GOVERNMENT OF KARNATAKA

ENVIRONMENTAL STUDIES

TEXT CUM WORK BOOK

PART-2

ENGLISH MEDIUM

5

FIFTH STANDARD

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KARNATAKA TEXTBOOK SOCIETY (R.)
6th Cross, Malleshwaram,
Bengaluru - 560 003

Constitution of India

Part IV A (Article 51 A)

Fundamental Duties

It shall be the duty of every citizen of India —

(a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers, wildlife and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;

*(k) who is a parent or guardian, to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

Note: The Article 51A containing Fundamental Duties was inserted by the Constitution (42nd Amendment) Act, 1976 (with effect from 3 January 1977).

*(k) was inserted by the Constitution (86th Amendment) Act, 2002 (with effect from 1 April 2010).

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CONSTITUTION OF INDIA

Part III (Articles 12 – 35)
(Subject to certain conditions, some exceptions and reasonable restrictions)

guarantees these

Fundamental Rights

Right to Equality

- before law and equal protection of laws;
- irrespective of religion, race, caste, sex or place of birth;
- of opportunity in public employment;
- by abolition of untouchability and titles.

Right to Freedom

- of expression, assembly, association, movement, residence and profession;
- of certain protections in respect of conviction for offences;
- of protection of life and personal liberty;
- of free and compulsory education for children between the age of six and fourteen years;
- of protection against arrest and detention in certain cases.

Right against Exploitation

- for prohibition of traffic in human beings and forced labour;
- for prohibition of employment of children in hazardous jobs.

Right to Freedom of Religion

- freedom of conscience and free profession, practice and propagation of religion;
- freedom to manage religious affairs;
- freedom as to payment of taxes for promotion of any particular religion;
- freedom as to attendance at religious instruction or religious worship in educational institutions wholly maintained by the State.

Cultural and Educational Rights

- for protection of interests of minorities to conserve their language, script and culture;
- for minorities to establish and administer educational institutions of their choice.

Right to Constitutional Remedies

- by issuance of directions or orders or writs by the Supreme Court and High Courts for enforcement of these Fundamental Rights.

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LESSON - 9

FOOD - ESSENCE OF LIFE

J3I7Q6

Hasiyade unabeda hasidu matthirabeda
bisigoodi thangalunabeda
vaidyanagasaneye beda Sarvajna.

Observe the tripadi of Kavi Sarvajna. In the second line he says not to eat stale food mixing with fresh food. Why does he say so? Think. Write your answer here.

_____

Yes, this line refers to the food which we eat. Food is the essence of our life. Everyday we do one or the other work. We need energy for doing work. We get energy from the food we eat. Food is necessary for our growth, development and good health. What is there in the food we eat? How should our food be? This unit contains some information about it. Read and understand.

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After studying this lesson you,

- recall the nutrients of food.
- know about the sources of food and availability of food.
- recognize the diversity of food in different places by understanding the points that decide the food system.
- understand the changing food habits and its effects on health.
- understand the term food wastage and the methods to preserve it.

You already know that there are many nutrients in the food that we eat. The nutrients of food and the food materials which are rich in those nutrients are given below. Match the statements that suit the nutrients correctly.

Nutrients	Food materials
carbohydrates	fenugreek (menthya), carrot, sprouted seeds, fish oil, green-yellow vegetables
lipid	ragi, wheat, jowar, foxtail millets, little millets, bread, honey.
protein	groundnut, meat, fish, dry coconut, sesame, egg yolk.
vitamin	vegetables, fruits, lemon, cereals.
minerals	cucumber, watermelon, grapes, radish, ashgourd, brinjal, cabbage, cauliflower
water	cowbeans, redgram, black eyed beans, milk, greengram, soyabean

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You have matched the nutrients and their suitable food materials. Haven't you? These nutrients are helpful for our growth, repair, body building and for being healthy.



Think : We can't maintain our health if we eat food containing the same nutrients everyday. Why?

Observe the following food materials.

Paddy, foxtail millets, meat, pearl millet, mango, cheese, ragi, ghee, egg, cauliflower, milk, fenugreek seeds, carrot, butter milk, radish.

Do this : Classify the food materials given above and write them in the table given below.

Food materials from plant source	Food materials from animal source

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These materials are available for us from plant source and animal source.

