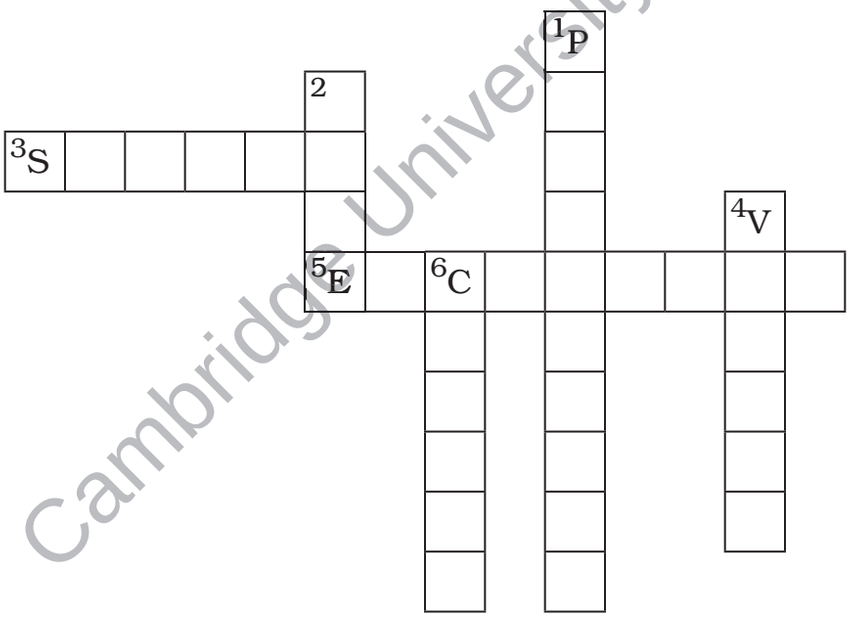
The three words highlighted above are interrogative adjectives. They refer to the noun that immediately follows them, while asking a question. The three interrogative adjectives are **whose**, **what** and **which**.

B. Use the appropriate interrogative adjective to fill in the blanks.

1. ..... time does your watch show?
2. ..... dessert would you like to have?
3. ..... name is at the bottom of the list?
4. ..... mountains have you climbed?
5. ..... score have you managed in the test?

Word Power

Look at the clues and solve the crossword puzzle.



Across

3. a trip to see wild animals
5. a short journey for pleasure usually involving a group of people

Down

1. a journey to a holy place for religious reasons
2. a long walk in the country
4. a long journey by sea or in space
6. a journey by sea as a vacation

Dictionary Work

And bring the Roman chariot. **A chariot was an open vehicle with two wheels, pulled by horses. It was used in ancient times in battle and for racing. Look at the following list of vehicles used in the past. Consult a dictionary and find out what they were.**

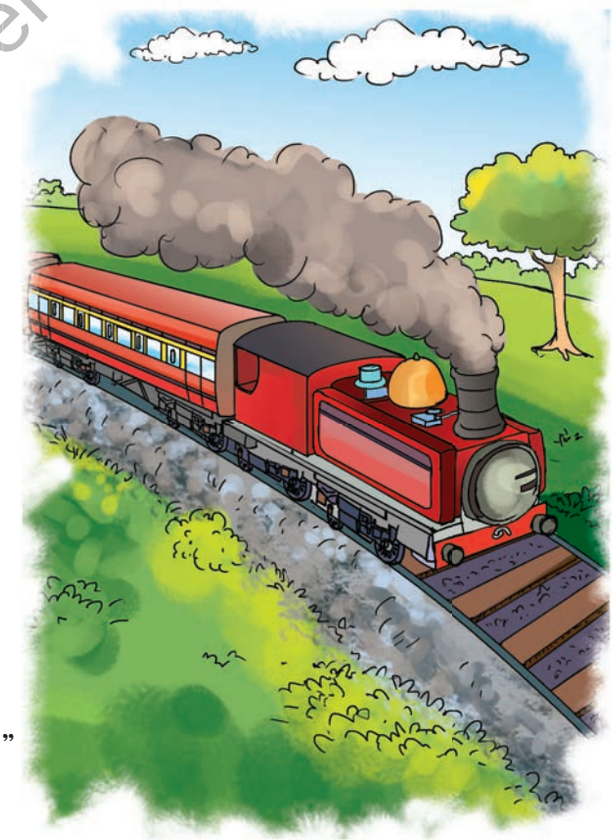
1. hansom 2. chaise 3. coupe 4. trap 5. victoria

Listening and Speaking

A. Listen to a short poem and fill in the missing words.

When you travel on a railway,
And the line goes up a hill,
Just listen to the engine
As it pulls you with a …….
Though it goes so very slowly
It sings this little …….
"I think I can, I think I can,"
And so it goes …….

But later on the …….
When you're going down a hill,
The train requires no pulling,
And the engine's singing still.
If you listen very …….
You will hear this little song,
"I ……. I could, I thought I could,"
And so it speeds along.



B. Have you travelled by train? How did you feel? Discuss your feelings if you have travelled by other means of travel.

Writing

A. The scene on a railway platform is always changing. Imagine spending a whole day and night on a busy railway platform. Write about your imagined experience.

B. In Indian trains, vendors are allowed to board trains and sell their wares. Imagine you are one such vendor. Write a story about your life selling things on a train.

Activity

Find out all about the Indian Railways in the hills and make a chart using the information.

4 The Clothesline

Charlotte Druitt Cole

Warm-up

Look at the following pictures. Can you think of these objects as something else? For example, a pencil can be a flute or a plane. Work in pairs.




Hand in hand they dance in a row,
Hither and thither, and to and fro,
Flip! Flap! Flop! and away they go—
Flutt'ring creatures as white as snow,
Like restive horses they caper and prance;
Like fairytale witches they wildly dance;
Rounded in front, but hollow behind,
They shiver and skip in the merry March wind.
One I saw dancing excitedly,
Struggling so wildly till she was free,
Then, leaving pegs and clothesline behind her,
She flew like a bird, and no one can find her.
I saw her gleam, like a sail, in the sun,

flutt'ring: fluttering; shaking in the breeze
restive: restless
caper: to run and jump about in an energetic way
prance: to take small, quick steps and raise the legs higher than necessary
pegs: small hooks or clips that prevent the wet clothes put on a clothesline from dropping

Flipping and flapping and flopping for fun.
Nobody knows where she now can be,
Hid in a ditch, or drowned in the sea.
She was my handkerchief not long ago,
But she'll never come back to my pocket, I know.

The first line on this page is an example of **alliteration**, which is the repetition of consonant sounds in a line for musical effect.

Little is known about this poet though her poems are such wonderful creations. Her poems have been found in a number of children's anthologies in the early twentieth century.

Comprehension

A. Answer in a word or two.

1. What kind of weather do you think it is?
2. What is hanging on the clothesline?
3. What is their colour?

B. Identify the line in the poem which says that

1. the clothes are like human dancers.
2. the clothes are like animals.
3. the clothes are like someone who has magical powers.

C. Read the lines and answer the questions with reference to the context.

1. *Rounded in front, but hollow behind*
   They shiver and skip in the merry March wind.
   a. What is being talked about?
   b. Why are they **rounded in front, but hollow behind**?
   c. Do you think they enjoy the wind?

flipping: turning over quickly one or more times
flapping: waving about (as if moving wings like a flying bird)
flopping: falling or dropping heavily

2. *Struggling so wildly till she was free,*
   a. Who is being referred to as **she** here?
   b. What was she struggling against?
   c. Why do you think she wanted to be free?

D. Answer in your own words.

1. Did you like the poem? Why?
2. Binomial expressions are pairs of words joined by **and** that always go together. Pick out the binomial expressions from the poem.

Appreciation

A **simile** is a figure of speech that shows similarities between two things that are very different from each other. A simile uses connecting words such as **like** or **as** to make comparisons.

Example:

Flutt'ring creatures **as white as snow**

Here the whiteness of the clothes is compared to that of snow.

A. How many such similes can you find in the poem?

B. Which simile did you like the best? Why?

We all know that clothes are inanimate. Yet the poet writes as if the clothes are alive, and that they act or do things like human beings. For example, they can dance, shiver, skip, struggle, etc.

Sometimes we speak about inanimate objects, or animals and plants, as if they have human qualities. This is known as **personification**.

C. How many instances of personification can you find in the poem?

D. Humans are supposed to have five senses—touch, taste, smell, hearing and sight.

How many of these senses have been used in this poem? Fill in the grid below with five examples of each from the poem.

Senses	
Sight	**Hearing**
image of people dancing	
.....	.....
.....	.....
.....	.....
.....	.....
	.....

Writing

A. The poet uses many poetic devices in the poem to create a lively description of the clothes on a clothesline on a windy day. Can you use some of the devices and write a description of trees on a stormy day?

B. Write about some sight that you remember and wish to share with others. It could be in the form of a story or even a poem.

Activity

Make as many words as you can, with four or more letters, using the letters in the words **handkerchief** or **clothesline**.

Give yourself two points for each four-letter word, four points for each five-letter word, six for each six-letter word and ten points for words with seven letters or more. Write all the words with five or more letters on paper sheets and hang them on a 'word line' in your classroom.

5 A Surprise!

Louisa May Alcott

Warm-up

What do you think of when you look at the following pictures? Discuss in pairs.




Jo sat on the old sofa, writing busily, with her papers spread out upon a trunk before her. Scrabble, the pet rat, strolled on the beams overhead, accompanied by his oldest son. Jo scribbled away till the last page was filled. Then she signed her name with a flourish and threw down her pen, exclaiming:

"There, I've done my best! If this won't suit I shall have to wait till I can do better."

Lying back on the sofa, she read the manuscript carefully through,

manuscript: the original version of a book or article before it is printed

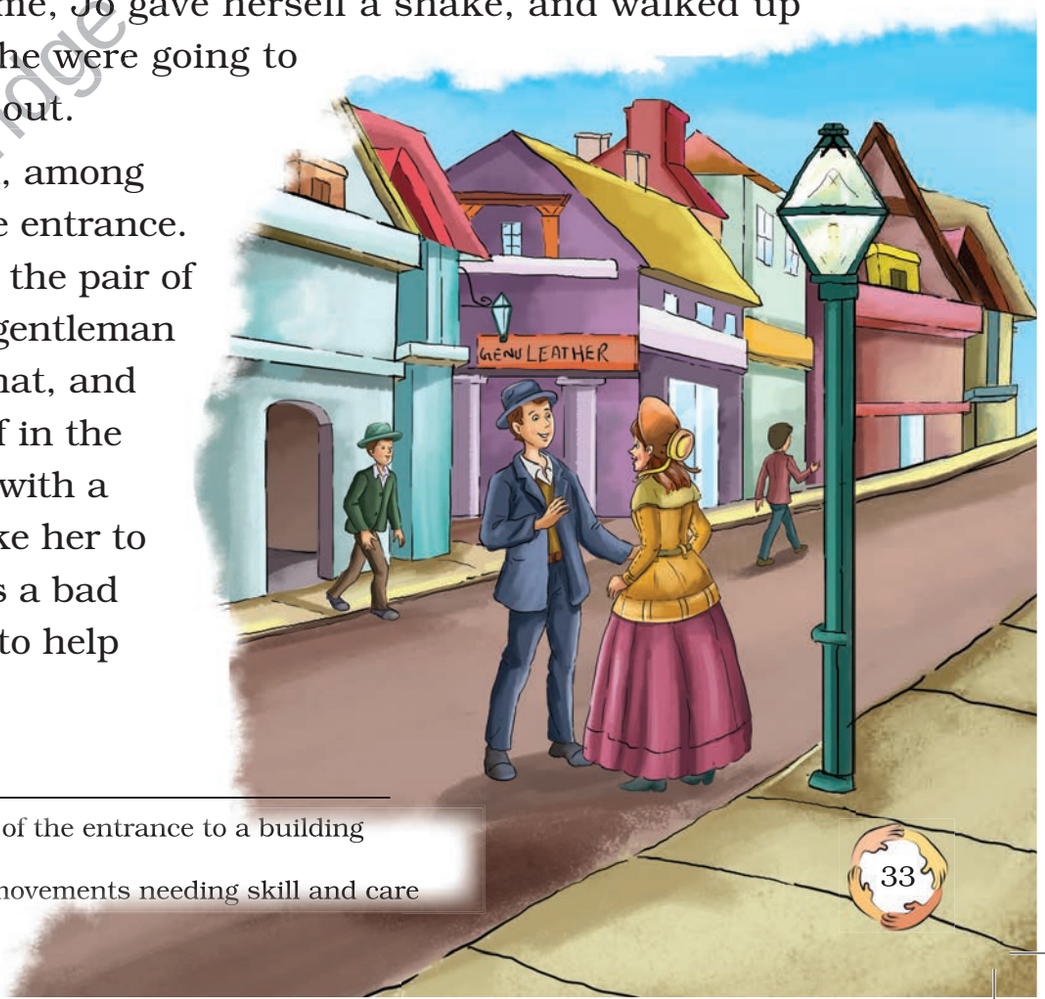
making dashes here and there, and putting in many exclamation points, which looked like little balloons. Then she tied it up with a smart red ribbon, and sat a minute looking at it with a wistful expression. Then, Jo picked up another manuscript from her desk and, putting both in her pocket, crept quietly downstairs.

Has the meaning of **manuscript** remained unchanged over the years?

She put on her hat and jacket as noiselessly as possible and, going to the back-entry window, got out upon the roof of a low porch, swung herself down to the grassy bank, and took a roundabout way to the road. Once there, she composed herself, hailed a passing omnibus, and rolled away to town, looking very merry and mysterious.

On alighting, she went off at a great pace till she reached a certain number in a certain busy street. Having found the place with some difficulty, she went into the doorway, looked up the dirty stairs and, after standing stock still a minute, suddenly dived back into the street and walked away as rapidly as she came. This manoeuvre she repeated several times, to the great amusement of a black-eyed young gentleman lounging in the window of a building opposite. On returning for the third time, Jo gave herself a shake, and walked up the stairs, looking as if she were going to have all her teeth pulled out.

There was a dentist's sign, among others, which adorned the entrance. After staring a moment at the pair of artificial jaws, the young gentleman put on his coat, took his hat, and went down to post himself in the opposite doorway, saying with a smile and a shiver, "It's like her to come alone, but if she has a bad time she'll need someone to help her home."



porch: a covered structure in front of the entrance to a building
omnibus: (old usage) same as bus
manoeuvre: a movement or set of movements needing skill and care

In ten minutes Jo came running downstairs with a very red face and the general appearance of a person who had just passed through a trying ordeal of some sort. When she saw the young gentleman she looked anything but pleased, and passed him with a nod. But he followed, asking with an air of sympathy, "Did you have a bad time?"

"Not very."

"You got through quickly."

"Yes, thank goodness! You'll not say anything about it at home, will you?"

"Not a word."

"Well, I've left two stories with a newspaperman, and he's to give his answer next week," whispered Jo, in her confidant's ear.

"Hurrah for Miss March, the celebrated American author!" cried Laurie, throwing up his hat and catching it again.

"Hush! It won't come to anything, I dare say, but I couldn't rest till I had tried, and I said nothing about it because I didn't want anyone else to be disappointed."

"It won't fail. Why, Jo, your stories are works of Shakespeare compared to half the rubbish that is published every day. Won't it be fun to see them in print, and shan't we feel proud of our author?"

Jo's eyes sparkled, for it is always pleasant to be believed in, and a friend's praise is always sweeter than a dozen newspaper puffs.

Shakespeare: A great playwright and actor in the English language. What is the mystery surrounding him?

For a week or two, Jo behaved so queerly that her sisters were quite bewildered. She rushed to the door when the postman rang, was rude to Mr Brooke whenever they met, would sit looking at Meg with a woe-begone face. Laurie and she were always making signs to one another, and talking about 'Spread Eagles' till the girls declared they had both lost their wits.

"What shall we do with that girl? She never will behave like a young

---

ordeal: a very unpleasant or difficult situation
confidant: a person you trust and share your feelings and secrets with
queerly: oddly
woe-begone: sad
lost their wits: gone mad

lady," sighed Meg, as she watched Laurie and Jo race in the garden.

"I hope she won't. She is so funny and dear as she is," said Beth, who had never betrayed that she was a little hurt at Jo's having secrets with anyone but her.

In a few minutes Jo bounced in, laid herself on the sofa, and affected to read.

"Have you anything interesting there?" asked Meg, with condescension.

"Nothing but a story; won't amount to much, I guess," returned Jo, carefully keeping the name of the paper out of sight.

"You'd better read it aloud. That will amuse us and keep you out of mischief," said Amy in her most grown-up tone.

"What's the name?" asked Beth, wondering why Jo kept her face hidden behind the sheet.

"The Rival Painters."

"That sounds well. Read it," said Meg.

With a loud "Hem!" and a long breath, Jo began to read very fast. The girls listened with interest, for the tale was romantic, and somewhat pathetic, as most of the characters died in the end. "I like that part about the splendid picture," was Amy's approving remark, as Jo paused.

"Who wrote it?" asked Beth, who had caught a glimpse of Jo's face.

The reader suddenly sat up, cast away the paper, displaying a flushed countenance, and with a funny mixture of solemnity and excitement replied in a loud voice,

"Your sister."

"You?" cried Meg, dropping her work.

"It's very good," said Amy critically.

"I knew it! I knew it! Oh, my Jo, I am so proud!" and Beth ran to hug her sister and exult over this splendid success.

Dear me, how delighted they all were, to be sure! How Meg wouldn't

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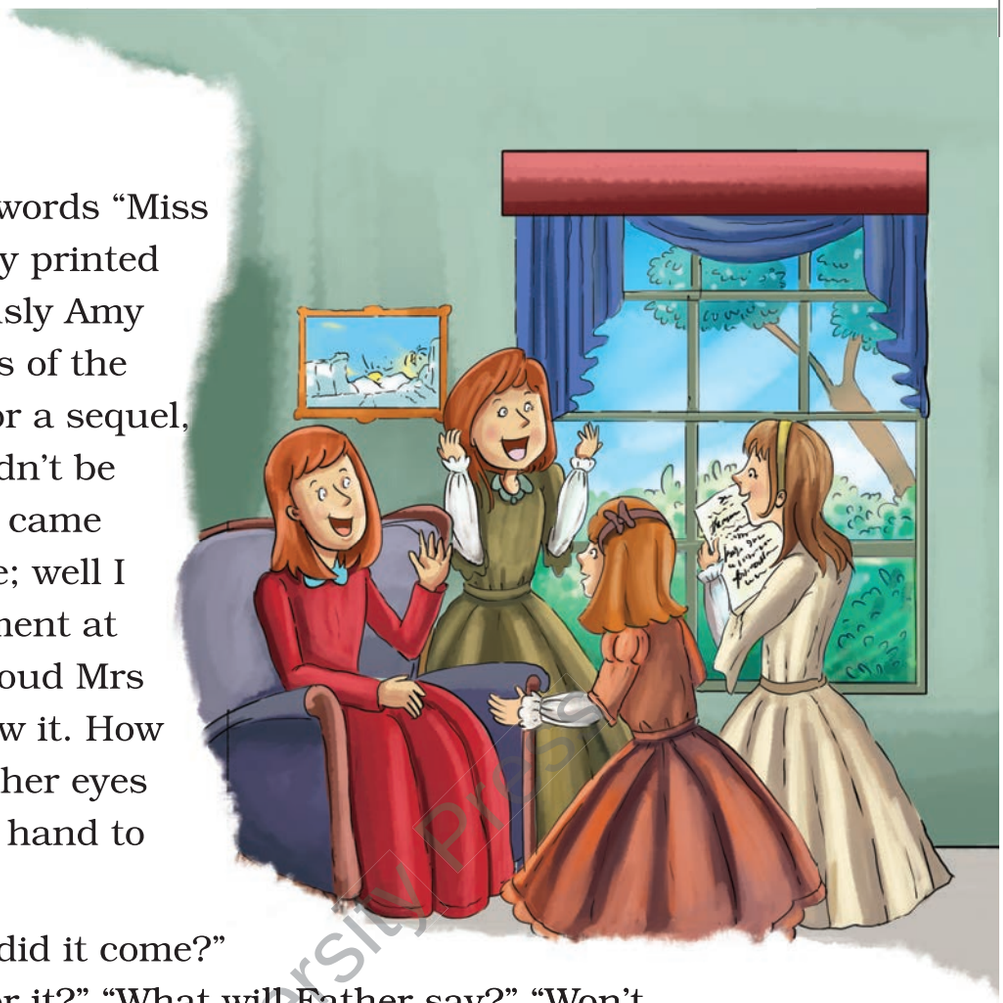
condescension: to treat someone as if you are better or more important than them

solemnity: seriousness



believe it till she saw the words "Miss Josephine March" actually printed in the paper. How graciously Amy criticised the artistic parts of the story, and offered hints for a sequel, which unfortunately couldn't be carried out. How Hannah came in to exclaim, "Sakes alive; well I never!" in great astonishment at "that Jo's doin's". How proud Mrs March was when she knew it. How Jo laughed, with tears in her eyes as the paper passed from hand to hand.

"Tell us about it!" "When did it come?" "How much did you get for it?" "What will Father say?" "Won't Laurie laugh?" cried the family, all in one breath as they clustered about Jo, for these foolish, affectionate people made a jubilee of every little household joy.

"Stop jabbering, girls, and I'll tell you everything," said Jo.

Having told how she disposed of her tales, Jo added, "And when I went to get my answer, the man said he liked them both, but didn't pay beginners, only let them print in his paper, and noticed the stories.

It was good practice, he said, and when the beginners improved, anyone would pay. In time I may be able to support myself and help the girls."

Jo's breath gave out here, and wrapping her head in the paper, she bedewed her little story with a few natural tears, for to be independent and earn the praise of those she loved were the dearest wishes of her heart, and this seemed to be the first step towards that happy end.

About the Author

Louisa May Alcott (1832 – 1888) was an American novelist and poet. She is best known for her novel Little Women *and its sequels* Little Men *and* Jo's Boys. *She also published her works under pseudonyms Flora Fairfield and A M Barnard.* Little Women *is loosely based on her own childhood and the character Jo on herself.*

Can you find the author's picture? Paste it here.

Comprehension

A. Which of the following is the best possible gist of the story? Tick the correct option.

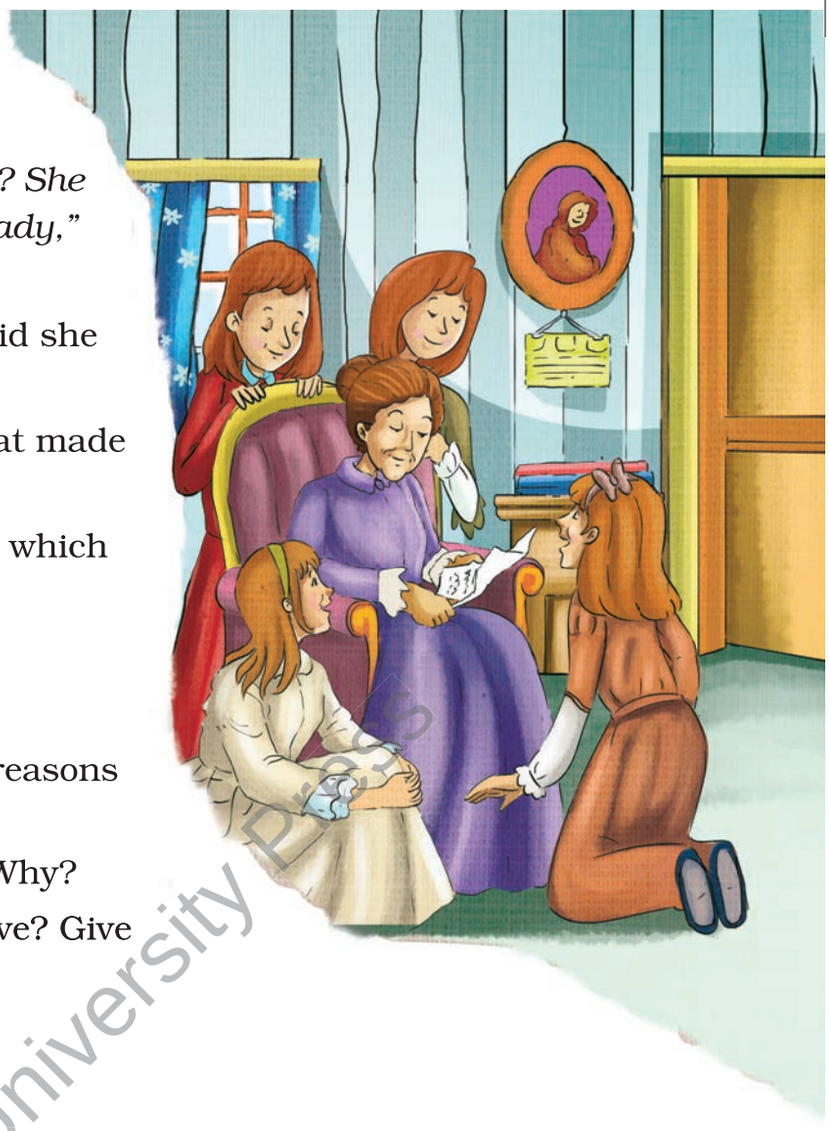
1. Jo March, a budding writer, writes her first story that gets published in a newspaper much to the joy of her family and friends. ☐
2. Jo March writes her first story and goes to the publisher to get it published. Her friend sees her coming out of the office and thinks she had been to the dentist that is on the same floor. ☐
3. Jo March belongs to a close-knit family of four sisters and parents. She writes two stories that she gives to the editor of a newspaper who says they might be published. Jo shares the secret with only her friend who catches her coming out of the newspaper office. After a week, her story gets published much to the joy of herself and her family. ☐

B. Answer briefly.

1. Who is Jo? What did she do? Who was the first person she told about it?
2. Why did Jo not want to disclose her secret to her family?
3. How long did Jo have to wait for the final outcome of her venture?
4. How did Jo's family react to her news?

C. Answer in reference to the context.

1. *"It's like her to come alone, but if she has a bad time she'll need someone to help her home."*
   a. Who said this and about whom? What was their relationship?
   b. What did he assume when he saw **her**?
   c. Was his guess correct? Why not?



2. *"What shall we do with that girl? She never will behave like a young lady," sighed Meg.*
   a. Who is Meg? About whom did she say this?
   b. What was **that girl** doing that made Meg say this?
   c. What things did **that girl** do which were not ladylike according to Meg?

D. Think and answer.

1. What do you think of Jo? Give reasons for your answer.
2. Do you like the March family? Why?
3. What kind of a friend did Jo have? Give reasons for your answer.

Language in Use

Phrases and Clauses

Look at the underlined words in the following sentence.

Jo sat on the old sofa, writing busily, with her papers spread out upon a trunk before her.

1. Do you think this part can stand alone as a sentence? Why not?
2. What role does this part play?

A **phrase** is a group of words that does not make complete sense, but adds to the meaning of a sentence. It does not contain a verb which changes tense.

A phrase, unlike a sentence, does not have a verb which changes tense and so is not a complete expression.

A. Say which of the following are phrases.

1. The moon shines in the sky. ☐
2. into the great wide sea ☐
3. because of the fact ☐

4. Many dogs howled. ☐
5. clear and present danger ☐

Now look at the two parts in the given sentence.

Laurie and she were always making signs to one another, *and talking about 'Spread Eagles' till the girls declared they had both lost their wits.*

The two parts are clauses, which together make up the sentence.

A **clause** is a group of words that includes a subject and a verb which changes tense. It can be a complete sentence or a part of a sentence.

Clauses are made up of phrases.

Every clause has at least two parts: a subject and a verb which changes tense.

Subject	Verb	
Jo	stood looking after	the fawn.
The fawn	ran	away.
The baby	laughed.	

Clauses always have a subject. (Exception: Clauses with imperatives, such as **stop** and **come**, do not have subjects). If there is no subject, **it** or **there** (called **dummy subject**) is used.

Example:

It will rain today.

B. Say whether the underlined part in each sentence is a phrase or a clause.

a. Alice was a little girl who was sitting in a garden with her sister. .....
b. She got bored and just then she saw a rabbit with a waistcoat and a pocket watch hurrying off. .....
c. It was such an unusual sight that Alice followed the rabbit. .....
d. She followed it down a hole and came to a hall that had many doors of all sizes. .....
e. There strange things happened to Alice who ate cakes and drank from bottles to become tall or short. .....

Noun Phrase

Read the following sentences.

- She put on her hat and jacket as noiselessly as possible.

- Then she tied it up with a smart red ribbon.
- A dentist's sign in red pointed towards the doctor's clinic.

Now, answer the following.

1. What did she put on as noiselessly as possible? .....
2. What did she tie it up with? .....
3. What pointed towards the doctor's clinic? .....

In the above sentences, the answers to the questions give us a group of words, each containing a noun (**her hat and jacket**, **a smart red ribbon**, **a dentist's sign in red**) that functions

- as a subject (in sentence 3),
- as an object (in sentence 1), and
- as a prepositional object (in sentence 2).

A group of words in a sentence that functions as a subject, an object or a prepositional object, and does not have a verb which changes tense is known as a **noun phrase**.

A noun phrase consists of a noun or pronoun and any dependent words before or after it.

Examples:

- the large round pumpkin pie
- the monkey sitting on top of the roof

C. Identify whether the underlined words in each sentence are noun phrases.

1. Has anyone seen my black football shorts? ☐
2. The football coach got very upset with his team. ☐
3. He is my favorite football coach. ☐
4. The kids were surprised by the sudden summer rain. ☐
5. All the school children are excited about the hockey match. ☐
6. He picked up the crying child. ☐
7. My sister went to watch the animated film with her best friend. ☐
8. I cheered the home team with great enthusiasm. ☐

Word Power

Look at the word pairs.

wait weight sun son new knew

Words which have the same pronunciation but different spellings and meanings are called **homophones**.

Choose the right words from the brackets to complete the sentences.

1. We cannot be sure ..... the ..... will improve by tomorrow. (weather, whether)
2. I was not ..... to express my thoughts ..... . (aloud, allowed)
3. The accident ..... was the most terrible thing we had ever ..... . (scene, seen)
4. He will not give you any ..... until you give him another ..... of cake. (peace, piece)
5. My aunt ..... me a bottle of my favourite ..... . (sent, scent)

Dictionary Work

An **abbreviation** is the shortened form of a word or a phrase.

Example:

Mr is for **mister**.

Look up a dictionary to find out what the abbreviations stand for.

1. misc. 2. e.g. 3. est. 4. a.m. 5. AD

Listening and Speaking

A. Listen and circle the word with the same vowel sound as the one at the beginning.

1. goat: park, sure, boat
2. tour: cure, rose, how

3. now: roast, few, cow
4. view: pure, new, grow
5. pear: bare, hear, fear

B. Write a long vowel antonym for each of these words.

1. sour: .....
2. hot: .....
3. wet: .....
4. high: .....

C. Listen to the speaker talking about easy steps to remember for writing a short story.

1. Say whether the following are true or false.
   a. Writing a short story is almost the same as writing a novel. .....
   b. There is greater scope of characterisation in a novel. .....
   c. The planning needs to be done before writing the story. .....
2. What do you think? Respond with **yes** or **no**.
   a. The speaker thinks everyone writes stories to get them published. .....
   b. Writing a short story does not really require much planning. .....
   c. The speaker has written short stories. .....

D. Sit in circles of six. Each person throws a dice and completes the sentence stem (given below) corresponding to the number shown on the dice.

1. I have always wanted...
2. Someday I am going to...
3. I get angry when...
4. I feel happy when...
5. The best thing I like about my home is...

Writing

A. Read the beginning of the story given below.

One afternoon Ronny was returning from school when something happened. The roads were empty because it was a hot summer afternoon. Ronny tried to walk in the shade of the tall buildings as far as possible, looking down to avoid the glare of the sun. That's when he bumped into a tall man rushing out of a shop. The man's bag fell on Ronny's left foot. Ouch! It was so heavy. Before Ronny could bend down to pick up the bag, the man snatched it up, glared at Ronny, and then quickly walked away. Ronny was amazed at the man's behaviour. As he watched, the man looked twice over his shoulder as he hurried away. Ronny looked at the shop. It was a jewellery store. As Ronny was wondering why the bag was so heavy...

Now complete the story in your own words. Give a suitable title to your story.

B. Read the story plan given below. Expand the plan into a complete story. Remember to add descriptions of the setting, characters and actions.

Monami moves to a new city—father has transferable job—Monami goes to new school—no friends yet—Mom and Dad work—Monami alone at home—reading a book—door bell rings—strange person standing outside—Monami surprised—person does not talk, uses gestures to introduce himself—takes Monami to roof—a two-seater flying vehicle—Monami and person get inside—see the city from above

Activity

Can you find the names of six popular writers in this grid?

A	A	M	I	L	N	E	N	G	S
B	C	E	R	R	A	H	B	E	T
R	O	A	L	D	D	A	H	L	O
E	N	I	D	B	L	Y	T	O	N
J	K	R	O	W	L	I	N	G	X
R	U	S	K	I	N	B	O	N	D
L	E	O	T	O	L	S	T	O	Y

Language in Use

Worksheet 1

Complete the table below with the correct comparative and superlative forms of adjectives, and mention if the adjectives are regular or irregular.

Adjective	Comparative	Superlative	Regular or Irregular
1. bad			
2. happy			
3. well	better		

Word Power

Write the antonyms of these words.

1. kindly .....
2. quiet .....
3. small .....
4. dull .....
5. foes .....

Writing

A. Write a short story based on the following hints:

A young girl comes to the city from her village—how she sees the city—she gets cheated by someone—she is alone and lost—someone helps her—she can find her way back to her village

B. Secret places are so much fun. Do you have a secret place in your house or your neighbourhood? Do you have a friend who shares this secret with you? Write a paragraph about such a secret location such as a room, an attic, a spot under a staircase, a place in the garden or the woods.

Language in Use

Worksheet 2

A. Underline the adjectives in the following sentences and write what type of adjectives they are.

1. The old lady participated in the marathon. .....
2. The third house in the lane is mine. .....
3. My bag is too heavy. .....
4. This story is the most interesting of all. .....

B. Say whether the following are phrases (P) or clauses (C).

1. in the market .....
2. Arun went for a walk .....
3. the talented dancer .....

Word Power

Choose the correct words from the pairs of homophones to complete the paragraph.

I had once written a lovely (story/storey). It was a fantastic (tail/tale) of fairies and goblins hosting a (ball/bawl). I showed it to (our/hour) teacher, (who's/whose) eyes became rather big after she (read/red) it.

_____

_____

_____

_____

_____

Writing

Write a letter to your best friend describing a scene that you saw very briefly from the window of a train. You were impressed by this scene although it lasted a short while. Give details of what the scene was, why it impressed you, and why it continues to stay with you.

Sample Test Paper

Comprehension

Read the passage and answer the following questions.

She put on her hat and jacket as noiselessly as possible and, going to the back-entry window, got out upon the roof of a low porch, swung herself down to the grassy bank, and took a roundabout way to the road. Once there, she composed herself, hailed a passing omnibus, and rolled away to town, looking very merry and mysterious.

On alighting, she went off at a great pace till she reached a certain number in a certain busy street. Having found the place with some difficulty, she went into the doorway, looked up the dirty stairs and, after standing stock still a minute, suddenly dived into the street and walked away as rapidly as she came. This manoeuvre she repeated several times, to the great amusement of a black-eyed young gentleman lounging in the window of a building opposite. On returning for the third time, Jo gave herself a shake, and walked up the stairs, looking as if she were going to have all her teeth pulled out.

There was a dentist's sign, among others, which adorned the entrance. After staring a moment at the pair of artificial jaws the young gentleman put on his coat, took his hat, and went down to post himself in the opposite doorway, saying with a smile and a shiver, "It's like her to come alone, but if she has a bad time she'll need someone to help her home."

In ten minutes Jo came running downstairs with a very red face and the general appearance of a person who had just passed through a trying ordeal of some sort. When she saw the young gentleman she looked anything but pleased, and passed him with a nod. But he followed, asking with an air of sympathy, "Did you have a bad time?"

"Not very."

"You got through quickly."

"Yes, thank goodness! You'll not say anything about it at home, will you?"

"Not a word."

"Well, I've left two stories with a newspaperman, and he's to give his answer next week," whispered Jo, in her confidant's ear.

1. Why did Jo go into town?

   .....

2. Why did she leave her house in a strange manner?

   .....

3. Who observed her going to the newspaperman's office? What did he think and why?

   .....

Language in Use

Say whether the underlined groups of words are noun phrases or not.

1. He <u>wished to talk</u> to his children during his illness. .....
2. <u>The kind lady</u> loves bringing food to the needy. .....
3. <u>The old dog</u> wanted to bite me. .....
4. <u>Nilima hates</u> having to wait for so long. .....
5. <u>I prefer fresh fruit juice</u> to chocolate milkshake. .....

Word Power

Choose the correct words from the pairs of homophones to complete the sentences.

1. I did not _____(except/accept) the gift because it looked expensive.
2. Eating junk food _____ (effects/affects) your health,
3. The teacher asked the students to read _____(aloud/allowed) the story.
4. I did not _____ (brake/break) the vase.
5. The _____ (principle/principal) of our school is very strict.

Writing

Have you ever been appreciated for your work? Write about it. What did you do that won praise from others? How did they show their appreciation? How did you feel at that moment?

Mathematics

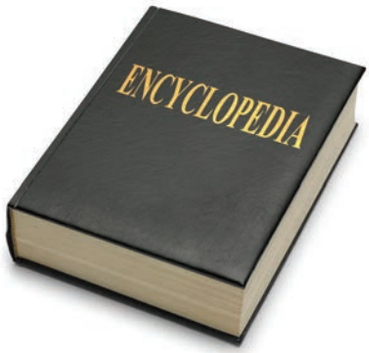
1 Numbers

warm-up

Caps of some pens have been mixed up. Help in matching the pens with their caps by colouring them alike.

Greatest 5-digit number	1,00,000
Smallest 6-digit number	55,006
3,00,000 + 5,000 + 60 + 9	5,000
Face value of 5 in 3,04,567	3,05,069
Numeral for fifty-five thousand six	99,999
Place value of 5 in 45,672	5

Numbers



Do you know encyclopedia is a book or a set of books containing many articles arranged in alphabetical order.

Note that the text printed on 136 pages of an encyclopedia contains approximately 1000000 characters excluding the spaces.

But what is 1000000? This is the smallest 7-digit number which is obtained by adding 1 to the greatest 6-digit number, 999999.

Similarly, 10000000 is the smallest 8-digit number which is obtained by adding 1 to the greatest 7-digit number, 9999999 and 100000000 is the smallest 9-digit number which is obtained by adding 1 to the greatest 8-digit number, 99999999 and so on.

Indian System of Numeration

To make reading easy, the digits are grouped into different periods or categories.

Crores period		Lakhs period		Thousands period		Ones period		
Ten Crores (TC)	Crores (C)	Ten Lakhs (TL)	Lakhs (L)	Ten Thousands (Th)	Thousands (T)	Hundreds (H)	Tens (T)	Ones (O)

Here, the ones, tens and hundreds digits are grouped together to form the Ones period. The thousands and ten thousands digits are grouped together to form the Thousands period. The lakhs and ten lakhs digits are grouped together to form the Lakhs period. The crores and ten crores digits are grouped together to form the Crores period.

Use of Commas

When a number is written, each period is separated by commas. These commas are used to separate the periods which help us to recognise the numbers and read them.

For example, the digits in 3437925 can be separated by putting commas as 34,37,925 and it is read as thirty-four lakh thirty-seven thousand nine hundred twenty-five.

Similarly, 94793021 can be separated by putting commas as 9,47,93,021 and it is read as nine crore forty-seven lakh ninety-three thousand twenty-one.

And, 507391631 can be separated by putting commas as 50,73,91,631 and it is read as fifty crore seventy-three lakh ninety-one thousand six hundred thirty-one.

Mental Maths

Complete the following table.

Numbers	Number names
10,00,00,000	Ten crores
20,00,00,000	.....
.....	.....
.....	.....
.....	.....
.....	Sixty crores
.....	.....
80,00,00,000	.....
.....	.....

Let's Practice 1.1

1. Complete the following number series.

a.	2,86,35,296				2,86,35,300
b.		15,27,30,182			15,27,30,185
c.					13,25,500
d.			12,37,28,020		
e.		59,25,200			
f.					1,69,83,000

2. Insert commas according to the Indian system of numeration. Also, write these numbers in words.

a. 2831642 b. 6288537 c. 57736273

d. 10012397 e. 908800459 f. 315628132

3. Write the following numerals.

   a. Two crore thirty-eight thousand six hundred twenty-two

   b. Twenty-six lakh ninety-nine thousand four hundred thirty-five

   c. Seventy-six crore three

   d. Ninety crore ninety-five lakh ninety-nine thousand ninety-nine

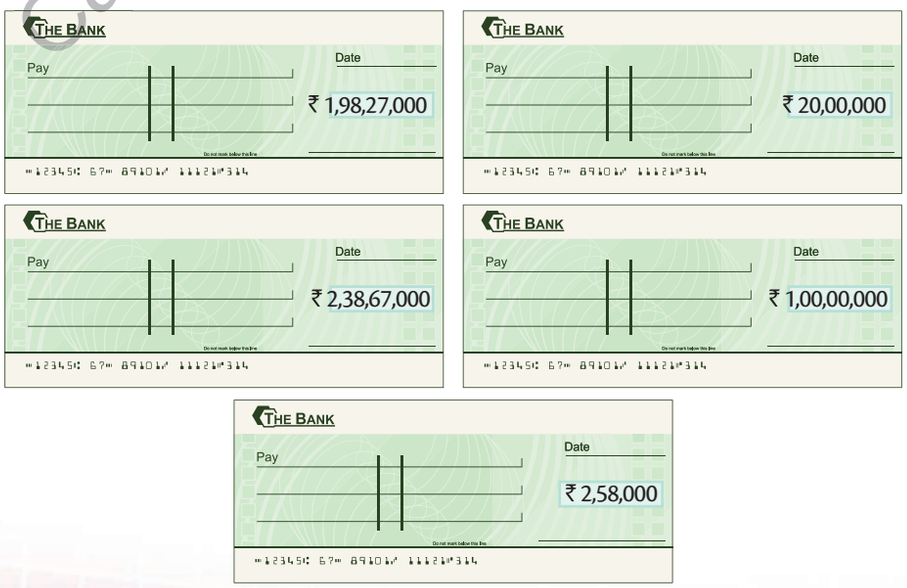
   e. Eighty-five lakh forty-two thousand seventy-two

   f. Sixty-four crore seventy-five thousand two hundred thirty-nine

4. Write the numbers in the place value chart.

Numbers	Crores		Lakhs		Thousands		Ones		
	Ten Crores	Crores	Ten Lakhs	Lakhs	Ten Thousands	Thousands	Hundreds	Tens	Ones
30,90,113									
1,21,29,409									
13,02,03,040									
90,70,65,040									
9,94,01,002									
42,18,10,021									

5. Mr Sinha has a toy manufacturing factory. At the end of every month, he makes payments by cheques for the raw material purchased. At the end of November, he filled an amount on the following cheques. But he forgot to write the amount in words. Complete these cheques.



Place Value and Face Value

The **place value** of a digit is represented by its place (or position) in the number.

For example, place value of 9 in 19,28,453 is 9,00,000 or 9 lakhs.

Place value of 6 in 6,28,39,450 is 6,00,00,000 or 6 crores.

Place value of 7 in 19,23,45,718 is 700 or 7 hundreds.

Face value of a digit is the digit itself.

For example, face value of 9 in 19,28,453 is 9.

Face value of 6 in 6,28,39,450 is 6.

Face value of 7 in 19,23,45,718 is 7.

Expanded and Standard Form

Expanded form of numbers is the sum of the place values of all the digits of the number.

For example, expanded form of 6,39,42,529 is $6 \times 1,00,00,000 + 3 \times 10,00,000 + 9 \times 1,00,000 + 4 \times 10,000 + 2 \times 1,000 + 5 \times 100 + 2 \times 10 + 9 \times 1$ or $6,00,00,000 + 30,00,000 + 9,00,000 + 40,000 + 2000 + 500 + 20 + 9$.

The reverse of the expanded form is known as the short form or standard form. When we write a number for the given expanded form, it is called its short form or standard form.

For example, short form or standard form of $5 \times 10,00,00,000 + 7 \times 1,00,000 + 6 \times 10,000 + 4 \times 1,000 + 3 \times 100 + 9 \times 10 + 6$ is 50,07,64,396.

Let's Practice 1.2

1. Write the place value and face value of the underlined digits in the following numbers.

   a. 12,6<u>8</u>,56,494 b. <u>6</u>,28,15,219 c. 11,25,5<u>1</u>0

   d. 5,1<u>9</u>,36,211 e. <u>1</u>5,28,13,205 f. 1<u>7</u>,45,392

2. Find the difference between the place value and face value of the underlined numbers.

   a. 12,22,<u>3</u>68 b. 3<u>4</u>,26,210 c. 1,23,12,51<u>9</u>

   d. 3<u>8</u>,68,990 e. 1,<u>3</u>1,25,138 f. <u>3</u>,42,69,397

3. Write the following numbers in the expanded form.

   a. 12,38,67,299 b. 30,49,25,608 c. 41,29,35,672

   d. 14,29,009 e. 14,78,293 f. 29,99,284

4. Write the following expanded forms in standard forms.

   a. $6 \times 10,00,00,000 + 6 \times 1,00,00,000 + 5 \times 10,00,000 + 8 \times 1,00,000 + 9 \times 10,000 + 7 \times 1,000 + 5 \times 100 + 9 \times 10 + 9 \times 1$

   b. $3 \times 10,00,00,000 + 5 \times 1,00,00,000 + 0 \times 10,00,000 + 7 \times 1,00,000 + 8 \times 10,000 + 0 \times 1,000 + 2 \times 100 + 5 \times 10 + 8 \times 1$

   c. $4 \times 10,00,00,000 + 2 \times 1,00,00,000 + 0 \times 10,00,000 + 1 \times 1,00,000 + 1 \times 10,000 + 0 \times 1,000 + 8 \times 100 + 6 \times 10 + 5 \times 1$

   d. 4 crores + 3 lakhs + 6 thousands + 2 hundreds + 6 tens + 9 ones

   e. 8 ten crores + 4 lakhs + 2 ten thousands + 5 hundreds + 8 ones

   f. 6,00,00,000 + 9,00,000 + 80,000 + 6,000 + 300 + 20 + 7

Comparing Numbers

To compare two or more numbers, proceed as follows.

Step 1: The number with more digits is greater.

Step 2: If the number of digits are equal, then compare the first digit from the left.

Step 3: If the first digits from the left are equal, then compare the second digits from the left.

Continue like this and keep comparing the digits until you get the greater number.

Example: Compare the following numbers using > or < sign.

a. 12,86,493 or 2,13,74,299 b. 13,58,19,267 or 96,00,00,000 c. 6,54,23,199 or 6,54,23,198

Solution: Let's compare.

a. 12,86,493 is a 7-digit number and 2,13,74,299 is a 8-digit number, so, the 8-digit number is greater than the 7-digit number.

   Thus, 2,13,74,299 > 12,86,493

b. Both the numbers are 9-digit numbers, so let us compare their digits from the left to right.

   Comparing ten crores digits, we get 1 < 9.

   Thus, 13,58,19,267 < 96,00,00,000

c. Both the numbers have 8 digits. So, let us compare their digits from the left to right.

   Crores digit in both the numbers is 6.

   Ten lakhs digit in both the numbers is 5.

   Lakhs digit in both the numbers is 4.

   Ten thousands digit in both the numbers is 2.

   Thousands digit in both the numbers is 3.

   Hundreds digit in both the numbers is 1.

   Tens digit in both the numbers is 9.

   Now, comparing ones digit, we get 9 > 8.

   Thus, 6,54,23,199 > 6,54,23,198

Ascending and Descending Orders

Ascending order means arranging numbers from the smallest to the greatest. For example, the numbers 13,88,15,290; 6,99,00,732; 14,13,19,868 and 9,00,59,280 can be arranged in ascending order as 6,99,00,732 < 9,00,59,280 < 13,88,15,290 < 14,13,19,868.

Descending order means arranging numbers from the greatest to the smallest. For example, the numbers 20,03,41,289; 3,54,28,192; 13,28,593 and 9,29,54,454 can be arranged in descending order as 20,03,41,289 > 9,29,54,454 > 3,54,28,192 > 13,28,593.

Formation of the Greatest and the Smallest Numbers

To form the greatest number using the given digits, arrange the digits in descending order and to form the smallest number using the given digits, arrange the digits in ascending order.

Example 1: Form the smallest and the greatest 7-digit number using the digits 6, 7, 0, 9, 3, 1, 8, without repeating the digits.

Solution: The smallest 7-digit number formed using the given digits is 10,36,789.

The greatest 7-digit number formed using the given digits is 98,76,310.

Example 2: Form the smallest 9-digit number using the digits 4, 2, 0, 1, 5, 8, 3, 9, when repetition of the digits is allowed only once.

Solution: The smallest 9-digit number that can be formed using the given digits is 10,02,34,589.

Active Maths

Forming the Smallest and the Greatest Numbers

You can play this game with your friends. Take number cards from 0 to 9. Shuffle these cards and pick any 5 cards to form the greatest 7-digit number using the numbers that you just picked repeating the digits only once.

Now, note down the number of thousands in this number and write it as your score.

Then the other player will repeat this process after shuffling the cards again. The player who has a higher score, wins.

[For example, assume that 5 cards drawn are 1, 0, 5, 9, 4. Then the greatest 7-digit number that can be made using these digits is 99,55,410. This number has 5 thousands. So, the score is 5.]

Play this game with as many friends as you want and enjoy.

Let's Practice 1.3

1. Compare the following numbers using >, <, or = sign.

   a. 6,83,19,273 ☐ 83,19,273

   b. 3,00,00,000 ☐ 9,00,00,000

   c. 68,46,39,193 ☐ 9,99,99,999

   d. 36,14,259 ☐ 36,14,259

   e. 90,80,70,600 ☐ 89,81,71,601

   f. 43,93,22,176 ☐ 63,22,94,248

2. Arrange the following numbers in ascending order.

   a. 21,36,298; 39,44,599; 25,31,990; 68,22,490 and 30,41,709

   b. 2,15,16,758; 5,19,68,752; 3,21,16,177; 19,21,38,459 and 10,15,26,359

   c. 1,16,94,133; 2,99,99,999; 10,00,00,000; 1,70,00,009 and 15,90,60,351

   d. 6,39,41,239; 16,44,593; 60,13,24,432; 18,29,42,615 and 3,88,19,279

   e. 6,09,09,009; 9,06,06,006; 30,06,06,006; 9,03,03,003 and 6,03,03,003

3. Arrange the following numbers in descending order.

   a. 21,34,29,682; 41,28,13,685; 5,29,99,206 and 13,25,68,791

   b. 31,19,26,482; 89,61,28,299; 54,16,19,119 and 47,19,84,090

   c. 76,45,00,089; 64,14,19,201; 12,68,192 and 5,23,96,000

   d. 8,49,77,299; 13,44,688; 3,84,19,500 and 7,01,62,545

   e. 66,66,66,666; 5,55,55,555; 33,33,33,333 and 44,44,444

4. Form the smallest and the greatest 7-, 8-, or 9-digit number, without repeating the digits.

   a. 9, 0, 8, 2, 3, 7, 4

   b. 1, 2, 3, 4, 5, 6, 7, 8

   c. 0, 9, 8, 7, 6, 5, 4, 3

5. Form the smallest 8-digit number by repeating the digits only once.

   a. 5, 4, 1, 0, 6, 9, 6

   b. 2, 3, 7, 6, 9, 1, 4

   c. 1, 0, 8, 7, 6, 4, 2

6. Form the greatest 7-digit number by repeating the digits only once.

   a. 6, 5, 7, 8, 9, 2 b. 1, 0, 4, 2, 5, 6 c. 3, 1, 0, 4, 9, 8

Rounding Off Numbers

To round off a number to the nearest 10s, check the ones digit.

To round off a number to the nearest 100s, check the tens digit.

To round off a number to the nearest 1000s, check the hundreds digit.

Rule of rounding off: If the digit is less than 5, then make that digit and digits on its right (if any) zero. If the digit is 5 or more than 5, then make it and all the digits on its right zero and add 1 to the digit on its left.

Example: Round off the following numbers.

a. 2,68,19,536 to the nearest 10s
b. 3,25,20,104 to the nearest 10s
c. 16,44,38,129 to the nearest 100s
d. 40,98,35,681 to the nearest 100s
e. 69,28,13,298 to the nearest 1000s
f. 25,38,19,508 to the nearest 1000s

Solution: a. To round off a number to the nearest 10s, check its ones digit. Here, the ones digit is 6, which is greater than 5.

So, make the ones digit zero and add 1 to the tens digit. Thus, the number 2,68,19,536 rounded off to the nearest 10s is 2,68,19,540.

b. To round off a number to the nearest 10s, check its ones digit. Here, the ones digit is 4 which is less than 5, so make the ones digit zero.

Thus, the number 3,25,20,104 rounded off to the nearest 10s is 3,25,20,100.

c. To round off a number to the nearest 100s, check its tens digit. Here, the tens digit is 2 which is less than 5, so make the tens and ones digits zero.

Thus, the number 16,44,38,129 rounded off to the nearest 100s is 16,44,38,100.

d. To round off a number to the nearest 100s, check its tens digit. Here, the tens digit is 8 which is greater than 5, so make the tens and ones digits zero and also add 1 to the hundreds digit.

Thus, the number 40,98,35,681 rounded off to the nearest 100s is 40,98,35,700.

e. To round off a number to the nearest 1000s, check its hundreds digit. Here, the hundreds digit is 2, which is less than 5. So, make the hundreds, tens and ones digits zero.

Thus, the number 69,28,13,298 rounded off to the nearest 1000s is 69,28,13,000.

f. To round off a number to the nearest 1000s, check its hundreds digit. Here, the hundreds digit is 5, which is equal to 5, so make hundreds, tens and ones digits zero and add 1 to the thousands digit.

Thus, the number 25,38,19,508 rounded off to the nearest 1000s is 25,38,20,000.

Let's Practice 1.4

1. Round off the following numbers to the nearest 10s.
   a. 4,38,67,999 b. 39,45,20,917 c. 24,10,09,108
   d. 1,29,38,421 e. 3,33,45,293 f. 3,26,00,534
2. Round off the following numbers to the nearest 100s.
   a. 6,29,38,505 b. 2,15,28,296 c. 3,44,11,281
   d. 25,39,84,672 e. 66,20,00,099 f. 60,06,50,050
3. Round off the following numbers to the nearest 1000s.
   a. 1,38,24,690 b. 24,39,042 c. 16,25,915
   d. 13,42,59,731 e. 6,27,00,319 f. 40,00,00,900

International System of Numeration

As we have studied about the Indian system of numeration, let us now have a look at another numeration system, i.e., the International system of numeration.

Millions period			Thousands period			Ones period		
Hundred Millions (HM)	Ten Millions (TM)	Millions (M)	Hundred Thousands (HTh)	Ten Thousands (TTh)	Thousands (Th)	Hundreds (H)	Tens (T)	Ones (O)

In International system of numeration, just like the Indian system, ones, tens and hundreds are placed under the Ones period. Thousands, ten thousands and hundred thousands (i.e., lakhs in Indian system) are placed under the Thousands period. Millions, ten millions and hundred millions (i.e., crores in Indian system) are placed under the Millions period.

Here also, we use commas to separate periods, that is, every period has three places and we place commas to separate each period. For example, 156293401 will be written as 156,293,401 and is

read as one hundred fifty-six million two hundred ninety-three thousand four hundred one.

Let us now look at the Indian and International place value chart.

Ten Crores (TC)	Crores (C)	Ten Lakhs (TL)	Lakhs (L)	Ten Thousands (TTh)	Thousands (Th)	Hundreds (H)	Tens (T)	Ones (O)	Indian System
Hundred Millions (HM)	Ten Millions (TM)	Millions (M)	Hundred Thousands (HTh)	Ten Thousands (TTh)	Thousands (Th)	Hundreds (H)	Tens (T)	Ones (O)	International System

Different Same

Thus, we get

One lakh in the Indian system is same as the Hundred thousands in the International system.

Ten lakhs in the Indian system is same as the One million in the International system.

One crore in the Indian system is same as the Ten millions in the International system.

Ten crores in the Indian system is same as the Hundred millions in the International system.

Let's Practice 1.5

1. Insert commas according to the International system of numeration. Also, write these numbers in words.

   a. 9428364 b. 65302419 c. 4529162

   d. 326288537 e. 577627389 f. 78523106

2. Write the following in numbers. Also, write their expanded form.

   a. Two million thirty-eight thousand six hundred twenty-two

   b. Eight million thirty-nine

   c. Two hundred fifty-four million six hundred nine thousand four hundred thirty

   d. Two million six thousand three hundred forty-four

   e. Six hundred ninety-nine thousand

Roman Numerals

After the Indian and International numeration system, let us now discuss Roman numerals. As the name signifies, Roman numeral system originated in Rome. Romans expressed their counting numbers using the alphabets: I, V, X, L, C, D and M

The Indian and International numeration systems are based on the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. Similarly, Roman numeral system is based on the above mentioned alphabets having a specific value as shown in the following table.

Roman numeral	I	V	X	L	C	D	M
Value/Number	1	5	10	50	100	500	1000

While writing Roman numerals, the following rules should be kept in mind.

1. If the smaller symbol is written before the larger symbol, it means subtraction.
   For example, IX means $X - I = 10 - 1 = 9$
   VC means $C - V = 100 - 5 = 95$
   CM means $M - C = 1000 - 100 = 900$
2. If the smaller symbol is written after the larger symbol, it means addition.
   For example, XI means $X + I = 10 + 1 = 11$
   CV means $C + V = 100 + 5 = 105$
   MC means $M + C = 1000 + 100 = 1100$
3. Number zero cannot be represented using Roman numerals.
4. A symbol (or alphabet) can be written for maximum three times together in a number.
   For example, XXXX does not represent any number, whereas XXX means 30.
5. When a smaller symbol is written in between two larger symbols, then the smaller symbol is subtracted from the next larger symbol.
   For example, CXC means $C + C - X = 100 + 100 - 10 = 100 + 90 = 190$

Example 1: Write the following numbers in Roman numerals.

a. 250 b. 501 c. 399 d. 138

Solution: a. $250 = 100 + 100 + 50 = CCL$

b. $501 = 500 + 1 = DI$

c. $399 = 100 + 100 + 100 + 90 + 9 = 100 + 100 + 100 + (100 - 10) + (10 - 1) = CCCXCIX$

d. $138 = 100 + 10 + 10 + 10 + 5 + 1 + 1 + 1 = CXXXVIII$

Example 2: Write the following Roman numerals into Hindu-Arabic numerals.

a. CMLV b. CDXVI c. CCVI d. DCCCXXVI

Solution: a. $CMLV = (1000 - 100) + 50 + 5 = 955$

b. $CDXVI = (500 - 100) + 10 + 5 + 1 = 416$

c. $CCVI = 100 + 100 + 5 + 1 = 206$

d. $DCCCXXVI = 500 + 100 + 100 + 100 + 10 + 10 + 5 + 1 = 826$

Let's Practice 1.6

1. Write the following numbers as Roman numerals.

   a. 319 b. 370 c. 505

   d. 555 e. 611 f. 990

2. Write the following Roman numerals as Hindu-Arabic numerals.

   a. CDXV b. DCCLXVII c. CMLXVI

   d. CXXXVIII e. DCXCVIII f. CM

Life Connect

Explore

Count the number of days that have passed from your birth, till date. Then, find the number of hours you have spent since birth. How many digits are there in the number that shows number of hours you have lived till now? Try the same for finding number of seconds you have spent since birth? These are really big numbers. Are they not?

Summary

- Place value of a digit is represented by its place or its position in the number.
- Face value of a digit is the digit itself.
- Expanded form of a number is the sum of the place values of all the digits of the number.
- Reverse of expanded form is called the standard form or short form.
- Ascending order means arranging numbers from the smallest to the greatest.
- Descending order means arranging numbers from the greatest to the smallest.
- To form the largest number using the given digits, arrange the digits in descending order.
- To form the smallest number using the given digits, arrange the digits in ascending order.
- Comparison between Indian and International system of numeration is shown below:

  1 Lakh = 100 Thousands; 10 Lakhs = 1 Million; 1 Crore = 10 Millions; 10 Crores = 100 Millions

- Roman numerals are written using the following symbols.

Roman symbol	I	V	X	L	C	D	M
Value	1	5	10	50	100	500	1000

Brain Teaser

1. Calculate the number of seconds in a week and then write this number in expanded form.
2. Form the smallest number of 8-digits using the digits 7 and 1 (repetition of these digits is allowed).
3. Form the greatest number of 9-digits using the digits 9 and 0 (repetition of these digits is allowed).
4. Solve the following:
   a. DCCCXC – DCCCX
   b. DCXC + DCLXXXVI
   c. DLXI – DLX
   d. M – DLVI

Assessment

1. Fill in the blanks.
   a. Sum of the face value of 6 and 3 in 69,345 is .....
   b. Sum of the place value of 4 and 9 in 14,39,567 is .....
   c. Product of the face value of 1 and 2 in 12,56,298 is .....
   d. 1 million = ... lakhs
   e. 100 millions = ... crores
   f. 1 crore = ... millions

2. Write the following numbers in words.

   a. 12,58,36,279 b. 323,456,129 c. 67,00,51,201 d. 500,201,397

3. Write the following numbers in the expanded form.

   a. 14,00,58,290 b. 13,25,83,196 c. 34,56,10,354 d. 9,45,23,019

4. Write the expanded form of the largest 8-digit number.

5. Write the expanded form of the smallest 9-digit number.

6. Which among the following is greater?
   a. Smallest 8-digit number or largest 7-digit number
   b. Smallest number that can be formed using the digits 5, 6, 4, 9, 1 and 2 or largest number that can be formed using the digits 5, 0, 6, 7, 2 and 1, without repetition.
   c. CDXLIX or CCXCIX
   d. CDLXXXIII or DCCCXXXIV

7. Insert commas according to both Indian and International system of numeration and also write them in words.

   a. 238447712 b. 1325647 c. 23635555
   d. 100015722 e. 100100100 f. 30912005

8. Round off the following numbers to the nearest 10s, 100s and 1000s.

   a. 12,88,739 b. 14,29,009 c. 28,14,00,079
   d. 60,40,05,109 e. 36,48,593 f. 20,71,01,028

Activities

Life Connect

Individual work

Comparing Large Numbers

Select an item whose price is a 6-, 7-, 8-, or 9-digit number in Indian currency (for example, car, home, furniture, electrical appliances, etc.). Now, explore and collect 5 different prices of the selected items which are available in the market.

Write these 5 prices in expanded form and then compare them using place values.

List the items (with description and photos) in ascending order of their price.

Group work

History of Numbers

Divide the class into small groups of 3 or 4 students. Ask each group to collect information about the history of numbers (Indian as well as International), that is, what was the need to discover numbers? How numbers developed? Who contributed majorly in the development of present day number system and so on.

This information can be collected from reference books (from your school library) or the internet.

Discuss the information collected with your teacher and prepare a project on 'HISTORY OF NUMBERS'. To make this project more interesting, paste photos of related topics.

2 Addition and Subtraction

warm-up

Purthi subtracted his birth year 2007 from the present year 2018 and found his age to be 11 years.

$$\begin{array}{r} 2\ 0\ 1\ 8 \\ -\ 2\ 0\ 0\ 7 \\ \hline 1\ 1 \end{array}$$

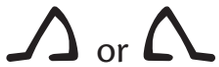
Help Purthi in calculating the age of all his family members whose year of birth are as follows.

Family member's relation with Purthi	Year of birth	Present year	Age (in years)
Father	1972	2018	—
Mother	1976	2018	—
Elder sister	2006	2018	—
Younger brother	2011	2018	—
Grandfather	1950	2018	—
Grandmother	1952	2018	—
Uncle	1985	2018	—
Aunt	1989	2018	—
Cousin sister	2012	2018	—

Addition and Subtraction

Knowledge Hub

Did you know that the Egyptian hieroglyphic sign for addition resembled a pair of legs walking in the direction in which the text was written, while the reverse sign indicated subtraction.



Minus Plus

We are already familiar with addition and subtraction till 4-digit numbers. Now, let us practice the addition and subtraction of larger numbers using standard algorithm.

Addition of Large Numbers

Without Regrouping

Example: Add 63,289 and 35,710.

Solution: Let's add.

	TTh	Th	H	T	O
	6	3	2	8	9
+	3	5	7	1	0
	9	8	9	9	9

Thus, 63,289 + 35,710 = 98,999.

Remember

Standard algorithm means adding or subtracting numbers by writing them vertically one below the other.

With Regrouping

Example: Add 34,76,281 and 46,40,781.

Solution: Let's add.

	TL	L	TTh	Th	H	T	O
	(1)	(1)		(1)	(1)		
	3	4	7	6	2	8	1
+	4	6	4	0	7	8	1
	8	1	1	7	0	6	2

Thus, 34,76,281 + 46,40,781 = 81,17,062.

Let's Practice 2.1

1. Add the following 5-digit numbers.

a.

	TTh	Th	H	T	O
	2	8	8	3	1
+	7	1	0	5	4

b.

	TTh	Th	H	T	O
	4	3	4	4	4
+	5	6	2	3	5

c.

	TTh	Th	H	T	O
	3	9	5	0	6
+	1	0	3	8	2

d.

	TTh	Th	H	T	O
	2	5	8	3	6
+	3	9	7	3	5

e.

	TTh	Th	H	T	O
	6	9	7	2	0
+	1	8	5	4	6

f.

	TTh	Th	H	T	O
	5	8	5	2	7
+	3	2	6	2	5

2. Add the following 6-digit numbers.

a.

	L	TTh	Th	H	T	O
	1	9	9	4	3	0
+	2	0	0	5	4	8

b.

	L	TTh	Th	H	T	O
	6	4	2	5	3	1
+	3	5	2	4	1	6

c.

	L	TTh	Th	H	T	O
	5	6	2	3	1	9
+	2	8	5	3	1	6

d.

	L	TTh	Th	H	T	O
	6	3	3	4	5	6
+	2	8	7	3	2	1

e.

	L	TTh	Th	H	T	O
	5	7	3	5	2	8
+	1	8	2	9	3	5

f.

	L	TTh	Th	H	T	O
	2	8	9	1	3	6
+	6	2	1	5	8	4

3. Add the following 7-digit numbers.

a.

	TL	L	TTh	Th	H	T	O
	2	3	2	5	6	7	8
+	5	3	4	3	2	1	1

b.

	TL	L	TTh	Th	H	T	O
	6	3	2	8	9	1	5
+	3	2	5	1	0	2	3

c.

	TL	L	TTh	Th	H	T	O
	2	9	0	6	4	1	3
+	5	0	9	2	3	8	5

d.

	TL	L	TTh	Th	H	T	O
	8	5	2	3	1	9	3
+	1	4	6	8	8	7	2

e.

	TL	L	TTh	Th	H	T	O
	8	1	3	6	2	9	9
+	1	0	5	8	3	4	9

f.

	TL	L	TTh	Th	H	T	O
	1	0	5	6	7	2	3
+	5	9	8	3	2	1	5

4. Add the following 8-digit numbers.

a.

	C	TL	L	TTh	Th	H	T	O
	2	3	5	6	7	2	5	9
+	1	4	2	3	1	5	3	0

b.

	C	TL	L	TTh	Th	H	T	O
	6	5	2	3	4	1	0	8
+	3	3	7	5	5	7	8	1

c.

	C	TL	L	TTh	Th	H	T	O
	2	9	9	1	5	3	2	6
+	3	0	0	8	3	5	3	2

d.

	C	TL	L	TTh	Th	H	T	O
	6	5	4	7	1	2	3	9
+	1	7	3	8	4	5	6	2

e.

	C	TL	L	TTh	Th	H	T	O
	8	0	8	9	3	0	1	5
+	1	0	0	0	9	9	9	9

f.

	C	TL	L	TTh	Th	H	T	O
	6	9	6	8	2	7	1	8
+	3	0	2	4	5	6	1	2

5. Add the following 9-digit numbers.

a.

	TC	C	TL	L	TTh	Th	H	T	O
	3	0	9	4	5	6	2	8	1
+	2	8	0	5	4	3	7	0	5

b.

	TC	C	TL	L	TTh	Th	H	T	O
	2	8	3	6	4	1	8	7	3
+	1	6	7	8	4	3	1	9	2

c.

	TC	C	TL	L	TTh	Th	H	T	O
	6	8	3	2	5	1	9	8	2
+	1	3	4	2	5	0	3	4	1

d.

	TC	C	TL	L	TTh	Th	H	T	O
	5	7	0	8	5	6	1	2	3
+	3	1	9	6	3	2	9	8	3

e.

	TC	C	TL	L	TTh	Th	H	T	O
	6	8	2	5	1	3	1	2	5
+	2	1	3	5	6	2	3	7	2

f.

	TC	C	TL	L	TTh	Th	H	T	O
	3	4	5	7	2	0	1	8	0
+	3	2	6	1	0	9	2	7	5

6. Solve the following sums.

a. 28,89,05,278 + 54,301

b. 15,951 + 2,88,72,045

c. 9,99,99,999 + 1

d. 1,10,30,292 + 2,91,20,059

e. 4,82,53,628 + 19,32,876

f. 2,92,03,013 + 1,82,301

7. Add the following numbers.

a. Fourteen lakh twenty-eight thousand three hundred forty-seven and two crore thirty-six lakh two hundred eight

b. Twenty-eight crore four hundred thirty-nine and ninety-nine lakh ninety-nine thousand nine hundred ninety-nine

c. Eight crore eighteen lakh twenty-eight thousand eight hundred thirty-eight and two lakh ninety-nine thousand

d. Sixty-nine crore forty-five thousand eight hundred thirty-six and sixty-eight lakh twenty-nine thousand four hundred seventy-six

e. Twelve lakh eighty-eight thousand four hundred six and twenty-eight thousand nine hundred eighty-one

Subtraction of Large Numbers

Without Regrouping

Example: Subtract 32,870 from 45,995.

Solution: Let's subtract.

	TTh	Th	H	T	O
	4	5	9	9	5
−	3	2	8	7	0
	1	3	1	2	5

Thus, 45,995 − 32,870 = 13,125.

Mental Maths

Fill in the blanks.

1. 32,457 + 0 = ...
2. 1,72,451 + 30,000 = 30,000 + ...
3. 84,500 − 1 = ...
4. ..... − 0 = 92,745

With Regrouping

Example: Subtract 4,83,72,958 from 16,85,32,859.

Solution: Let's subtract.

	TC	C	TL	L	TTh	Th	H	T	O
				(4)	(12)	(11)	(18)		
	1	6	8	~~5~~	~~3~~	~~2~~	~~8~~	5	9
−		4	8	3	7	2	9	5	8
	1	2	0	1	5	9	9	0	1

Thus, 16,85,32,859 − 4,83,72,958 = 12,01,59,901.

Let's Practice 2.2

1. Subtract the following 5-digit numbers.

a.

	TTh	Th	H	T	O
	2	8	7	6	3
–	1	4	8	2	9

b.

	TTh	Th	H	T	O
	5	9	8	2	3
–	1	2	7	6	5

c.

	TTh	Th	H	T	O
	6	8	7	3	4
–	4	3	2	1	3

d.

	TTh	Th	H	T	O
	6	8	8	2	9
–	3	4	9	9	5

e.

	TTh	Th	H	T	O
	6	0	5	4	3
–	3	1	7	8	9

f.

	TTh	Th	H	T	O
	7	2	8	5	7
–	5	1	3	9	2

2. Subtract the following 6-digit numbers.

a.

	L	TTh	Th	H	T	O
	2	8	8	3	6	5
–	1	7	5	2	5	3

b.

	L	TTh	Th	H	T	O
	2	8	8	3	9	5
–	1	4	5	2	8	3

c.

	L	TTh	Th	H	T	O
	6	9	7	2	4	3
–	3	4	5	1	3	2

d.

	L	TTh	Th	H	T	O
	4	8	8	2	0	6
–	3	7	9	3	4	6

e.

	L	TTh	Th	H	T	O
	3	6	9	4	5	6
–	3	5	8	5	6	8

f.

	L	TTh	Th	H	T	O
	7	8	6	2	4	4
–	5	8	5	1	9	9

3. Subtract the following 7-digit numbers.

a.

	TL	L	TTh	Th	H	T	O
	5	8	2	3	4	1	8
–	4	4	1	1	3	0	7

b.

	TL	L	TTh	Th	H	T	O
	8	8	2	9	3	8	5
–	7	3	1	6	2	6	3

c.

	TL	L	TTh	Th	H	T	O
	2	8	9	7	6	5	3
–	1	5	8	8	5	3	6

d.

	TL	L	TTh	Th	H	T	O
	2	9	9	2	4	3	7
–	1	8	9	4	3	5	2

e.

	TL	L	TTh	Th	H	T	O
	5	9	3	7	2	6	5
–	4	8	8	5	6	1	9

f.

	TL	L	TTh	Th	H	T	O
	9	8	8	2	3	8	7
–	7	5	8	2	5	3	9

4. Subtract the following 8-digit numbers.

a.

	C	TL	L	TTh	TH	H	T	O
	2	8	8	3	4	1	8	5
–	1	4	3	2	3	0	7	2

b.

	C	TL	L	TTh	TH	H	T	O
	6	8	7	3	2	9	3	0
–	3	5	2	3	1	8	1	0

c.

	C	TL	L	TTh	TH	H	T	O
	2	9	2	3	4	5	6	2
–	1	5	1	2	4	0	6	1

d.

	C	TL	L	TTh	TH	H	T	O
	6	9	0	0	1	5	2	8
–	3	4	5	3	2	6	0	0

e.

	C	TL	L	TTh	TH	H	T	O
	2	0	4	8	1	9	5	6
–	1	9	2	3	7	4	3	9

f.

	C	TL	L	TTh	TH	H	T	O
	9	2	6	7	2	3	4	1
–	2	5	8	9	1	9	2	0

5. Subtract the following 9-digit numbers.

a.

	TC	C	TL	L	TTh	Th	H	T	O
	4	8	5	3	2	7	6	3	4
–	4	3	5	3	1	4	3	3	2

b.

	TC	C	TL	L	TTh	Th	H	T	O
	2	0	3	7	2	1	9	8	5
–	1	6	8	2	3	4	5	2	9

c.

	TC	C	TL	L	TTh	Th	H	T	O
	8	3	4	7	2	1	9	3	5
–	5	2	1	8	1	2	1	3	4

d.

	TC	C	TL	L	TTh	Th	H	T	O
	6	7	1	0	4	0	8	5	1
–	4	9	2	9	5	6	2	8	9

e.

	TC	C	TL	L	TTh	Th	H	T	O
	3	7	2	6	5	4	0	3	2
–	2	8	5	3	4	9	6	5	3

f.

	TC	C	TL	L	TTh	Th	H	T	O
	4	5	3	7	2	8	1	9	2
–	3	4	6	5	2	5	1	8	2

6. Solve the following.

a. 2,83,54,675 – 42,53,342 b. 19,92,88,367 – 91,35,153 c. 4,78,527 – 8,415

d. 90,80,70,605 – 9,08,070 e. 5,79,20,121 – 28,30,919 f. 47,91,04,011 – 2,61,83,919

7. Subtract.

a. Five crore ninety-nine lakh twenty-eight thousand from ten crore eighty-eight thousand nine hundred forty

b. Sixteen lakh fourteen thousand eight hundred thirty-nine from two crore five hundred

c. Eighty-nine crore forty-four thousand five hundred thirty-nine from ninety-one crore two lakh eighteen thousand four hundred nineteen

d. Three crore three lakh three hundred thirty-three from twenty crore two lakh three thousand thirty-nine

e. Twenty-five lakh from ten crore

Addition and Subtraction Together

Addition and subtraction are inverse of each other. For example, 1,391 + 2,837 = 4,228 means 4,228 − 2,837 = 1,391 and 4,228 − 1,391 = 2,837. But, sometimes, we need to do addition and subtraction together. Let us take some examples that includes both addition and subtraction calculations.

Example 1: Calculate: 14,896 + 12,941 − 13,875

Solution: Let us first add the two numbers and then subtract the third number from their sum.

	TTh	Th	H	T	O
	1	4	8	9	6
+	1	2	9	4	1
	2	7	8	3	7

Now, subtracting 13,875 from the sum 27,837, we get

	TTh	Th	H	T	O
	2	7	8	3	7
−	1	3	8	7	5
	1	3	9	6	2

Thus, 14,896 + 12,941 − 13,875 = 13,962.

Example 2: Subtract 29,56,281 from 38,69,285 and add 2,83,965 to the difference.

Solution: Firstly, let's calculate the difference between 38,69,285 and 29,56,281.

	TL	L	TTh	Th	H	T	O
	3	8	6	9	2	8	5
−	2	9	5	6	2	8	1
		9	1	3	0	0	4

Therefore, 38,69,285 − 29,56,281 = 9,13,004.

Now, add 2,83,965 to this difference.

	TL	L	TTh	Th	H	T	O
		2	8	3	9	6	5
+		9	1	3	0	0	4
	1	1	9	6	9	6	9

Therefore, 2,83,965 + 9,13,004 = 11,96,969

∴ The required number is 11,96,969.

Addition and Subtraction in Real Life

Like small numbers, addition and subtraction of large numbers are also used in our everyday life. Let us look at some examples.

Example 1: Diya sold her old camera for ₹ 16,999 and her old guitar for ₹8,999. How much did she get from selling these old items?

Solution: Price at which camera is sold = ₹16,999

Price at which guitar is sold = ₹ 8,999

Total price = ₹ 16,999 + ₹ 8,999

= ₹ 25,998

₹	1	6	9	9	9
+ ₹		8	9	9	9
₹	2	5	9	9	8

So, Diya got ₹25,998 on selling her old camera and guitar.

Example 2: A courier company had the target of delivering 1,26,780 parcels in three days across the country. If the courier company delivered 38,579 parcels on the first day and 45,298 parcels on the second day, then how many parcels are to be delivered on the third day to meet the target?

Solution: Number of parcels delivered on the first day = 38,579

Number of parcels delivered on the second day = 45,298

Total number of parcels delivered on both days = 38,579 + 45,298 = 83,877

Given, total number of parcels to be delivered by company in three days = 1,26,780

Therefore, number of parcels left to be delivered on the third day = 1,26,780 − 83,877 = 42,903

Thus, 42,903 parcels are to be delivered on the third day, to meet the target.

Let's Practice 2.3

1. Calculate the following.
   a. 28,84,63,219 + 18,53,26,081 − 30,15,29,189
   b. 12,34,567 + 98,76,543 − 34,56,789
   c. 46,29,58,781 − 39,34,02,396 + 12,45,60,213
   d. 2,35,964 + 28,856 − 59,834
   e. 29,95,013 − 10,98,713 + 20,10,109
   f. 1,18,292 − 82,183 + 54,328
2. Calculate the following and write the answer in words.
   a. Subtract 2,87,325 from the sum of 1,62,859 and 5,93,640.
   b. Subtract 8,25,62,807 from 9,68,23,571 and add 28,954 to the difference.
   c. Subtract the sum of 28,650 and 49,281 from 1,62,864.
   d. Subtract 23,615 from the difference of 9,87,325 and 58,264.
   e. Add 4,87,391 to the difference of 6,85,730 and 5,23,615.
3. What should be added to the sum of 4,09,468 and 5,03,619 to get 12,21,331?
4. Which is greater: 28,945 + 5,62,894 or 3,81,399 + 93,465 and by how much?
5. Sohail wants to gift a recliner worth ₹1,15,000 to his parents on their wedding anniversary in May. He saved ₹28,000 in January, ₹32,000 in February and ₹27,000 in March. How much does he need to save in April so that he can buy the recliner in May?
6. On shifting to a new city, Ramesh purchased a house for ₹1,20,38,400 and a car for ₹6,88,999. How much did he spend in all?
7. Out of 29,687 children of a city, 16,574 are studying in primary school, 8,547 are studying in secondary school and remaining are infants. How many infants are there in the city?
8. A newly opened restaurant prints 1,15,000 pamphlets for advertisement. Out of these, 97,258 pamphlets are distributed through newspapers and the remaining pamphlets are to be distributed personally in residential areas. Find out the number of pamphlets that are to be distributed personally.

Estimation

Estimating the sum and difference helps in getting an idea of sum or difference very quickly. We need to give and take money while shopping and it is not possible to add or subtract big numbers accurately without writing. Here, estimation helps us to check roughly whether the addition and subtraction are correct or wrong.

Estimating Sums and Differences

To estimate the sum or difference of the given numbers, we first estimate the numbers by rounding off and then add or subtract the estimated numbers.

Example 1: Estimate the following by first rounding off the numbers to the nearest 10s.

a. 13,829 + 859 b. 1,28,456 − 1,05,223

Solution: a. 13,829 rounded off to the nearest 10s is 13,830 and 859 rounded off to the nearest 10s is 860.

So, 13,830 + 860 = 14,690.

b. 1,28,456 rounded off to the nearest 10s is 1,28,460 and 1,05,223 rounded off to the nearest 10s is 1,05,220.

So, 1,28,460 − 1,05,220 = 23,240.

Example 2: Estimate the following by first rounding off the numbers to the nearest 100s.

a. 26,859 + 14,236 b. 2,37,651 − 1,78,791

Solution: a. 26,859 rounded off to the nearest 100s is 26,900 and 14,236 rounded off to the nearest 100s is 14,200.

So, 26,900 + 14,200 = 41,100.

b. 2,37,651 rounded off to the nearest 100s is 2,37,700 and 1,78,791 rounded off to the nearest 100s is 1,78,800.

So, 2,37,700 − 1,78,800 = 58,900.

Example 3: Estimate the following by first rounding off the numbers to the nearest 1000s.

a. 43,287 + 56,297 b. 2,37,295 − 1,26,610

Solution: a. 43,287 rounded off to the nearest 1000s is 43,000 and 56,297 rounded off to the nearest 1000s is 56,000.

So, 43,000 + 56,000 = 99,000.

b. 2,37,295 rounded off to the nearest 1000s is 2,37,000 and 1,26,610 rounded off to the nearest 1000s is 1,27,000.

So, 2,37,000 − 1,27,000 = 1,10,000.

Teacher's Tip

Hold a discussion in class, wherein students should cite examples where estimation of addition and subtraction is observed in daily life.

Let's Practice 2.4

1. Estimate the following numbers to the nearest 10s and then solve.

   a. 25,836 + 22,329

   b. 1,35,625 – 25,684

   c. 46,658 + 45,223 – 23,049

   d. 12,506 + 42,285 – 34,287

   e. 24,793 + 12,605 – 3,421

   f. 73,215 + 2,105 - 169

2. Estimate the following numbers to the nearest 100s and then solve.

   a. 13,825 + 23,275

   b. 5,93,925 + 5,42,945

   c. 45,332 + 13,325

   d. 9,83,218 – 2,41,233

   e. 2,37,248 – 15,621

   f. 52,014 – 1,025 + 1,13,078

3. Estimate the following numbers to the nearest 1000s and then solve.

   a. 91,089 + 25,624

   b. 36,865 – 12,995

   c. 16,728 + 41,230 – 24,507

   d. 2,46,192 + 31,245 – 35,215

   e. 5,26,791 – 3,25,194

   f. 28,528 + 32,685 - 43,265

4. During summer vacations, 13,73,289 tickets were sold in a water park in a month. If out of the total visitors, approximately 4,75,200 were adults and remaining were children, then find out how many children visited the water park during that month by first rounding off the numbers to the nearest 100s.

5. Keshav's fitness tracker recorded that he walked 12,715 steps on Monday and 15,218 steps on Tuesday during morning walk. Find the number of steps Keshav walked on both these days by first rounding off the numbers to the nearest 10s. Why is walking good? Discuss.

Explore

Note down the time for which you did your homework during a week in the following table.

Days of the week	Time for which homework was done (in hours and minutes)	Homework time converted in seconds	Seconds rounded off to the nearest 100s
Monday	1 hour 12 minutes	4,320	4,300
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

Now, add the seconds rounded off to the nearest 100s and find the approximate number of seconds that you devoted to your homework in a week. (Note: 1 hour = 60 minutes and 1 minute = 60 seconds.)

Summary

- Standard algorithm means adding or subtracting the numbers after writing them vertically one below the other.
- When you add three or more numbers with different digits, arrange the digits one below the other in the correct place.
- While adding the numbers, at times you get numbers larger than 9, then you need to carry over values to the column on the left and regroup.
- When we subtract one number from another, at times we need to borrow a value from the column on the left and then regroup so that you get a higher value in the minuend than in subtrahend.

Brain Teaser

1. Form the greatest and the smallest 7-digit number using the digits 5, 0, 2, 7, 1, 9 by repeating the digits only once. Also, find the difference of the numbers formed.
2. If A = 3,42,262, B = 13,52,819 and C = 23,51,719, then find A + C − B. Also, compare A + B with C − B.

Assessment

1. Solve the following.
   a. 2,89,53,287 + 8,12,65,428
   b. 14,92,83,418 – 6,84,99,929
   c. 5,00,000 – 19,999 + 4,80,016
   d. 36,32,814 + 1,33,914 – 2,56,281
   e. 45,29,645 – 2,89,235 + 10,10,101
   f. 6,99,238 – 5,99,138 + 1,23,456

2. Round off the following numbers first as directed and then solve.
   a. 82,339 + 3,12,201 (to the nearest 100s)
   b. 1,49,508 + 1,42,561 (to the nearest 1000s)
   c. 36,487 – 25,682 (to the nearest 100s)
   d. 2,33,643 – 1,23,283 (to the nearest 1000s)
   e. 21,38,143 + 2,28,509 (to the nearest 1000s)
   f. 7,42,841 – 3,25,746 (to the nearest 1000s)

3. Fill in the missing digits.

   a.

	C	TL	L	TTh	Th	H	T	O
	4	2	□	6	□	□	1	9
+	2	□	4	0	8	5	7	3
	□	1	9	□	7	7	□	□

   b.

	TC	C	TL	L	TTh	Th	H	T	O
	□	9	□	□	7	3	□	6	1
–	2	□	7	5	8	0	2	□	3
	3	8	7	6	□	3	1	8	□

4. What should be added to 53,46,215 to get 86,73,154?

5. If A = ₹1,10,281, B = ₹75,999 and C = ₹2,93,517, then solve:
   a. A + B
   b. C – B
   c. A + C – B
   d. A + B + C

6. Find the sum of the predecessors of 14,32,61,745 and 2,76,14,379.

7. The population of a village in the year 2017–2018 was 13,25,583. If 7,39,229 people shifted to the village in the next year, then what will be the total population of the village?

8. Mr Khan bought a new house worth ₹35,18,475 and Mr Mehra bought a house for ₹25,44,864. What is the difference in the prices of the two houses?

Activities

Individual work

Estimation in Everyday Life

Life Connect

Choose a destination and plan a vacation for your family using estimation.

Vacation should be 2 nights and 3 days long.

According to the number of family members and destination of vacation, estimate the following:

- Transportation and its cost
- Hotel and its tariff
- Types of meals and their cost
- Shopping to be done during vacation and budget for shopping
- Cost of sight-seeing or any other activity during vacation

After estimating the above figures, find out the total estimated cost of your vacation and describe it in your class.

Group work

Estimating Distances

Life Connect

Divide the class into groups of four. Every group will take a map of the world and mark any 5 countries on it. Find out the actual distances between these countries and approximate these distances to the nearest 100s and fill the table below.

Countries marked on map

Country 1: ..... Country 2: ..... Country 3: .....

Country 4: ..... Country 5: .....

Distance Between Countries

	Distance between countries	Actual distance (in km)	Approximate distance (in km rounded off to the nearest 100s)
1.	Country 1 and 2		
2.	Country 2 and 3		
3.	Country 3 and 4		
4.	Country 4 and 5		

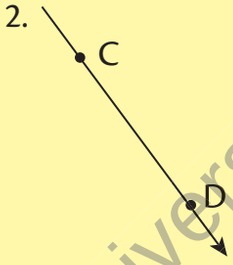
Now, find out the total distance that one has to cover to travel from country 1 to 2, then to 3, then to 4 and lastly 5.

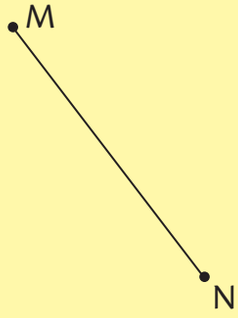
3 Geometry

warm-up

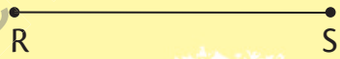
Identify the following as point, line, line segment or ray. Also, write their names (using the given alphabets).

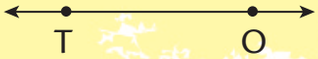
1. • X

2. 

3. 

4. 

5. 

6. 

Exploring Angles

Knowledge Hub

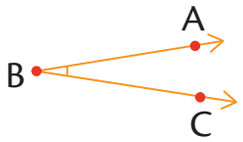
Dance is an art of moving your body and feet to the beat of music. Do you know that dance requires us to make different shapes and angles with our body? Whenever we adopt a pose, or perform a specific movement in dancing, our body and limbs form a group of lines and angles.

But, what is an angle?

An angle is formed when two rays meet at a point. The rays are called the arms of the angle and the meeting point of the rays is called the vertex of the angle.

Naming of an Angle

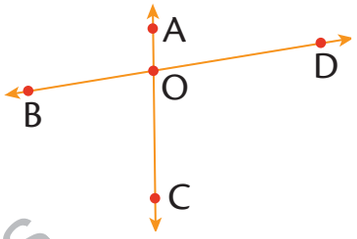
An angle is always named using the capital letters. For example, observe the angle given alongside.



Here, $\overrightarrow{BA}$ and $\overrightarrow{BC}$ are the arms of the angle and B is the vertex.

It is represented as ∠ABC.

Example: Name all the possible angles in the given figure.

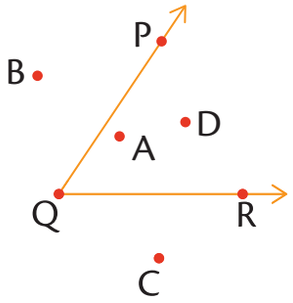


Solution: All possible angles are:

∠AOB, ∠AOC, ∠AOD, ∠BOC, ∠BOD, ∠COD

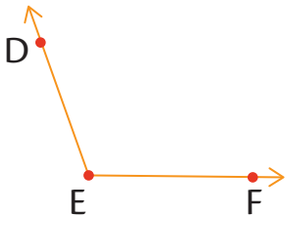
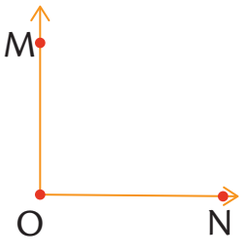
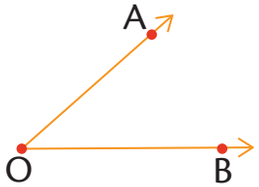
Interior, Exterior, On the Boundary of an Angle

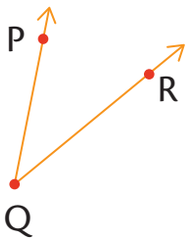
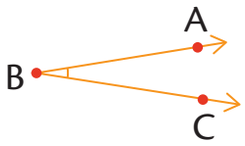
Observe the ∠PQR given alongside. Here, points A and D lie in the interior of ∠PQR; points B and C lie in the exterior of ∠PQR and points P, Q, R lie on the ∠PQR.