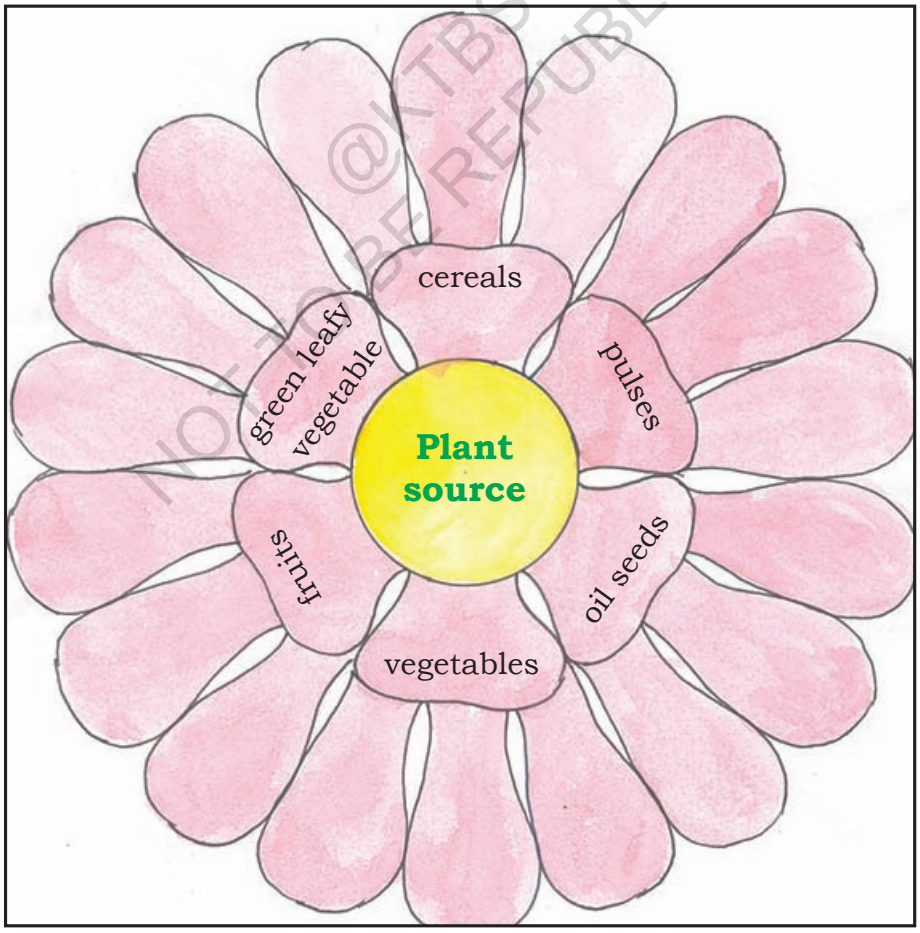
The food substances from plant source are classified as follows.

- cereals
- pulses
- oil seeds
- vegetables
- green leafy vegetables
- fruits

The list of some food materials obtained from plant source is given. Observe.

mango	brinjal	sesame	green gram	foxtail millets	amaranth (harive)
palak	groundnut	lemon	beetroot	fenugreek seeds (menthya)	sunflower seeds
sweet potato	redgram	jowar	black gram	orange	little millet

Write the food materials given above in the related petals of the plant source.