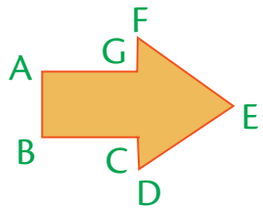
Let's Practice 3.1

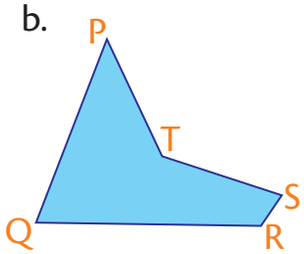
1. Name the arms and vertices of the following angles.

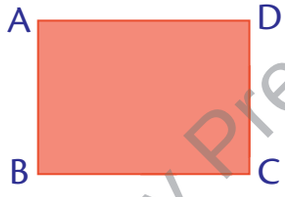
		
Arms –	Arms –	Arms – .....
Vertex –	Vertex –	Vertex – .....

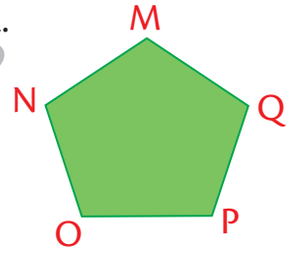
		
Arms – ..... Vertex –	Arms – ..... Vertex –	Arms – ..... Vertex – .....

2. Name all the possible angles in the given figures.

a. 

b. 

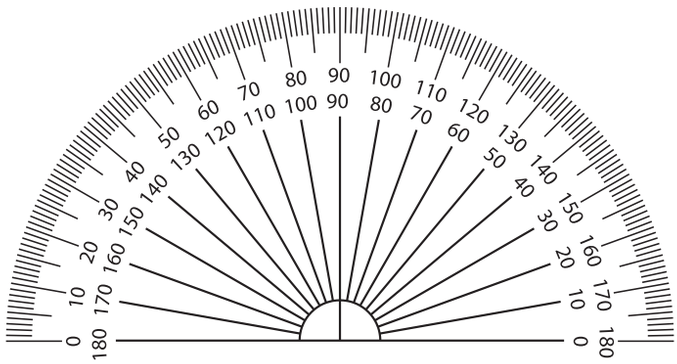
c. 

d. 

3. Draw an ∠ABC and mark the following points.
   a. Points D, R and Q in the exterior of the angle.
   b. Points E, P and O in the interior of the angle.

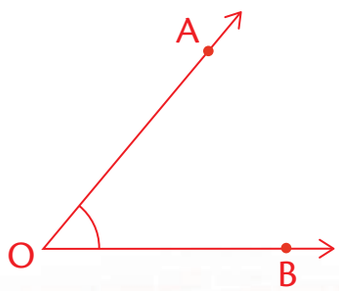
Measuring Angles

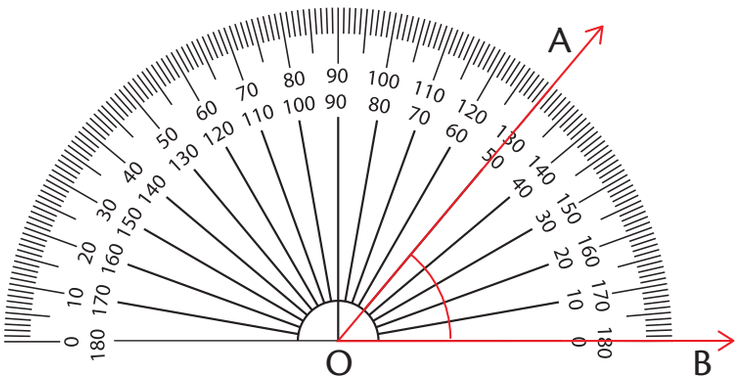
Angles are usually measured in units called degrees (°). To measure angles, we use a tool called protractor. A protractor is a device/ instrument which is usually semi-circular in shape and is made from transparent plastic with degrees printed on it.



It has numbers 0 to 180 marked on it from both the sides, which helps it to measure angles from both the sides. The centre of the protractor shows 90°.

Let us now use a protractor to measure the angle as shown.





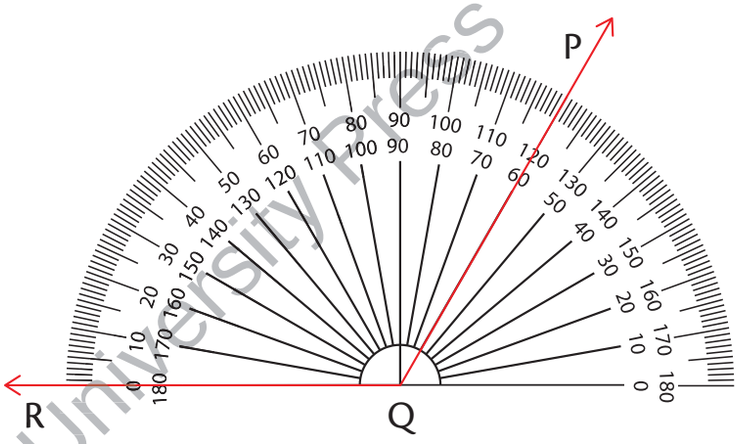
For this, place the protractor over the angle in such a way that the centre of the protractor lies directly over the vertex O of the angle and the baseline of the protractor is along the arm OB of the angle.

Now, use the inner scale to measure the ∠AOB and find that the arm AO passes through the inner scale at 50°.

Thus, ∠AOB = 50°.

Similarly, to measure ∠PQR, use the outer scale and find that the arm PQ passes through the outer scale at 120°.

Thus, ∠PQR = 120°.



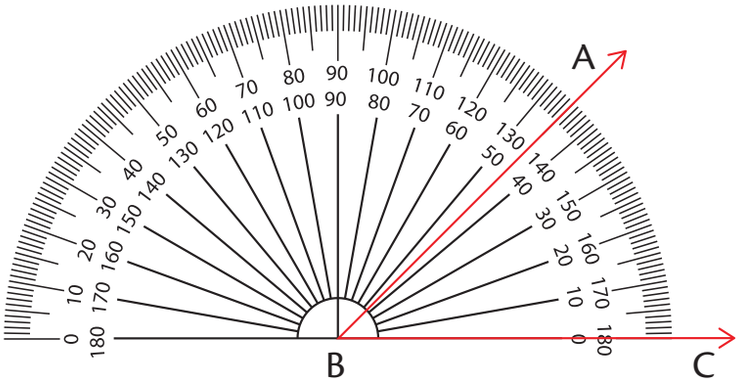
Constructing Angles Using a Protractor

To construct an angle, say 45° using a protractor, we proceed as follows.

Step 1: Draw a ray BC, which represents one arm of the angle.

Step 2: Mark a point B, which represents the vertex of the angle.

Step 3: Place the centre of the protractor on the vertex B and the baseline of the protractor along the arm BC.



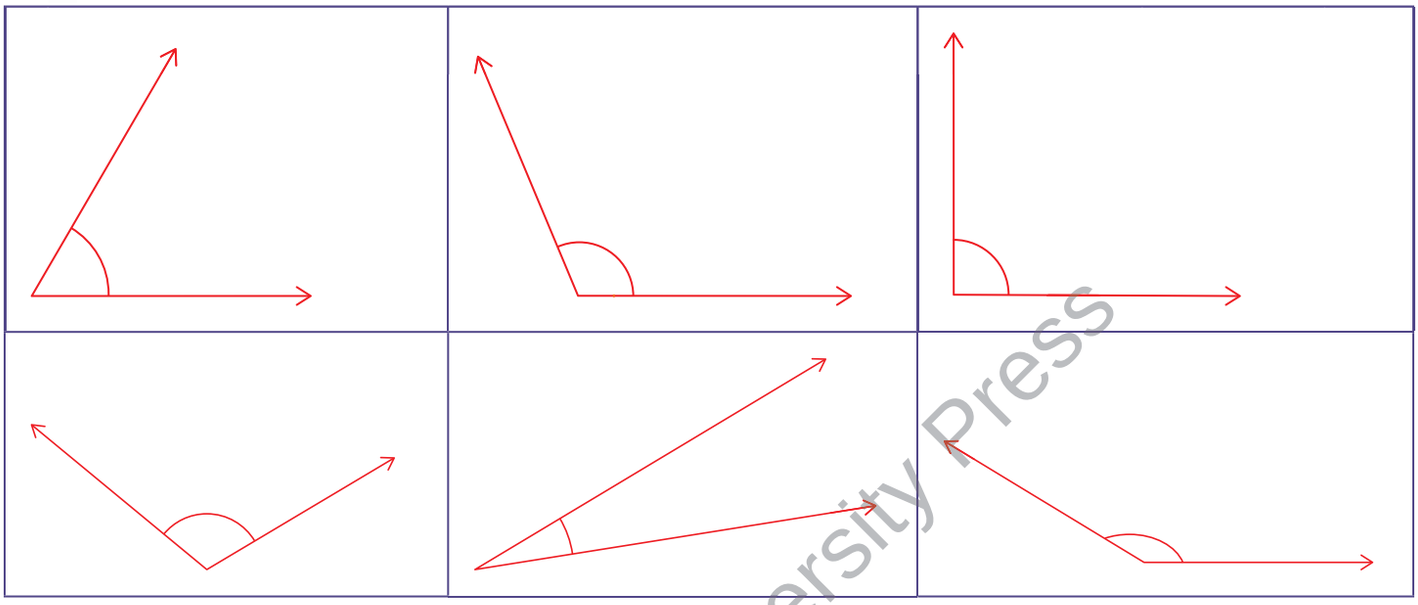
Step 4: Now, look for the angle required on the protractor. Here, it is 45°. Mark a point A on the edge of the protractor.

Step 5: Remove the protractor and join the point A with the point B, which represents the other arm, AB of the angle.

Thus, ∠ABC = 45° is the required angle.

Let's Practice 3.2

1. Measure the following angles using a protractor.



2. Construct the following angles using a protractor.

   a. 25° b. 110° c. 60°

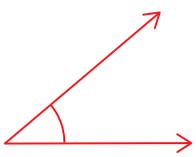
   d. 72° e. 180° f. 150°

Types of Angles

Angles are of different types. Let us observe some of them.

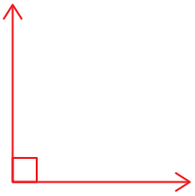
Acute Angle

An angle whose measure is greater than 0°, but less than 90° is called an acute angle.



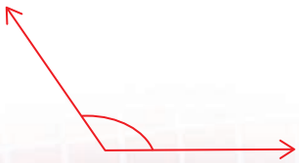
Right Angle

An angle whose measure is equal to 90° is called a right angle.



Obtuse Angle

An angle whose measure is greater than 90°, but less than 180° is called an obtuse angle.

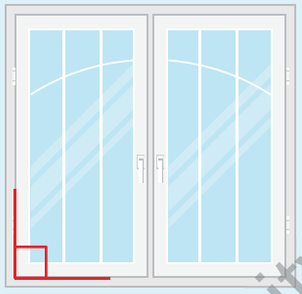


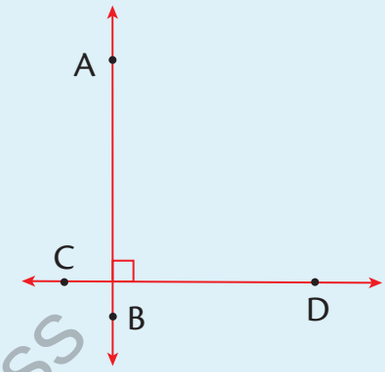
Active Maths

Perpendicular Lines

Do you know that the lines which intersect (or meet) each other at right angles are called perpendicular lines? Here 'lines AB and CD are perpendicular to each other' and is written as 'AB ⊥ CD'.

We can see perpendicular lines in many objects around us.

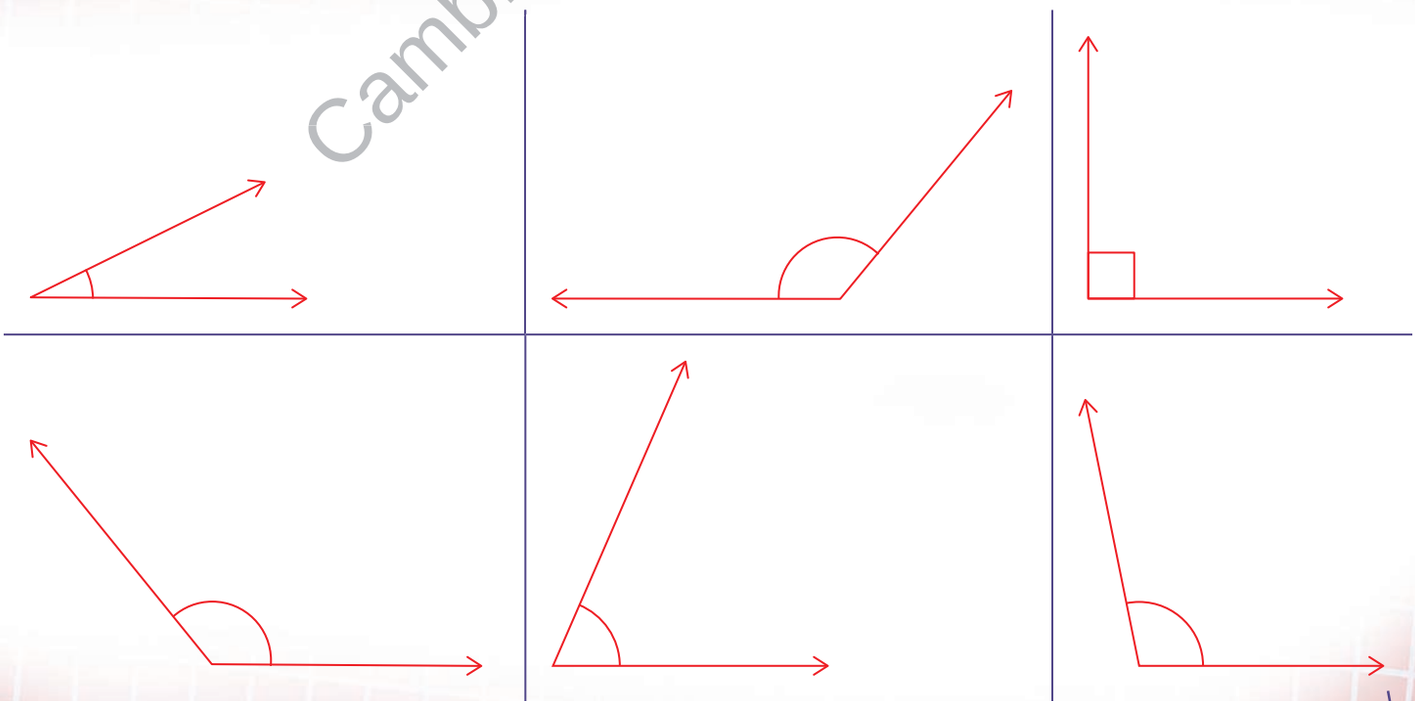




Now, list down at least 5 objects where you see perpendicular lines in your surroundings.

Let's Practice 3.3

1. Identify the following angles as acute, right or obtuse angle.



2. Sort the given angles as acute, obtuse or right angle.

a. 158° b. 90° c. 75°

d. 30° e. 125° f. 60°

Nets of 3D Shapes

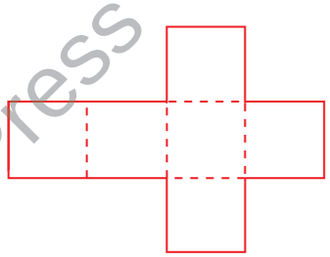
3D (Three-dimensional) shapes are quite different from 2D (two-dimensional) shapes. A 2D shape can be converted into a 3D shape using nets.

A net is a two-dimensional figure that can be folded to form a three-dimensional object.

Let us observe the nets of some of the solid shapes.

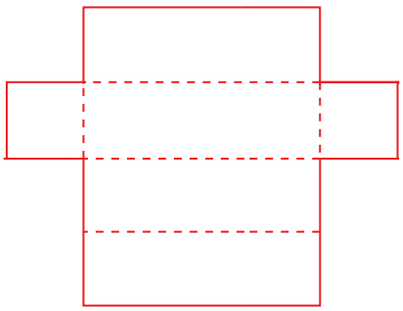
Net of a Cube

Observe the net of a cube. When we fold along the edges of the squares, we get a cube.



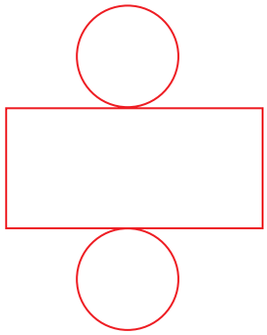
Net of a Cuboid

Take a shoe box. If you unfold such a box, you will get the net of a cuboid. This net when folded will make a cuboid again.



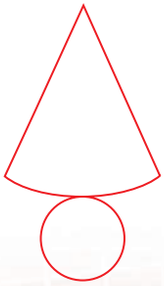
Net of a Cylinder

Take a rectangular sheet of paper and roll it to join two of its opposite edges. You will get a cylinder.



Net of a Cone

Take a birthday cap and open all its folds to get a net of a cone as shown alongside.

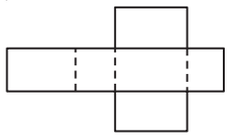


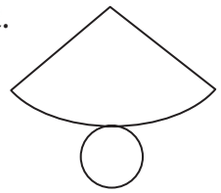
Remember

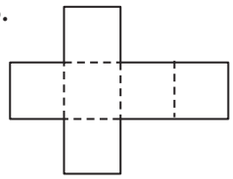
A sphere does not have a net.

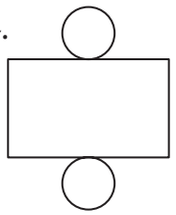
Mental Maths

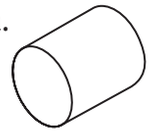
Match the nets of the solid shapes given by colouring them alike.

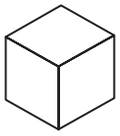
1. 

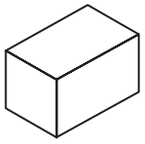
2. 

3. 

4. 

a. 

b. 

c. 

d. 

Life Connect

Explore

Ask the students to go out and observe their surroundings. Ask them to note down at least 5 objects or items where they can identify angles in the vicinity, like, the traffic policeman clears the traffic jam using his hands and so on.

Summary

- An angle is formed when two rays meet at a point. The rays are called the arms of the angle and the meeting point of the rays is called the vertex of the angle.
- Angles are usually measured in units called degrees (°).
- An angle whose measure is greater than 0° but less than 90° is called an acute angle.
- An angle whose measure is equal to 90° is called a right angle.
- An angle whose measure is greater than 90° but less than 180° is called an obtuse angle.
- A net is a two-dimensional figure that can be folded to form a three-dimensional object.

Brain Teaser

1. An angle measures 25° more than 65°. What type of angle is it?
2. Name an angle whose measure is 34° less than 180°.
3. Draw all possible nets of a cube. How many ways are possible?
4. If it is 2 o'clock now, then after how many minutes will a right angle be formed by the hands of the clock?

Assessment

1. Choose the correct option.

   a. Which of the following alphabet looks like a right angle?

   i. L ii. M iii. X iv. O

   b. Name the angle which measures 90°.

   i. Obtuse ii. Acute iii. Right iv. None of these

   c. Name the angle which measures less than 90°.

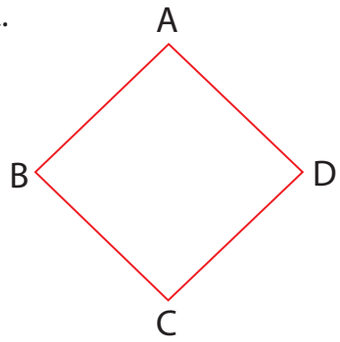
   i. Obtuse ii. Acute iii. Right iv. None of these

   d. Angles are measured in ..... .

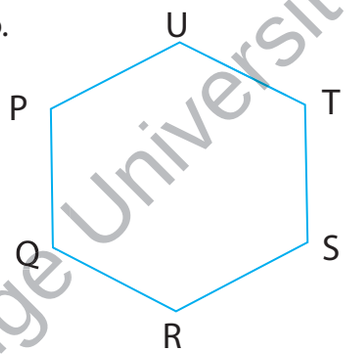
   i. cm ii. degrees iii. litres iv. grams

2. Name all the possible angles in the given figures.

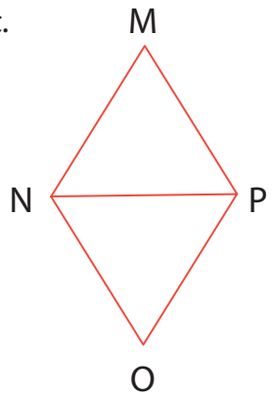
a.



b.

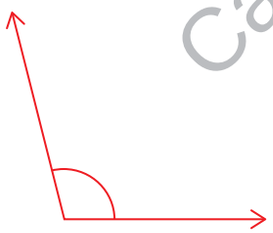


c.

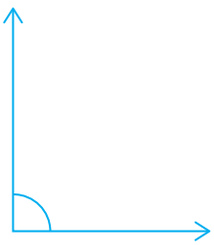


3. Measure the following angles.

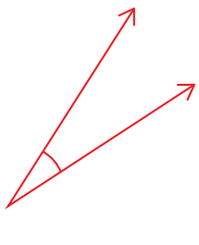
a.



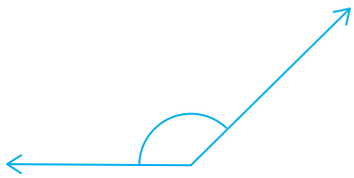
b.



c.



d.



4. Construct the following angles. Also, name the type of angle each represents.

   a. 40° b. 75° c. 90°

   d. 115° e. 170° f. 85°

5. Draw a net of a cube and cylinder.

Activities

Individual work

Angles in Letters

Write your name on a sheet of paper using capital letters. Now, find how many right angles, acute angles and obtuse angles are there in your name.

For example, your name is Anil.

Observe that there are 5 acute angles (marked orange), 5 right angles (marked blue) and 2 obtuse angles (marked green).

Group work

Angles Around Us

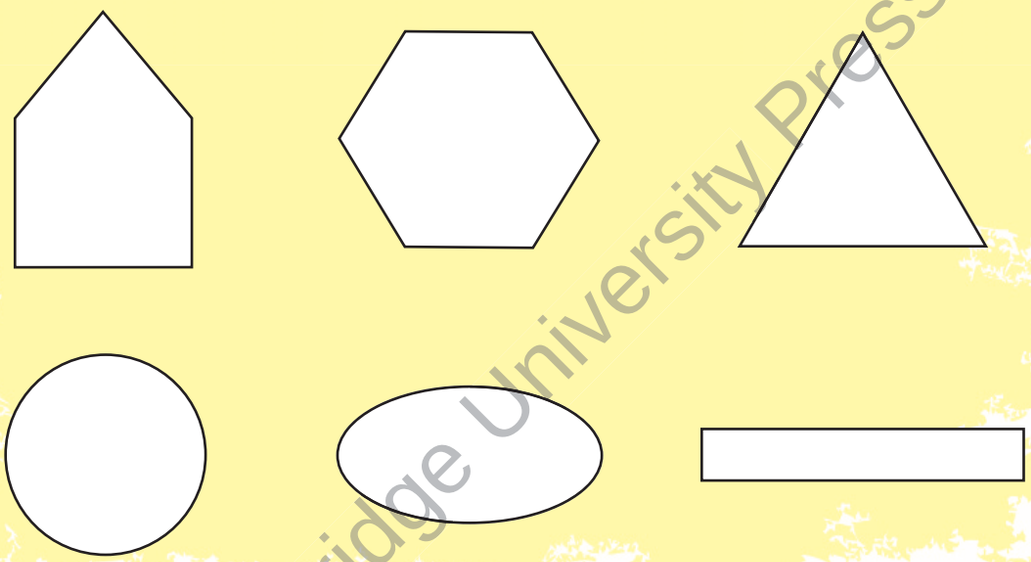
Work in pairs. Ask the students to collect some items from their homes, for example, a watch, a pencil box, a sharpened pencil, picture of a dancing girl, etc.

Now, ask the children to draw images of the items on paper and using a protractor measure the angles of the objects.

Extend the activity by asking the students to mark different angles using different coloured markers.

4 Patterns and Symmetry

Draw the line of symmetry in each of the following shapes.



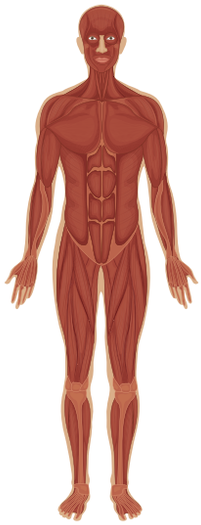
Introduction to Symmetry

Knowledge Hub

When any shape is divided into two equal parts of the same size and shape, the parts look like mirror image of one another and the shape is known as symmetrical.

If you look around, you will observe symmetry in various objects of nature. Butterflies, crabs, plants, flowers, zebra stripes, etc. all display symmetry.

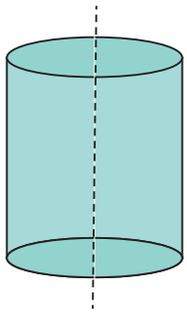
Do you know that our body (or human body) is perfectly symmetrical, that is, we have symmetry in our 2 eyes, 2 legs, 2 arms, 2 hands, 2 feet, 2 ears, etc. But, this symmetry is seen in external part of human body. But it is asymmetrical from inside. We have heart only on the left side, liver only on the right side. So, our body is symmetrical from outside and asymmetrical from inside.



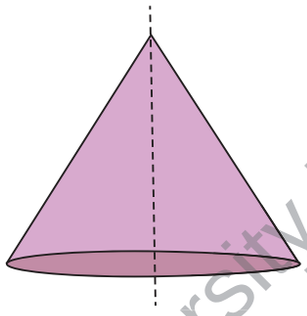
Symmetry in 3D Shapes

Symmetry not only exists in plane shapes but also in 3D shapes and other objects.

Now, let us observe the line of symmetry in some of the 3D shapes.



Cylinder



Cone

Let's Practice 4.1

Draw the line of symmetry in the following objects, if possible.

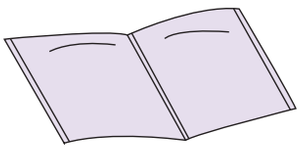
Life Connect

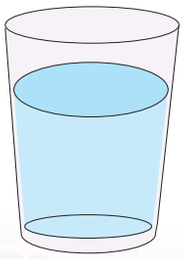
1. 

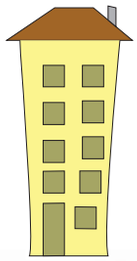
2. 

3. 

How does symmetry add to the beauty of nature? Discuss.

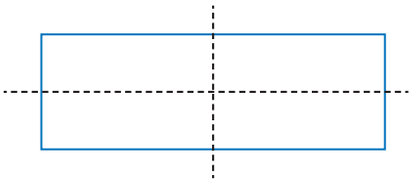
4. 

5. 

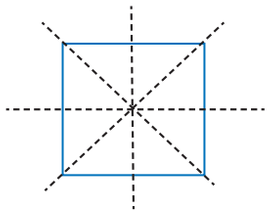
6. 

Two or More Lines of Symmetry

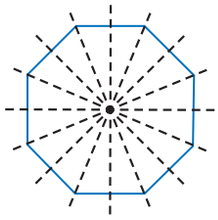
We have learnt about symmetry in many shapes, designs, alphabets and objects. We have also drawn the line of symmetry in symmetrical figures. Do you know that some figures have more than one line of symmetry? Let us look at some examples.



Rectangle has 2 lines of symmetry



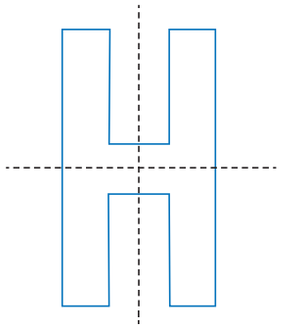
Square has 4 lines of symmetry



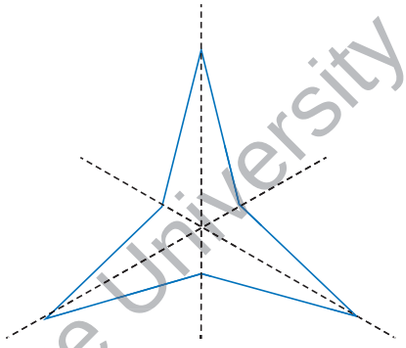
Octagon has 8 lines of symmetry

Let us see some more examples.

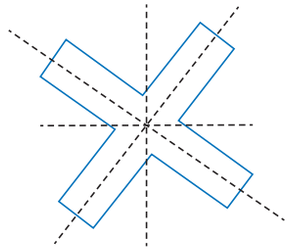
2 lines of symmetry



3 lines of symmetry



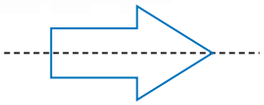
4 lines of symmetry

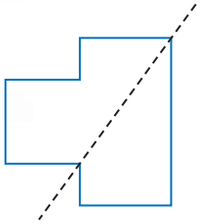


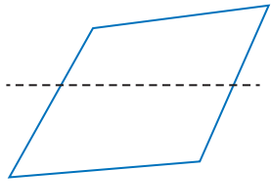
How many lines of symmetry does a circle have?

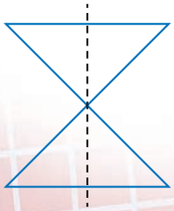
Let's Practice 4.2

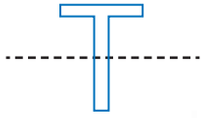
1. Check whether the dotted lines drawn in the following figures are the lines of symmetry.

a. 

b. 

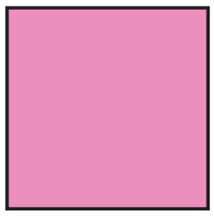
c. 

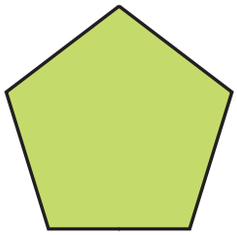
d. 

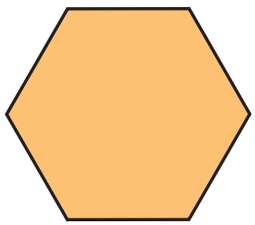
e. 

f. 

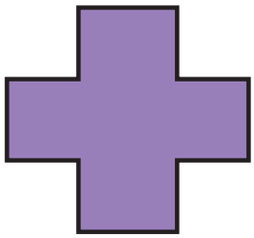
2. Draw the maximum number of lines of symmetry in the following shapes.

a. 

b. 

c. 

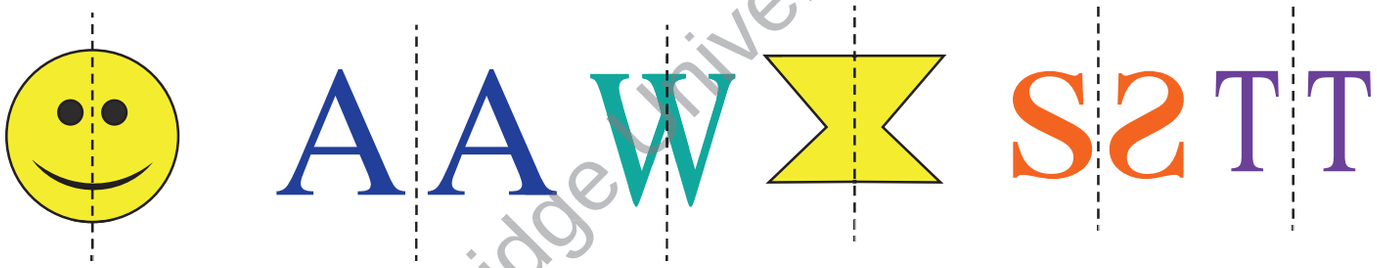
d. 

e. 

f. 

Reflection and Symmetry

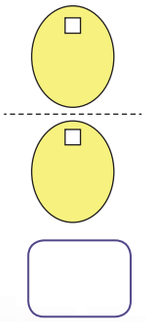
This is the symmetry that we are familiar with. In reflectional symmetry, there is a line of symmetry which divides the figure into two parts of the same shape and size. The figure and its reflection (mirror image) are on either side of the line of symmetry. These parts look like a reflection of each other. For example,

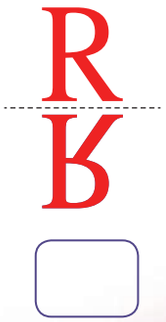


Let's Practice 4.3

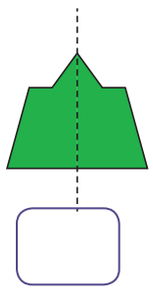
1. Tick (✓) the pictures which show reflectional symmetry.

a. 

b. 

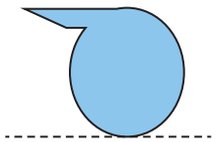
c. 

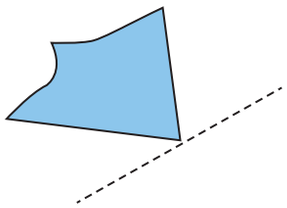
d. 

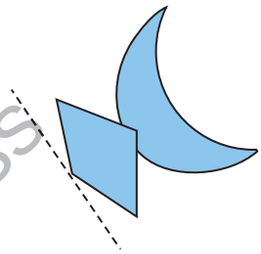
e. 

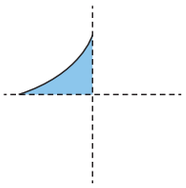
f. 

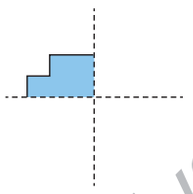
2. Complete the figures along the line/lines of symmetry.

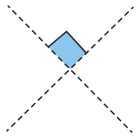
a. 

b. 

c. 

d. 

e. 

f. 

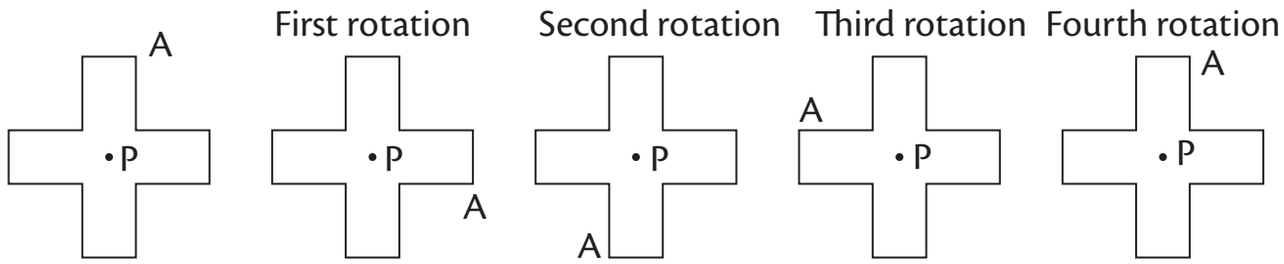
Rotational Symmetry

This is different from reflection symmetry. As the name indicates, here the figure is rotated or turned around the centre of rotation and still it looks the same. For example, here is a triangle with equal sides.

The above triangle has centre (marked as O) and a point (marked as A). This figure is rotated 3 times and every time it looks the same as the original figure but point A reaches its original position after 3 rotations. So, we can conclude that:

- The triangle with equal sides has **rotational symmetry**.
- **Centre of rotation** is point O (centre of triangle).
- **Order of rotation** is 3.

Let us take another example.



Here, central point is P and A is a corner point. This figure is rotated 4 times so that A reaches its original position and after each rotation, figure looks like the original figure.

So, we conclude that:

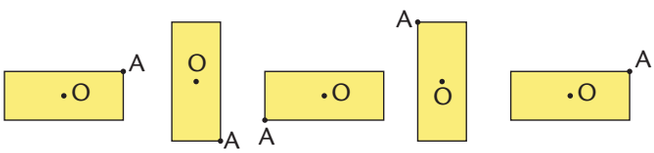
- The given figure has rotational symmetry.
- Centre of rotation is *P*.
- Order of rotation is 4.

Remember

Circle also has rotational symmetry. Since it always looks the same on rotation about its centre (O), so its order of symmetry is infinite (or uncountable) and its centre of rotation is O (central point).

Let's Practice 4.4

1. Fill in the blanks choosing the correct answer from the brackets.

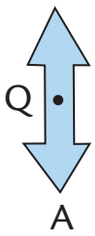
Square	Rectangle
	
Here, square ..... rotational symmetry (has/does not have).	Here, rectangle ..... rotational symmetry (has/does not have).
Centre of rotation is ..... (O/A)	Centre of rotation is ..... (O/A)
Order of rotation is ..... (2/4)	Order of rotation is ..... (2/4)

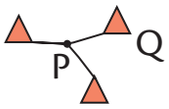
Teacher's Tip

Emphasise the fact that some shapes have two-fold rotation symmetry, some have three and some may also have four-fold rotation symmetry.

2. Look at the following figures which are rotated. Write the centre and order of rotation of the following figure.

a. 

b. 

c. 

d. 

Active Maths

It's Logo Time

Have you seen logo of recycle?
What is its order of rotation?

Create a scrapbook with different logo's. You may draw or paste the same. Also, write the order of rotation of each.

Geometric and Number Patterns

Let us revisit the patterns and complete the same.

Here, the unit of repeat is  .

Now, let us observe the number pattern.

1016, 1014, 1012, 1010, 1008, 1006, ...

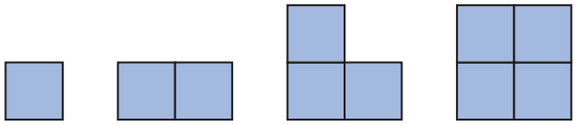
Here, the unit of repeat is subtraction of 2.

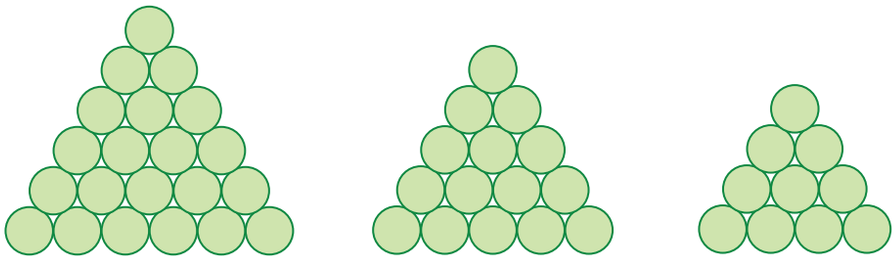
Let's Practice 4.5

1. Extend the pattern.

a.  ..... , ...

b.  ....

c.  ....

d.  ....

2. Find the unit of repeat and complete the pattern.

Operation	Unit of repeat	Pattern
Add	_____	3121, 3124, 3127, 3130, 3133, ..., ...
	_____	4816, 4826, ..., ..., 4856, 4866, ..., 4886
Subtract	_____	2431, 2429, 2427, 2425, ..., ...
	_____	2865, 2860, 2855, ..., 2845, ..., 2835
Multiply	_____	120, 240, ..., 960, ...,
	_____	1, 12, ..., 1728, ...
Divide	_____	..... , 5000, 2500, ..., 625
	_____	10000, 1000, ..., 10, ...

Square Numbers

Square numbers are the numbers we receive after multiplying the number by itself.
For example, 1, 4, 9, 16 and 25 are the first five square numbers.

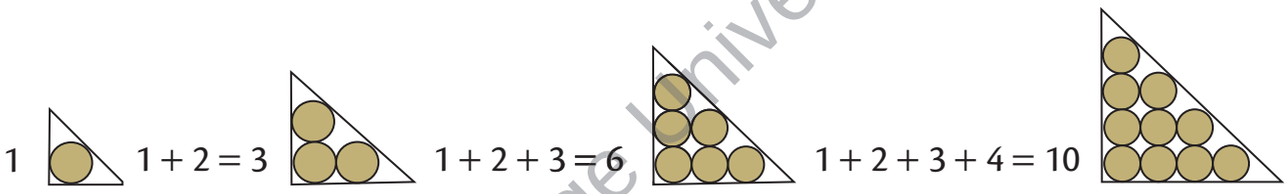
That is, $1 = 1 \times 1$ $4 = 2 \times 2$ $9 = 3 \times 3$ $16 = 4 \times 4$ $25 = 5 \times 5$

Remember

Square numbers are related to geometrical shape 'SQUARE'. If we take dots or blocks equal to a square number, then we can easily arrange them to look like a square shape. Let us see a few examples.

Triangular Numbers

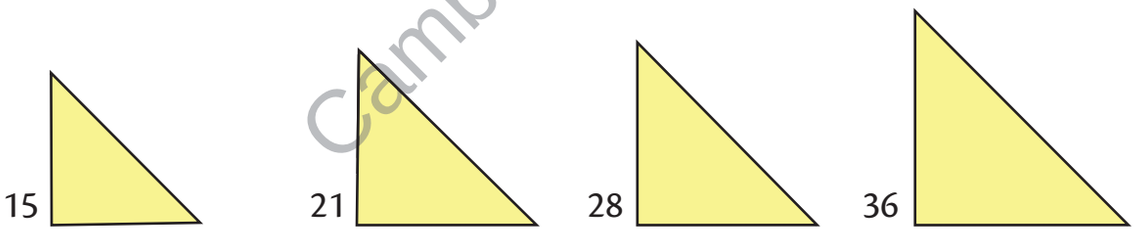
Triangular numbers are related to the geometrical shape 'triangle'. If we take number of dots equal to the triangular number, then we can arrange these dots into a geometrical shape 'triangle with each line of dots having one less than the one below'. Some of the triangular numbers are:



Search and Gain

Why do we always measure area in square measurements like square metres, etc.? Find out.

Now, draw dots in these triangles to represent triangular numbers as directed.



Thus, triangular numbers are 1, 3, 6, 10, 15, 21, 28, 36, 45, ... and so on.

Let's Practice 4.6

1. Which of the following are square numbers? Circle them.

   2, 4, 6, 8, 10, 14, 16, 20, 25, 30, 35, 36, 40, 49, 64, 100

2. Which of the following are triangular numbers? Circle them.

   1, 3, 5, 6, 7, 9, 10, 13, 15, 17, 19, 21, 24, 28

3. Fill in the blanks.

   $1 \times 1 = 1$

   ..... $= 4$

   $3 \times 3 =$ .....

   ..... $= 36$

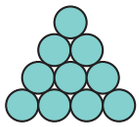
   $7 \times 7 =$ .....

   ..... $= 64$

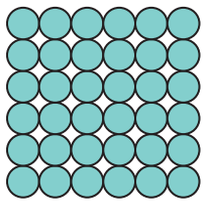
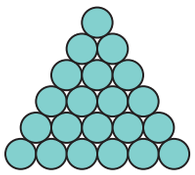
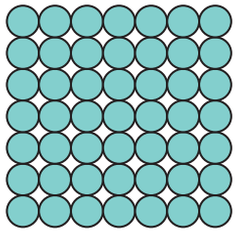
   ..... $=$ .....

   $12 \times 12 =$ .....

4. Complete the following tables.

Triangular number	Figure of dots
1	
	
6	
	

Square number	Figure of dots
1	
	
16	
25	

15			
			
28		9	

Life Connect

Explore

Visit or look online, grounds of various sports like cricket, basketball, football, volleyball, badminton, table tennis', etc. Draw the playing areas of any 5 different sports on 5 different sheets of paper and observe the following.

- Do they have reflection symmetry? If yes, then how many lines of symmetry are there?
- Do they have rotational symmetry? If yes, then mark its centre of rotation and order of rotation.

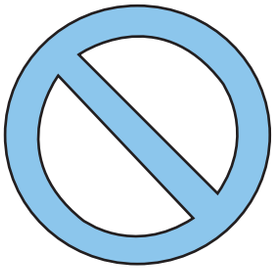
Also, draw the material (equipment) used to play these sports and check whether they have reflectional or rotational symmetry or no symmetry (*for example,* bat and ball used for cricket; ball used to play basketball; table tennis racket and ball used to play table tennis and so on).

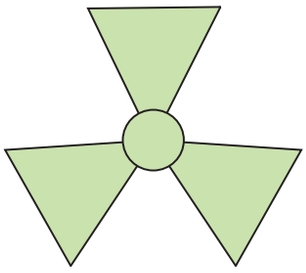
Summary

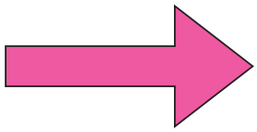
- Symmetrical shapes are divided from the centre by the line of symmetry. The two halves are exactly like each other in shape and size.
- Reflectional symmetry shows the mirror image of a figure.
- In rotational symmetry, the figure looks the same, even if rotated from the centre of rotation.
- Like shapes, numbers have patterns too. Square numbers are formed when a number is multiplied by itself. Triangular numbers are numbers which can be arranged into the triangular shape in a defined order.

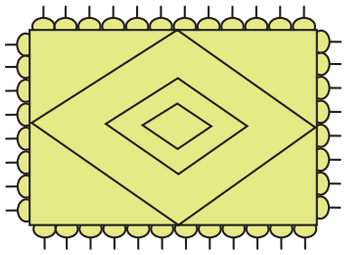
Assessment

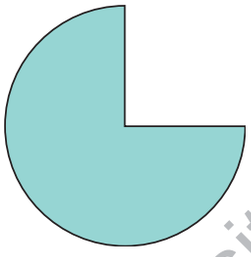
1. Draw the line (or lines) of symmetry in the following figures.

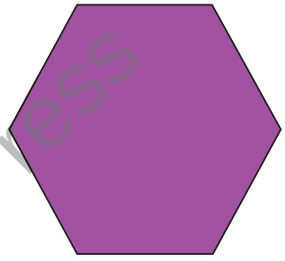
a. 

b. 

c. 

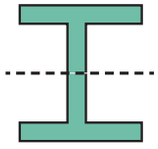
d. 

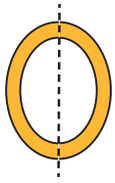
e. 

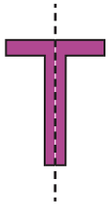
f. 

2. State true or false.
   a. 1, 3, 6 and 10 are square numbers. .....
   b. 1×1; 2×2; 3×3; 4×4 are square numbers. .....
   c. Every object has odd number of lines of symmetry. .....
   d. A square has a rotational symmetry of order 4. .....
   e. A square and a rectangle both have 4 lines of symmetry. .....
   f. Order of symmetry of a circle is 10. .....

3. Check whether the dotted line is the line of symmetry. Also, check whether more lines of symmetry can be drawn.

a. 

b. 

c. 

4. Draw a figure, with order of rotation as:
   a. 3 b. 2 c. 4

5. Find the 10th and 15th triangular numbers.

6. Find the 15th and 24th square numbers.

Activities

Individual work

Magic Square

Magic square is a square table with a few numbers written on it based on a pattern. Magic square is magical because of following reasons:

- Sum of the number of each row is equal to its magic sum.
- Sum of the number of each column is equal to its magic sum.
- Sum of the number of each diagonal is equal to its magic sum.

Let's take an example of 3×3 magic square.

Sum of the rows	Sum of the columns	Sum of the diagonals
$2 + 9 + 4 = 15$	$2 + 7 + 6 = 15$	$2 + 5 + 8 = 15$
$7 + 5 + 3 = 15$	$9 + 5 + 1 = 15$	$4 + 5 + 6 = 15$
$6 + 1 + 8 = 15$	$4 + 3 + 8 = 15$	

2	9	4
7	5	3
6	1	8

MAGIC SUM = 15

Now, think and prepare:

1. 4×4 Magic Square
2. 5×5 Magic Square
3. 6×6 Magic Square

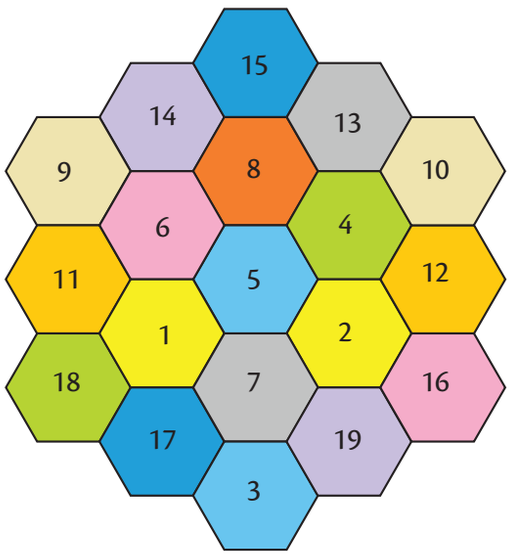
Also, find their magic sums.

Group work

Magic Hexagons

Divide the class in pairs and ask them to cut out some pictures of hexagons. Now, ask them that they will be forming magic hexagons.

Tell the students that like magic squares, magic hexagon is a hexagon made up of some numbers. The total number of each row is equal to its magic sum. For example, given alongside is a magic hexagon whose sum of the rows, columns and diagonals is 38.



Here, magic sum is 38.

Enrichment

Patterns in a Calendar

We all use calendars to know the day, date and months, but calendars have much more in them. Calendars have some very interesting number patterns.

Let us look at the calendar of January 2018.

1. Let us choose a row, say,

7 8 9 10 11 12 13

Here, first number + last number = 7 + 13 = 20 = Double of the Middle Number '10'

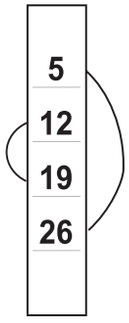
Second number + Second last number = 8 + 12 = 20 = Double of 10

Third number + Third last number = 9 + 11 = 20 = Double of 10

Also, middle number × 7 = Sum of all the numbers (10 × 7 = 7 + 8 + 9 + 10 + 11 + 12 + 13)

Isn't it interesting? Try the same with another row.

2. Now, choose a column, say

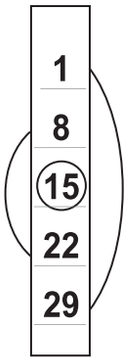


Here, first number + last number = 5 + 26 = 31

Second number + second last number = 12 + 19 = 31

See, the sums are again equal.

3. Now, choose a column with five numbers say,



Here, 1 + 29 = 8 + 22 = 30 = Double of the middle number, 15

Also, middle number × numbers in column = Sum of all the numbers in column

15 × 5 = 1 + 8 + 15 + 22 +29

75 = 75

Wow !!! Now, find some more interesting patterns and amaze your friends and parents.

Chapters 1 and 2

Worksheet 1

1. Insert commas and write the number names of the following numbers according to the Indian and International systems of numeration.

   a. 11679265 b. 78523109 c. 902649834

   d. 88721679 e. 5392134 f. 23819076

2. Solve the following expressions.

   a. 36,43,890 + 63,54,219 – 29,13,990 b. 9,56,33,288 – 63,94,235 – 2,34,56,789

   c. 25,29,43,248 – 12,69,34,232– 1,02,83,119 d. 8,95,49,322 – 1,23,93,261 + 2,20,30,102

3. Form the greatest and the smallest 7-digit number by repeating the digits only once.

   a. 6, 2, 1, 3, 4, 0 b. 4, 9, 1, 3, 0, 2 c. 1, 5, 0, 9, 4, 2

4. Population of village A is 14,75,842 and that of village B is 8,74,329. Find the total population of village A and B. Also, find the difference between the population of the two villages.

5. Arrange the following numbers in ascending order.

   a. 26,90,50,786; 3,23,86,209; 3,12,34,689; 16,23,04,339; 3,43,34,092

   b. 1,23,09,465; 7,09,23,888; 75,45,31,108; 30,60,23,168; 9,23,14,112

6. A newly opened restaurant with different branches in India tried to promote its business by distributing pamphlets in the different cities. Around 1,20,30,489 pamphlets were distributed, out of which 50,34,980 pamphlets were received and read by the people, 18,25,356 pamphlets were only received by the people and rest of the pamphlets were not received. Determine the number of pamphlets that were not received by the people.

7. Write the following Roman numerals as Hindu-Arabic numerals.

   a. DCCCXCIV b. CCLV c. XVI d. DLIV e. CDLXI f. CM

8. Simplify the following numbers.

   a. Add sixty lakh fifty-eight thousand three hundred twenty-five and nine lakh fifteen thousand five hundred twenty-three

   b. Subtract one crore twenty-three lakh five hundred twenty-nine from sixty crore thirty-three lakh twenty-five thousand five hundred forty-one

9. First round off the following numbers to the nearest 1000s and then solve.

   a. 2,33,286 + 8,54,298 b. 4,57,386 – 3,36,710

   c. 34,84,387 + 41,92,428 d. 18,72,547 – 4,13,845

Chapters 3 and 4

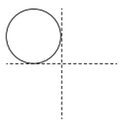
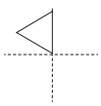
Worksheet 2

1. Circle the triangular numbers with black sketch pen and square numbers with blue sketch pen among the given numbers.
   3, 5, 6, 7, 8, 9, 11, 13, 25, 30, 33, 36, 39, 49, 60, 64, 78, 81, 99, 100

2. Find the unit of repeat and complete the pattern.

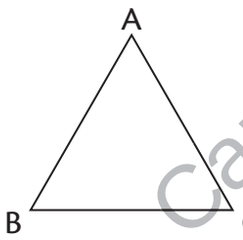
Operation	Unit of repeat	Pattern
Add	....	4203, 4206, 4209, ..., ..., ... 5250, 5255, 5260, ..., ..., ...
Subtraction	....	5276, 5270, 5264, ..., ..., ... 2978, 2970, 2962, ..., ..., ...
Multiply	....	6, 36, ..., 1296, ... 8, ..., 512, ..., 32768
Divide	....	20000, 2000, ..., 20, ... 12500, ..., ..., 100, ...

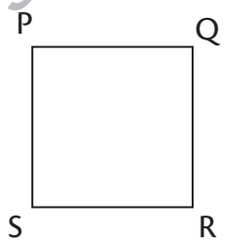
3. Complete the other part of the given figure so that they look symmetrical.

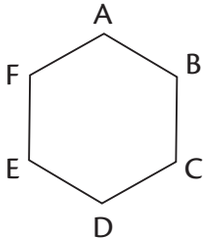
   a.  b.  c.  d. 

4. Draw the figure whose order of rotation is given as follows:
   a. 2 b. 4 c. 3

5. Name all possible angles in the following figures.

   a. 

   b. 

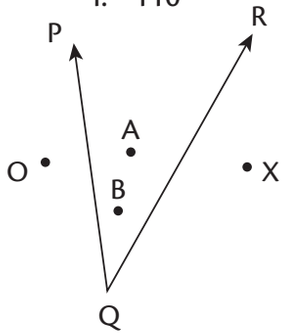
   c. 

6. Construct the angles of the following measures and identify them as acute, obtuse and right angle.
   a. 90° b. 120° c. 159° d. 70° e. 50° f. 110°

7. Look at the figure (given alongside) carefully and answer the following questions.

   a. Name the points that are in the interior of ∠PQR.

   b. Name the points that are in the exterior of ∠PQR.



Sample Test Paper

1. Check which of the following statements are true or false.
   a. The sum of 96,359 and 8,96,45,545 is 8,97,41,914. .....
   b. The place value and face value of digit 6 in number 67,89,231 are 60,00,000 and 6, respectively. ....
   c. 5,23,19,389 rounded off to the nearest 100s is 5,23,19,300. .....
   d. CXC is the Roman numeral form of number 190. .....

2. Insert commas and write the following numbers in words according to the Indian and International systems of numeration.
   a. 6792145 b. 4368521 c. 57762930 d. 8456300 e. 9278950

3. Write the following numbers in expanded form according to the International system of numeration.
   a. 7,768,375 b. 38,689,578 c. 87,453,726 d. 216,709,367 e. 55,789,456

4. Form the greatest and the smallest 9-digit numbers, when repetition of digits is allowed only once.
   a. 4, 3, 0, 1, 2, 8, 7, 6
   b. 9, 5, 2, 0, 1, 6, 7, 8

5. Write the following numbers as Roman numerals.
   a. 350 b. 601 c. 76 d. 100 e. 167

6. Solve the following addition and subtraction problems.

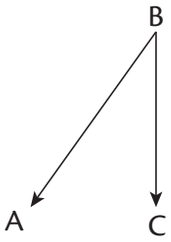
a.	b.	c.	d.
619324813	326100275	7653825	5987765
+ 167843192	+ 570853224	– 6825743	– 3953654
_____	_____	_____	_____
_____	_____	_____	_____

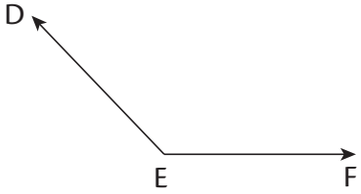
7. Round off the numbers first to the nearest 10s and then solve.
   a. 15,628 + 20,498
   b. 17,98,205 – 1,20,406 + 14,20,119

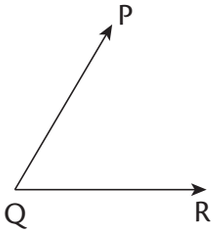
8. The savings of Mr Rizwan is ₹3,40,629 and that of Mrs Reena is ₹2,31,398. Find how much more did Mr Rizwan save than Mrs Reena.

9. Fernandez book distributors sold 20,20,645 books in the month of June and 3,27,345 books in the next month. Estimate the total number of books sold by Fernandez book distributors in the two months by first rounding off to the nearest 100s.

10. Name the arms and vertex of the following angles.

a. 

b. 

c. 

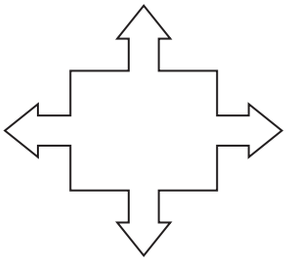
11. Which of the following are triangular numbers? Circle them.

a. 6 b. 9 c. 10 d. 14 e. 27 f. 24

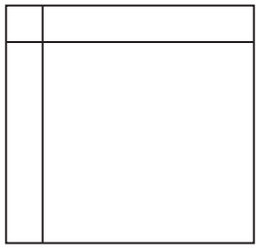
12. Sort out the given angles as acute, obtuse or right angle.

a. 160° b. 90° c. 50°
d. 130° e. 110° f. 70°

13. Draw the line(s) of symmetry of the following shapes.

a. 

b. 

c. 

14. Draw a net of a cone and a cylinder.

Answer Key

Chapter 1 – Numbers

Warm-up

99,999 1,00,000 3,05,069 5 55,006 5,000

Mental Maths

Numbers	Number names
10,00,00,000	Ten crores
20,00,00,000	Twenty crores
30,00,00,000	Thirty crores
40,00,00,000	Forty crores
50,00,00,000	Fifty crores
60,00,00,000	Sixty crores
70,00,00,000	Seventy crores
80,00,00,000	Eighty crores
90,00,00,000	Ninety crores

Let's Practice 1.1

1. a. 2,86,35,297; 2,86,35,298; 2,86,35,299
   b. 15,27,30,181; 15,27,30,183; 15,27,30,184
   c. 13,25,496; 13,25,497; 13,25,498; 13,25,499
   d. 12,37,28,018; 12,37,28,019; 12,37,28,021; 12,37,28,022
   e. 59,25,199; 59,25,201; 59,25,202; 59,25,203
   f. 1,69,82,996; 1,69,82,997; 1,69,82,998; 1,69,82,999
2. a. 28,31,642 - Twenty-eight lakh thirty-one thousand six hundred forty-two
   b. 62,88,537 - Sixty-two lakh eighty-eight thousand five hundred thirty-seven
   c. 5,77,36,273 - Five crore seventy-seven lakh thirty-six thousand two hundred seventy-three
   d. 1,00,12,397 - One crore twelve thousand three hundred ninety-seven
   e. 90,88,00,459 - Ninety crore eighty-eight lakh four hundred fifty-nine
   f. 31,56,28,132 - Thirty-one crore fifty-six lakh twenty-eight thousand one hundred thirty-two
3. a. 2,00,38,622 b. 26,99,435
   c. 76,00,00,003 d. 90,95,99,099
   e. 85,42,072 f. 64,00,75,239
4.

Numbers	Crores		Lakhs		Thousands		Ones		
	Ten Crores	Crores	Ten Lakhs	Lakhs	Ten Thousands	Thousands	Hundreds	Tens	Onse
30,90,113			3	0	9	0	1	1	3
1,21,29,409		1	2	1	2	9	4	0	9
13,02,03,040	1	3	0	2	0	3	0	4	0
90,70,65,040	9	0	7	0	6	5	0	4	0
9,94,01,002		9	9	4	0	1	0	0	2
42,18,10,021	4	2	1	8	1	0	0	2	1

5. 1,98,27,000 - One crore ninety-eight lakh twenty-seven thousand
   20,00,000 - Twenty lakh
   2,38,67,000 - Two crore thirty-eight lakh sixty-seven thousand
   1,00,00,000 - One crore
   2,58,000 - Two lakh fifty-eight thousand

Let's Practice 1.2

1. a. 8,00,000; 8 b. 6,00,00,000; 6 c. 10; 1
   d. 9,00,000; 9 e. 10,00,00,000; 1 f. 7,00,000; 7
2. a. 297 b. 3,99,996 c. 0
   d. 7,99,992 e. 29,99,997 f. 2,99,99,997
3. a. $1 \times 10,00,00,000 + 2 \times 1,00,00,000 + 3 \times 10,00,000 + 8 \times 1,00,000 + 6 \times 10,000 + 7 \times 1,000 + 2 \times 100 + 9 \times 10 + 9 \times 1$
   b. $3 \times 10,00,00,000 + 4 \times 10,00,000 + 9 \times 1,00,000 + 2 \times 10,000 + 5 \times 1,000 + 6 \times 100 + 8 \times 1$
   c. $4 \times 10,00,00,000 + 1 \times 1,00,00,000 + 2 \times 10,00,000 + 9 \times 1,00,000 + 3 \times 10,000 + 5 \times 1,000 + 6 \times 100 + 7 \times 10 + 2 \times 1$
   d. $1 \times 10,00,000 + 4 \times 1,00,000 + 2 \times 10,000 + 9 \times 1,000 + 9 \times 1$
   e. $1 \times 10,00,000 + 4 \times 1,00,000 + 7 \times 10,000 + 8 \times 1,000 + 2 \times 100 + 9 \times 10 + 3 \times 1$
   f. $2 \times 10,00,000 + 9 \times 1,00,000 + 9 \times 10,000 + 9 \times 1,000 + 2 \times 100 + 8 \times 10 + 4 \times 1$
4. a. 66,58,97,599 b. 35,07,80,258 c. 42,01,10,865
   d. 4,03,06,269 e. 80,04,20,508 f. 6,09,86,327

Let's Practice 1.3

1. a. > b. < c. >
   d. = e. > f. <
2. a. 21,36,298; 25,31,990; 30,41,709; 39,44,599; 68,22,490
   b. 2,15,16,758; 3,21,16,177; 5,19,68,752; 10,15,26,359; 19,21,38,459

c. 1,16,94,133; 1,70,00,009; 2,99,99,999; 10,00,00,000; 15,90,60,351
d. 16,44,593; 3,88,19,279; 6,39,41,239; 18,29,42,615; 60,13,24,432
e. 6,03,03,003; 6,09,09,009; 9,03,03,003; 9,06,06,006; 30,06,06,006

3. a. 41,28,13,685; 21,34,29,682; 13,25,68,791; 5,29,99,206
b. 89,61,28,299; 54,16,19,119; 47,19,84,090; 31,19,26,482
c. 76,45,00,089; 64,14,19,201; 5,23,96,000; 12,68,192
d. 8,49,77,299; 7,01,62,545; 3,84,19,500; 13,44,688
e. 66,66,66,666; 33,33,33,333; 5,55,55,555; 44,44,444

4. a. Greatest number: 98,74,320; Smallest number: 20,34,789
b. Greatest number: 8,76,54,321; Smallest number: 1,23,45,678
c. Greatest number: 9,87,65,430; Smallest number: 3,04,56,789

5. a. 1,00,45,669 b. 1,12,34,679 c. 1,00,24,678

6. a. 99,87,652 b. 66,54,210 c. 99,84,310

Let's Practice 1.4

1. a. 4,38,68,000 b. 39,45,20,920 c. 24,10,09,110
d. 1,29,38,420 e. 3,33,45,290 f. 3,26,00,530

2. a. 6,29,38,500 b. 2,15,28,300 c. 3,44,11,300
d. 25,39,84,700 e. 66,20,00,100 f. 60,06,50,100

3. a. 1,38,25,000 b. 24,39,000 c. 16,26,000
d. 13,42,60,000 e. 6,27,00,000 f. 40,00,01,000

Let's Practice 1.5

1. a. 9,428,364 - Nine million four hundred twenty-eight thousand three hundred sixty-four
b. 65,302,419 -Sixty-five million three hundred two thousand four hundred nineteen
c. 4,529,162 - Four million five hundred twenty-nine thousand one hundred sixty-two
d. 326,288,537 -Three hundred twenty-six million two hundred eighty-eight thousand five hundred thirty-seven
e . 577,627,389 - Five hundred seventy-seven million six hundred twenty-seven thousand three hundred eighty-nine
f. 78,523,106 - Seventy-eight million five hundred twenty-three thousand one hundred six

2. a. 2,038,622 b. 8,000,039 c. 254,609,430
d. 2,006,344 e. 699,000

Let's Practice 1.6

1. a. CCCXIX b. CCCLXX c. DV
d. DLV e. DCXI f. CMXC

2. a. 415 b. 767 c. 966
d. 138 e. 698 f. 900

Brain Teaser

1. 604800, $6 \times 1,00,000 + 4 \times 1000 + 8 \times 100$
2. 1,11,11,117 3. 99,99,99,990
4. a. LXXX b. MCCCLXXVI c. I d. CDXLIV

Assessment

1. a. 9 b. 409000 c. 2
d. 10 e. 10 f. 10

2. a. Twelve crore fifty-eight lakh thirty-six thousand two hundred seventy-nine
b. Three hundred twenty-three million four hundred fifty-six thousand one hundred twenty-nine
c. Sixty-seven crore fifty-one thousand two hundred one
d. Five hundred million two hundred one thousand three hundred ninety-seven

3. a. $1 \times 10,00,00,000 + 4 \times 1,00,00,000 + 5 \times 10,000 + 8 \times 1,000 + 2 \times 100 + 9 \times 10$
b. $1 \times 10,00,00,000 + 3 \times 1,00,00,000 + 2 \times 10,00,000 + 5 \times 1,00,000 + 8 \times 10,000 + 3 \times 1,000 + 1 \times 100 + 9 \times 10 + 6 \times 1$
c. $3 \times 10,00,00,000 + 4 \times 1,00,00,000 + 5 \times 10,00,000 + 6 \times 1,00,000 + 1 \times 10,000 + 3 \times 100 + 5 \times 10 + 4 \times 1$
d. $9 \times 1,00,00,000 + 4 \times 10,00,000 + 5 \times 1,00,000 + 2 \times 10,000 + 3 \times 1,000 + 1 \times 10 + 9 \times 1$

4. $9 \times 1,00,00,000 + 9 \times 10,00,000 + 9 \times 1,00,000 + 9 \times 10,000 + 9 \times 1,000 + 9 \times 100 + 9 \times 10 + 9 \times 1$

5. $1 \times 10,00,00,000$

6. a. Smallest 8-digit number > Largest 7-digit number
b. 124569 < 765210 c. 449 > 299
d. 483 < 834

7. **Indian system:**
a. 23,84,47,712 - Twenty-three crore eighty-four lakh forty-seven thousand seven hundred twelve
b. 13,25,647 - Thirteen lakh twenty-five thousand six hundred forty-seven
c. 2,36,35,555 - Two crore thirty-six lakh thirty-five thousand five hundred fifty-five
d. 10,00,15,722 - Ten crore fifteen thousand seven hundred twenty-two
e. 10,01,00,100 - Ten crore one lakh one hundred
f. 3,09,12,005 - Three crore nine lakh twelve thousand five

International system:
a. 238,447,712 - Two hundred thirty-eight million four hundred forty-seven thousand seven hundred twelve
b. 1,325,647 - One million three hundred twenty-five thousand six hundred forty-seven
c. 23,635,555 -Twenty-three million six hundred thirty-five thousand five hundred fifty-five
d. 100,015,722 - One hundred million fifteen thousand seven hundred twenty-two
e. 100,100,100 - One hundred million one hundred thousand one hundred
f. 30,912,005 - Thirty million nine hundred twelve thousand five

8. a. 12,88,740; 12,88,700; 12,89,000
b. 14,29,010; 14,29,000; 14,29,000
c. 28,14,00,080; 28,14,00,100; 28,14,00,000
d. 60,40,05,110; 60,40,05,100; 60,40,05,000
e. 36,48,590; 36,48,600; 36,49,000
f. 20,71,01,030; 20,71,01,000; 20,71,01,000

Chapter 2 – Addition and Subtraction

Warm-up

Father – 46 yrs; Mother – 42 yrs; Elder sister – 12 yrs; Younger brother – 7 yrs; Grandfather – 68 yrs; Grandmother – 66 yrs; Uncle – 33 yrs; Aunt – 29 yrs; Cousin sister – 6 yrs

Let's Practice 2.1

1. a. 99,885 b. 99,679 c. 49,888
   d. 65,571 e. 88,266 f. 91,152
2. a. 3,99,978 b. 9,94,947 c. 8,47,635
   d. 9,20,777 e. 7,56,463 f. 9,10,720
3. a. 76,68,889 b. 95,79,938 c. 79,98,798
   d. 99,92,065 e. 91,94,648 f. 70,39,938
4. a. 3,77,98,789 b. 9,89,89,889 c. 5,99,98,858
   d. 8,28,55,801 e. 9,09,03,014 f. 9,99,28,330
5. a. 58,99,99,986 b. 45,14,85,065 c. 81,75,02,323
   d. 89,04,89,106 e. 89,60,75,497 f. 67,18,29,455
6. a. 28,89,59,579 b. 2,88,87,996 c. 10,00,00,000
   d. 4,01,50,351 e. 5,01,86,504 f. 2,93,85,314
7. a. 2,50,28,555 b. 29,00,00,438 c. 8,21,27,838
   d. 69,68,75,312 e. 13,17,387

Mental Maths

1. 32,457 2. 1,72,451
3. 84,499 4. 92,745

Let's Practice 2.2

1. a. 13,934 b. 47,058 c. 25,521
   d. 33,834 e. 28,754 f. 21,465
2. a. 1,13,112 b. 1,43,112 c. 3,52,111
   d. 1,08,860 e. 10,888 f. 2,01,045
3. a. 14,12,111 b. 15,13,122 c. 13,09,117
   d. 10,98,085 e. 10,51,646 f. 22,99,848
4. a. 1,45,11,113 b. 3,35,01,120 c. 1,41,10,501
   d. 3,44,68,928 e. 12,44,517 f. 6,67,80,421
5. a. 5,00,13,302 b. 3,54,87,456 c. 31,29,09,801
   d. 17,80,84,562 e. 8,73,04,379 f. 10,72,03,010
6. a. 2,41,01,333 b. 19,01,53,214 c. 4,70,112
   d. 90,71,62,535 e. 5,50,89,202 f. 45,29,20,092
7. a. 4,01,60,940 b. 1,83,85,661 c. 2,01,73,880
   d. 16,99,02,706 e. 9,75,00,000

Let's Practice 2.3

1. a. 17,22,60,111 b. 76,54,321 c. 19,41,16,598
   d. 2,04,986 e. 39,06,409 f. 90,437
2. a. 4,69,174 b. 1,42,89,718 c. 84,933
   d. 9,05,446 e. 6,49,506
3. 3,08,244
4. (28,945 + 5,62,894) > (3,81,399 + 93,465); 1,16,975
5. ₹28,000 6. ₹1,27,27,399
7. 4,566 8. 17,742

Let's Practice 2.4

1. a. 48,170 b. 1,09,950 c. 68,830
   d. 20,510 e. 33,980 f. 75,160
2. a. 37,100 b. 11,36,800 c. 58,600
   d. 7,42,000 e. 2,21,600 f. 1,64,100
3. a. 1,17,000 b. 24,000 c. 33,000
   d. 2,42,000 e. 2,02,000 f. 19,000
4. 8,98,100 5. 27,940

Brain Teaser

1. 99,75,210; 10,02,579; Difference: 89,72,631
2. A + C – B = 13,41,162, A + B (16,95,081) > C – B (9,98,900)

Assessment

1. a. 11,02,18,715 b. 8,07,83,489 c. 9,60,017
   d. 35,10,447 e. 52,50,511 f. 2,23,556
2. a. 3,94,500 b. 2,93,000 c. 10,800
   d. 1,11,000 e. 23,67,000 f. 4,17,000
3. a.

	C	TL	L	TTh	Th	H	T	O
	4	2	5	6	9	2	1	9
+	2	9	4	0	8	5	7	3
	7	1	9	7	7	7	9	2

   b.

	TC	C	TL	L	TTh	Th	H	T	O
	5	9	5	2	7	3	4	6	1
–	2	0	7	5	8	0	2	7	3
	3	8	7	6	9	3	1	8	8

4. 33,26,939
5. a. ₹1,86,280 b. ₹2,17,518
   c. ₹3,27,799 d. ₹4,79,797
6. 1,70,87,6122 7. 20,64,812
8. ₹ 9,73,611

Chapter 3 – Geometry

Warm-up

1. Point X
2. Ray, $\overrightarrow{CD}$
3. Line segment, $\overline{MN}$
4. Ray, $\overrightarrow{PQ}$
5. Line segment, $\overline{RS}$
6. Line, $\overleftrightarrow{TO}$

Let's Practice 3.1

1.

Arms	Vertex
$\overrightarrow{ED}$, $\overrightarrow{EF}$	E
$\overrightarrow{ON}$, $\overrightarrow{OM}$	O
$\overrightarrow{OA}$, $\overrightarrow{OB}$	O
$\overrightarrow{QP}$, $\overrightarrow{QR}$	Q
$\overrightarrow{YX}$, $\overrightarrow{YZ}$	Y
$\overrightarrow{BA}$, $\overrightarrow{BC}$	B

2. a. *∠GAB, ∠ABC, ∠BCD, ∠CDE, ∠DEF, ∠EFG, ∠FGA*
   b. *∠PQR, ∠QRS, ∠RST, ∠STP, ∠TPQ*
   c. *∠A, ∠B, ∠C, ∠D* d. *∠M, ∠N, ∠O, ∠P, ∠Q*

Let's Practice 3.3

1. Acute angle; Obtuse angle; Right angle; Obtuse angle; Acute angle; Obtuse angle
2. a. Obtuse angle b. Right angle c. Acute angle
   d. Acute angle e. Obtuse angle f. Acute angle

Mental Maths

1-c; 2–d; 3–b; 4 –a

Brain Teaser

1. Right angle
2. Obtuse angle
4. 60 min

Assessment

1. a. i b. iii c. ii d. ii
2. a. ∠A, ∠B, ∠C, ∠D b. ∠P, ∠Q, ∠R, ∠S, ∠T, ∠U
   c. ∠M, ∠MNP, ∠ONP, ∠O, ∠OPN, ∠MPN
4. a. acute angle b. acute angle c. right angle
   d. obtuse angle e. obtuse angle f. acute angle

Chapter 4 – Patterns and Symmetry

Let's Practice 4.2

1. a. Line of symmetry b. Asymmetrical
   c. Asymmetrical d. Line of symmetry
   e. Asymmetrical f. Asymmetrical

Let's Practice 4.3

1. c,d,e and f show reflection symmetry.

Let's Practice 4.4

1. **Square:**
   Square has rotational symmetry.
   Centre of rotation is **O**.
   Order of rotation is **4**.
   Rectangle:
   Rectangle **has** rotational symmetry.
   Centre of rotation is **O**.
   Order of rotation is **2**.
2. a. O,5 b. Q,2 c. P,3 d. A,6

Let's Practice 4.5

2.

Operation	Unit of repeat	Pattern
Add	3	3136 , 3139
	10	4836 , 4846 , 4876
Subtract	2	2423 , 2421
	5	2850 , 2840
Multiply	2	480 , 1920
	12	144 , 20,736
Divide	2	10,000 , 1250
	10	100 , 1

Let's Practice 4.6

1. 4,16,25,36,49,64 and 100
2. 1,3,6,10,15,21,28
3. $2 \times 2 = 4$
   $3 \times 3 = 9$
   $4 \times 4 = 16$
   $5 \times 5 = 25$
   $6 \times 6 = 36$
   $7 \times 7 = 49$
   $8 \times 8 = 64$
   $9 \times 9 = 81$
   $10 \times 10 = 100$
   $11 \times 11 = 121$
   $12 \times 12 = 144$

Assessment

2. a. false b. true c. false
   d. true e. false f. false
5. 55, 120
6. 225, 576

Worksheet 1

1. a. **IS:** 1,16,79,265 = One crore sixteen lakh seventy-nine thousand two hundred sixty-five
   Ins: 11,679,265 = Eleven million six hundred seventy-nine thousand two hundred sixty-five
   b. **IS:** 7,85,23,109 = Seven crore eighty-five lakh twenty-three thousand one hundred nine
   Ins: 78,523,109 = Seventy-eight million five hundred twenty-three thousand one hundred nine
   c. **IS:** 90,26,49,834 = Ninety crore twenty-six lakh forty-nine thousand eight hundred thirty-four
   Ins: 902,649,834 = Nine hundred two million six hundred forty-nine thousand eight hundred thirty-four
   d. **IS:** 8,87,21,679 = Eight crore eighty-seven lakh twenty-one thousand six hundred seventy-nine
   Ins: 88,721,679 = Eighty-eight million seven hundred twenty-one thousand six hundred seventy-nine
   e. **IS:** 53,92,134 = Fifty-three lakh ninety-two thousand one hundred thirty-four
   Ins: 5,392,134 = Five million three hundred ninety-two thousand one hundred thirty-four
   f. **IS:** 2,38,19,076 = Two crore thirty-eight lakh nineteen thousand seventy-six
   Ins: 23,819,076 = Twenty-three million eight hundred nineteen thousand seventy-six
2. a. 70,84,119 b. 6,57,82,264
   c. 11,57,25,897 d. 9,91,86,163
3.

	Greatest	Smallest
a.	66,43,210	10,02,346
b.	99,43,210	10,02,349
c.	99,54,210	10,02,459

4. 23,50,171; 6,01,513
5. a. 3,12,34,689; 3,23,86,209; 3,43,34,092, 16,23,04,339; 26,90,50,786
   b. 1,23,09,465; 7,09,23,888; 9,23,14,112; 30,60,23,168; 75,45,31,108
6. 51,70,153
7. a. 894 b. 255 c. 16 d. 554 e. 461 f. 900
8. a. 69,73,848 b. 59,10,25,012
9. a. 10,87,000 b. 1,20,000
   c. 76,76,000 d. 14,59,000

Worksheet 2

1. Triangular numbers: 3, 6, 36, 78
   Square numbers: 9, 25, 36, 49, 64, 81, 100
2. 3; 4212, 4215, 4218 5; 5265, 5270, 5275
   6; 5258, 5252, 5246 8; 2954, 2946, 2938
   6; 216, 7776 8; 64, 4096
   10; 200, 2 5; 2500, 500, 20
5. a. ∠A, ∠B, ∠C b. ∠P, ∠Q, ∠R, ∠S
   c. ∠A, ∠B, ∠C, ∠D, ∠E, ∠F

6. Acute: d, e
   Obtuse: b, c, f
   Right: a
7. a. A, B b. O, X

Sample Test Paper

1. a. False b. True c. False d. True
2. a. **IS:** 67,92,145 = Sixty-seven lakh ninety-two thousand one hundred forty-five
   Ins: 6,792,145 = Six million seven hundred ninety-two thousand one hundred forty-five
   b. **IS:** 43,68,521 = Forty-three lakh sixty-eight thousand five hundred twenty-one
   Ins: 4,368,521 = Four million three hundred sixty-eight thousand five hundred twenty-one
   c. **IS:** 5,77,62,930 = Five crore seventy-seven lakh sixty-two thousand nine hundred thirty
   Ins: 57,762,930 = Fifty-seven million seven hundred sixty-two thousand nine hundred thirty
   d. **IS:** 84,56,300 = Eight-four lakh fifty-six thousand three hundred
   Ins: 8,456, 300 = Eight million four hundred fifty-six thousand three hundred
   e. **IS:** 92,78,950 = Ninety- two lakh seventy-eight thousand nine hundred fifty
   Ins: 9,278,950 = Nine million two hundred seventy-eight thousand nine hundred fifty
3. a. 7,768,375 = 7× 1,00,000 + 7 × 1,00,000 + 6 × 10,000 + 8 × 1000 + 3 × 100 + 7 × 10 + 5
   b. 38,689,578 = 3 × 10,000,000 + 8 × 1,000,000 + 6 × 100,000 + 8 × 10,000 + 9 × 1000 + 5 × 100 + 7 × 10 + 8
   c. 87,453,726 = 8 × 10,000,000 + 7 × 1,000,000 + 4 × 1,00,000 + 5 × 10,000 + 3 × 1000 + 7 × 100 + 2 × 10 + 6
   d. 216,709,367 = 2 × 100,000,000 + 1 × 10,000,000 + 6 × 1,000,000 + 7 × 100,000 + 9 × 1000 + 3 × 100 + 6 × 10 + 7
   e. 55,789,456 = 5 × 10,000,000 + 5 × 1,000,000 + 7 × 100,000 + 8 × 10,000 + 9 × 1000 + 4 × 100 + 5 × 10 + 6
4. a. G – 88,76,43,210 S – 10,02,34,678
   b. G – 99,87,65,210 S – 10,02,56,789
5. a. CCCL b. DCI c. LXXVI
   d. C e. CLXVII
6. a. 78,71,68,005 b. 89,69,53,499
   c. 8,28,082 d. 20,34,111
7. a. 36,130 b. 30,97,920
8. ₹ 1,09,231
9. 23,47,900
10.

	Arms	Vertex
a.	BA, BC	B
b.	ED, EF	E
c.	QP, QR	Q

11. a, c
12. Acute: c, f,
    Obtuse: a, d, e
    Right: b

Science

Chapter 1

Human Body: The Circulatory System

Chapter Objectives

- Learn about the different organs of the circulatory system and their functions
- Learn the functions of blood
- Learn about the types of blood vessels—arteries, veins and capillaries
- Understand the process of blood circulation.

LET'S BEGIN

Geeta likes to jog every morning. After running for a while, her breathing becomes heavy. When she keeps her palm on her chest, she feels her heart is beating very fast. However, after taking rest for some time, the heartbeats become normal. Why do you think this happens? List out the reasons.

Life Connect

.....

.....

.....

.....

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.....

THE CIRCULATORY SYSTEM

The food we eat, the water we drink and the air we breathe in, must reach different organs of our body so that they function properly. At the same time, waste products, such as carbon dioxide, must be expelled out of our body. This transportation of substances in our body is carried out by the circulatory system. Thus, we can define circulatory system as the organ system that allows circulation and transportation of nutrients and oxygen in the body as well as the removal of waste products from our body.

Which component of air do we breathe in? .....

The different parts of the circulatory system are:

- Heart
- Blood
- Blood vessels

The **heart** is a muscular organ that pumps the **blood** through a complex network of **blood vessels** extending to different organs. The blood carries essential nutrients and oxygen to different organs. It also plays a vital role in removing waste products from these organs.

Let us learn about the parts of circulatory system in detail.

HEART

The human **heart** is a fist-sized muscular organ located between the lungs. The heart's function is to pump blood to different organs of the body through the blood vessels.

INFO HUB

The heart is protected by the ribcage.

Structure of the Heart

The heart is divided into four chambers. The upper two chambers are called **auricles** or **atria** (singular: Atrium). The lower two chambers are called **ventricles**.

Teaching Tip: Get a chart showing the human circulatory system. Let the students observe the system and come up with their own idea of functioning of the circulatory system. Encourage the students to discuss the process of circulatory system.

The two upper chambers are called the **left atrium** and **right atrium**. The two lower chambers are called the **left ventricle** and **right ventricle**.

- The right auricle receives blood from the different parts of the body. This blood contains waste materials.
- The left auricle receives oxygen-rich blood from the lungs. This blood is rich in oxygen.
- The right ventricle pumps out blood containing waste materials (rich in carbon dioxide) to lungs.
- The left ventricle pumps the blood out of the heart to the different parts of the body. This blood is rich in nutrients and oxygen.

Keep your palm on your chest. You will feel your heartbeat. The rhythmic movement of heart while pumping the blood creates a sound called **heartbeat**. We can feel this movement, if we hold our wrist with our thumb. This throbbing feeling of the artery near the wrist is called **pulse**. The normal human pulse rate is 60–100 beats per minute.

Measuring pulse rate on the wrist

BLOOD

Blood is a special kind of fluid that flows in the tubular structures called **blood vessels**. It transports essential substances to different organs of the body. It transports:

- the nutrients obtained from the digested food from small intestine to all parts of the body.
- oxygen from lungs to all the cells of the body. It also takes back carbon dioxide from these cells to the lungs.
- liquid waste generated in the body to the kidneys for its removal.

There are three types of blood cells—red blood cells (RBCs), white blood cells (WBCs) and platelets.

Red Blood Cells: The RBCs present in the blood are responsible for absorbing oxygen from the air we breathe in and transporting it to all the cells of the body.

INFO HUB

Blood also helps in maintaining the ideal body temperature.

Throbbing: A sound with a strong rhythmic beat

The red colour of the blood is due to the presence of a pigment called **haemoglobin**. This pigment contains iron.

White Blood Cells: They help in building the immune system of the body by fighting against the various diseases-causing agents.

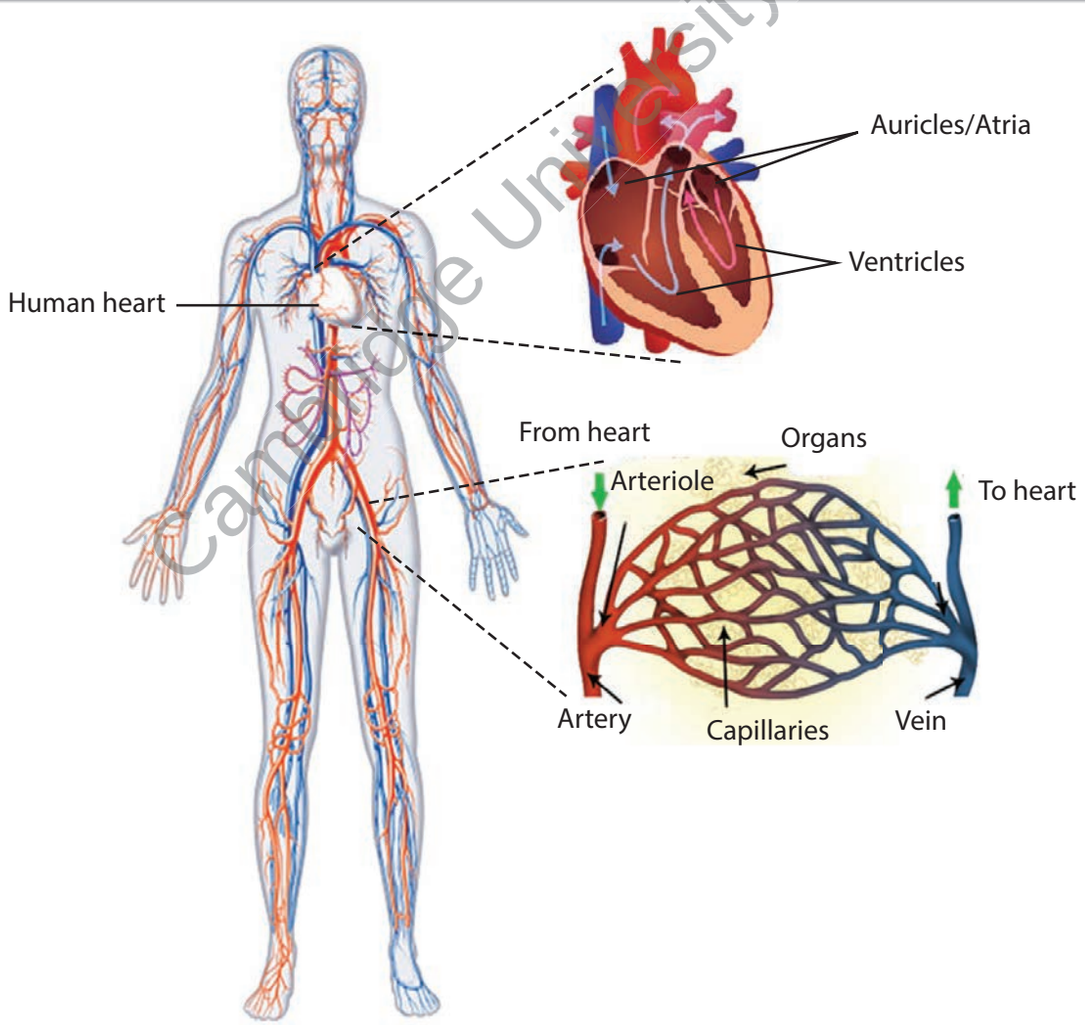
Platelets: They help in clotting of blood to prevent blood loss, in case of external or internal injury.

How is iron useful for the functioning of our body? Discuss in class.

ACTION TIME 1

Aim: To observe permanent blood slides.

Observe some blood slides in your school laboratory. Try to identify the various types of blood cells. Note down your observations.



The human circulatory system showing heart, arteries and veins

Immune: Protect or secure against

BLOOD VESSELS

The blood circulates throughout the body through a network of tubes called the **blood vessels**. Some of the blood vessels are discussed here:

Arteries: The blood vessels that carry blood away from the heart to different parts of the body are called arteries. Arteries branch out into smaller network of blood vessels called **arterioles**. These arterioles further lead to capillaries. They carry blood rich in oxygen.

Veins: The blood vessels that carry blood back to the heart from all parts of the body are called veins. There are two important veins—superior vena cava and inferior vena cava. **Superior vena cava** brings blood from those organs of the body that lie above the heart. **Inferior vena** cava brings blood from those organs of the body that lie below the heart. Veins carry blood rich in carbon dioxide and low in oxygen content.

INFO HUB

- The largest artery is the **aorta**.
- The **carotid artery** carries blood from the heart to the brain.
- Veins have valves that prevent blood going towards the heart from flowing back to the other parts.

Capillaries: The smallest blood vessels are called capillaries. Capillaries connect small arteries (arterioles) with small veins (venules). They have very thin walls, and all exchange of materials takes place at the capillary level.

Quick Check 1

Fill in the blanks.