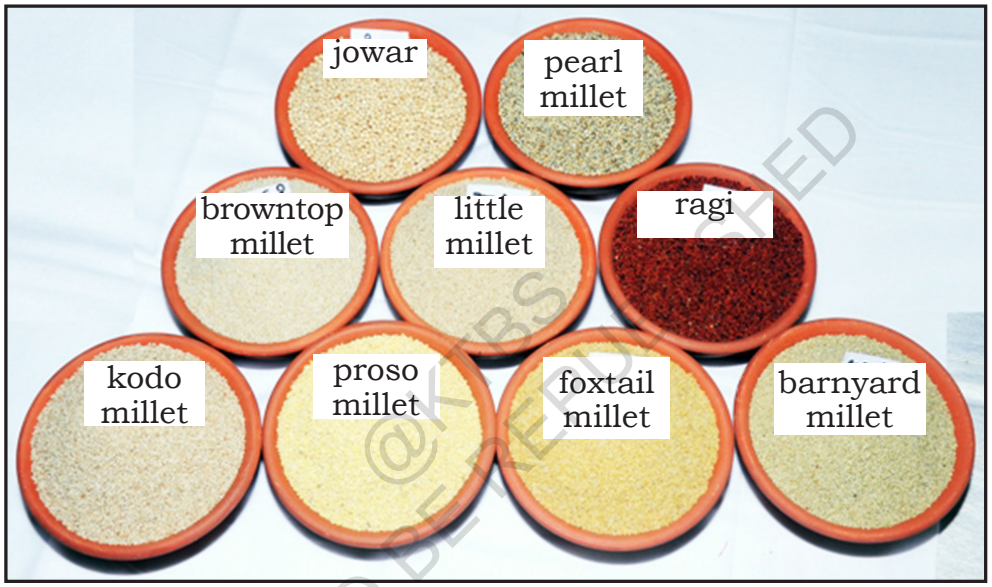


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Millets

The food we eat consists of more than one nutrient. Among them, millets like foxtail millets, barnyard millets, kodo millets are the barn of nutrients. Our elders used to consume more of millets. Now-a-days the consumption of these cereals which are considered to be healthy, is reducing.

Important millets.



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Activity : List out the millets shown in the picture

_____ _____ _____ _____ _____

_____ _____ _____ _____

Uses of millets :

- Millets can be grown using less water in less period of time.
- They grow easily in different environment and climatic condition.
- These can be grown without using chemical fertilizers, pesticides and herbicides.
- These are called the **friends of famine**.
- These cereals have a lot of nutrients.

Think: Now a days doctors advise patients to consume millets. Why?

Availability of food : The fertility of agricultural land and climatic conditions differ from one place to another in our state. So all types of crops cannot be grown in all the places. Crops like jowar, ragi and paddy cannot be grown in all places.

Think : Increasing population and decreasing agricultural land is the cause for decrease in the availability of food. How?

Therefore the Government has taken steps to ensure availability of food for all the people.

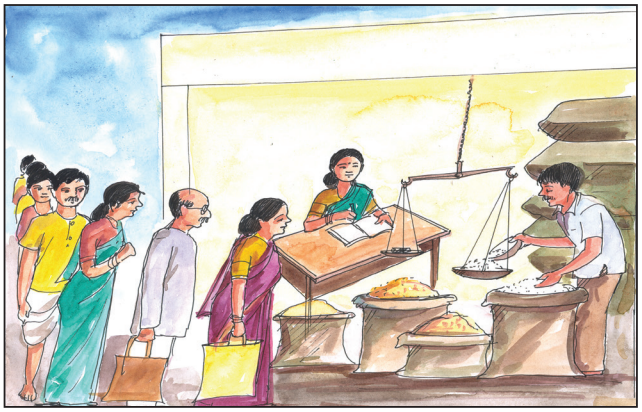
Example :

1. Giving milk and mid-day meals to students in school.





2. Supplying food materials at nominal rates through fair price shops.



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3. Steps are taken to prevent unnecessary holding of food materials by the merchants.

4. Purchasing the food materials from the farmers, storing them in proper godowns and then distributing.



Think : What are the advantages of giving mid-day meals and milk in schools.

As food materials are available, it is possible to prepare food for us. Make a list of the food, prepared at your home.

1) _____

2) _____

3) _____

4) _____

Compare this list with that of your friends. Observe whether your and your friends' list of food differ.

Complete the following activity.

Your food

Season	**Food you eat**
Summer	
Rainy	
Winter	

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Neighbour's food

Neighbouring house	
The common food of your village or town	
The common food of your district	

The common food of different places of Karnataka
(Get the help of the teacher)

North Karnataka	
South Karnataka	
Coastal Karnataka	
Malnad	

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Answer the following questions
(use the chart shown above)

- Which food do you take mainly in summer?
- Which food do you take commonly in winter?
- Which is the main food of your district?
- The food of different places in Karnataka are different. Why?

1) _____

2) _____

3) _____

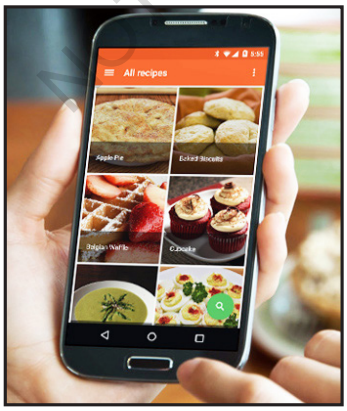
You have answered the questions. Haven't you? Some statements about the factors which decide the food we take are given. Observe.