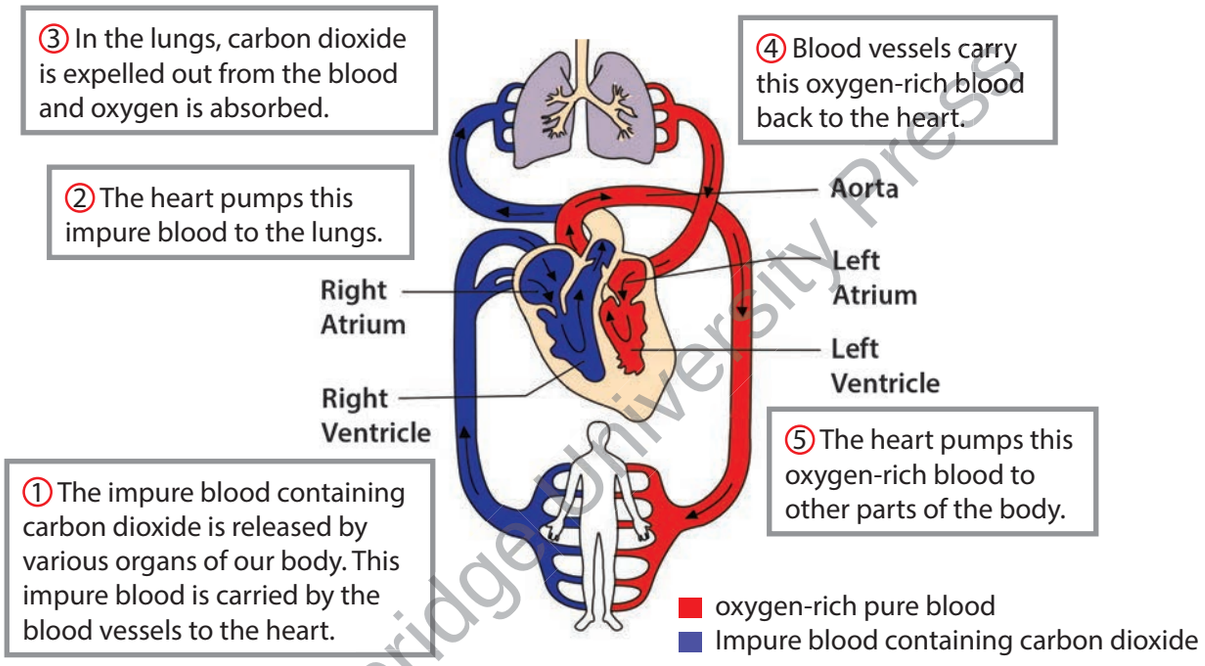
1. The heart is divided into ..... (**two**/**four**) chambers.
2. The throbbing feeling of the artery near the wrist is called ..... (**pulse**/**heartbeat**).
3. Blood is a special kind of fluid that flows in the tubular structures called ..... (**blood vessels**/**pipes**).
4. The red colour of blood is due to the presence of a pigment called .... (**haemoglobin**/**chlorophyll**).
5. ..... (**WBCs**/**Platelets**) help in clotting of blood to prevent blood loss.

ACTION TIME 2

Using the Internet, prepare cutouts of the circulatory system. Paste them on an outline diagram of a human body.

BLOOD CIRCULATION

The process of blood circulation throughout our body is summarised in the figure given here.



The stages in circulation of blood

Thus, the constant movement of blood throughout the body, by pumping of the heart is called **circulation**.

Quick Check 2

State true or false.

1. The blood circulates throughout the body through a network of tubes called the blood vessels.
2. The blood vessels that carry blood away from the heart to different parts of the body are called veins.
3. The smallest blood vessels are called capillaries.

4. Superior vena cava brings blood from those organs of the body that lie above the heart.
5. Arteries branch out into smaller network of blood vessels called arterioles.

A HEALTHY HEART

To have a healthy body, one must take care of their heart. We should adopt a healthy lifestyle so that our heart functions properly.

- **Be physically active:** We must exercise daily. Walking, running, skipping and jumping are some of the easy forms of exercise. Exercise gives our body strength and flexibility. It also provides our organs with sufficient oxygen.

  How do exercises provide us more oxygen? Discuss.

- **Choose outdoor sports:** We should make sure that we play at least one outdoor sport. Sports such as football, badminton, hockey and basketball can be played in a playground.
- **Do not watch TV while eating food:** Watching TV while eating food can lead to overeating. Overeating makes us obese. Excess deposition of fat in our body is not good for our health.
- **Eat a variety of nutritious food:** We must eat home-cooked food. We should include fruits and vegetables in our diet. Fruits and vegetables provide our bodies with fibre. Fibre is essential to maintain a healthy heart. We should also eat a balanced diet.
- **Avoid junk food:** Junk food does not contain essential nutrients required by our body to function properly. Also, junk food is rich in fat. It makes us gain weight. Thus, to maintain an ideal weight and healthy body, we must cut down on junk food.
- **Manage stress:** We should not think too much about our worries and problems. Overthinking leads to stress. Stress can have a bad impact on our organs. We should share our concerns with our elders.
- **Stay away from polluted surroundings:** Avoid places with smoke and people smoking cigarettes. Pollution can trigger heart diseases.

Obese: Extremely fat | **Trigger:** Make active

YOGA—A ROUTE TO A HEALTHY HEART

Every yoga pose has a direct effect on respiratory system, which in turn also benefits the circulatory system. Yoga exercises help to maintain a healthy heart and improve the blood circulation.

Yoga helps to:

- maintain normal levels of blood pressure in blood vessels
- increase capacity of lungs
- improve blood circulation
- improve heart rate
- reduce stress
- reduce weight

'Pranayama' is a part of the yoga system that teaches us the regulation of breath. It is a set of breathing techniques that helps to improve overall health. It provides our organs with abundant oxygen, thereby helping them function effectively.

ACTION TIME 3

Collect pictures of various yoga poses or *asanas*. Paste them on a chart paper. Also, name them.

KEY TERMS

Heart: A muscular organ that pumps blood to different organs of the body through the blood vessels

Heartbeat: The sound created by the rhythmic movement of the heart while pumping the blood

Atria: The two upper chambers of the heart

Ventricles: The two lower chambers of the heart

Blood: A special kind of fluid that flows in the blood vessels and transports essential substances to different organs of the body

Blood Vessels: A network of vessels through which blood circulates throughout the body

Capillaries: The smallest blood vessels

Blood Circulation: The constant movement of blood throughout the body, by pumping of the heart

Teaching Tip: The students can be encouraged and conveyed the importance of practicing yoga. | **Yoga:** A set of physical and mental exercises, originally from India, intended to give control over the body and mind. It should be practiced strictly under the guidance of a trained yoga expert or trainer.

QUICK NOTES

- We can define circulatory system as an organ system that allows circulation and transportation of nutrients and oxygen in the body as well as the removal of waste products from our body.
- The different parts of the circulatory system are heart, blood and blood vessels.
- The heart is divided into four chambers. The upper two chambers are called auricles or atria. The lower two chambers are called ventricles.
- The three kinds of blood cells are—red blood cells (RBCs), white blood cells (WBCs) and platelets.
- Arteries, veins and capillaries are the different types of blood vessels.
- Arteries carry blood rich in oxygen. Veins carry blood rich in carbon dioxide and low in oxygen content.
- We must adopt a healthy lifestyle so that our heart functions properly.

RUN-THROUGH

I. Very Short Answer Questions

A. Tick (✓) the correct answer.

1. The transportation of substances in our body is carried out by this organ system.
   a. Circulatory system ☐ b. Respiratory system ☐
   c. Digestive system ☐ d. None of these ☐
2. The two upper chambers of the heart are called ..... .
   a. ventricles ☐ b. aorta ☐ c. atria ☐ d. capillaries ☐
3. Which of the following is not a part of circulatory system?
   a. Heart ☐ b. Blood vessels ☐
   c. Blood ☐ d. Kidneys ☐
4. Blood flows in the tubular structures called ..... .
   a. blood vessels ☐ b. atria ☐
   c. ventricles ☐ d. none of these ☐
5. These helps in blood clotting.
   a. WBCs ☐ b. Platelets ☐ c. RBCs ☐ d. None of these ☐

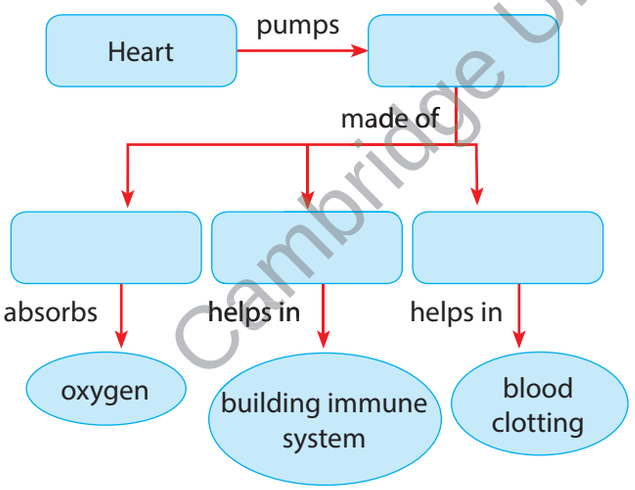
B. State true or false. Correct the false statement.

1. Blood does not remove waste from the body.
2. Superior vena cava brings blood from those organs of the body that lie below the heart.
3. The smallest blood vessels are called aorta.
4. Blood vessels are of two types only—arteries and veins.
5. The red blood cells help in building immune system of the body.

C. Guess, who am I?

1. The part of the circulatory system that carries essential nutrients and oxygen to different organs. It also plays a vital role in removing waste products from these organs. ……..
2. The throbbing feeling of the artery near the wrist. ……..
3. The pigment present in blood that gives it the red colour. ……..
4. The smaller blood vessels that branch out from arteries. ……..
5. The vein that brings blood from those organs of the body that lie above the heart. ……..

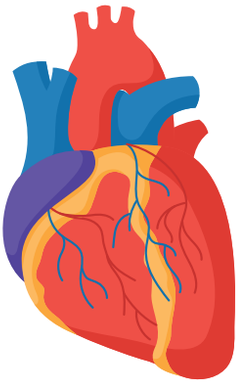
D. Complete the concept map.



Draw a concept map on 'Blood circulation in human body'.

II. Short Answer Questions

1. Name the different parts of the circulatory system.
2. What are red blood cells?
3. What is the use of arterioles?
4. What are the functions of blood?



5. Distinguish between the following.
   a. Superior vena cava and Inferior vena cava
   b. Pure and Impure blood
   c. Heartbeat and Pulse

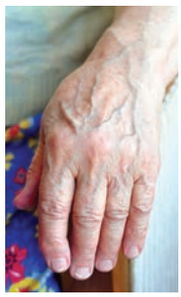
III. Long Answer Questions

1. Describe the structure of heart.
2. Explain blood and its different components.
3. Differentiate between arteries and veins.
4. How does circulation of blood take place in our body? Explain with the help of a well-labelled diagram.
5. How can we keep our heart healthy?

Life Connect

IV. Challenge

1. Name the two systems that work together to obtain oxygen and get rid of carbon dioxide.
2. Look at the picture. What do you observe? There are thin blue lines. What are these? (You may have a look at your own hand.) ▶



V. Enrichment

A. Discuss: Make the human circulatory system on a chart paper. Get in groups and discuss its functioning.

B. Model Making: Work in groups and create a working model of the circulatory system. Use the Internet or the school library to get some ideas for the same.

SCIENTIFIC QUEST

Haemophilia is a disorder that impairs the body's ability to make blood clots. The ability to clot blood gets severely reduced. This causes the person suffering from this disorder to bleed severely from even a slight injury.

Why and when is World Haemophilia Day observed? Find out.

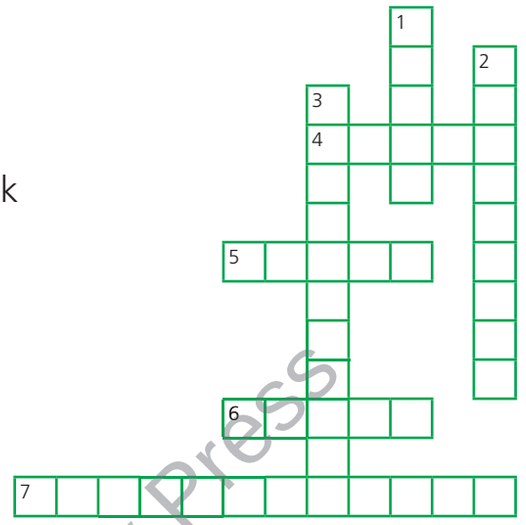
ENJOY SCIENCE

Across:

4. The upper two chambers of the heart
5. The throbbing feeling of artery near the wrist
6. The blood vessels that carry blood back to the heart from all parts of the body
7. Tubular structures that carry blood

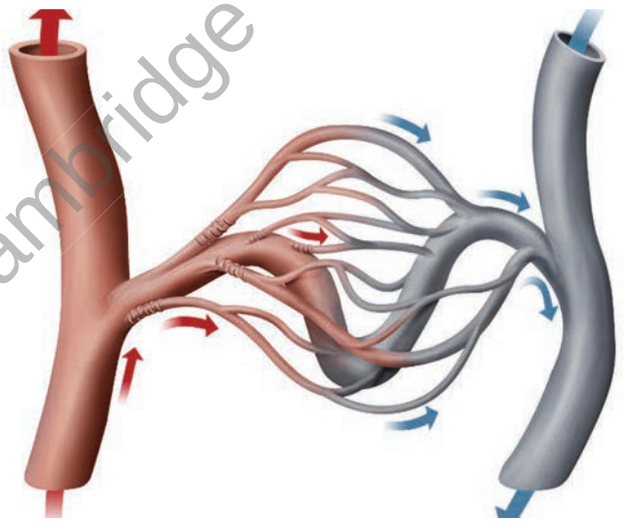
Down:

1. A muscular organ that pumps blood
2. Helps in blood clotting
3. The smallest blood vessels



PICTURE SURVEY

Label the picture.



1. What does this picture show?

   .....

2. What do blue and red colours in the picture depict?

   .....

Chapter 2

Plant Reproduction

Chapter Objectives

- Understand the sexual reproduction in plants; fertilisation
- Learn about the seed structure and germination
- Learn about seed dispersal
- Understand vegetative reproduction in plants

LET'S BEGIN

Label and write the male and female reproductive parts of a flower.

Male Reproductive Parts:

.....

.....

Female Reproductive Parts:

.....

.....

All living organisms including plants and animals grow and produce young ones. The process by which living organisms produce young ones is called **reproduction**. Let us understand how reproduction takes place in plants.

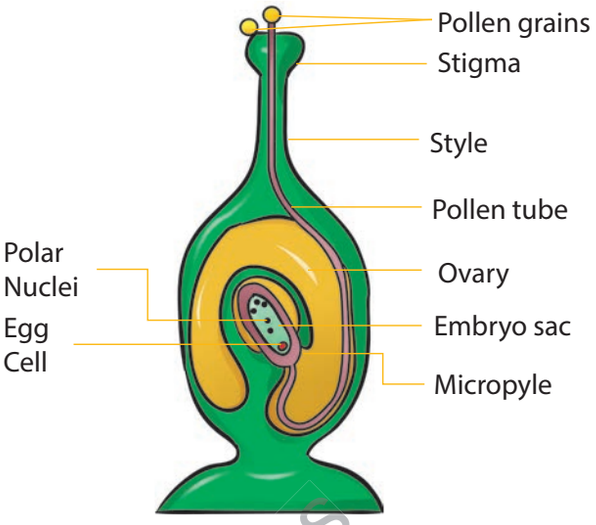
SEXUAL REPRODUCTION IN PLANTS: FERTILISATION

The **sexual reproduction** in plants is carried out by male and female reproductive parts. The flower contains the male and female reproductive parts.

When the mature pollen grains reach the stigma, they stick there due to the presence of a sticky substance produced by the stigma. The pollen grains' compatibility with the stigma depends on the recognition of the sticky substance by the pollen grains. Once the connection is done, the outer wall of the pollen grain

Compatibility: Ability to occur together without problems

bursts and produces a pollen tube carrying the male cell. The male gamete has to find a way to reach the female gamete (which is basically an egg cell) present in the ovule of the ovary, of the flower. Once the male cell reaches there, the male and female cells unite and fuse together forming a fertilised cell called the **zygote**. This fusion of the male and female gametes is called **fertilisation**.



Location of ovule inside a flower

The Fruit and Seeds

After fertilisation, the union of pollen grain with ovule forms the **zygote**. The zygote further develops into an embryo. Gradually, the fertilised ovule develops into seeds. The ovary begins to ripe and changes into a fruit.

STRUCTURE OF A SEED

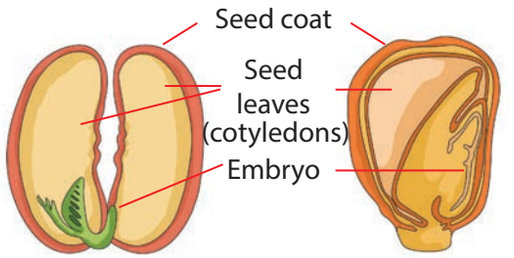
Although seeds of different plants may differ in size, shape and colour, they have some parts that are common. The seeds have a hard covering called the **seed coat**. It protects the seed.

Do you know what is inside a seed? Soak a few bean seeds for 2–3 days. Observe the soaked bean seeds. You will notice that the seed coat has become soft.

Split the bean seed and observe what is inside it.

You will see seed leaves. The seed leaves inside a seed are called **cotyledons**. These cotyledons contain all the food supply for the baby plant. Seeds with two cotyledons are called **dicotyledonous** or **dicot seeds**. For example, kidney beans, all pulses.

A corn seed and all cereals have only one cotyledon and is called **monocotyledonous** or **monocot seed**. The baby plant inside the cotyledons is called the embryo. The embryo has a **radicle** and a **plumule**. The plumule later grows out of the ground and develops into shoot system, and the radicle develops into root system.



Dicot seed Monocot seed

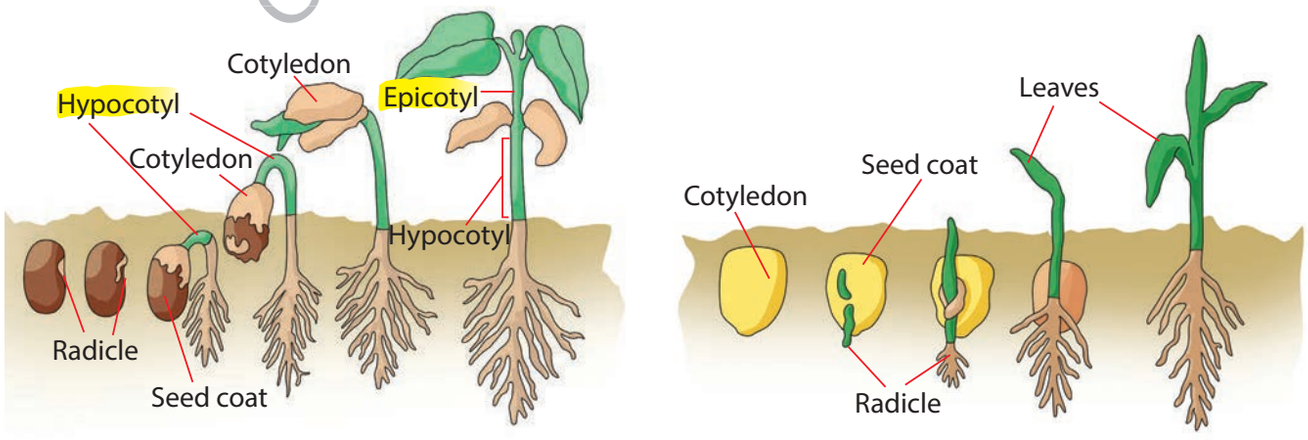
GERMINATION

Most plants grow from seeds. But all the seeds do not grow into plants. Only ripe and healthy seeds that get all the favourable conditions, grow into new plants. Germination is the process by which a seed produces a baby plant or seedling in the presence of water, air and warmth. If any one condition is missing, the seed will not germinate.

INFO HUB

A seed needs good **soil** which is rich in nutrients along with air, warmth and water.
Air is needed by the seed to breathe.
Warmth makes the seed active.
Water softens the food inside. Water also softens the seed coat so that the baby plant can break open the seed coat and come out.

The root of the embryo pushes the seed coat. It grows down into the soil and forms the root. The cotyledons are pulled upwards. The baby plant, called **seedling**, starts coming out of the cotyledons. The stem grows longer and the leaves appear first. When the leaves develop completely, the cotyledons fall off. Later, the branches, buds, flowers and fruits appear. The process of germination is thus completed.



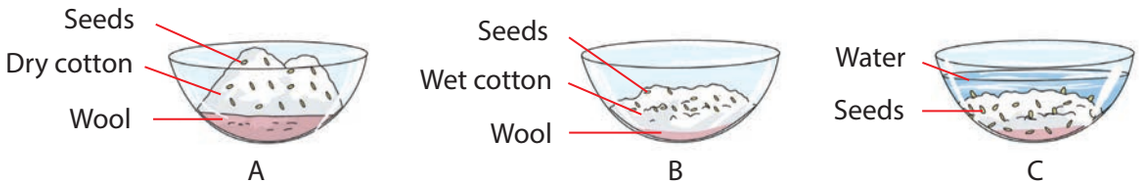
a. Bean seed b. Maize seed

Seed germination

Hypocotyl: Part of the stem below the cotyledons in the embryo of a plant.
Epicotyl: The part of an embryo plant stem above the cotyledons.

ACTION TIME 1

Take three open glass bowls and perform the activity as shown in the three images. Ensure that the cotton does not dry up.



Observe the seeds for a day or two. In which bowl, did you find the seeds germinate into plants? Why?

DISPERSAL OF SEEDS

It is important for the seeds to be dispersed at some distance away from the parent plant, because if all seeds fall just below the parent plant, they will not be able to grow and develop at one place. It is so because there will be shortage of water, space and nutrients. The dispersal of seeds is carried out by agents (of dispersal) which could be wind, water, animals or by explosion.

The process by which the seeds are scattered away from the parent plant is called **dispersal**.

Dispersal by Wind

Some seeds that are small and light in weight, are easily dispersed by wind to far away places. Examples of seeds that are dispersed by wind include cotton and drumstick. These seeds also have hair-like structures or wings that help the seeds to glide even in gentle breeze.

a. Dandelion seeds

b. Maple seeds

c. Drumstick seed

Dispersal by wind

Explosion: The act of bursting | **Scatter:** Cause to separate and go in different directions

Dispersal by Water

Plants that grow near water bodies are dispersed by water. The seeds have fibrous or spongy covering that helps them to float on water. Examples include coconut and lotus.

a. Coconut

b. Lotus

Dispersal by water

Dispersal by Animals

Animals help in seed dispersal. They may eat the fleshy fruit and the hard seed is egested from their bodies and fall at various places. Additionally, fruits also develop hooks, spines, bristles or projections that stick to the bodies of animals or to the clothes of humans and are carried to far off places where they fall and germinate.

Human beings consume fruits like watermelon, papaya and mango and throw their seeds in other places. When conditions are favourable, these seeds germinate to form new plants.

a. Cocklebur (*Xanthium*) fruits: Dispersal by dog

b. Hazel nut: Dispersal by Jay bird

Dispersal by animals

Two pots were kept side-by-side. One pot had a *tulsi* plant. Other pot had only soil. After a few days, it was observed that the pot with only soil had a small *tulsi* plant growing in it. How did this happen? Discuss.

Dispersal by Explosion

Seeds of some plants are dispersed when the ripened fruit bursts open. For example, balsam fruit bursts when ripe and dry and the seeds are expelled and thrown out with a force. These seeds are scattered around the parent plant where they germinate under favourable conditions.

a. Poppy

b. Pea pod

Dispersal by explosion

Quick Check 1

Correct and rewrite the following statements.

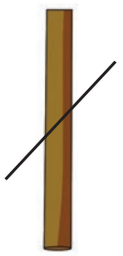
1. All seeds grow into plants.
   .....
2. Seeds with two seed coats are called monocots.
   .....
3. Animals do not help in seed dispersal.
   .....
4. Some seeds do not require water for germination. They can grow into plants in the presence of air and warmth.
   .....
5. Dicot seeds do not have roots.
   .....
6. The part of the seed that gives rise to root system is called plumule.
   .....

REPRODUCTION IN PLANTS THROUGH VEGETATIVE PARTS

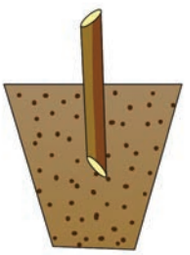
Most plants grow from seeds. But there are some plants that grow from stems, leaves, roots, etc.

Growing Plants from Stem

- Onion, potato and ginger are underground stems. There are small buds on a potato and ginger, which grow into new plants. Money plant and sugar cane grow into a new plant if a stem cutting is planted in the soil.
- Plants like rose, *Hibiscus* and sugar cane are grown from stem cuttings.



A slant cut given on to the stem



The cut stem is planted in the soil

After a few days, new leaves grow from the stem

ACTION TIME 2

Aim: To show that some plants reproduce through the stem.

Materials required: a few potatoes, soil and water

Procedure: Take a few potato pieces. Put them in soil (in a pot or ground). Water them daily.

Observation: You will see buds appearing on some parts of the potato. If you keep this potato in a warm place for a few more days, you will notice that the buds will grow leaves.

Note: Now, if you place the potato in a bowl of water and keep it in a refrigerator, you will observe that the growth of the leaves stops.

Growing Plants from Roots

Sweet potatoes grow into new plants from their roots. Buds appear on the roots of a sweet potato. These buds then grow into new plants. Carrot and turnip can also be grown from their roots.

ACTION TIME 3

Aim: To grow plants from the root.

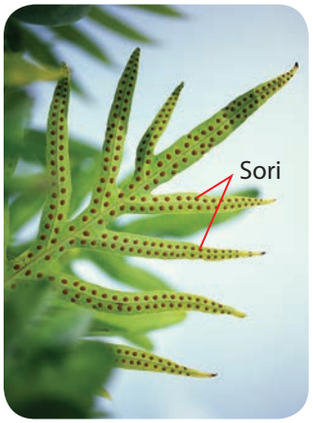
Take a carrot and cut off its top portion. Now, place it on a tray with the cut end facing downwards. Now, put some soil and pour water into the tray such that half portion of the carrot is dipped under water. Keep the tray in a place such that its top receives enough sunlight. Observe it after a few days. You will find that a new plant would grow from the top.

Carrot top grows into a new plant

Growing Plants from Leaves

Leaves of *Bryophyllum* and *Begonia* (elephant ear) grow buds along their edges. These buds grow into new plants when they fall on the ground, and find soil, water and warmth.

Bryophyllum leaf



Fern

Growing Plants from Spores

Some plants do not bear seeds and flowers. They reproduce through special structures called **spores**. For example, ferns, mosses and some fungi. These spores fall on the ground and grow into new plants.

Quick Check 2

Fill in the blanks.

1. Sugar cane is grown from …… (**stem**/**root**) cuttings.
2. Leaves of *Bryophyllum* grow …….. (**flowers**/**buds**) along their edges.
3. Mushrooms reproduce through special structures called …… (**spores**/**seedlings**).
4. Ferns grow from …….. (**leaves**/**spores**).
5. Carrot and turnip grow from their …….. (**roots**/**stems**).

KEY TERMS

Fertilisation: The process of fusion of male and female gametes

Zygote: The fusion of male and female gametes or cells forms a zygote

Cotyledons: The seed leaves inside a seed

Germination: The process by which a seed produces a baby plant or seedling in the presence of water, air and warmth

Dispersal: The process by which the seeds are scattered away from the parent plant

QUICK NOTES

- The sexual reproduction in plants is carried out by male and female reproductive parts.
- Once the male cell reaches there, the male and female cell unite and fuse together forming a fertilised cell called the zygote. This fusion of the male and female gamete is called fertilisation.
- The seeds have a hard covering called the seed coat.
- Germination is the process by which a seed produces a baby plant or seedling in the presence of water, air and warmth.
- The dispersal of seeds is carried out by agents of dispersal which could be wind, water and animals.
- Most plants grow from seeds. But there are some plants that grow from stems, leaves, roots, etc.

RUN-THROUGH

I. Very Short Answer Questions

A. Tick (✓) the correct option.

1. Seeds need warmth to sprout. So, would a roasted seed sprout faster?
   a. Yes. ☐
   b. No, too much heat would harm the baby plant inside the seed. ☐
   c. It may or may not sprout. ☐
2. Is it necessary that all types of fruits contain seeds?
   a. No, a fruit may or may not have a seed. ☐
   b. Yes, just one or two seeds. ☐
   c. Yes, every fruit has seeds and the number of seeds can be one or many. ☐
3. Where does a seed get its own roots and leaves from?
   a. From air around it ☐
   b. From the soil around it ☐
   c. From its cotyledons ☐
4. Which among the following is not an agent of seed dispersal?
   a. Wind ☐ b. Explosion ☐ c. Spores ☐

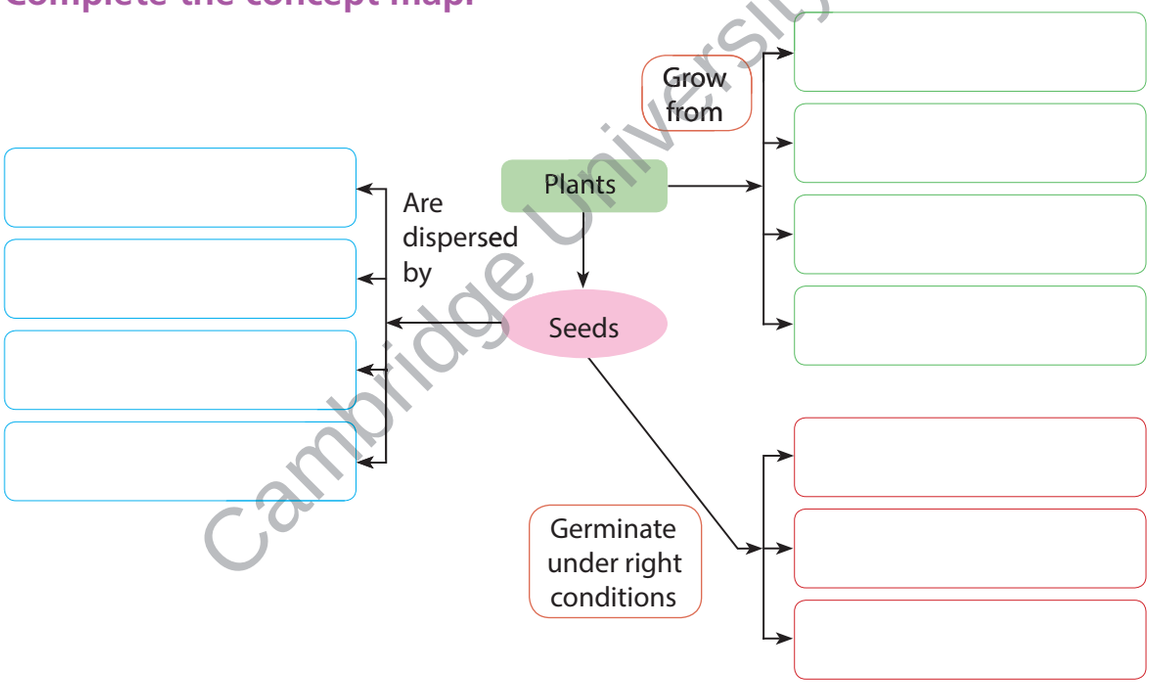
B. Unscramble the words and find the answer.

1. Outer cover of a seed. **DSEE CATO** .....
2. Its seed is dispersed by wind. **ITDMRUKSC** .....
3. Its seed is dispersed by water. **SOUTL** .....
4. The method of seed dispersal in balsam. **XELPSOINO** .....
5. Sweet potatoes grow from: **TOROS** .....

C. Which part of the following plant will grow into a new plant?

1. *Bryophyllum* .....
2. Sweet potato .....
3. Ginger .....
4. Chilly .....
5. Money plant .....

D. Complete the concept map.



II. Short Answer Questions

1. Define fertilisation in plants.
2. Name two plants in which seed dispersal happens through explosion.
3. What is germination?
4. Name three essential elements for the growth of a seed.

5. Which special feature of potato helps in growing its new plant?
6. Differentiate between monocot and dicot seeds.

III. Long Answer Questions

1. Describe the different ways of seed dispersal.
2. Explain the process of germination in detail.
3. Explain how plants grow from the different parts of a plant other than seeds. Give examples.
4. Draw well-labelled diagrams of dicot and monocot seeds.

IV. Challenge

1. A watermelon has many seeds. Each seed can grow into a new plant. But this does not happen. Why?
2. Why can't all seeds be dispersed by water?
3. Explain how seed dispersal happens in custard apple.

Custard apple

Life Connect

V. Enrichment

A. Make your own nursery! Take a pot full of soil. Add some organic fertiliser to it. Add a few grains of wheat to it. Keep it in a place where it receives sunlight. Water it regularly. You will find wheatgrass growing in a few days' time. Now, list out some uses of wheatgrass.

B. Field Trip: Visit a nursery with your parents or teacher. Observe different types of plants, fruits and flowers the plants bear. Make a note of your observations.

Collect different types of seeds and classify them based on dispersal methods.

Subject Connect

C. Go Green: Before placing a plant in a pot, make sure you water it thoroughly. This is because dried roots will grow with difficulty as they mature.

D. Map Work: On a political map of India, mark the coastal areas. Make a list of plants that grow in these areas. Can these plants grow in deserts? Why?

SCIENTIFIC QUEST

Rose plants grow by stem cuttings. Then, do they have pollination? Have a class discussion.

Organic fertiliser: Fertilisers derived from animal matter, animal excreta (manure), human excreta and vegetable matter.

ENJOY SCIENCE

Subject Connect

'Money doesn't grow on trees'. It is a saying that means 'money is hard to earn and should be spent wisely'.

Find out five such sayings that include plants or parts of a plant.

PICTURE SURVEY

Identify the plant and the seed dispersal method.

1. 

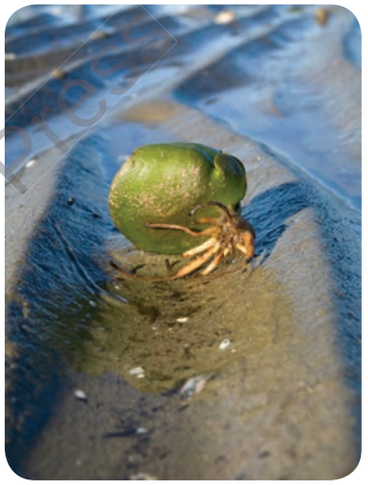
.....

.....

2. 

.....

.....

3. 

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Chapter 3

Food and Health

Chapter Objectives

- Discuss the components of food
- Identify the need for balanced diet
- Identify healthy and junk food
- Examine the ways to prevent diseases caused by incorrect food habits and unhealthy lifestyle
- Learn about food adulteration

LET'S BEGIN

Name at least five of your favourite food items and mention why are they your favourite.

1. .....
2. .....
3. .....
4. .....
5. .....

Life Connect

COMPONENTS OF FOOD

Food is an essential requirement for us to live. It contains a few components called **nutrients**. They are chemical substances that are essential for the healthy growth and development of the body. These nutrients provide us energy to do work.

The nutrients of food are:

C __ RB__ __ __ D __ __ T __ __ , F __ __ __ , P __ __ T __ __ N __ ,

V __ T __ __ __ NS , M __ __ E __ __ __S

The other two components are:

R __ __ __ H __ __ __ , __ __ T __ __ .

Let us do a quick recap and study the following table.

Component of food	Found in (food items)	Function
Carbohydrates (sugar and starch)	rice, wheat, fruit juices, cereals and potatoes	give us energy to do work
Fats	meat, nuts, butter, oil and *ghee*	give us energy to do work and keep our body warm
Proteins	pulses, fish, eggs, cheese and beans	help us to grow, repair damaged cells
Vitamins	green vegetables, fruits and sprouts	help our body to fight against diseases
Minerals	milk, curd, cheese, green leafy vegetables, whole grains, beans and dairy products	are required for the formation of healthy bones, blood and teeth
Water	fruits, vegetables, milk	helps to regulate the body temperature and maintain other body functions; helps in waste removal
Roughage	fruits and vegetables (with peel/skin), oats, cereals, pulses, barley and whole grains	helps in removing waste material from our body in the form of stool

BALANCED DIET

We must eat a diet that contains all the nutrients in the right amount, along with water and roughage, for the proper functioning of our body. Such a diet is known as a **balanced diet**.

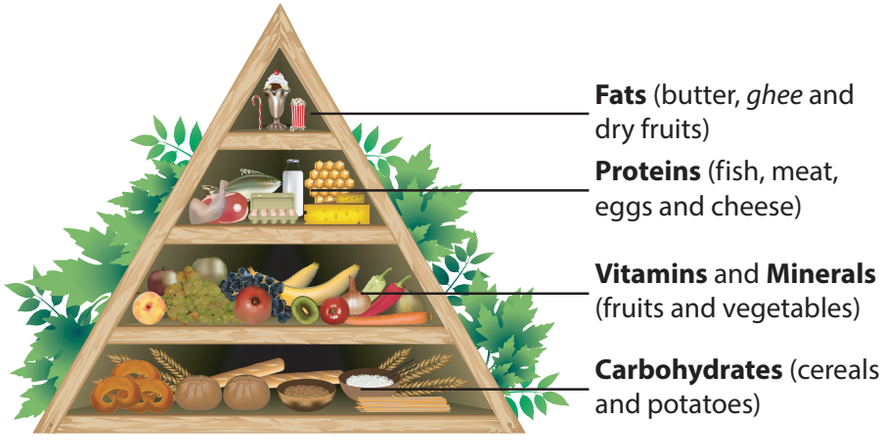
INFO HUB

Healthy food includes whole grains, fruits, nuts, legumes (beans) and yogurt.

All the above mentioned food items from the different groups, when eaten in right amount, contribute to a balanced diet.

The food pyramid given on the next page shows different types of food we should eat in a day for maintaining a balanced diet.

The pyramid below shows five essential components of food.



Food Pyramid for a balanced diet

INFO HUB

The Food Pyramid helps in making healthy eating easier. As we move up the food pyramid, those food items should be consumed in lesser quantity.

A balanced diet is not the same for all people. This is because people differ in their nutrient requirements. The amount of each of these components depends on the **age, gender** and the **amount of physical activity** of a person.

- Growing children need more proteins in their diet for muscle and tissue building.
- Pregnant women and nursing mothers need more proteins, calcium and iron in their diet for the growing baby.
- Labourers require more carbohydrates and fats in their diet owing to hard physical work.
- Athletes require more proteins and carbohydrates to meet their energy needs.
- People suffering from obesity or chronic diseases are often advised to cut down on food items rich in fats and sugars.

Need for Eating a Balanced Diet

Efficient working of body organs: Our body organs need specific nutrients to keep functioning efficiently. This also affects the growth and development of our body.

Maintains ideal body weight: We should maintain an ideal body weight. Our body weight should not be too much or too less. Being overweight or underweight can be a cause for various health problems.

Prevents diseases: Eating a balanced diet strengthens the disease-fighting mechanism of our body, thereby preventing diseases.

Athlete: A person who is good at sports or physical exercise. | **Chronic:** Of long duration

EXERCISE, SLEEP AND REST

We must exercise daily. It helps us to maintain right posture and remain active throughout the day. Walking, cycling, running, jumping and skipping are some forms of exercises.

Cycling

Sleeping

Apart from exercise, our body needs sufficient rest and sleep. We must take proper rest for proper functioning of our body. We should sleep for about 6 to 8 hours in a day.

ACTION TIME 1

Record your diet for a week. Observe whether you are eating a balanced diet, or not. Get it reviewed from an elder or a teacher. If not, plan measures you will take to make it a balanced one.

Similarly, prepare an exercise chart and exercise regularly.

Quick Check 1

State true or false.

1. Food provides us with energy.
2. Balanced diet helps our body to fight against diseases.
3. Roughage is required for the formation of healthy bones, blood and teeth.
4. Sleep is required for the proper functioning of our body.
5. Rice, wheat, fruit juices and potatoes are rich sources of carbohydrates.
6. Athletes require more proteins and carbohydrates.

Teaching Tip: Discuss in class the problem of obesity in children. Sensitise students on the need for a healthy diet.

JUNK FOOD

The food that has less nutritional value but lots of fat and sugar is referred to as **junk food**. When people eat junk food, they usually do not feel full, which leads to overeating. They contain too much fat, all of which cannot be used up by the body, hence it is stored as body fat. This makes a person obese.

Adverse Effects of Eating Junk Food

Junk food should not be consumed daily. Eating junk food regularly can cause the following:

- Excess weight gain
- Nutrient deficiency
- Feeling tired and lethargic/lack of energy
- High amount of salt in junk food can cause diseases like high blood pressure and heart, kidney and liver diseases
- Improper digestion causes stomach problems like constipation, acidity, etc.
- Interferes with the uptake of other nutrients (such as vitamins and minerals).

MAKING A DIET HEALTHIER

Eat a variety of food: We should eat a variety of food to ensure that we get all the nutrients that contribute to good health.

Include more whole grains: Whole grains, such as wheat, barley and oats, should be included in our diet. These provide us with essential nutrients and fibres.

Limit sugar and salt intake: Do not add extra salt to the cooked food. Likewise, avoid eating a lot of sugar.

Include nuts in your diet: Nuts provide the feeling of fullness. Hence, they do not cause weight gain, if eaten in limited quantity.

Use less oil for cooking: The food should be cooked in minimum amount of oil.

Deficiency: Lack of adequate quantity or number | **Lethargic:** Deficient in alertness or activity

DISEASES RELATED TO UNHEALTHY FOOD HABITS AND LIFESTYLE

Mayank wakes up at 10:00 a.m. every day. He does not perform any physical activity. He eats junk food for breakfast. He likes to eat fried food for lunch but eats orange every day in the evening. He does not go out to play in the evening but plays video games on his father's mobile phone. He watches TV till late at night and hence sleeps very late.



Do you think Mayank has a healthy lifestyle? Why or why not? Discuss.

If a person follows unhealthy eating habits and lifestyle, it can give rise to various diseases. Such diseases are called **lifestyle diseases**. For example, diabetes, high- and low-blood pressure, anaemia and various heart ailments.

Obesity

If a person has too much body fat, he/she is said to be 'obese'. This occurs because of eating a lot of junk food and less of physical work. An obese person's weight is greater than what is considered healthy as per his/her height. Being obese increases one's risk of diabetes/heart diseases/cancer, etc.

Symptoms:

- Excess weight gain
- Fat deposition around waist
- Feeling lethargic
- Getting tired easily

Diabetes: A disease characterised by abnormally high glucose levels in the blood | **Cancer:** When cells in a particular body part divide abnormally

Anaemia

Anaemia is a disease that occurs due to the lack of iron in the diet. Food items rich in iron are green leafy vegetables, lentils, beans, etc.

Symptoms:

- Pale skin
- Shortness of breath
- Feeling lethargic and loss of energy
- Dizziness

Diabetes

Diabetes is the most common lifestyle disease. It occurs when our blood sugar levels (glucose) are high. Unhealthy food, obesity, lack of exercise, cause diabetes.

INFO HUB

In the year 2016, India was designated as 'Diabetes Capital of the World' by the World Health Organization.

Symptoms:

- Excess hunger and thirst
- Urge to pass urine frequently
- Blood pressure
- Weakness and loss of weight
- High amount of sugar in the blood

High Blood Pressure

When a person suffers from high blood pressure, it means his/her heart must pump blood at a faster rate. This causes arteries to come under immense strain as they carry blood. Stress and anxiety, eating food with high salt and sugar content and lack of physical exercise are some of the causes of high blood pressure.

Symptoms:

- Dizziness
- Breathlessness
- Chest pain
- Excessive sweating

PREVENTION OF LIFESTYLE DISEASES

Eat right!

Eat a balanced diet. Avoid junk food. Include more fruits and vegetables in your diet. Avoid excess salt and sugar intake. Drink at least 8 glasses of water every day.

Play outdoor games!

Exercise regularly. Play outdoor games such as football, volleyball, basketball, cricket, badminton, etc.

Say NO to stress and anxiety!

If you are stressed out about something, you should discuss it with your parents. They will help you come up with a solution to that problem. Being in isolation will only increase stress.

Some other ways to prevent lifestyle diseases are:

- Try to cover short distances by bicycles or walking. Use stairs instead of escalators or lifts.
- Do not remain indoors. Fresh air is important for a healthy life.
- We should sleep on time at night and wake up early in the morning.

Quick Check 2

State true or false.

1. Fat around the waist is a symptom of obesity.
2. Pale skin is a symptom of diabetes.
3. If a person is suffering from high blood pressure, his/her arteries are working under strain.
4. Anaemia is the most common lifestyle disease.
5. We should sleep on time at night.

Teaching Tip: Have a class discussion on 'lifestyle diseases'. Ask students to state examples from daily life. | **Isolation:** A state of being alone

DEFICIENCY DISEASES

A disease caused by the lack of a particular nutrient in the diet, over a long period of time, is called **deficiency disease**.

Some of the common deficiency diseases are as follows.

Kwashiorkor

A child suffering from kwashiorkor

Symptoms:

- Swollen belly
- Swollen ankles and feet
- Thinning of hair
- Flaky and patchy skin
- Reduced growth
- Frequent infections

Cause: Severe deficiency of protein

Prevention: Diet rich in protein, fats and carbohydrates

Marasmus

A child suffering from marasmus

Symptoms:

- Lack of energy
- Poor muscle development
- Extremely thin
- Loosened skin and weakened legs

Cause: Severe deficiency of protein

Prevention: Diet rich in protein (milk, meat, cereals, eggs)

Night Blindness

Symptoms:

Inability to see in dark or in poor light

Cause: Lack of vitamin A

Prevention: Eating carrots, green leafy vegetables, pumpkin, papaya, mango and milk.

Anaemia

Symptoms:

The person gets tired easily, looks pale and unhealthy

Cause: Lack of iron in diet

Prevention: Eating grapes, dates, bananas, spinach, jaggery, apple and beetroot.

Rickets

Symptoms:

Pigeon chest, knock knees and bowed legs

Cause: Lack of vitamin D in diet

Prevention: Drinking milk and eating dairy products. Sun's rays help in making vitamin D in our body.

A child suffering from rickets

Scurvy

Symptoms:

Wounds take longer time to heal and swollen gums that bleed easily

Cause: Lack of vitamin C in diet

Prevention: Eating orange, lemon, tomato, gooseberry, grapes, guava, kiwi and strawberries.

A person suffering from scurvy

Beriberi

Symptoms:

Weak muscles and nerves, person gets cramps and gets tired easily

Cause: Lack of vitamin B in diet

Prevention: Eating sprouts, cereals, unpolished rice, milk, nuts and meat.

Teaching Tip: Explain the meaning of polished and unpolished rice to students.

Goitre

Symptom:

Swollen neck

Cause: Lack of iodine in diet

A person suffering from goitre

Prevention: Using iodised salt in food, sea food, sea weed and fish

FOOD ADULTERATION

Food adulteration is a process wherein quality of food is lowered by the addition of harmful or inferior quality ingredients. This ingredient is known as **adulterant**. Thus, adulterant makes the food product unsafe for human consumption. It is usually done to increase the quantity of food or to change its presentation.

Some of the common ways in which food adulteration is carried out are given here:

- Milk is adulterated by adding water to it. Adding water increases the quantity of milk, thereby helping the milkmen to make profit.
- Honey is adulterated with refined sugar and water to increase its quantity.
- Spices like turmeric are also adulterated using chemical powders of the same colour. These chemicals can cause diseases like cancer. Chilli powder is adulterated using brick powder.
- Rice is adulterated with small grains of stones.
- The ingredients like *khoya* and *chena*, used to make sweets, can also be adulterated with starch.
- The coffee powder is adulterated with tamarind seeds' powder.
- Tomato sauces are adulterated with pumpkin pulp.
- Ice creams are adulterated with washing powder.

List any two more daily-life examples of food adulteration.

• What can pure *ghee* be adulterated with?

Life Connect

.....

• What can black pepper be adulterated with?

.....

Quick Check 3

1. Identify the diseases. Also, state the nutrient lacking in each of the following:

a.

Disease: .....

Lack of nutrient: .....

b.

Disease: .....

Lack of nutrient: .....

2. Name common adulterants in: a. Chilli powder, b. milk, c. rice

KEY TERMS

Nutrients: Substances required by our body to live, grow and remain healthy
Balanced diet: A diet that consists of all the nutrients in the right amount
Junk food: The food that has less nutritional value and lots of fat and sugar
Lifestyle diseases: Diseases caused due to unhealthy lifestyle
Deficiency diseases: Diseases caused by lack of nutrients in the diet
Food adulteration: A process wherein quality of food is lowered by the addition of harmful or inferior quality ingredients

QUICK NOTES

- Our body needs a balanced diet to keep healthy.
- A balanced diet contains the right amount of carbohydrates, proteins, fats, minerals, vitamins, roughage, and water.
- Balanced diet is not the same for all people. This is because people differ in their nutrient requirements. It depends on the age and work.
- The food that has less nutritional value and lots of fat and sugar is referred to as junk food.
- Some of the common lifestyle diseases are diabetes, high blood pressure, anaemia and obesity.
- Some of the common deficiency diseases are kwashiorkor, marasmus, anaemia, rickets, scurvy, goitre, beriberi and night blindness.
- Food adulteration is a process wherein quality of food is lowered by the addition of harmful or inferior-quality ingredients. This ingredient that is added is called the adulterant.

RUN-THROUGH

I. Very Short Answer Questions

A. State true or false.

1. Anaemia makes you fit and active.
2. Sunlight helps in making vitamin D within our body.
3. Carbohydrates are required by our body to grow.
4. Diabetes is a lifestyle disease.
5. Food adulteration is good for us.

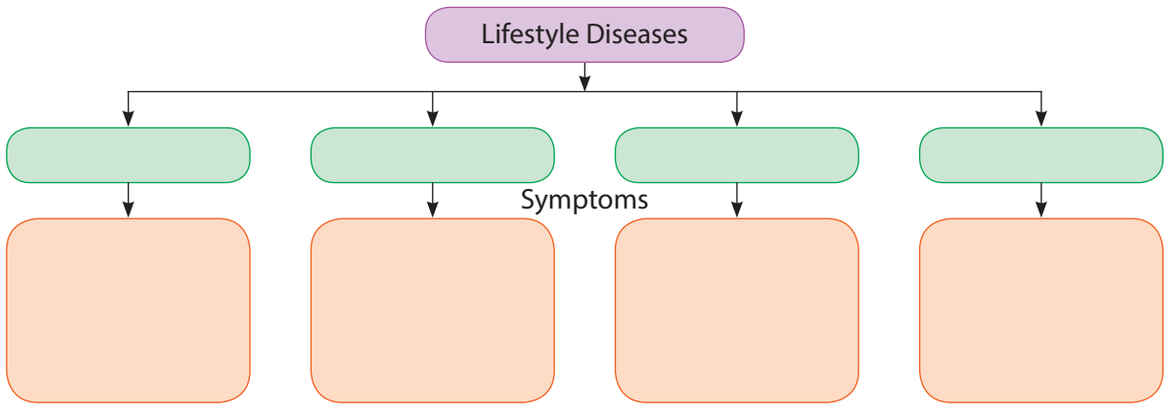
B. Fill in the blanks.

1. ..... (**Marasmus**/**Goitre**) is an iodine-deficiency disease.
2. Burger is a ..... (**junk**/**healthy**) food.
3. High blood pressure is a ..... (**lifestyle**/**deficiency**) disease.
4. Spinach is rich in ..... (**milk**/**iron**).
5. Night blindness occurs due to lack of vitamin ..... (**D**/**A**) in our diet.

C. Give two examples of each of the following.

1. Food items rich in vitamin A: .....
2. Foods that cause obesity: .....
3. Deficiency diseases: .....
4. Food items rich in vitamin D: .....
5. Ways of preventing deficiency diseases: .....

D. Complete the concept map.



II. Short Answer Questions

1. Define a balanced diet.
2. What is a lifestyle disease?
3. Give two methods to make a diet healthier.
4. Why is exercise important for us?
5. Which disease is caused due to the lack of vitamin B? Also, state its symptoms.

III. Long Answer Questions

1. What is a balanced diet? Why should we have a balanced diet?
2. Briefly explain some of the adverse effects of junk food. How can we make our diet healthier?
3. Differentiate between lifestyle diseases and deficiency diseases in detail.
4. Write a detailed note on food adulteration.

IV. Challenge

1. What is the difference between being overweight and being obese?
2. How can eating junk food cause anaemia?

Life Connect

3. How can goitre be prevented by eating sea food?
4. Why do people suffering from anaemia always feel tired?
5. Is it advisable not to completely eliminate healthy high-carb items from your diet? Why or why not?

V. Enrichment

A. Discuss: Bring some food items to school. Divide your class into four groups (proteins, carbohydrates, vitamins and minerals, roughage). Segregate the food items according to the groups and discuss about their benefits and nutritional value.

B. Debate: Divide the class into two groups and conduct a debate on 'Eating junk food'.

Subject Connect

C. Info Gathering: There are many diseases that people suffer from, which have not been discussed in the book. With the help of books in the library or the Internet, find out about such diseases and prepare a short write-up on them.

D. Survey and Report: Carry out a survey on 'Diet of people—healthy or unhealthy'. Gather the information from people in your surroundings and brainstorm if they eat a balanced diet or not.

E. Report Writing: Prepare a questionnaire on 'Deficiency diseases—their causes and prevention'. Ask these questions to a doctor. Prepare a report.

Segregate: Separate **Questionnaire:** A form with a set of questions

F. Slogan Writing: You have been designated as the food inspector of your class for a week. How will you encourage your friends to eat healthy food? Write 5 slogans in support of healthy eating.

Subject Connect

G. Some Food Adulteration Tests!

1. Let us test the presence of water in milk.

Put a drop of milk on a slanting surface (preferably mirror-like). Pure milk either stays or flows and leaves a trail behind. Adulterated milk will flow immediately without leaving a mark.

(Perform the activity, take a picture and printout. Paste in the box alongside.)

2. How will you test the presence of detergent in milk? Write an activity in your Science notebook.

3. Let us detect the presence of papaya seeds in black pepper.

Add some black pepper to a glass of water. Pure black pepper settles at the bottom, while papaya seeds float on the surface of water.

(Perform the activity, take a picture and printout. Paste in the box alongside.)

4. How will you detect the presence of mashed potatoes and other starches in *ghee*? Write an activity in your Science notebook.

SCIENTIFIC QUEST

What are **overnutrition disorders**? What are its causes? What diseases do they cause?

What is the difference between overnutrition and undernutrition?

Make a chart depicting the same.

ENJOY SCIENCE

Create a scrapbook by pasting wrappers of different food products and listing their components.

PICTURE SURVEY

It is a holiday. Ada and Kiann have their own plans. Ada wants to watch television the whole day. However, Kiann wants to watch television for some time and then play with his friends.

Ada

Kiann

Life Connect

Observe and comment on the lifestyle of both the kids. Is it a good or a bad habit? Why or why not? Write a conclusion in your Science notebook in about 250 words.

Chapter 4

Simple Machines

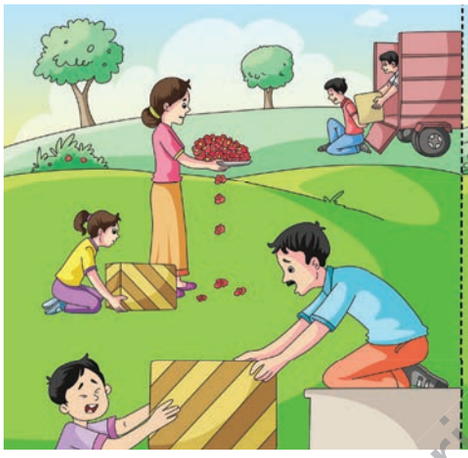
Chapter Objectives

- Appreciate the use of simple machines in our daily life
- Classify simple machines
- Discuss the need for levers
- Understand the functioning of simple machines

LET'S BEGIN

Look at the two pictures given below. Identify the image in which more energy has been used. Discuss.

Picture A



Picture B

SIMPLE MACHINES

Sometimes, we find it difficult to do certain work with our hands. So, we use tools or machines to make our work easier as it requires less energy. **Simple machines** are devices that make doing work easier and faster by using less effort for more work. They have few, or no moving parts.

INFO HUB

A complex machine consists of two or more simple machines.

There are six different types of simple machines. They are:

1. Lever 2. Pulley 3. Wheel and Axle 4. Inclined plane 5. Screw 6. Wedge

Lever

Lever is a long and rigid bar that rests on a fixed point (called fulcrum), which lifts or moves loads. A lever is usually a long machine that is put under an object to lift it. Levers are used in our everyday life and are all around us. Examples of levers include door handles, bottle openers and crowbars.

A lever has three main components:

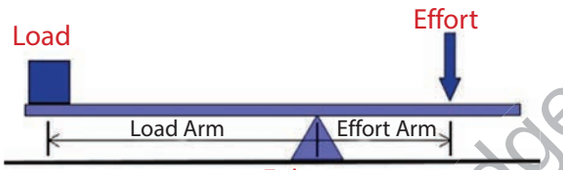
Effort (E) – It is the force that a user applies on the lever.

Load (L) – It is the weight of the body on which the work is to be done.

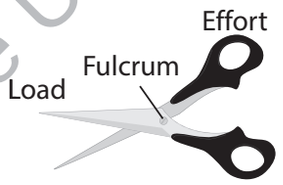
Fulcrum (F) – It is the fixed point about which the lever moves freely to do the required work.

Levers are of three kinds based on the position of the load, effort and fulcrum.

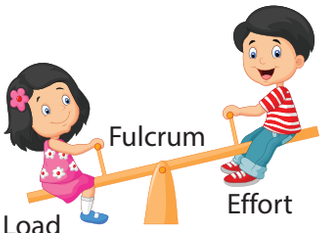
Class I lever: In class I levers, the fulcrum is in between the load and the effort. Few examples of class I levers are the seesaw, scissors, pliers, crowbar and catapult.



Class-One lever
(Diagrammatic representation)

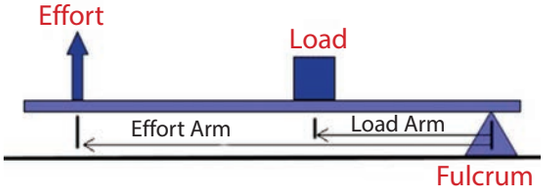


Scissors

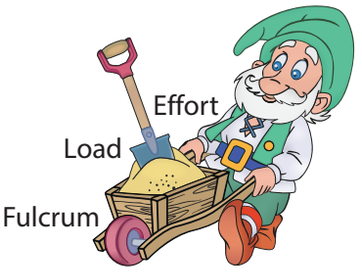


Seesaw

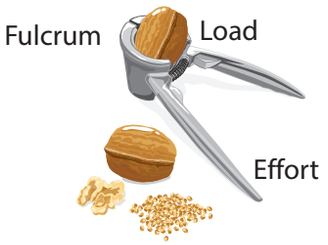
Class II lever: In class II levers, the load is placed in between the fulcrum and the effort. Some of the class II levers in daily use are wheelbarrow, nutcracker, bottle opener.



Class-two lever
(Diagrammatic representation)



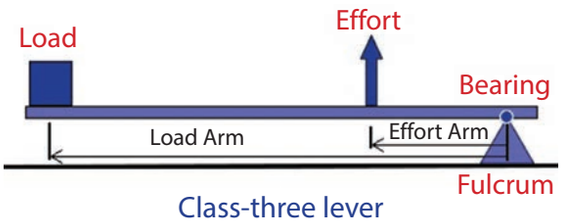
Wheelbarrow



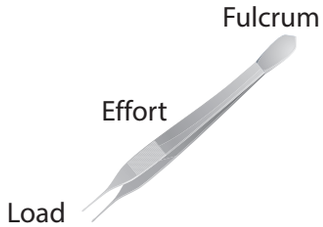
Nutcracker

Crowbar: An iron bar with a flattened end | **Catapult:** A forked stick with an elastic band fastened to the two pointed projections, used by children for shooting small stones

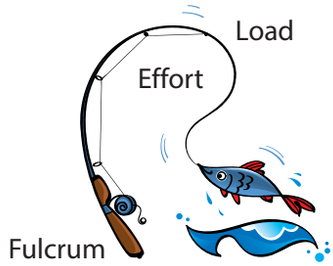
Class III lever: In class III levers, the effort is applied in between the load and the fulcrum. Some examples are fishing rods, tongs, tweezers, forceps and broom.



Class-three lever
(Diagrammatic representation)



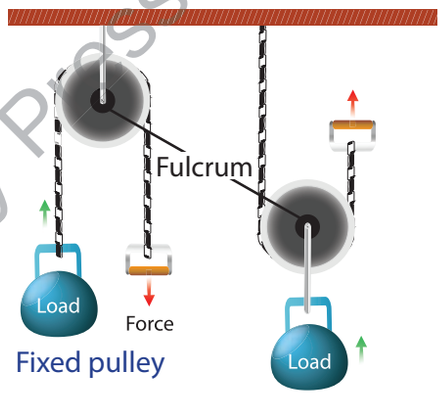
Forceps



Fishing rod

Pulley

A **pulley** makes lifting of loads much easier. It is provided with a rope or chain that can move things up and down, or back and forth. An elevator is an example of a pulley. Pulleys are of two types—Fixed pulley and Movable pulley.



Fixed pulley
Movable pulley

Fixed pulley

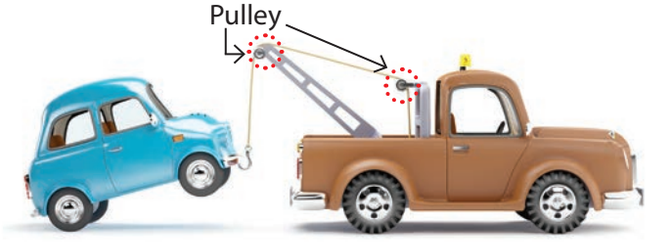
A pulley that remains fixed to a position is known as a **fixed pulley**. This type of pulley does not reduce or increase the force applied. It only changes the direction of the force. A flag post is an example of a fixed pulley.


Flagpost—Fixed pulley

Movable pulley

At times, we need to lift very heavy loads, much heavier than our own weight. For example, lifting of a car and cargo. For lifting such loads, the fixed pulleys are not enough as they do not reduce the effort. So, here we make use of movable pulleys.

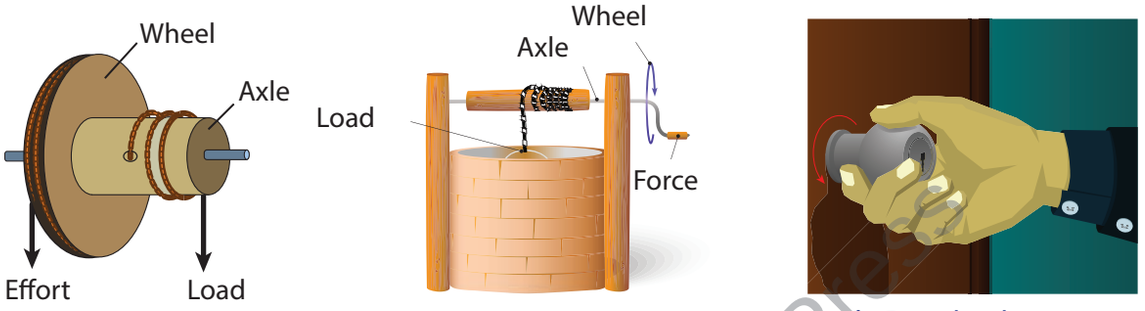
A movable pulley is a pulley that moves with the load.



Movable pulley

Wheel and Axle

Wheel and axle is a simple machine with a wheel and an axle or a rod that allows the wheel to be turned. Examples of wheel and axle include bicycles, electric fans, revolving doors, door knob and merry-go-round. Wheel and axle is also used for drawing water from the wells.

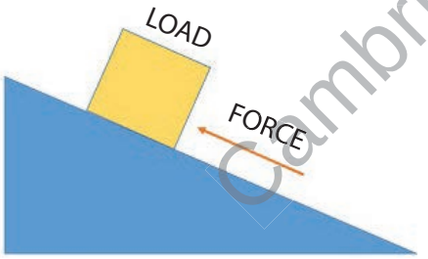


a. Well b. Door knob

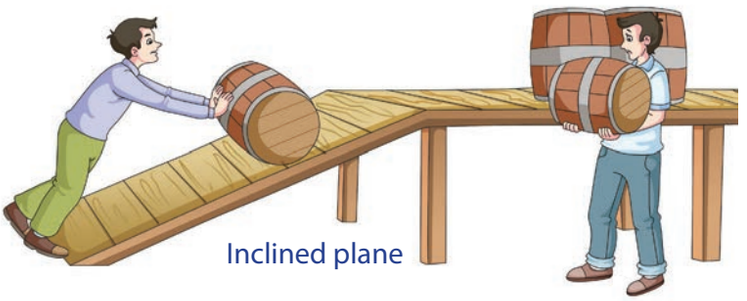
Examples of wheel and axle

Inclined Plane

Inclined plane is a ramp. In an inclined plane, one end is levelled higher than the other so as to allow objects to be moved from a lower place to a higher place or vice versa. When you move objects over an inclined plane, you would use less energy or force, thus making the work of moving things easier. The best example of an inclined plane is a slide that children play on.



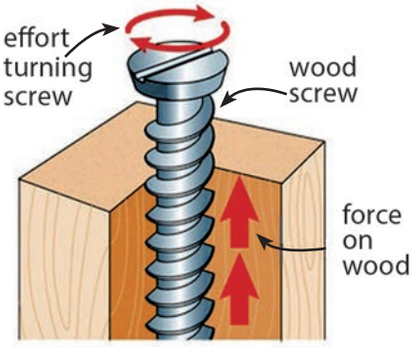
Diagrammatic representation of an inclined plane



Inclined plane

Screw

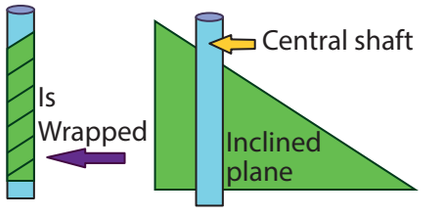
A **screw** is a modified inclined plane that travels in a circle around a central point. A screw can raise weights or it can press or fasten objects. Screws can be tightened to hold objects together with the help of a screwdriver.



Screw

INFO HUB

A screw is an inclined plane wrapped around a cylinder, forming the path and the pitch.



The inclined plane is wrapped around a central shaft

Wedge

A **wedge** is an inclined plane where the pointed edges are used to do work. Examples of wedges include shovel, knife, axe, needle, etc.

Wedge

Quick Check 1

Identify the types of simple machines.

KEY TERMS

Simple Machines: Devices that make our work easier

Lever: A long bar that rests on a fixed point that lifts or moves loads

Pulley: It is like a wheel and axle and is provided with a rope or chain that can move things up and down or back and forth

Wheel and axle: A simple machine with a wheel and an axle or a rod that allows the wheel to be turned

Inclined plane: A slope or a tilted surface used to move a heavy load with less effort

Screw: A kind of inclined plane that travels in a circle around a central point

Wedge: A kind of inclined plane where the pointed edges are used to do work

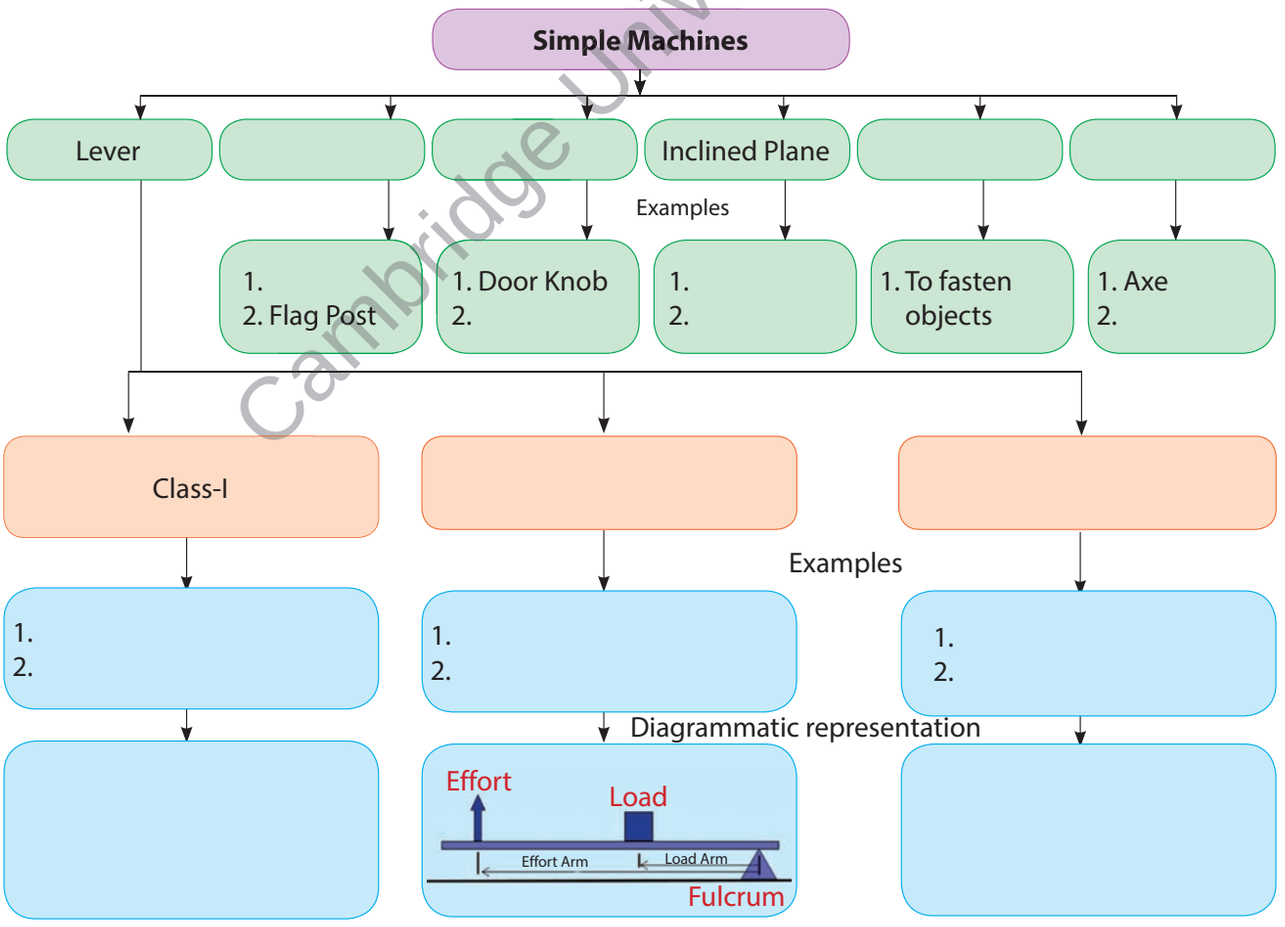
QUICK NOTES

- Simple machines are devices that make our work easier. They have a few, or no moving parts.
- There are six types of simple machines. They are—Lever, Pulley, Wheel and axle, Inclined plane, Screw, Wedge.
- A lever has three main components—Effort, Load and Fulcrum.
- A lever in which the fulcrum is located in between the load and the effort is called class-one lever.
- A lever in which the load is located in between the fulcrum and effort is called class-two lever.
- A lever in which the effort is located in between the load and fulcrum is called class-three lever.

RUN-THROUGH

I. Very Short Answer Questions

A. Complete the concept map.



B. Name the following.

1. A long bar that rests on a fixed point that lifts or moves load.
2. Force that a user applies on the lever.
3. A simple machine with a wheel and an axle or a rod that allows the wheel to be turned.
4. It has a rope or chain that can move things up and down or back and forth.
5. A pulley that remains fixed to a position.

C. Fill in the blanks.

1. …… (**Machines**/**Force**) are devices that make work easier.
2. …… (**Pulley**/**Lever**) is a long bar that rests on a fixed point that lifts or moves loads.
3. …….. (**Load**/**Fulcrum**) is the weight of the body on which the work is to be done.
4. Flagpost is an example of a …… (**fixed**/**movable**) pulley.
5. In class-…… (**one**/**two**) levers, the fulcrum is in between the load and effort.
6. Forceps is an example of a class-…… (**two**/**three**) lever.

II. Short Answer Questions

1. Define class-one levers.
2. Give two examples of class-two levers.
3. What is wheel and axle?
4. Define inclined plane.
5. Give the diagrammatic representation of levers.

III. Long Answer Questions

1. Distinguish between the different types of levers.
2. Explain pulley and its types with well-labelled diagrams.
3. Differentiate between screw and wedge.

IV. Challenge

1. How are screws different from nails? Which one will you choose to hold things tightly?
2. What type of simple machines will you use to do the following:
   a. Oars, when used for moving or splashing water
   b. Boat paddle
   c. Bicycle hand breaks
   d. Cutting a paper
   e. Take out a nail from a wooden box.

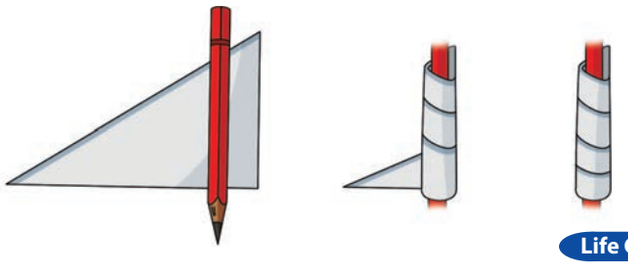
V. Enrichment

A. Discuss: Discuss at least five uses of simple machines in our everyday life.

B. Project:

Aim: To make a screw driver and to prove that a screw is an inclined plane.

What I need: A sheet of paper, adhesive tape, pencil



What to do: Take a piece of paper and make a line of about 10 cm height and base 7 cm such that it forms an L. Now, join the two open ends of the drawn L. Cut this triangle and join the base of the triangle on the pencil and wrap it in such a way that it forms a screw.

Life Connect

SCIENTIFIC QUEST

Try and make a simple machine at home. Use your imagination!

ENJOY SCIENCE

Identify the simple machines used in the following places. List in a tabular form in your Science notebook.

Simple machine (name it and draw)	Area	Function
	Kitchen	
	Home	
	School	

Life Connect

PICTURE SURVEY

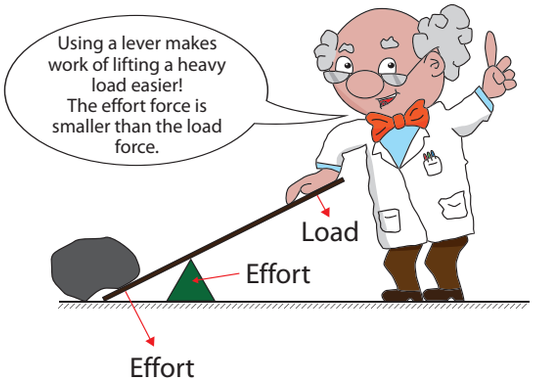
What is wrong with the given picture?

.....

.....

.....

.....



Chapters 1 and 2

Worksheet 1

A. Fill in the blanks.

one	capillaries	fertilisation	blood vessels	seed coat

1. The blood flows through the _____.
2. The fusion of male and female gametes in fruits is called _____.
3. The smallest blood vessels are called _____.
4. The seeds have a hard covering called the _____.
5. A corn seed and all cereals have _____ cotyledon.

B. State whether the following is true or false.

1. Levers are of five types.
2. *Bryophyllum* reproduces through leaves.
3. Heart is located in the chest.
4. Arteries branch out into smaller network of blood vessels called arterioles.
5. All plants grow from seeds.

C. Give one word for the following.

1. It is a process by which the seeds are scattered away from the parent plant.
2. It is a process by which a seed produces a baby plant or seedling in the presence of water, air and warmth.
3. It is a muscular organ that pumps blood to different organs of the body through the blood vessels
4. It is the sound created by the rhythmic movement of the heart while pumping the blood.
5. These are the blood vessels that carry blood back to the heart from all parts of the body.

Chapters 3 and 4

Worksheet 2

A. Fill in the blanks.

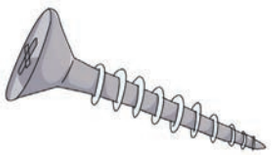
Inclined plane	Deficiency	Junk food	Wedge	Diabetes

1. A disease caused by the lack of a particular nutrient in the diet, over a long period of time, is called _____ disease
2. _____ is a slope or a tilted surface used to move a heavy load with less effort.
3. The food that has less nutritional value but lots of fat and sugar is referred to as _____.
4. _____occurs when our blood sugar levels (glucose) are high.
5. _____ is a kind of inclined plane where the pointed edges are used to do work.

B. Identify the deficiency diseases.

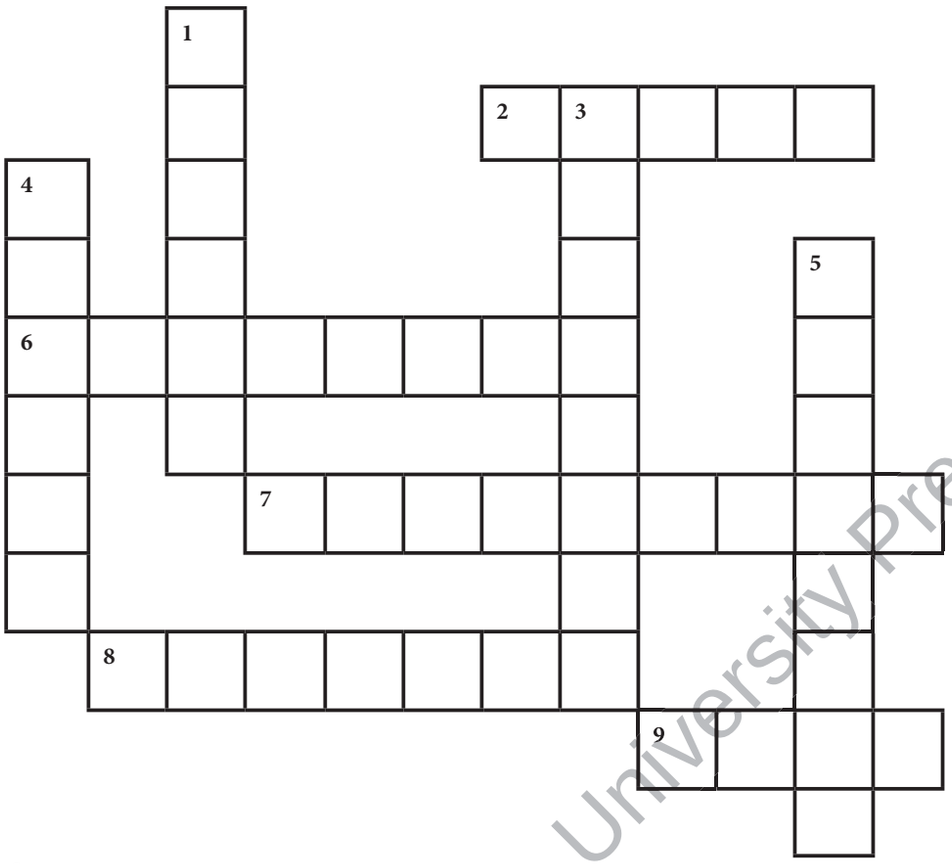
1. It is caused by severe deficiency of protein.
   Flaky skin and swollen belly are some of its symptoms.
2. It is caused by lack of vitamin A.
   Inability to see in dark or in poor light is its symptom.

C. Look at the given pictures and identify the type of simple machines.

	_____
	_____

Sample Test Paper

A. Solve the crossword with the clues given here.



Across

2. The seeds of lotus get dispersed by _____.
6. It helps us in keeping us fit.
7. The components present in our food that helps our growth
8. The blood vessels that carry blood back to the heart from all parts of the body
9. The seeds of maple plant get dispersed by _____.

Down

1. This simple machine makes it easier to carry loads
3. The blood vessels that carry blood away from the heart to different parts of the body
4. Food provides us this
5. The nutrient that helps in repairing tissues

B. Fill in the blanks with the words from the help box.

Dispersal	Vitamins	Proteins	Zygote	Roughage

1. The fusion of male and female gametes or cells forms a _____.
2. The process by which the seeds are scattered away from the parent plant is called _____.
3. Growing children need more _____ in their diet for muscle and tissue building.
4. _____ helps our body fight against diseases.
5. _____ in food helps in removing waste material from the body.

C. Define:

1. cotyledons

   .....

   .....

2. balanced diet

   .....

   .....

3. class-one levers

   .....

   .....

4. fertilisation

   .....

   .....

5. germination

   .....

   .....

6. seed dispersal

.....

.....

D. Answer the following questions.

1. What are two types of pulleys? Give examples.
2. Name the methods by which the seeds can be dispersed.
3. Which disease is caused due to the lack of vitamin B? Also, state its symptoms.
4. How can we keep our heart healthy?
5. What are the functions of superior vena cava and inferior vena cava?

Social Studies

1

The Earliest People

On Your Marks...

Travel back to the time of early humans. If you get a chance to interview people from the past think of the questions you would ask them. Write below.

_____

_____

_____

_____

I Shall Learn

- ☑ How early humans evolved into modern humans
- ☑ Sources of history

Evolution of Humans

The human evolution is a process of change by which modern humans evolved from early human ancestors over millions of years. It is a lengthy process of **gradual** development by which modern humans originated from ape-like **ancestors**.

As per the various scientific studies, it is believed that the early humans who first appeared on the Earth were ape-like creatures. They could not walk straight. These ape-like creatures were called **hominids**. The first hominids made an appearance on the Earth nearly five to four million years ago. They lived either on tree tops or in caves. They wandered from place to place in search of food and shelter.

Gradually, as hominids evolved, changes occurred in their body. They could now stand erect. Their fingers became more flexible and thus they developed a grip which helped them to hold things firmly. These were called Homo erectus. The Homo erectus travelled long distances unlike their predecessors.

Then emerged the Homo sapiens which literally means the 'thinking/ wise man' from which modern day humans have evolved.

You know what

Scientific study of human evolution is called Palaeoanthropology.

Sources of History

The period of human history before there were any written records of the events is called **prehistory**. Human prehistory is divided into three successive periods: the Stone Age, the Bronze Age, and the Iron Age. This period is best understood from the study of **fossils**, stone tools and cave paintings. These archaeological evidences are the sources of history which help the archaeologists understand how early humans might have lived in their environment. Let us find out more about these sources of history.

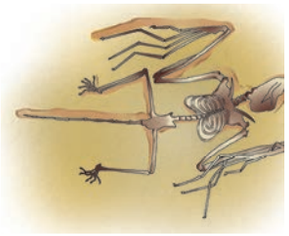
You know what

Do you know why you get goosebumps? The body hair of mammals stand up during cold to provide them a layer of warmth. Since humans have evolved and no longer have a thick layer of body hair, all we see on our skin are the goose bumps.

Old stone tools

Old pots

Old cave painting



Fossils

Fossils and Bones

Fossils are the hardened remains of prehistoric animals and plants. From skeletons to teeth, early human fossils have been very important in tracing the **evolution** of mankind. With the rapid pace of new discoveries every year, changes in bone structure, addition of bones and other aspects can be analysed.

Think about it!

List the knowledge and skills that you think hominids needed to survive.

'Lucy', dated to be more than 3.2 million years old, is the oldest hominid fossil to be discovered. It was discovered in 1974 at the site of Hadar in Ethiopia by Donald C. Johanson and his student Tom Gray.

The 'Lucy' fossil

Johanson and Gray were out searching for animal bones in the sand, ash and silt when they spotted a tiny fragment of arm bone. Johanson immediately recognised it as belonging to a hominid. Shortly thereafter, as they looked up the slope, they saw more bone fragments of ribs, vertebrae, thighbones and a partial jawbone.

Two weeks later, after many hours of excavation, screening, and sorting, several hundred fragments of bone had been recovered, representing 40 percent of a single hominid skeleton. It was named 'Lucy' after '*Lucy in the Sky with Diamonds*', the Beatles' song playing on the radio when Johanson and his team were celebrating the discovery back at the camp.

A cave painting

Cave Paintings

Apart from fossils, paintings have been found in caves which date back to millions of years ago. It appears that they used natural **pigments** from plants and rocks to draw the pictures. Much of the art depicts drawing and painting of people and animals. Since the people back then sustained themselves through animals, these paintings bear proof of that. It also tells us about the types of animals that were around back then and how they hunted them.

Primitive stone tools

Tools

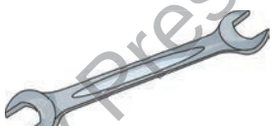
Many tools have been discovered which can be **traced** back to the prehistoric times. The recovered stone tools suggest that the tools were used to cut meat and bone, scrape bark of trees, and animal skins. They were also used to chop fruits and

roots. The very first tools were just pieces of stones. Once they discovered that it can be helpful, they began to sharpen stones of different shapes and sizes to make more useful tools. Flint, a hard steel-gray stone was often used because it could be chipped easily. Even bones of animals were used as tools.

Activity 1

Look at the pictures given below and identify the tools that we use today. Pick your answers from the help box. Find out from elders about the ways in which we use them.




1. _____ 2. _____ 3. _____ 4. _____ 5. _____

screw driver	hammer	saw	axe	wrench

Life of Early Humans

The early humans are often referred to as hunter-gatherers. They were totally dependent on nature for their survival. The earliest humans wandered from place to place for several reasons. Firstly, they wandered in search of animals that they hunted for food and skin. The animals wandered about with no permanent place to live, so did the early humans.

Secondly, plants and trees bore fruits in different seasons. Since early humans lived on hunting and gathering, they had to wander to different places in different seasons.

Thirdly, they moved in search of water. Many rivers and lakes are seasonal, so early humans who lived on the banks of such rivers and lakes had to move in search of water during the dry seasons. Also, when they exhausted the resources of an area they had to look for newer habitats.

Activity 2

Find out more about the life of early humans. Compare and write how your life is different from their life in terms of the following things.

	Your Life Today	Life of Early Humans
Food		
Clothing		
Shelter		

I Learnt

- Human beings are the result of human evolution. It is a lengthy process of gradual development by which modern humans originated from ape-like ancestors.
- Humans evolved from ape-like creatures called hominids.
- Since writing had not been invented during the prehistoric period, there are no written records of that period.
- Archaeological evidence such as fossils, bones, utensils, cave paintings and tools help archaeologists understand how early humans lived in their environment.

Words I Learnt

Ancestors: from whom one is descended
Evolution: development of something over a period of time
Gradual: a slow process
Fossil: the remains of prehistoric creatures embedded in the soil
Trace: to mark the course of something
Pigment: natural colouring matter

Get Set, Go!

A. Fill in the blanks.

Homo erectus	Homo sapiens	Evolution	Fossil	Palaeoanthropology

1. Human beings are the result of human _____.
2. The scientific study of human evolution is called _____.
3. The _____ had grip which helped them to hold things firmly.
4. _____ literally means the 'thinking/wise man' from which the modern day humans have evolved.
5. _____ is the remains of prehistoric creatures embedded in the soil.

B. State true or false.

1. Human beings are believed to have evolved from ape-like creatures.
2. During the evolution of human beings, various features were developed which helped them survive in their surroundings.
3. Writing was invented during the prehistoric period.
4. We use the word prehistoric to define the time of the early humans.
5. To understand prehistoric times, archaeologists have to collect the remains of the past.

C. Choose the correct answer.

1. _____ literally means the 'thinking/wise man' from which modern-day human beings evolved. (Homo sapiens/ Homo erectus)
2. _____ could stand erect. (Homo sapiens/ Homo erectus)
3. Whatever we know today about the pre-historic period is through sources such as tools, paintings, and _____. (fossils/coins)
4. Early human used tools made of _____ because it could be chipped easily. (Flint/Steel)
5. Lucy was a _____ (painting/ fossil)

D. Answer the following questions.

1. Define human evolution.
2. Who were hominids?
3. What are the sources of history?
4. Write a brief note on the evolution of human.

E. Find the words in the word grid given below.

evolution hominids history archaeology
cave painting fossil

F	O	S	S	I	L	A	P	C	U	J	H
O	P	H	L	T	H	X	W	G	G	B	I
G	Q	C	Z	M	J	I	U	B	L	B	S
S	X	F	O	S	S	I	L	Z	T	D	T
A	R	C	H	A	E	O	L	O	G	Y	O
I	D	Y	X	P	G	T	C	C	E	T	R
E	Q	M	H	O	M	I	N	I	D	S	Y
V	G	D	P	X	Y	R	O	T	S	I	H
C	A	V	E	P	A	I	N	T	I	N	G
T	B	O	M	O	H	C	V	D	R	U	G
Y	Q	N	T	K	E	T	U	G	M	Q	Y
Z	K	E	V	O	L	U	T	I	O	N	W

Connect

Arts Education

Work in pairs. Travel back to the time of early humans. One student becomes an early human from the past and the other one becomes the interviewer. Interview the person from past. You can ask the question you wrote in On Your Marks... activity and do the role play.

Life Skills

Curiosity is the mother of all inventions. The curiosity of Early Humans led to major discoveries of fire and wheel. The curiosity to find out why did the apple fall on the ground led Newton to discover the law of gravity.

Think of all the things that make you curious and seek answers from elders.

Project

Archaeologists collect the remains of the past such as tools, paintings, fossils and more in order to understand prehistoric times. Look around for old things in order to learn more about your family history. Old photographs, letters, paperwork, diaries, coins, even old clothes can serve as enough evidence for your study. Find out who it belonged to, how old it is and what it tells about your family history.




2

Evolution of Transport and Communication

On Your Marks...

Talk to the elders in your family and ask them about the means of transportation they used when they were of your age. Compare them with the means of transportation you see now. What kind of changes have happened?

I Shall Learn

- ☑ Evolution in means of transport
- ☑ Evolution in means of communication

Beginning of Transport

Wheel is one of the most important inventions of human history. It has certainly become an essential part of our lives.

In the early period of human civilisation, there were no vehicles. Humans used to carry large objects by themselves or drag them. Sometimes, animals were used to carry heavy things. This was the earliest mode of transportation which was slow and exhausting.

Invention of the Wheel

The invention of wheel was a revolutionary event in the history of mankind. The wheel was invented in a long-drawn-out process which happened over a few stages.

Initially, wooden logs were used to drag heavy objects. These logs were placed one after another and the object was dragged on top of them. Over a period of time, wooden logs were used under sledges to facilitate movement. And to further improve its efficiency, the wood logs were carved out of big wooden chunks. A supportive axle was also

Block of stone being moved on wooden rollers

developed. Holes were made at the center of each wheel, to which the ends of an axle were fitted. The wheel moved in a circular motion on the axle.

The oldest wheel was found in what is believed to be ancient Mesopotamia. It was used as a potter's wheel.

A Mesopotamian wheel

Reaching Distant Places

The earliest land transport made use of horses, oxen, donkeys and camels.

By 4th or 5th century BCE, wheeled carts were introduced. These carts were either animal-drawn or were pulled by humans. The first evidence of wheeled carts came from Central Asia and the Tigris-Euphrates valley in the Middle East. Horse-drawn carriages were introduced much later, followed by closed coaches.

Think about it!

Wheels and wheel-shaped parts are used every day. List as many devices as you can think of that we use today that depend on the wheel.

Introduction of wheeled vehicles increased the need for roads. Paved roads were introduced in Mesopotamia and the Indus Valley civilisation. Persian and Roman empires constructed stone-paved roads, which were used by armies to travel long distances in a short period.
Tar-paved roads were known to exist in medieval Caliphate times.

A series of ox-carts transporting goods

During ancient times, water transport was also an efficient way to travel long distances.

The earliest watercrafts were the dugout canoes cut out from tree trunks. These canoes were known to be in use as far back as 7600 BCE.

People started using wind power to travel long distances by the sea. The introduction of sailed vessels occurred at around 3100 BCE.

You know what

The first animal-drawn vehicle is believed to be from Ancient civilisation near East.

Use of canoes in transportation

Trade and Voyages

Since the ancient times, trade has been the primary reason behind many **voyages**.

The earliest maritime trade was believed to be from Eastern Mediterranean. Since 3000 BCE, Egypt and Minoan Crete were involved in trade. Soon Egyptians began trading with Mediterranean islands and along the North African coast.

Caravans of camels were common means of transport in the west coast of Arabia. The Indus Valley Civilisation had trading contacts with Sumerians in Mesopotamia. New trade routes were established in 300 BCE, connecting the different regions for trade and commerce.

Marco Polo reached China from the shores of Venice in 13th century.

The period between 15th century and 18th century is called the Age of Discovery. The period saw many expeditions undertaken by sailors and traders of powerful European countries. These expeditions were mainly aimed to find new trade routes and new markets for countries like Portugal, Spain, Italy and England.

The Portuguese discovered many new trade routes. They discovered a new sea route to India when Vasco da Gama, the famous Portuguese explorer landed in Calicut, India on 20 May 1498.

Ferdinand Magellan, the famous Portuguese explorer organised the Spanish expedition to the East Indies from 1519 to 1522, resulting in the first circumnavigation of the Earth. The American continent was discovered in the trans-Atlantic voyages carried out by Christopher Columbus in between 1492 and 1502. Christopher Columbus

First landing of Christopher Columbus in America

was an Italian explorer who completed several voyages across the Atlantic Ocean. Those voyages were successful in establishing European contacts and settlements in the American Continent.

The age of exploration continued with English voyagers William Dampier (1651–1715) and Abel Tasman (1603–1659). They were able to map the coast of modern-day Australia, along with the help of Captain James Cook (1728–1779).

You know what

Extensive land expeditions enabled the large-scale transfer of plants, animals, food and human populations across different continents.

Modern Means of Transport

Even though people still use animals as means of transport at some places, most journeys now are made with the help of vehicles or modern means of transport.

Road transport

Roads are used for walking or to travel on bicycles, scooters, motorcycles, cars, buses and trucks. The first bicycles were invented about 200 years ago. They had no pedals. The wheels were made of wood or iron and were known as bone shakers. Modern bicycles have a light frame, rubber tyres and a chain to drive the wheels. Special cycles are fitted with systems to run on different speeds. The first cars were simple vehicles and could be literally called "horseless carriages".

You know what

During the 19th century, the first "modern" highways were built using tarmac and concrete.

Rail transport

Rail transport is a means of carrying passengers and goods on wheeled vehicles running on rails, also known as tracks. The tracks make travel less bumpy. The early trains were drawn by horses. Then came the steam engines and later the diesel locomotives and now trains run on electricity. Trains are economical and best suited for long distance travel.

Rail transport was made faster and better with the development of rail-based mass rapid transit system such as 'tube', 'subway' or 'metro'. These trains are a way

An old steam engine

Delhi Metro

of transporting maximum passengers rapidly without overloading the surface transport systems in big cities. Now metro trains run in almost all metro cities of India. They travel both underground and on elevated tracks. Presently the DMRC (Delhi Metro Rail Corporation Limited) is the most intricate metro railway network in India.

Water transport

Human beings probably made their first journeys on water by floating on rivers and bays on top of tree trunks. The first canoes were made by hollowing out tree trunks. Tall grasses or reeds were bundled together to make rafts. Today, boats and motorboats are used to travel short distances in rivers and oceans. Ships carry passengers and goods from one country to another on oceans. Hovercrafts, another means of water transport, can travel both on land and water. It can travel faster than ships.

Airways

French brothers, Joseph and Étienne Montgolfier were the first to invent the hot air balloon. In 1783, they flew this balloon for nearly ten minutes. These days aeroplane is the most commonly used means of air travel. Helicopters can fly to places where aeroplanes cannot. Rockets are used for travelling to outer space.

A passenger airplane

Beginning of Communication

Long back, early humans did not know how to read and write. There was no language in which they could communicate. They communicated through signs and gestures. Later, humans learned the skill of pictorial writing. They used pictures and paintings to express their thoughts and feelings.

You know what

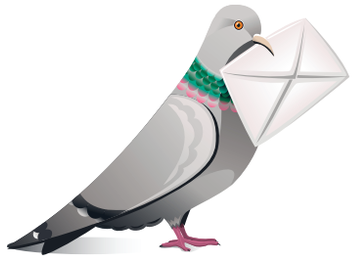
The first known production of paper is believed to have occurred in China. Here, torn silk shreds were used as writing material in 200 BCE.

Later, when the ancient hunter-gatherer societies started farming, they felt the need of keeping records. Soon, they developed their own language and the **alphabet**. Alphabet enabled the formation of words and sentences. What began as primitive cave paintings and signed language has morphed into endless ways to express oneself to other humans.

Use of Pigeons

In ancient times, messages were delivered in person which used to consume a lot of

time. So the practice of using pigeons to communicate was started. Persians were the first to use pigeons to send and receive messages.



The homing pigeons had the ability to fly back to their homes, so they were trained to fly between two places. A message was tied to the leg of the pigeon. Once they delivered the message, these pigeons would fly back home.

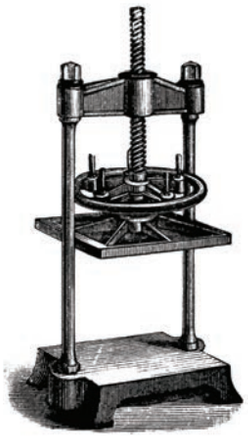
Greeks were known to use carrier pigeons to send the names of the victors at the Olympic Games to their respective cities. Over 2000 years ago, Romans used homing pigeons in their military campaigns. Genghis Khan placed pigeon relay posts all across Asia and most of Eastern Europe. Carrier pigeons were also used by Mughals in India.

You know what

The use of pigeons for sending post continued until the 20th century. In the First World War, over 100,000 pigeons were used with a success rate of 95%.

Printing Press

A **printing press** is a mechanical device for producing many copies of a text on paper. Till the 14th century, books were written by hand. This was the reason why books were expensive and very few in number.



An antique printing press

Then, in 1450, Johannes Gutenberg set up the first printing press in Germany. The first book that he printed was the Bible. While it might take someone a year to make a copy of bible by hand; with the Gutenberg Press it was possible to produce several hundreds copies a year. Now books could be made quickly, and this spread new ideas and learning.

Invention of Telephone and Telegraph

You know what

To print, Gutenberg used his own ink made from linseed oil and soot.

Since the invention of electricity, electric signals were used in communication. As electrical signals could travel at great speed, messages could be sent to a far-away destinations.

Telegraph

A **telegraph** is an instrument that allows transmission of a message to a distant place using electrical signals.

In 1837, Samuel F.B. Morse independently developed and patented a recording electric telegraph. This instrument could send electrical signals over wires between two distant places. This was the first form of electrical telecommunications.

Samuel F.B. Morse developed a code known as the **"Morse Code"** to be used with an electric telegraph. This code consists of a set of dots and dashes that allowed transmission of complex messages.

Telephone

A **telephone** is a communication device that can transmit sound or voice to a distant place using electrical signals.

Alexander Graham Bell is credited to be the inventor of the first telephone. In 1876, he was the first to patent a telephone that used a liquid transmitter and an electromagnetic receiver.

In 20th century, new developments led telephone to become smaller and cheaper. More people started using telephones to communicate.

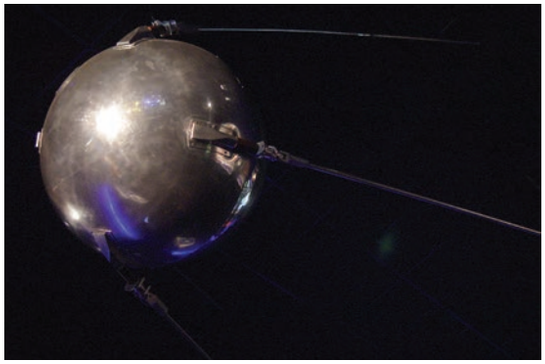
Computers

A computer is an electronic machine which can manipulate information. It accepts data and instructions and provides results. With the advance technology, sharing of information between machines became a possibility. This resulted in a network of computers known as the Internet that revolutionised communication system.

Internet is used on computers or mobile phones to exchange messages and information. It has become one of the most common ways of communication today. The email or electronic mail is a quick and inexpensive method of sending and receiving messages.

Satellites

A **satellite** is a device sent up into space to travel around the Earth, used for collecting information or mass communication by radio and television. Today, artificial satellites stationed in space relay information to us instantly. On October 4, 1957, the world's first artificial satellite, Sputnik 1, was launched by the Soviet Union. Telstar 1 became the first privately sponsored active communication satellite, launched on July 10, 1962. It was designed to receive radio signals from Earth and transmit them back.



A model of Sputnik satellite

On February, 1976, the satellite MARISAT was launched. It was developed by the COMSAT Corporation to enable mobile services to US Navy and other clients.

At the end of the 20th century, more than 2,200 satellites were successfully launched from Earth. Many of these allow us to communicate through Internet and television.

I Learnt

- The oldest wheel was found in what is believed to be ancient Mesopotamia.
- The Age of Discovery refers to the period of extensive overseas exploration, from the end of the 15th century to the 18th century.
- What began as primitive cave paintings and signed language has morphed into an endless ways to express oneself to other humans.

Words I Learnt

Voyages: a long journey especially by a ship

Morse Code: a system used for sending messages in which letters and numbers are represented by short and long marks, sounds, or flashes of light.

Get Set, Go!

A. Fill in the blanks.

1. By 4th or 5th century BCE, _____ were introduced.
2. Since the ancient times, _____ has been the primary reason behind many voyages.
3. _____ reached China from the shores of Venice in 13th century.
4. _____, the famous Portuguese explorer landed in Calicut, India on 20 May 1498.
5. _____, the famous Portuguese explorer organised the Spanish expedition to the East Indies from 1519 to 1522, resulting in the first circumnavigation of the Earth.

B. State true or false.

1. Egyptians were the first to use pigeons to send messages.
2. In 1837, Alexander Graham Bell independently developed and patented a recording electric telegraph.
3. In 1450, Johannes Gutenberg set up the first printing press in Germany.
4. Internet is used on computers or mobile phones to exchange messages and information
5. Satellites allow radio, television, telephone transmission anywhere in the world.

C. Name the following.

1. Civilisation that was known to use carrier pigeons to send the names of the victors at the Olympic Games.
2. An instrument that allows transmission of a message to a distant place using electrical signals.
3. A device sent up into space to travel around the Earth, used for collecting information or mass communication by radio and television.
4. A long journey particularly taken by a ship.
5. A system used for sending messages in which letters and numbers are represented by short and long marks, sounds, or flashes of light.

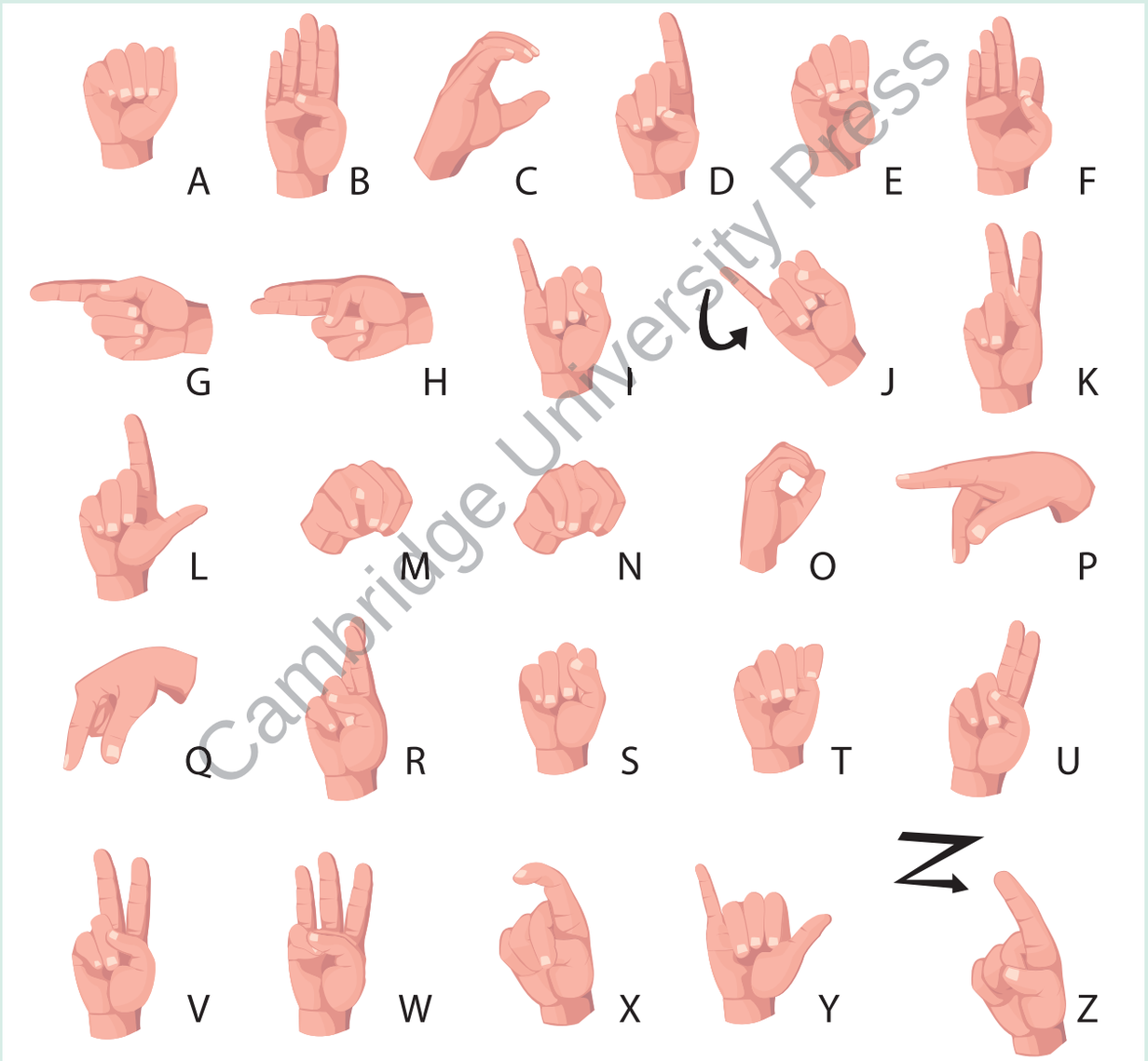
D. Answer the following questions.

1. Describe the invention of the wheel.
2. List the new developments in means of transportation.
3. Explain the reason behind using pigeons to send messages.
4. Explain the origins of the electric telegraph.

Life Skills

Starbucks, a popular coffeehouse chain has partnered with the Society of Interpreters for the Deaf (SID) to train their staff members to use sign language. This is a noble initiative which has also been adopted by many food chains to provide equal employment opportunities to differently abled people.

Look at the sign language chart given below. Use the sign language chart to spell out your name. Share how it felt.



Connect

Language

This is how the letters of the English alphabet are written in the Morse code.

Ch.	Code	Ch.	Code	Ch.	Code	Ch.	Code	Ch.	Code
A	.—	G	——.	M	——	S	...	Y	—.——
B	—...	H	....	N	—.	T	—		
C	—. —.	I	..	O	———	U	..—		
D	—..	J	.—— —	P	.——.	V	...—	Z	——..
E	.	K	—.—	Q	——.—	W	.——		
F	..—.	L	.—..	R	.—	X	—..—		

Write a secret message to a classmate using this code.

Project

Create a report on the different languages that are officially recognised by the Government of India. Identify their use in government offices.

3

Locating Places on Earth

On Your Marks...

Take a globe. Observe the lines, running from north to south and east to west on a globe. What do you think are these?

I Shall Learn

- ☑ About latitudes and longitudes
- ☑ About how to calculate time and locate places on the Earth

Imaginary Lines

We can a see a number of lines that run from north to south and east to west on a globe. These are imaginary lines because they do not actually exist on the surface of the Earth. We use these imaginary lines to find the exact location of a place on a map or on a globe. These imaginary lines are lines of **latitude** and **longitude**.

Imaginary lines on a globe

Latitudes

Latitudes are the imaginary lines that run from east to west. They encircle the Earth horizontally. These lines are parallel and lie at an equal distance from one another. Hence, these are also known as **parallels** of latitude. The length of the latitudes increases as we move away from the poles, towards the centre of the Earth. There are 181 lines of latitude.

The latitude which divides the Earth exactly at the centre is the longest. It is known as the **Equator**. The Equator divides the Earth into two equal halves or **hemispheres**. The hemisphere above the Equator is known as the **northern hemisphere** and the one below it is called **southern hemisphere**. The two flattened ends of the Earth, towards north and south, are called North Pole and South Pole respectively.

Lines of latitude are labeled in degrees. The latitudes northward from the Equator are marked as 1° N, 2° N and so on.

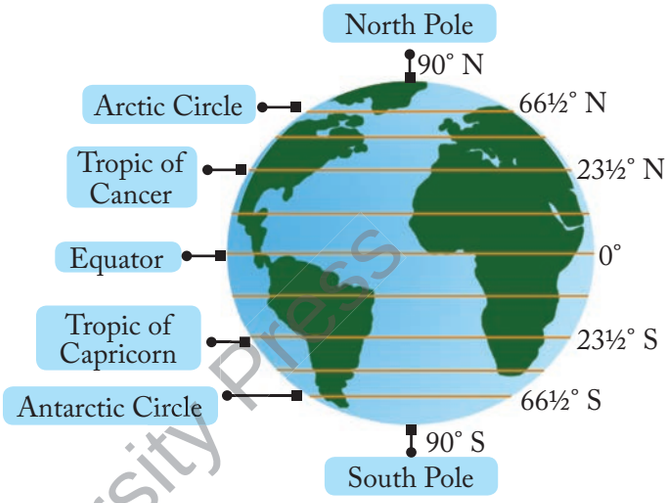
The latitudes southwards from the Equator are marked as 1° S, 2° S and so on.

The latitude of the North Pole is 90° N, and that of the South Pole is 90° S. The Equator is the 0° latitude.

Some important latitudes are:

	Latitude	Degree
1.	Equator	0°
2.	Tropic of Cancer	23½° N
3.	Tropic of Capricorn	23½° S
4.	Arctic Circle	66½° N
5.	Antarctic Circle	66½° S

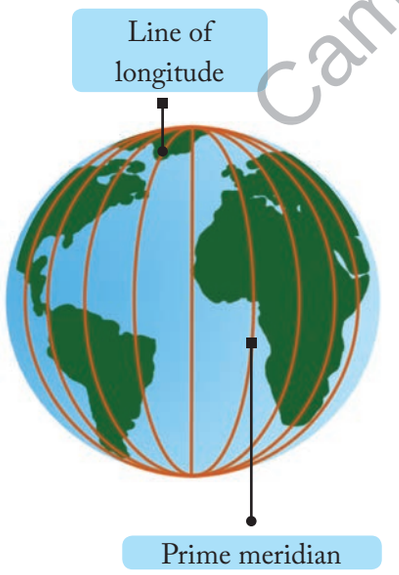
The Tropic of Cancer passes through India.



Longitudes

Longitudes are the imaginary lines that run from the North Pole to South Pole. Unlike latitudes, these lines are not parallel to each other. They are all of the same length. All longitudes meet at the poles and widen on reaching the Equator.

Longitudes are important indicators of time, so they are also known as **meridians**. The meridian which passes through the Royal Observatory at Greenwich near South London is called the **Prime Meridian**. The Prime Meridian is 0° meridian or 0° longitude. Lines of longitude located to the east of Prime Meridian are indicated with °E and those located to the west are indicated with °W.



The Prime Meridian divides the Earth into two hemispheres—the **eastern hemisphere** and the **western hemisphere**. In each hemisphere, there are 180 lines of longitudes, numbered from 0° to 180°. These are 360 in total.

Another important meridian is the **International Date Line** at 180° longitude. The International Date Line marks the difference of date between the eastern and the western hemispheres.

Locating Places

Longitudes and latitudes form a network called **grid**. The grid helps us to accurately locate places on the maps and globes.

To locate a place on a map or globe, we must know the degrees of the latitude and longitude. We can find the exact position of the place at the point where these two lines cross each other. For example, New Delhi lies at 29° N, 77° E.

You know what

AM stands for Ante Meridiem. It means before noon. PM stands for Post Meridiem. It means after noon.

Calculating Time

Longitudes help in calculating time. The difference between two **consecutive** longitudes is of 4 minutes. When we travel eastwards from the Prime Meridian, we need to add 4 minutes on passing each meridian. When we travel westwards from the Prime Meridian, we need to subtract 4 minutes as we pass each meridian. The moment we cross to the east of the International Date Line, we gain or add a day. Similarly, if we cross to the west of the International Date Line, we lose or subtract a day.

Grid of latitudes and longitudes

Let us understand this with the help of an example. The current time at the Prime Meridian is 12 noon. Location A is at 4° E longitude and location B is at 4° W longitude. Then, the time at location A will be 12:16 PM and time at location B will be 11:44 AM.

Think about it!

Christmas is a summer festival in Australia. Think why?

Activity

Take a globe and find answers to the following.

1. Name any two states that the Tropic of Cancer passes through in India.
2. Name any two countries that the Tropic of Capricorn passes through.

I Learnt

- Latitudes are imaginary lines which encircle the Earth horizontally.
- Longitudes are imaginary lines which run from North Pole to South Pole of the Earth.
- The grids of latitudes and longitudes help to locate places.

Words I Learnt

Consecutive:	to follow each other continuously
Latitudes:	the imaginary lines that run from east to west
Equator:	the latitude which divides the Earth exactly at the centre
Longitudes:	the imaginary lines that run from the North Pole to South Pole
Grid:	a network of horizontal and vertical lines
Parallel:	lying in the same direction but always at the same distance

Get Set, Go!

A. Fill in the blanks.

1. Latitudes and longitudes are also known as _____.
2. The 0° latitude is the _____.
3. The Tropic of _____ passes through India.
4. The 0° longitude is known as _____.

B. Choose the correct answers.

1. Imaginary lines running parallel to the Equator are called _____.

   a. Meridians b. Latitudes c. Axis d. Longitudes

2. Longitudes and latitudes form a network called _____.

   a. grid b. boxes c. parallels d. squares

3. The Prime Meridian is a longitude of _____.

a. 180° b. 0° c. ½° d. 4°

C. Match the following.

1. Arctic Circle	a. 23½° S latitude
2. Prime Meridian	b. 23½° N latitude
3. Tropic of Cancer	c. 66½° N latitude
4. Equator	d. 0° latitude
5. Tropic of Capricorn	e. 0° longitude

D Answer the following in detail.

1. What are latitudes?
2. What are longitudes?
3. Write a short note on the important longitudes.

E. On an outline map of the world, mark and label the following.

1. Equator 2. South Pole 3. Greenwich 4. International Date Line

Life Skills

Imagine you were asked to pick up a friend at the airport at midnight of April 13. When would you go to pick her up – midnight at the beginning of April 13, or midnight at the end of April 13?

Technically, it is the time when the date changes from the previous date to the next date.
One way to overcome this problem is to refer to the time as 12:01 am, April 13 or 11:59 pm April 13 depending on the time you are referring to or use the 24-hour clock format to refer to the time.

AM or PM to 24-Hour Clock

You can convert am or pm time to time on a 24-hour Clock by using these rules.

If the time is given in a.m., there is no change and a.m. is replaced by hours.

Example: 4:15 a.m. is written as 4:15 hours

If the time is given in pm, then add 12 to the time and replace p.m. with hours.

Example: 7 p.m. is written as 7:00 + 12 = 19:00 hours

So, 7:00 hours would mean 7 in the morning and 19:00 hours would mean 7 in the evening.

Connect

Maths

Calculate the time in the countries which are at the given longitudes if the current Prime Meridian time is 2 pm.

1. 16° East
2. 4° West
3. 20° West
4. 12° East

Project

Form pairs and find out the locations of the given places from the world map with the help of grids of latitude and longitude.

- New Delhi, India
- Tokyo, Japan
- London, UK
- New York, USA

4

India – Location and Extent

On Your Marks...

Your address tells your location. Fill in the blanks with your house address.

Name: _____

House no.: _____ Locality: _____

Town/Village: _____ District: _____

State: _____ Country: _____

Do you know where is our country located? Let us learn about it.

I Shall Learn

- ☑ Location and extent of India
- ☑ Neighbouring countries of India

India – Location and Extent

India is the seventh largest and the second most populated country in the world. It is located in the southern part of the continent of Asia.

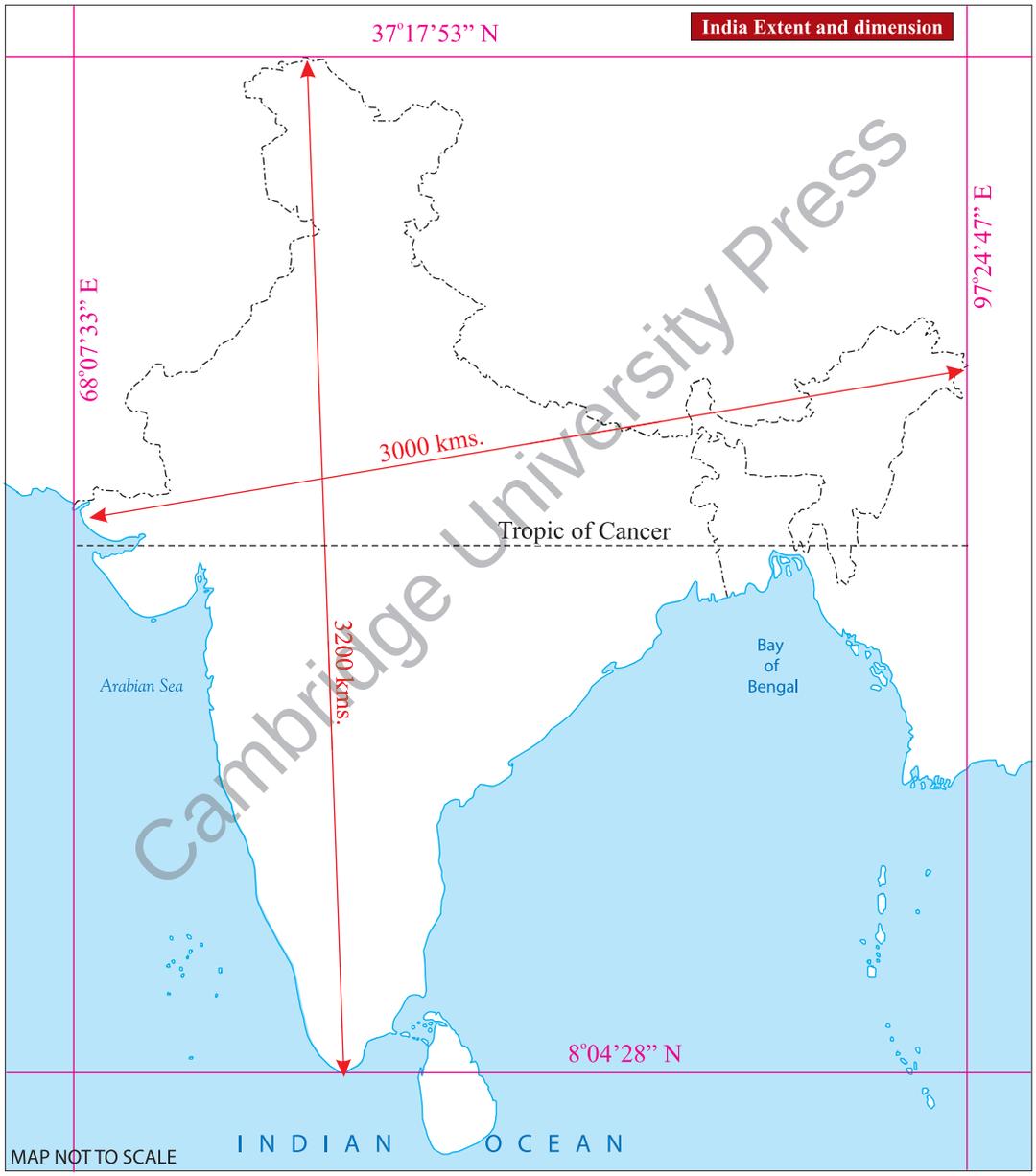
India is surrounded by the Arabian Sea in the west, the Bay of Bengal in the east and the Indian Ocean in the south. The natural boundary in the north is formed by the Himalayas.

A piece of land which has water on three sides is called a **peninsula**. Hence, most of the India forms a peninsula.

Longitudinal and Latitudinal Extent of India

India lies wholly in the northern and eastern hemispheres. The latitudinal extent of India is about 8° N to 37° N. India's longitudinal extent is about 68° E to 97° E.

The north-south extent of India from Ladakh in the north to Kanyakumari in the south is 3214 km. India's east-west extent from the Rann of Kutch in the west to Arunachal Pradesh in the east is 2933 km.

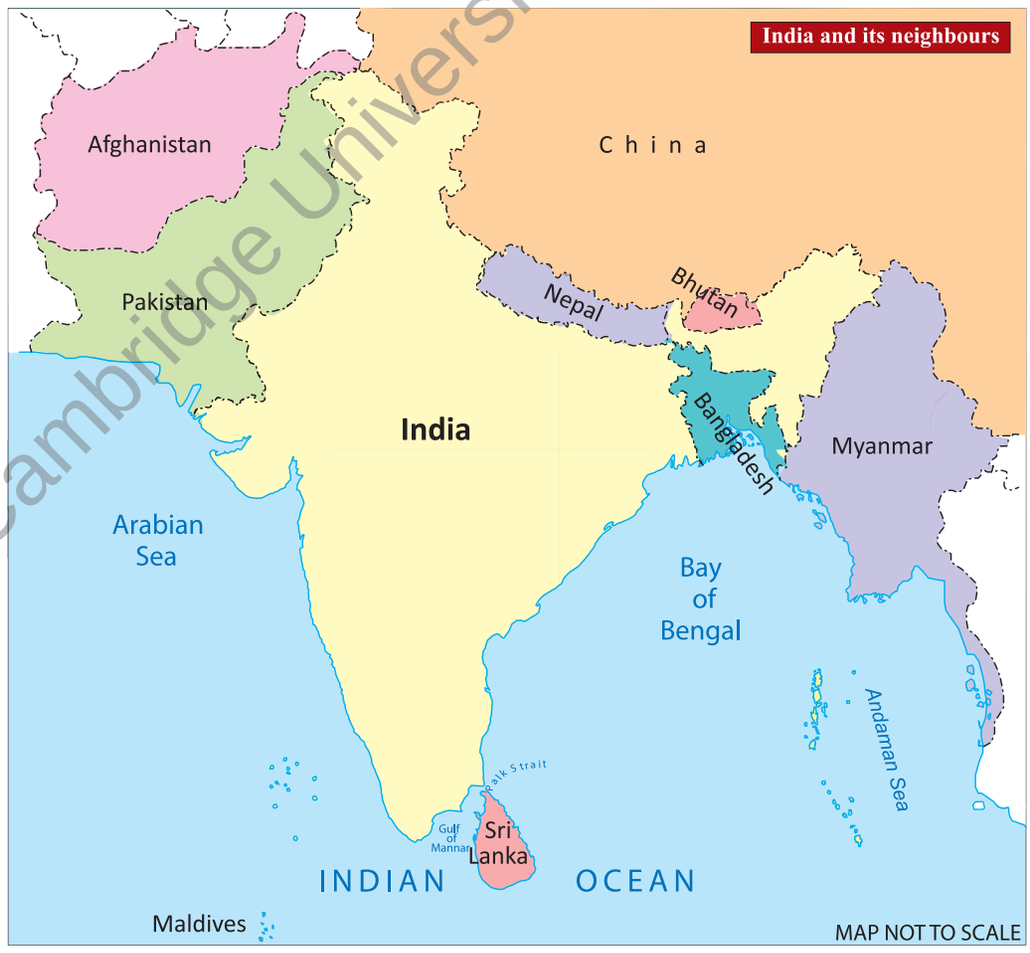


Map showing extent of India

Neighbours of India

India has several neighbouring countries. Pakistan and Afghanistan lie to the west. Nepal, Bhutan and China lie to the north. To the south, we have Sri Lanka and Maldives. Bangladesh and Myanmar are located on the eastern boundary.

- The Indian regions of Jammu and Kashmir, Ladakh, Gujarat, Rajasthan and Punjab share their borders with Pakistan. The River Indus and its tributaries Chenab, Beas, Ravi, Sutlej and Jhelum flow through India before flowing into Pakistan. Both the countries also share the Great Himalayas.
- The Indian states that touch the border with Nepal are Bihar, Uttar Pradesh, Uttarakhand, West Bengal and Sikkim.
- Bhutan shares a border with the Indian states of Arunachal Pradesh, Sikkim, Assam and West Bengal.
- China shares its borders with the Indian regions of Ladakh, Himachal Pradesh, Sikkim, Arunachal Pradesh and Uttarakhand. It is the world's most populous country.
- India and Bangladesh share one of the longest borders in the world. The Indian states of Assam, Mizoram, Tripura, Meghalaya and West Bengal touch the border of Bangladesh.



Map showing neighbouring countries of India

Activity

1. **Look at the political map of India. Imagine you are standing at the centre of India, facing north. Which direction would you be going if you were to go to:**
   1. Himachal Pradesh _____
   2. Assam_____
   3. Gujarat_____
   4. Tamil Nadu _____

2. **Find out about the size and extent of the neighbouring countries of India. Compare it with India's.**

I Learnt

- India is located in the southern part of Asia.
- India has several neighbouring countries.

Words I Learnt

Peninsula: a piece of land which has water on three sides

Get Set, Go!

A. Fill in the blanks.

1. India has the _____ Sea on its west.
2. _____ and _____ are the neighbouring countries in the south.
3. India is located in the southern part of the continent of_____.
4. India is the _____ most populated country in the world.

B. Match the following.

1. Latitudinal Extent	a. 68° 7' 53" E to 97° 24' 47" E
2. Longitudinal Extent	b. 8° 4' 28" N to 37° 17' 53" N.
3. East-West Extent	c. 2933 km
4. North-South Extent	d. 3214 km

C. Answer the following questions.

1. Where is India located?
2. What are the latitudinal and longitudinal extent of India?
3. Name the neighbouring countries of India.

D. Map Work

On a physical map of India, mark any four neighbouring countries of India.

Life Skills

Diversity is that one thing we all have in common. Celebrate it!

Say yes or no to find out if you have diversity in your class.

1. Are there children who speak different native Indian languages?
2. Are there children in your class who follow different religions?
3. Do your classmates celebrate different festivals from different parts of India?

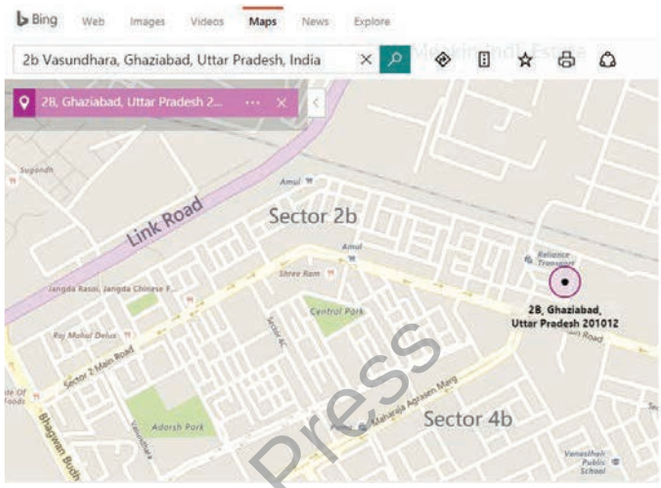
3 yes: Yes, we have diversity in our class.
2 yes: We are close to being a diverse class.
1 yes: Let's work on becoming a diverse class.

Connect

Find the location of your house using the computer.

Computer Studies

- Go to the computer lab with your teacher and open **https://www.bing.com/.**
- Click on **Maps.**
- Type your address in the **search box.** Click **search.**
- The location of your house will appear.

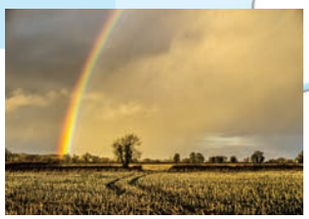


Project

Take a look at any Indian currency note. You will find its value written on one side in about 15 different Indian languages. Find out which languages are these.

5

Climate of India



On Your Marks...

How do you find the weather today? Are you in a sweater or are you sweating? Look at the trees outside your classroom. Are they green, dry or flowering? Think about how it was like when it was your birthday. Think, observe and discuss them with your friends.

I Shall Learn

- ☑ About the climatic conditions of India
- ☑ About the factors that affect the climate of the country
- ☑ About the seasons of India
- ☑ About the climatic regions of India

The Climate of India

Weather refers to the atmospheric conditions experienced in a place for a short period of time. Climate refers to the weather conditions of a place over a long period of time. The climate of a country affects the lives of the people living in that country. The type of vegetation and wildlife found in a country also depends on its climate.

India is a very large country so different parts of the country experience different types of climate. Some places are very hot and some are very cold. The places near the oceans and seas are neither too hot nor too cold.

Value Tip!

Planet Earth is our home. Polluting the environment brings about an imbalance in nature. As responsible citizens of this planet, it is our duty to protect mother nature to ensure a better future for ourselves and for the generations to come.

Factors Affecting Climate of India

Besides **temperature, wind, rainfall** and **sunshine,** there are various factors that affect the climate of India.

- **Location:** The **Tropic of Cancer** passes through India. This makes it a tropical country characterised by hot and humid climate.
- **Distance from the sea:** India is a vast peninsular country. So, many states are located close to the sea. The distance from the sea largely determines its wind and rainfall pattern.
- **The Himalayas:** Due to their great height, the Himalayas behave as a climatic barrier in the north. They confine the monsoon to India.
- **Physical features:** The different physical features cause variation in climate. For example, the sea facing side of the Western Ghats receives heavy rainfall whereas the areas behind it remain dry.
- **Altitude:** Places located at higher attitudes like hill stations or mountain tops experience relatively colder climate.

India's climate is determined by all the mentioned factors playing together. All these factors affect the climate of an area which in turn determines the lifestyle of people living there. Lifestyle includes the kind of clothes people living there wear, the food they eat and the types of crops that are grown there. For this reason, some areas are more fertile and thickly populated than others.

You know what

Some ragas of the Indian classical music are based on different seasons and their features. Can you find out about some of them?

Seasons

India's climate can broadly be divided into three main seasons -**summer, winter** and **monsoon**. Regions like the North East and the Kashmir Valley experience **spring** and **autumn** as well.

Summer Season

Summer is the season of hot weather. In India, it lasts from middle of March till the end of June. The months of May and June are the hottest months of the year. The season is marked by longer days and shorter nights. The mountains remain cool during this season as compared to the other parts of the country. Therefore, people visit hill stations to escape the heat of the plains.

Tourists at hill station during summers

Hot dry winds called the loo blow in the afternoons through the Northern Plains. Dust storms are common during this time. The Northern

Plains record the highest temperatures while the Deccan Plateau remains cooler due to its height and closeness to the sea. Coastal areas too remain cool because of winds blowing from the sea.

Monsoon Season

Monsoon season in India

Towards the end of the summer season, the **humidity** in the air starts increasing. This leads to the onset of rainy or monsoon season. It starts in June and continues till the end of September. The main characteristic of this season are the heavy moisture-laden, rain-bearing winds that blow towards Indian mainland from the Arabian Sea and the Bay of Bengal.

The distribution of rain across different parts of the country is uneven. Some areas receive more rainfall than the others and some areas may receive little or no rainfall at all. For example, coastal areas receive heavy rainfall but places in Rajasthan and Gujarat receive little rainfall often leading to **drought**. Due to heavy downpour, monsoons also cause floods and **landslides** in certain regions. The region of Tamil Nadu receives rainfall between the months of November and January. The monsoon plays a major role in the agriculture in India. Sowing and harvesting time of crops is calculated by the cycle of the monsoon. So if the monsoon is late in arriving or does not carry adequate rain it causes a huge loss.

You know what

Mawsynram in Meghalaya is the wettest place on Earth. It receives around 12,000 mm of rain every year.

Winter Season

Winter is the season of cold weather. In India, it begins in mid-November and continues till February. The days are short while the nights are longer. December and January are the coldest months in North India. States in the Northern Mountains get snowfall and Northern Plains experience low temperatures. Regions like Jammu and Kashmir, Himachal and Punjab experience freezing temperatures. Strong winds from the west, known as **western disturbances**, cause rainfall in the plains and snowfall in the mountains in winters. The proximity to the Himalayas in the north adds to the cold wave situation in the region.

The western desert too experiences colder nights and pleasant days. However, in south India and coastal areas, there is no such well-defined winter season. This is because of the area's proximity to the sea and the **Equator**.

Activity 1

Form pairs, discuss and give reasons for the following.

1. Why do the two houses have different type of roofs?
2. The Thar Desert has an extreme type of climate, with very hot days and cooler nights in summer.
3. More people visit hill stations during summer than in winter.

Autumn and Spring

Autumn comes just after the rainy season, before the onset of winter season. It is the time when leaves fall off the trees.

The spring season comes after winter in the months of March and April before the onset of summer. During this season, plants and trees bear new leaves and flowers bloom.

Tulip garden in Srinagar during Spring season

Climatic Regions of India

India is a very large country so different parts of the country experience different types of climate. The main climatic regions of India are listed below.

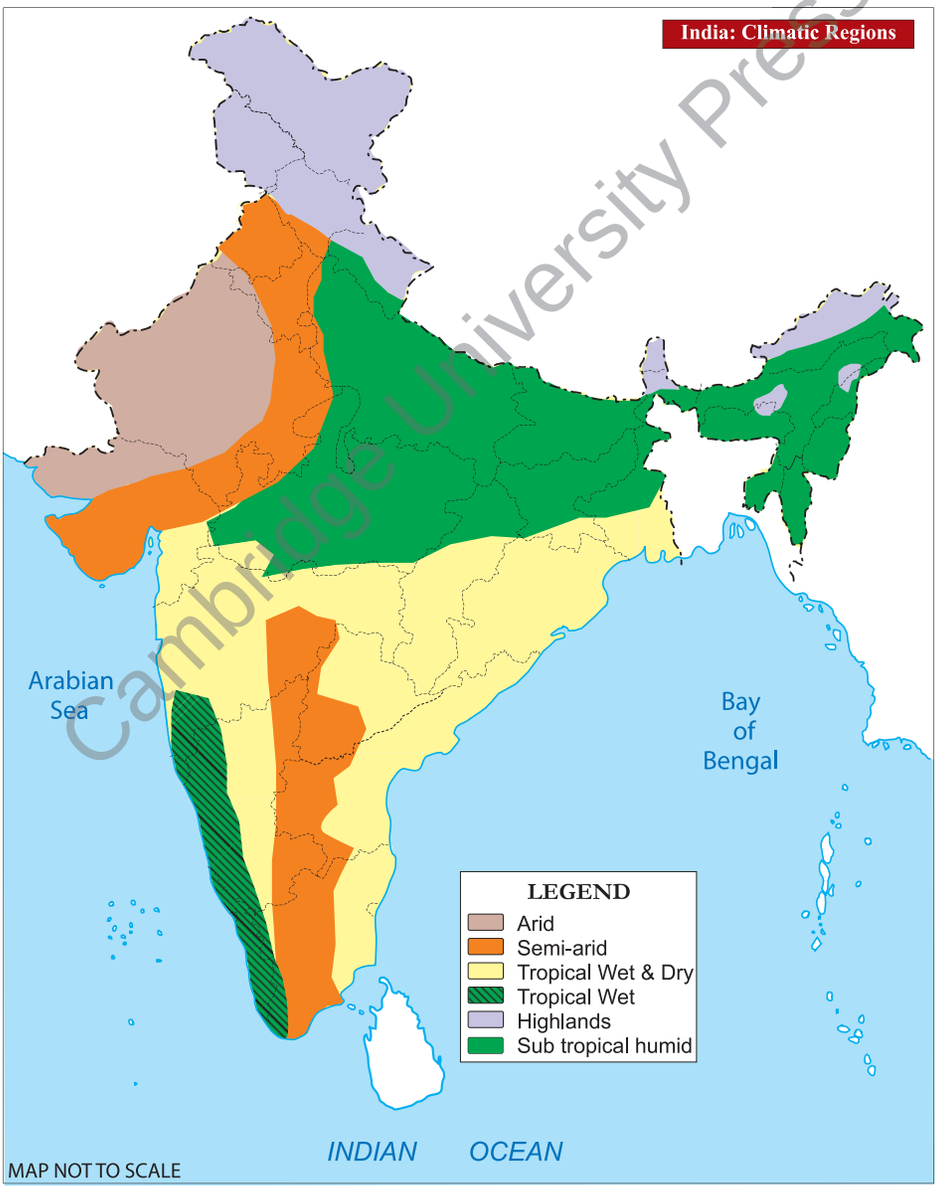
Climatic Regions of India

Climate Pattern	Characteristics
Tropical wet	Hot summers and heavy rainfall during the monsoon season
Tropical wet and dry	Hot summers and heavy rains in monsoon; southeastern coastal region receives rain in winter
Subtropical humid	Hot summers with monsoon rains heavier in the east than in the west; winters are cool, hills are colder
Highland	Very cold winters and cool summers; rain in the monsoon

Climate Pattern	Characteristics
Arid	Summers are hot and little or no rain received during monsoon and cold winters
Semi-arid	Hot summers, slightly more rainfall than the arid region and some regions experience a cool winter

Activity 2

Look at the map of India showing different climatic regions. Write the names of the states to know the climatic region they come under.



I Learnt

- Climate refers to the weather conditions of a place over a long period of time.
- Factors determining the climate of a region include location, distance from the sea, the
- Himalayas, physical features and altitude.
- India has three main seasons—summer, winter and monsoon.
- India is divided into different climatic regions.

Words I Learnt

Equator: an imaginary line drawn around the middle of the Earth at an equal distance from the North Pole and the South Pole

Humidity: the amount of water vapour in the air

Landslide: a collapse or falling of large mass of earth or rock from a mountain or cliff

Drought: a long period of time with little or no rain

Get Set, Go!

A. Fill in the blanks.

1. The day-to-day change in the atmospheric conditions is called _____.
2. Northern Plains experiences intense heat in the _____ season.
3. Hot and dry winds that blows across the Northern Plains during summer is called _____.
4. Winds full of moisture that bring rain to India are called _____.
5. Extended period of dry weather with little or no rain is called _____.

B. State true or false.

1. The climate of a place depends on its location and rainfall.

2. The summer season starts in June and ends in September.
3. The humidity rises during the monsoon season.
4. Flowers bloom during the autumn season.
5. Seasons follow a pattern every year.

C. Match the following.

1. Summer	a. Western disturbance
2. Winter	b. Shedding of leaves
3. Monsoon	c. Loo
4. Autumn	d. March and April
5. Spring	e. Rainfall in Tamil Nadu

D. Answer the following questions.

1. What are the different factors that affect the climate of India?
2. Why does South India experience mild winters?
3. Describe the importance of monsoon in India. Give some characteristic features of the season.
4. Name the different climatic regions in India and write their characteristics.
5. Explain briefly the summer and winter seasons in the Northern Plains.

E. Map Work

On a political map of India, label the different climatic regions of India.

Life Skills

We see in our neighbourhood that there are many poor people who suffer during different seasons for different reasons. They do not enjoy the facilities that we have. How can you help these people?

Form small groups and be accompanied by adults. Give them umbrellas and blankets that are no longer in use. Collect woolen clothes that do not fit you anymore and give them away. With the help of NGOs (organisations that help people in need), you can visit an orphanage or an old age home and spend a day with children or old people.

Connect

Adaptation

Science

Just as we adjust ourselves to different climatic conditions by wearing different clothes and eating different kind of food, animals adapt in special ways to survive in the climatic region they belong. The ability in animals which help them survive in their natural habitats is called **adaptation**.

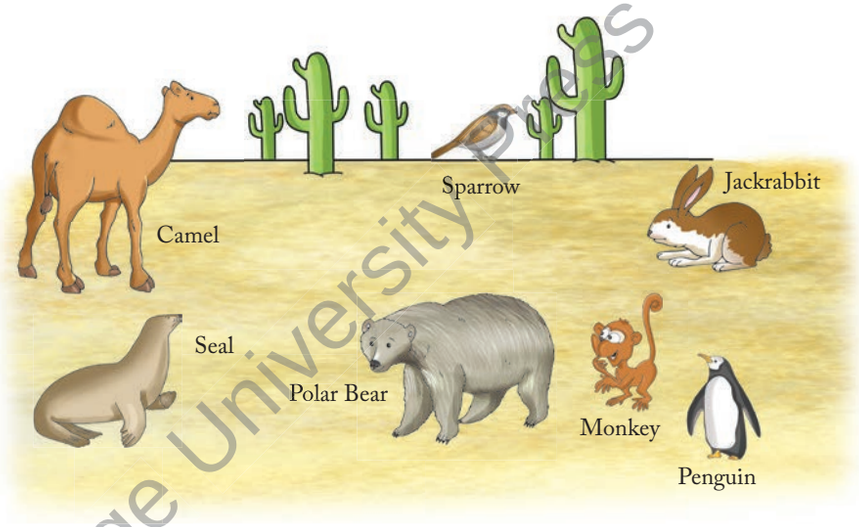
Who belongs in the desert?

Which of these animals can adapt well in the desert. Read the clues and identify. Circle the correct animal.

They have long eyelashes and thick eyebrows to stop the sand from entering their eyes.

They have a hump to store food and water for future use because of lack of water and vegetation in the desert.

They have special feet that help them walk in the sand.



What helps this animal to adapt in the desert? Write.

_____

_____

Can you think of other animals that can adapt in the desert?

_____

_____

Project

Given below is the Indian calendar based on the seasons. Find out if other countries also have calendars based on seasons.

Seasons	Months (According to the Indian Calendar)	Months (According to the English Calendar)
1. Vasanta	Chaitra-Vaisakha	March-April
2. Grishma	Jyaistha-Asadha	May-June
3. Varsha	Sravana-Bhadra	July-August
4. Sharada	Asvina-Kartika	September-October
5. Hemanta	Margashirsa-Pausa	November-December
6. Shishira	Magha-Phalguna	January-February

6

The Constitution of India

On Your Marks...

I Shall Learn

- ☑ Constitution
- ☑ Our rights and duties
- ☑ Directive Principles of State Policy

Read the scenarios.

Scene 1

This is Mira's School. It is always in a state of chaos. Students come at any time in the morning. They start eating in class whenever they feel like.

Students attend classes if they want to and leave for home anytime.

Scene 2

Mira and Sakshi are playing Snakes & Ladders. They fight over the dice and whosoever catches hold of it gets the turn to play.

There is shouting and howling in the entire house whenever the girls would play.

Now, identify the problem. Tick (✓)

a. There are no rules ☐

b. There is no need of rules ☐

c. There are so many rules ☐

How would you fix the problem in the given scenarios? Think and write.

_____

_____

What if there were no traffic rules, no rules in schools or workplaces? It would be a state of complete chaos. Henceforth, the rules are needed to establish order and avoid chaos.

Constitution

After India's independence from the British rule, the newly formed Indian government framed a set of rules that would be a guide for them and the future governments to govern the country. These set of rules is known as the **constitution**. India has the world's longest-written constitution.

Dr B.R. Ambedkar

The Constitution of India was drafted by the **Constituent Assembly** under the chairmanship of **Dr B.R. Ambedkar**. It was adopted by the Constituent Assembly on 26th November 1949. The Constitution of India came into effect on **26 January 1950**. Since then, this day is celebrated as our **Republic Day**.

Some important parts of the constitution are the Preamble, the Fundamental Rights and Duties and the Directive Principles.

The Preamble of Our Constitution

The **Preamble** is the introduction to our Constitution. It lays down the ideals on which our nation is built. The Preamble states India to be "a sovereign, socialist, secular, democratic and republic".

1. **Sovereign:** It means that India is a free country.
2. **Socialist:** It means that in India, all people are equal. Everyone has equal rights and opportunities to get jobs and earn their livelihood.
3. **Secular:** It means that all religions are treated with equal respect in India. The people are free to follow the religion or belief of their choice.

The Constitution of India

Preamble

WE THE PEOPLE OF INDIA having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity;

FRATERNITY assuring the dignity of the individual and unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

4. **Democratic:** It means that people in India elect their own government.
5. **Republic:** It means that India has an elected head of the state.

Our Fundamental Rights

Fundamental Rights refer to the rights given to every citizen of a country. These rights are basic and essential conditions that are necessary for any individual to progress and lead a decent life. The Constitution of India guarantees every citizen six fundamental rights. These are listed below.

You know what

The Government of India passed the Right to Education Act in 2009. The Act ensures that every child who is between 6–14 years of age goes to school and receives quality education.

1. **Right to Equality**: All citizens, irrespective of their religion, caste, sex, race and place of birth are equal before the law and are entitled for the equal protection of the laws.
2. **Right to Freedom**: The citizens of India have the right to freedom of speech and expression, travel and reside within the country and choose any profession to earn a living.
3. **Right against Exploitation**: No person can be exploited or made to work without pay. This right prohibits the employment of children below the age of 14 years in dangerous jobs.
4. **Right to Freedom of Religion**: Every citizen can practice the religion of their choice. All religions are treated equally in the eyes of the law.
5. **Right to Cultural and Educational Freedom**: We can develop and preserve a culture or language.
6. **Right to Constitutional Remedies**: It allows every citizen to go to the court if any of their Fundamental Rights are being denied to them.

Activity

Identify the fundamental right the citizens enjoy in the following situations.

1. A woman will be treated the same way by the court as a man if they both broke the law.
2. We can celebrate our festivals freely.
3. You are free to choose your occupation.

Our Fundamental Duties

Just as the Constitution grants us rights, it also expects us to perform certain duties towards the country. Some of the **fundamental duties** are listed below.

- To abide by the Constitution
- To honour the national flag and the national anthem
- To value and preserve the rich heritage of our composite culture
- To promote harmony and sense of brotherhood among the citizens of the country
- To take care of public property
- To protect and improve the natural environment of the country and to have compassion for living creatures
- Parents and guardians must educate their children and send them to school

Directive Principles of State Policy

Our Constitution also lays down certain guidelines for the government to follow in policy-making to ensure welfare of the people. These are known as the **Directive Principles of State Policy**.

Some of the directive principles are listed below:

- All the citizens, men and women have equal right to work and make a living.
- Both men and women should be entitled to equal pay for equal amount of work.
- Proper living conditions and better living standards for people.
- Interests of the people belonging to Schedule Castes, Schedule Tribes and Other Backward Classes should be protected.
- Children up to 14 years of age should get free and compulsory education.

You know what

The original constitution didn't contain Fundamental Duties. In 1976, the Fundamental Duties of Indian Citizens were added to the Constitution as a part of 42nd amendment.

Think about it!

What is the need to amend the constitution?

I Learnt

- The government of India governs on the basis of the rules mentioned in the constitution.
- The Preamble is the introduction to the Constitution.
- The Constitution of India gives every citizen some Fundamental Rights.
- The Fundamental Duties mentioned in the constitution are expected to be performed by every citizen of the country.
- The guidelines followed by the government to ensure the welfare of people are called Directive Principles of State Policy.

Words I Learnt

Constitution:	rule book of a country through which it is governed
Exploitation:	the action of treating someone unfairly in order to benefit from their work
Fundamental Rights:	rights given in the Constitution of India to every citizen
Fundamental Duties:	duties given in the Constitution of India that every citizen is expected to perform

Get Set, Go!

A. Fill in the blanks.

1. The _____ is the set of rules according to which the government governs the country.
2. Indians have _____ fundamental rights.
3. India has the world's longest _____.
4. The Constitution of India was framed by the _____ under the leadership of _____.
5. The Constitution of India came into effect on _____.

B. State true or false.

1. The Constitution of India was drafted by the Constituent Assembly.
2. Secular means that all religions are treated with equal respect in India.
3. We have eight fundamental rights.
4. The Constitution states only our rights but not our duties.
5. The Directive Principles of State Policy in the constitution are to be followed by the people of India to serve the government.

C. Answer the following in a few words.

1. What is a Constitution?
2. List any two Fundamental Rights given to us by the Indian Constitution.
3. What is the main objective of Directive Principles of State Policy?

D. Answer the following in brief.

1. Write a note on the Constitution of India.
2. Explain the Fundamental Rights given to us by the Constitution?
3. Mention any four Fundamental Duties mentioned in the Constitution.
4. What is Preamble?

Connect

Computer Studies

With the help of your teacher, research on child labour. Find out why it is an offence, where it is practised and what is the punishment one deserves for practising it.

Life Skills

With rights come duties towards the nation and other fellow-citizens. Cooperate by fulfilling your duties. Every duty that you fulfill is good for you and for the society.

Malay went on a school trip to see the Taj Mahal with his classmates. He ate a banana and threw the peel in the lawns in front of the monument.

When questioned by Rinkoo for his inappropriate behaviour, Malay replied, "It is my right to use the national property as I wish."

1. Was it right for Malay to throw a peel like that? Why?
2. Which fundamental duty did he violate?

Project

Form a mock constituent assembly and frame a constitution for your class. Discuss and write down the rights and duties of your classmates. Address different issues that you think are important for maintaining a good and friendly environment in the classroom.

Worksheet 1

A. Match the following with the most suitable options.

Column A	Column B
1. Fossils	a. Outer space
2. Ancestors	b. Airways
3. Helicopter	c. Roadways
4. Ship	d. Telephone
5. Bus	e. Source of history
6. Alexander Graham Bell	f. Ape-like
7. Satellite	g. Water transport

B. Fill in the blanks.

1. Human beings are the result of human _____ .
2. The Earth is divided into two equals halves called _____.
3. The difference between two consecutive longitudes is of _____ minutes.
4. The _____of latitudes and longitudes help to locate places.
5. The _____ is 0° meridian or 0° longitude.

C. Give one word for the following.

1. Development of something over a period of time
2. The remains of prehistoric creatures embedded in the soil
3. A long journey especially by a ship
4. The imaginary lines that run from east to west
5. The imaginary lines that run from the North Pole to South Pole

D. State true or false.

1. Human beings are not the result of human evolution.
2. Earliest modes of transportation were slow and exhausting.
3. A telegraph is an instrument that allows transmission of a message to a distant place using electrical signals.
4. James Morse developed a code known as the "Morse Code" to be used with an electric telegraph.
5. The grids of latitudes and longitudes help to locate places.

Worksheet 2

A. Choose the correct option.

1. Which of these DOES NOT affect the climate of a place?
   a Temperature b. Peninsula
   c. Altitude d. Location
2. Which of these is the introduction to our constitution?
   a. Preamble b. Fundamental Rights
   c. Fundamental duties d. Ancestors
3. Hot dry winds are called:
   a. loo b. humidity
   c. landslides d. moisture
4. It means that all religions are treated with equal respect in India.
   a. Secular b. Socialist
   c. Democratic d. Republic
5. The latitudinal extent of India is about:
   a. 6° N to 36° N b. 9° N to 37° N
   c. 8° N to 37° N d. 8° N to 30° N

B. Unjumble the words and define them.

1. WTHEARE : _____
   _____
2. HMUIIDYT : _____
   _____
3. EPNNIUSAL : _____
   _____

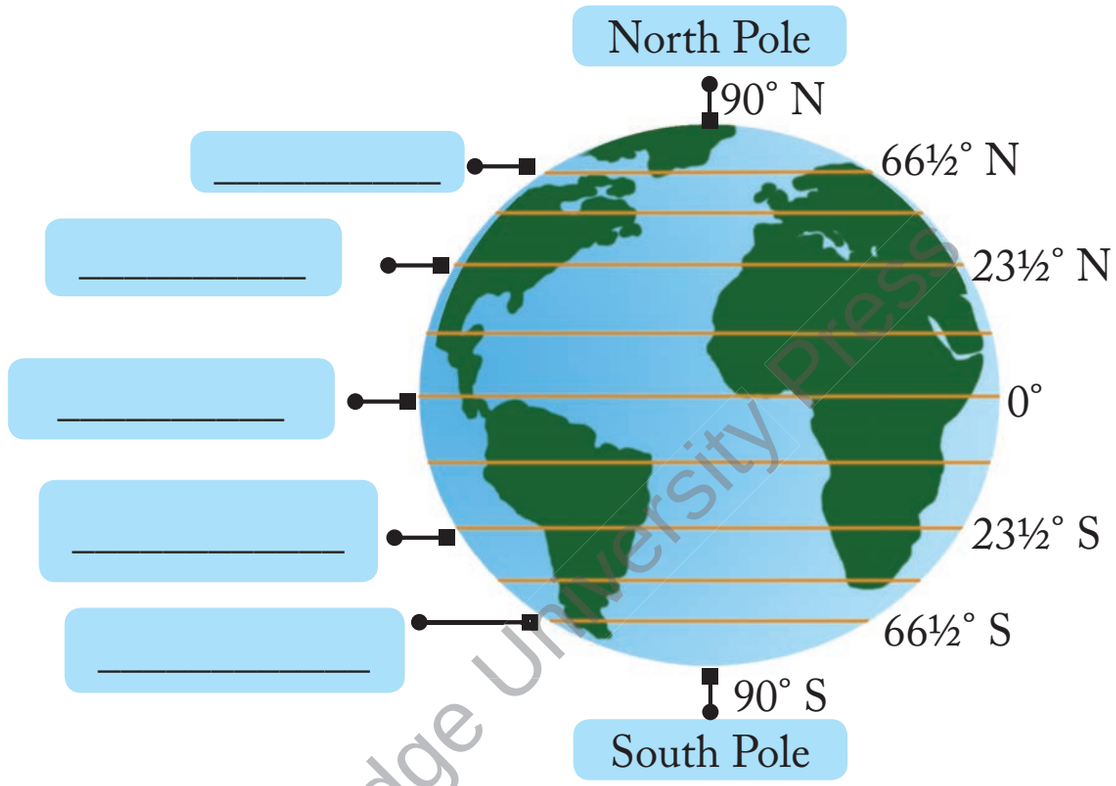
C. State true or false.

1. Lines of latitudes and longitudes form grid.
2. Rajasthan and Punjab share their borders with Afghanistan.
3. India lies in the southern hemisphere.
4. India and Bangladesh share one of the longest borders in the world.
5. Heavy rains may cause drought.
6. The Constitution of India was drafted by the Constituent Assembly under the chairmanship of Dr B.R. Ambedkar.

Sample Test Paper

A. Label the diagram with the words given here.

Topic of Cancer	Tropic of Capricorn	Antarctic Circle
Arctic Circle	Equator	



B. Fill in the blanks.

1. The places located at higher _____ like hill stations or mountain tops experience relatively colder climate.
2. The north-south extent of India from Kashmir in the north to Kanyakumari in the south is _____ km.
3. Due to less _____ Rajasthan and Gujarat often get draught-like situations.
4. A piece of land which has water on three sides is called a _____.
5. India respects all the religions and treat them equally. Hence, India is a _____ country.

C. Give definitions for the following.

1. Fundamental Rights

_____

_____

2. Fundamental Duties

_____

_____

3. Humidity

_____

_____

4. Landslide

_____

_____

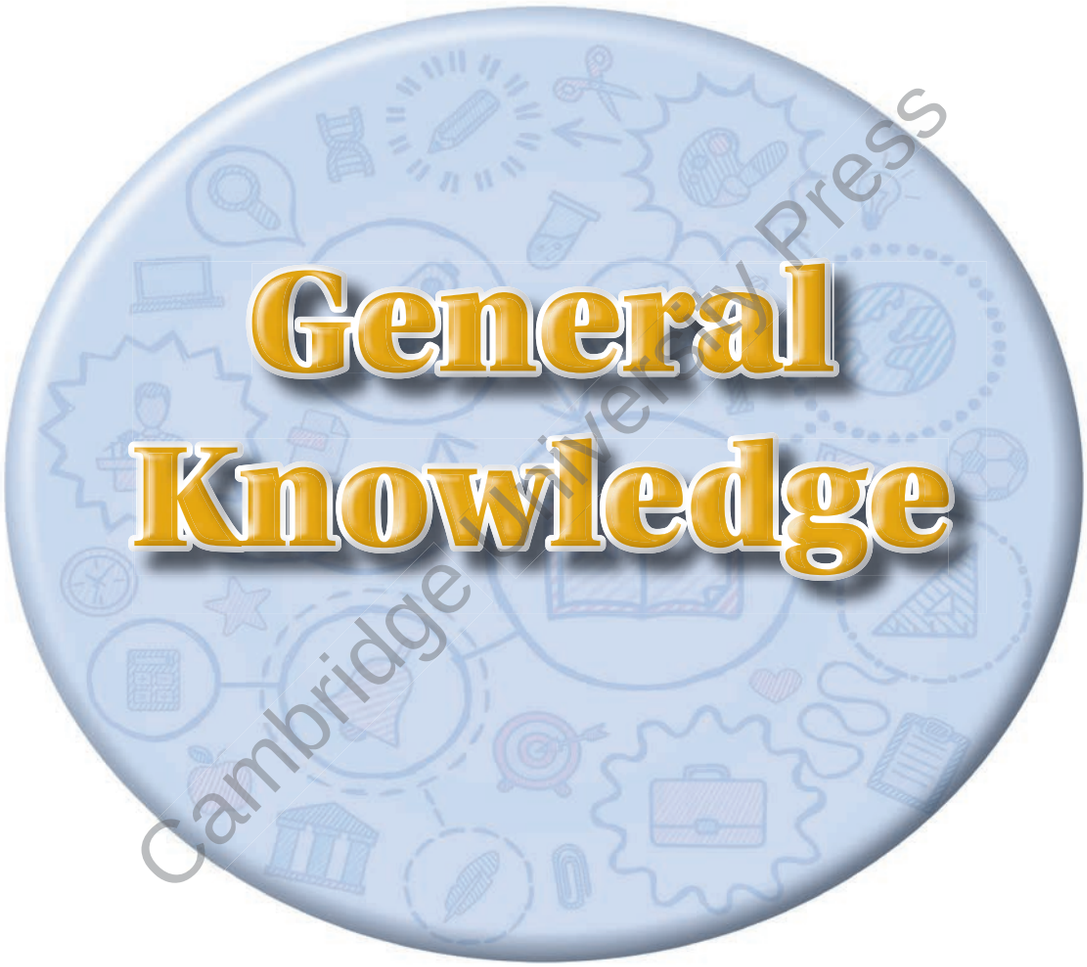
5. Drought

_____

_____

D. Answer the following questions.

1. How was wheel invented?
2. When did iron age start? How was iron used at that time?
3. What are our fundamental rights?
4. State the factors that affect the climate of India.



1 NATURAL WONDERS OF THE WORLD

Draw a line to match these natural wonders with their description.

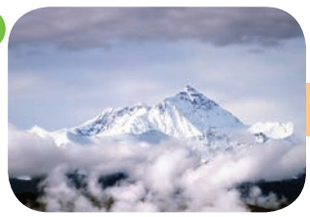
1. It is carved by the Colorado River in the state of Arizona, USA. It is known for its overwhelming size and its intricate and colourful landscape.
2. It is a natural light display in the sky, mainly in the high latitude regions around the Arctic. It is also referred to as Northern Lights.
3. It is the world's longest and largest coral reef system composed of over 2,000 individual reefs and 800 fringe reefs stretching for over 2000 kilometres. It is a single structure made by living organisms.
4. David Livingstone is believed to have been the first European to view this natural wonder located about midway along the course of the Zambezi River. He named it after the British Queen of that time.
5. In 1865, the highest mountain in the world was given its official English name by the Royal Geographical Society, upon a recommendation by Andrew Waugh, the British Surveyor General of India.

a 

Aurora Borealis

b 

Great Barrier Reef

c 

Mount Everest

d 

The Grand Canyon

e 

Victoria Falls

Do You Know?

The Uluru/Ayers Rock located in Australia is the world's second largest monolith.

Let Us Apply

Name the natural wonder that comprises about 40 percent of Brazil's total area.

2 GREETINGS AROUND THE WORLD

People in different parts of the world greet each other in the language they speak.

Read the greetings 'Hello' and 'Bye' respectively in each clue. Identify the language they are being spoken in using the Help box and complete the crossword.

Help box

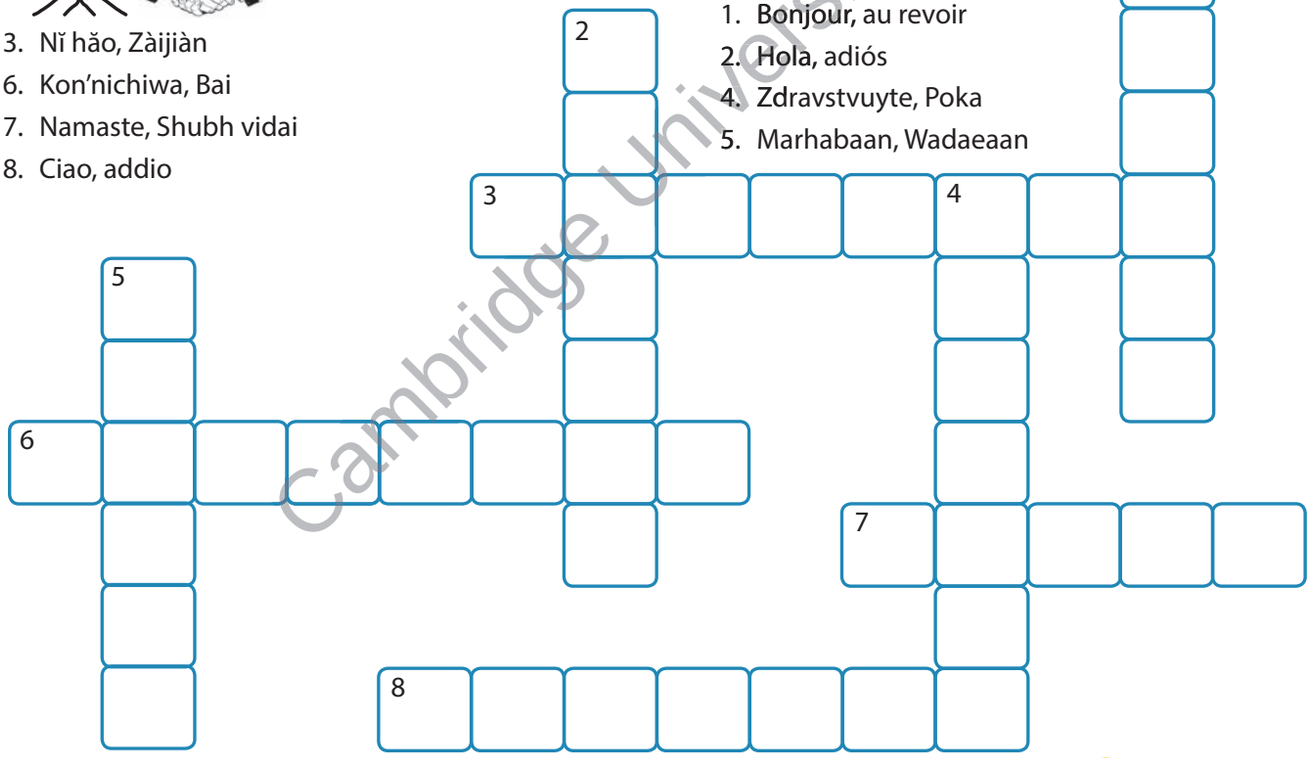
Russian	French	Hindi	Mandarin
Spanish	Arabic	Japanese	Italian

Across

3. Nǐ hǎo, Zàijiàn
6. Kon'nichiwa, Bai
7. Namaste, Shubh vidai
8. Ciao, addio

Down

1. Bonjour, au revoir
2. Hola, adiós
4. Zdravstvuyte, Poka
5. Marhabaan, Wadaeaan



Do You Know?

The Cambodian language Khmer has the largest alphabet in the world which is 74 characters long.

Let Us Apply

Whenever you meet people you must greet them politely. Find out how people in different parts of India greet each other in their respective languages.

3 YOUNG ACHIEVERS OF MY COUNTRY

Match the achievements in Column A with their respective achievers in Column B.

Column A	
1	This 19-year old from Baran district, Rajasthan designed a driverless tractor operated by a remote control.
2	At 24, she became the first Indian woman wrestler to win a medal at the Olympics.
3	This 4-year old archer shot 118 arrows in 14.40 seconds from a distance of 15 metres creating a national record.
4	This young girl from Bhubaneswar received the Dr A. P. J. Abdul Kalam IGNITE Award 2016 from the President. She created a device which makes motorists aware of the ways they contribute to air pollution.
5	This young girl from Rourkela invented the 'air bike' without pedals which runs on compressed air released through a cylinder.

Column B	
a	Sakshi Malik
b	Malapati Maruthi Aarush Reddy
c	Tejaswini Priyadardhini
d	Yogesh Nagar
e	Priyanka Panda

Do You Know?

Ritesh Malik, an Indian doctor and marketing graduate from London School of Economics, is currently investing in and mentoring 20+ startups in India.

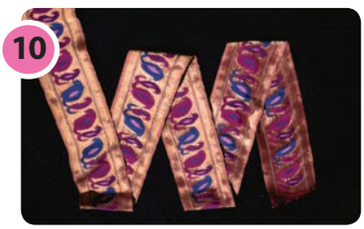
Let Us Apply

Share something that you consider as your personal achievement. Can you list at least three more young achievers who have been in the news recently?

4 WRAP IT UP!

Draw a line to match the fabrics to the states they come from.

Fabric		State	
1.	Kalamkari	a	Chhattisgarh
2.	Muga silk	b	Haryana
3.	Bhagalpuri silk	c	Himachal Pradesh
4.	Kosa silk	d	Karnataka
5.	Bandhani	e	Assam
6.	Panja durries	f	Maharashtra
7.	Kullu shawls	g	Andhra Pradesh
8.	Mysore silk	h	Madhya Pradesh
9.	Chanderi	i	Bihar
10.	Paithani	j	Gujarat



Do You Know?

The traditional Manipuri costume, Phanek refers to a skirt that is handwoven from cotton, silk and other synthetic materials.

Let Us Apply

Prepare a list of different textiles and printing styles from the state of Rajasthan.

5 GARDENS OF INDIA

Identify and name these famous gardens of India using the Help box.

Help box

Brindavan Gardens, Mysuru | Rock Garden, Chandigarh | Lal Bagh, Bengaluru
Mughal Gardens, Delhi | Indira Gandhi Memorial Tulip Garden, Srinagar

1

A sculpture garden that was inaugurated in 1976.

.....

2

A garden located inside the Rashtrapati Bhawan compound.

.....

3

It is Asia's largest tulip garden situated at the foothills of the Zabarwan mountain range.

.....

4

A beauty spot known for its symmetric design.

.....

5

This botanical garden is famous for its glass house.

.....

Do You Know?

Shalimar Bagh was built by Mughal emperor Jehangir, on the banks of Dal Lake in Kashmir.

Let Us Apply

Collect information on the following gardens of India.

- Yadavindra Gardens, Pinjore
- Kamla Nehru Park, Mumbai

6 WOMEN IN THE SPOTLIGHT

Tick (✓) the correct answer.

1. She created history when she was chosen as the first female president of Taiwan.

   a. Aung San Suu Kyi ☐ b. Tsai Ing-wen ☐

2. On 3 November 2015, she became the first female jockey to win the Melbourne Cup, one of the world's biggest and richest horse racing events.

   a. Michelle Payne ☐ b. Mary Kom ☐

3. In October 2015 in Malaysia, this writer and poet was named the 13th National Laureate, becoming the first woman to be honored with the recognition.

   a. Zurinah Hassan ☐ b. Arundhati Roy ☐

4. She is an Indian-American astronaut who previously held the record for total spacewalks by a woman (seven) and most spacewalk time for a woman (50 hours 40 minutes).

   a. Sunita Williams ☐ b. Kalpana Chawla ☐

5. She became the first woman mountaineer to reach Mt Everest and in June 1992, she also became the first woman to scale the Seven Summits, the highest peak on each continent.

   a. Bachendri Pal ☐ b. Junko Tabei ☐

Do You Know?

In 2013, Tatyana McFadden became the first athlete to win six gold medals during the 2013 IPC Athletics World Championships in Lyon.

Let Us Apply

Prepare a list of five Indian women and their achievements that has made the country take pride in them.

7 EXPLORING SPACE

State whether these facts about space exploration are true or false.

1. Astronauts eat frozen, refrigerated or thermostabilised (processed and canned) food. .....
2. Even on a clear night, International Space Station cannot be seen with the naked eye. .....
3. India's first unmanned mission to the moon in 2008 was Chandrayaan-1. .....
4. Saturn has seven spectacular rings which are composed majorly of ice particles. .....
5. Mercury was the first planet to be discovered with a telescope. .....
6. Mars is also called the 'Red Planet'. .....
7. NASA's space shuttle which has made maximum trips to space is named 'Discovery'. .....
8. Edwin Aldrin was the first person to set foot on the moon. .....

Do You Know?

The first woman to travel into space was Valentina Tereshkova.

Let Us Apply

Make a fact file on:
a. The International Space Station
b. The longest time spent by an astronaut in space

8 SCIENTIFIC AND MEDICAL INSTRUMENTS

Unscramble the letters to name these scientific and medical instruments.

1. A ..... (EOTPHSECSTO) is an instrument used by a doctor to listen to your heartbeat.

2. A ..... (EMRHTOTRMEE) is an instrument used to measure your body temperature.

3. An ..... (CNEPOEDSO) is an instrument to inspect inside the human body.

4. A ..... (YAODNM) is a machine used to convert mechanical energy into electrical energy.

5. A ..... (SIMRCOCOEP) is an instrument used to make very small objects look large through lenses for scientific examination and study.

6. An ..... (ROEEENAMMT) is an instrument used to measure the speed of wind.

7. A ..... (LTEEPOCES) is an instrument which helps in viewing and studying stars.

1


2


5


7


Do You Know?

A battery is a device that converts chemical energy into electrical energy. Alessandro Volta was an Italian physicist who invented the first chemical battery in 1800.

Let Us Connect

Collect information on at least three more instruments used for study of different things. Share your list in the class.

9 AQUATIC PLANTS

State whether the following statements related to aquatic plants are true or false.

1. Cuticles are either thin or absent in aquatic plants as the main function of these structures is to prevent loss of water. .....

2. Plants close their stomata to retain water. However, aquatic plants always keep their stomata open. .....

3. Aquatic plants have a rigid structure. .....

4. The flat leaves on the surface of water enable aquatic plants to float. .....

5. Lotus plant has light roots. .....

6. Underwater leaves and stems help aquatic plants to move with the water current. .....

7. The roots of aquatic plants cannot take up oxygen from the water. .....

Do You Know?

Aerenchyma is a soft tissue in some aquatic plants that contains thin-walled cells and large spaces between these cells. This allows better internal circulation of air in plants.

Let Us Apply

Find names of five aquatic plants and discuss their characteristics.

10 BELIEVE IT OR NOT!

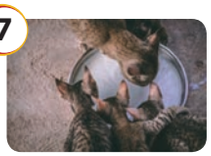
Write 'T' for true statements and 'F' for false statements. In case the statement is false, replace the underlined word using a word from the Help box. The box may have extra words than what you require.

Help box

sheep	frogs	shark	sharp
he-cat	camels	gorilla	she-cat

1. <u>Rhinoceroses</u> have three eyelids. ☐ .....
2. Birds of prey, also known as raptors, have <u>hooked</u> beaks. ☐ .....
3. The killer whale (also known as Orca) is actually a type of <u>dolphin</u>. ☐ .....
4. An adult <u>monkey</u> is about 1 metre tall to their shoulders when walking on all fours using their arms and their legs. ☐ .....
5. <u>Giraffes</u> are ruminants which means that they have more than one stomach. ☐ .....
6. Instead of drinking water, <u>crocodiles</u> soak it into their body through their skin. ☐ .....
7. A group of cats is called a clowder, a male cat is called a <u>tom</u>, a female cat is called a <u>molly</u> or queen and the young ones are called kittens. ☐ ....



Do You Know?

Gray wolves are the most widespread land mammals in the world after humans and livestock.

Let Us Apply

Many whales are toothless. How, do you think they catch their prey and consume them?

11

BOOKS FOR YOU

Tick (✓) the correct author for these books.

1. Anne of Green Gables
   a. Maurice Sendak ☐
   b. L. M. Montgomery ☐
   c. Beatrix Potter ☐

2. Wonder
   a. Eric Carle ☐
   b. R. J. Palacio ☐
   c. Judy Blume ☐

3. Bunnicula
   a. James Howe, Deborah Howe ☐
   b. Julia Donaldson ☐
   c. Beverly Cleary ☐

4. The BFG
   a. Astrid Lindgren ☐
   b. H. A. Rey ☐
   c. Roald Dahl ☐

5. Holes
   a. Louis Sachar ☐
   b. Rudyard Kipling ☐
   c. Neil Gaiman ☐

6. On the Wings of Heroes
   a. Ludwig Bemelmans ☐
   b. Shel Silverstein ☐
   c. Richard Peck ☐

Do You Know?

The act of smelling old books and liking it is called bibliosmia.

Let Us Apply

If you are unaware of the contents of a book, the book blurb on the back cover is a good way of knowing what the story is about. Go to the library and pick up any five books. Read the blurb and share with the class if it convinced you to read the book.

12 ANCIENT GAMES

Match these popular games and sports of the past with their appropriate description.

1. Plunge for Distance	a. Medieval sport in which competitors played with lances on horseback
2. Knurr and Spell	b. Ancient Olympic athletic competition comprising of five events: running, long jump, discus throw, javelin throw and wrestling
3. Cuju	c. A motorsport held on a track made of wooden planks
4. Pentathlon	d. A popular ancient game of competing on chariots
5. Board track racing	e. Ancient Chinese ball game involving kicking a ball through an opening into a net
6. Chariot racing	f. An old English game using a stick (spell) to strike a ball (knurr) released from a trap
7. Jousting	g. An ex-Olympic sport where participants dived into water trying to go the maximum distance while staying under water

Do You Know?

Croquet, cricket, polo and jeu de paume are some of the sports that have been discontinued at the Olympics.

Let Us Connect

Find out from your elders some games that they played in their childhood but have now lost popularity.

13 LEISURE TIME

Look at the images and write the name given to the person associated with collecting the particular item using the Help box.

Help box

Plangonologist	Pannapictagraphist	Numismatist
Arctophile	Vexillophile	Philatelist

1

.....

2

.....

3

.....

4

.....

5

.....

6

.....

Do You Know?

In 2011, Steven Smith, a phillumenist, earned a place in the Guinness Book of World Records for his collection of 1,054,221 matchbox labels from more than 130 countries.

Let Us Apply

Do you find being a collector interesting? Give reasons for your answer.

14 HOLISTIC HEALING

Match the yogasanas with their correct description.

1	Tadasana
2	Sukhasana
3	Trikonasana
4	Bhujangasana
5	Vrikshasana
6	Vajrasana
7	Shavasana

a	Standing steady like a mountain balancing the body on the toes and raising arms above the head
b	Standing with feet wide apart and bending sideways bringing the body in a triangular position to touch the ground
c	Keeping one foot on the other thigh, balancing the body with the arms with palms joined over the head
d	After eating, sitting with legs folded and tucked under the body to facilitate better digestion
e	Relaxing the body and mind by lying straight and breathing calmly
f	Comfortable position for meditation where legs are crossed, back is kept straight and hands are on the knees
g	Lying on the stomach and curling the torso backwards with the help of hands

Do You Know?

Holistic healing is the form of treatment that focuses on multiple health aspects: mind, body and soul.

Let Us Apply

How many of the above mentioned yogasanas can you perform correctly? Seek help from teachers and instructors to learn all of these and perform them regularly.

15 SPOT THE DIFFERENCE

Spot 10 differences between the pictures given below.

Do You Know?

Solving puzzles like 'Spot the differences' enhances concentration.

Let Us Apply

Observe your classroom closely. Now, go to the other classroom which should be similar with respect to the basic arrangement. Find 10 differences between the two of them.

16 CODES AND CIPHERS

Have some fun time coding and decoding secret messages!

Write down the letters of the English alphabet.

Now, replace the letters in the first row with their reverse in alphabetical order. For example, instead of A write Z, instead of B write Y, etc.

A	B	C	D	E	F	G	H	I	J	K	L	M
Z	Y	X	W	V	U	T	S	R	Q	P	O	N

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
M	L	K	J	I	H	G	F	E	D	C	B	A

Using this technique, write the following message.

LET'S HAVE A SURPRISE PARTY FOR

AMAN ON HIS BIRTHDAY!

!

Do You Know?

Julius Caesar created his own code by shifting each letter by three spaces. This is called Caesar Cipher.

Let Us Apply

Create your own secret code and write a message to your mother thanking her for the delicious lunch.

17

IDIOMS

Match the given idioms with their meanings by drawing a line.

1	Actions speak louder than words	a	Not risk losing something a person already has by trying to get something they think might be better
2	Cut corners	b	Looking in the wrong place
3	A bird in hand is worth two in the bush	c	Not speaking directly about the issue
4	Add insult to injury	d	Join a popular trend or activity
5	Straight from the horse's mouth	e	Doing something badly to save effort or money
6	Barking up the wrong tree	f	To worsen an unfavourable situation
7	Pull wool over someone's eyes	g	Presenting a counter argument
8	Jump on the bandwagon	h	People's intentions can be judged better by what they do than what they say
9	Devil's Advocate	i	From a reliable source
10	Beat around the bush	j	Deceive someone

IDIOMS

Do You Know?

The idiom 'pull someone's leg' owes its origin to a method used by thieves to entrap pedestrians and then rob them.

Let Us Apply

Use of idioms and proverbs make our writing interesting. Make sentences using the idioms given above.

18 DICTIONARY RACE

Work in pairs and compete to arrange the following word sets in the sequence they would appear in a dictionary.

1	Abstract	Abolish	Absurd
2	Blizzard	Blank	Bland
3	Comply	Compassion	Companion
4	Detect	Decline	Dictate
5	Exert	Exult	Evade
6	Jubilation	Jaguar	Jumble
7	Negate	Nick	Narcissistic
8	Peril	Petrify	Perish
9	Revert	Retire	Retain
10	Solitary	Solidarity	Solo

Do You Know?

The six-letter word, Eunoia, is the shortest word in the English language that contains all five vowels.

Let Us Connect

According to you, what is better – the autocorrect in a phone or a paper dictionary? Justify your stance.

Worksheet 1

A. Tick (✓) the correct sentences and cross out (✗) the incorrect sentences.

1. Shalimar Bagh was built by Mughal emperor Shah Jahan, on the banks of Dal Lake in Kashmir.
2. 19 year old, Priyanka Panda from Baran district, Rajasthan designed a driverless tractor operated by remote control.
3. Junko Tabei created history when she was chosen as the first female president of Taiwan.
4. Aurora Borealis is a natural light display in the sky, mainly in the high latitude regions around the Arctic.
5. Saturn has seven spectacular rings which are composed majorly of ice particles.

B. Fill in the blanks using the help box.

Cuticles	Microscope	Discovery	The Grand Canyon	Dynamo

1. A _____ is a machine used to convert mechanical energy into electrical energy.
2. _____ are either thin or absent in aquatic plants as the main function of these structures is to prevent loss of water.
3. A _____ is an instrument used to make very small objects look large through lenses for scientific examination and study.
4. NASA's space shuttle which has made maximum trips to space is named _____ _____.
5. _____is carved by the Colorado River, in the state of Arizona, USA. It is known for its overwhelming size and intricate and colourful landscape.

C. Write true or false.

1. On 3rd November, 2015, Zurinah Hassan became the first female jockey to win the Melbourne Cup, one of the world's biggest and richest horse racing events.
2. Tejaswani Priydarshini from Rourkela invented the 'air bike' without pedals which runs on compressed air released through a cylinder.

3. Kullu shawls are associated with the state of Uttarakhand.

4. Indira Gandhi Memorial Tulip Garden in Srinagar is Asia's largest tulip garden situated at the foothills of Zabarwan mountain range.

5. At 24, Sakshi Malik became the first Indian woman wrestler to win a medal at Olympics.

D. Match the following.

1.	Mysore silk	a.	Aurora Borealis
2.	Northern Lights	b.	Mars
3.	Red Planet	c.	light roots
4.	Endoscope	d.	Karnataka
5.	Lotus	e.	Instrument to inspect inside human body

Worksheet 2

A. Tick (✓) the correct sentences and cross out (✗) the incorrect sentences.

1. Instead of drinking water, dolphins soak it into their body through their skin.
2. Richard Peck is the author of the book, *On the Wings of Heroes*.
3. In a dictionary, negate would come before narcissistic.
4. The idiom 'Jump on the bandwagon' means to join a popular trend or activity.
5. A person who collects coins is called Vexillophile.

B. Fill in the blanks using the help box.

Devil's Advocate	Sukhasana	Roald Dahl	Philatelist	Bhujangasana

1. _____ is a comfortable position for meditation where legs are crossed, back is kept straight and hands are on the knees.
2. The *BFG* book is authored by _____.
3. The idiom _____ means presenting a counter argument.
4. In meditation, lying on the stomach and curling the torso backwards with the help of hands is called _____.
5. A collector of stamps is called _____.

C. Write true or false.

1. In meditation, standing steady like a mountain balancing the body on the toes and raising arms above the head is called Tadasana.
2. Ancient Chinese ball game involving kicking a ball through an opening into a net is called Cuju.
3. Jousting is an ex-Olympic sport where participants dived into water trying to go the maximum while staying under water.
4. 'Straight from the horse's mouth' is an idiom which means to worsen an unfavourable situation.
5. The word 'retire' would come before the word 'evade' in a dictionary.

D. Match the following.

1. Camels	a. L.M. Montgomery
2. Chariot racing	b. Killer whale (also known as Orca)
3. *Anne of Green Gables*	c. A popular ancient game of competing on chariots
4. Dolphin	d. R.J. Palacio
5. *Wonder*	e. Three eyelids

Sample Test Paper

A. Write 'Y' for yes and 'N' for no.

1. Yogesh Nagar, the 4 year old archer shot 118 arrows in 14.40 seconds from a distance of 15 metres creating a national record.
2. It is the world's longest and largest coral reef system composed of over 2,000 individual reefs and 800 fringe reef stretching for over 2000 kilometres. It is a single structure made by living organisms. This natural wonder is known as the Great Canyon.
3. India's first unmanned mission to the moon in 2008 was Suryayan 1.
4. A telescope is an instrument which helps in viewing and studying stars.
5. The flat leaves on the surface of water enable aquatic plants to float.

B. Answer the following in one word.

1. This adult mammal is about 1 meter tall to their shoulders when walking on all fours using their arms and their legs.
2. Ancient Chinese ball game involving kicking a ball through an opening into a net
3. Keeping one foot on the other thigh, balancing the body with the arms with palms joined over the head
4. These animals are ruminants which means they have more than one stomach.
5. These are either thin or absent in aquatic plants as the main function of these structures is to prevent the loss of water.

C. Match the following.

1. Bandhani	a. Madhya Pradesh
2. Chanderi	b. People's intentions can be judged better by what they do than what they say
3. Actions speak louder than words	c. James Howe, Deborah Howe
4. *Bunnicula*	d. Doing somethings badly to save effort or money
5. Cut corners	e. Gujarat

D. Unscramble and write the correct sentences.

1. Ancient Olympic athletic competition tatlohnpen comprising of five events: running, long jumps, discus throw, javelin throw and wrestling.
2. The collection of niocs is known as Vexillophile.
3. In 1865, the highest mountain in the world, oumnt versete was given its official English name by the Royal Geographical Society, upon a recommendation by Andrew Waugh, the British Surveyor General of India.
4. NASA's space shuttle which has made maximum trips to space is named coverisdy.
5. A momthereter is an instrument used to measure your body temperature.

E. Correct the following sentences.

1. Cuju was a medieval sport in which competitors played with lances on horsebacks.
2. Brindavan Gardens are located inside the Rashtrapati Bhawan compound in Delhi.
3. Muga Silk is a fabric which is associated with the state of Tamil Nadu.
4. At 24, Sakshi Malik became the first Indian woman boxer to win a medal at Olympics.
5. Tsai Ing-wen created history when she was chosen as the first female president of Thailand.

Notes