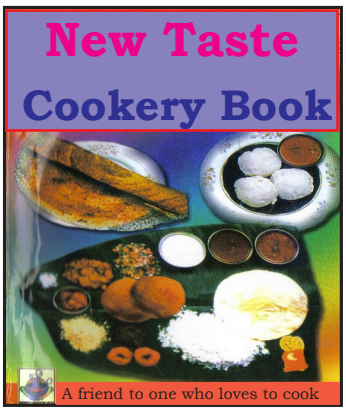
- Although we are of the same state, our food system is on the basis of the climate and the food materials which are available/grown in the region in which we live.
- The food which we eat is decided by the tradition/beliefs of a particular family.
- Our food changes according to the seasons like summer, rainy and winter.

Although all these aspects influence our food, now a days our food habits are becoming similar. Observe the following pictures.









The above factors are responsible for the change in our food habits.

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They can be described as follows

- Magazines, advertisement.
- Cooking related programmes telecasted in TV channels and radio.
- The new food habits have become common, due to the use of internet in mobile phones and computers.
- Cookery books

Due to the influence of factors mentioned above, our food habits have changed as follows.

- Consumption of food items like pizza, burger, sauce, samosa, corn-flakes, soup, noodles, ice cream, chocolate, chips have increased, instead of consuming nutritious home made food. Some of them are considered junk food.



Know this : Junk food means the food material which has less nutritional value or is unnecessary from the health point of view.



Think : Junk food is not good for health. Why?

- Consuming sauce rich food items like gobi manchurian, pani puri,chinese food has become common. The sauce contains certain chemicals which make food tastier.
- Consuming the outside food instead of home made food is on the increase today.
- Use of readymade food is increasing in the mechanical life of city/town.
- Eating fast food, is an example for this.



Think : What is fast food?

The effects of change in food habits:

- People fall sick easily.
- Poisonous chemicals enter the body due to the intake of tasty food instead of healthy food.

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- Body is losing the power to fight diseases.
- Consumption of spicy food and junk food has given rise to obesity problems.

Activity : Which type of food should we eat? Discuss with your friends about this.

Ready made food packets

Now-a-days, food we eat is now available in packets. While buying them observe the following points.

- Date of manufacture and expiry date.
- The ingredients added to the stuffs/ quantity of chemicals.
- Temperature needed to preserve the packet.



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Activity : Take a packet of food stuff and list out the points mentioned above.



Think : It is dangerous to eat food stuffs which have expired or consist of a lot of added chemicals.

Wasting of food

We can see food being wasted here and there in these pictures. Throwing away food which is worth consuming is called **wasting of food**.







Activity : Food is being wasted in many circumstances. With the help of your teacher, list out the situations and the reasons for which food is being wasted.

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It is important to preserve our food or food stuffs without wasting and spoiling them.

Now a days food stuffs are preserved by following some methods. They are-

- We know the taste of pickles. Salt is added to it in order to avoid spoiling for many days. Chemicals like sugar are used to preserve the fresh fruits.



- Grapes are dried and used as drygrapes.



Activity : List out the food stuff which are preserved by drying them.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

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- Fish, meat and milk are preserved by storing them at very low temperature. It is called **cold storage**.

For example, Refrigerator (fridge).

Good food keeps us healthy-physically and mentally. Food is the essence of our life. To be healthy, it is important to protect ourselves by eating good food.

LESSON - 10

RESIDENCES

K7V3V7

You might have heard that **home is the first school and mother is the first teacher.** Home is a familiar term for us. Early man protected himself against sun light, rain, wind and wild animals by living in caves and bushes. Hence they are called the early shelters of mankind. Home became a need as man became civilized. Construction of houses were started by the civilized man as the need for a home increased in accordance with the changes in society. Construction of residences started from independent houses and got transformed to community houses.

After studying this lesson you,

- know about personal and community housing projects.
- understand the problems related to rural and urban residences.

Look at the pictures given below. You have learnt about the construction of these houses in the previous class. Write the materials required to build the houses given in the picture in the space provided.

Type of house	Building materials required
	_____ _____ _____

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	_____ _____ _____
	_____ _____ _____

People live in various types of houses such as hut, house with tiled roof and houses with concrete terrace. Many families in villages or towns are living in houses constructed side by side in a locality. These are called **residences.**

Do this : Observe the lanes of your village or town. These are the areas of common residences. Generally families lead their life by constructing their own personal houses. The common features found in residences are given below. Write down the other features that you have observed.

- Houses built here and there or houses in a lane.
- Lanes are mostly zig zag.
- Street lights are there in the residential areas.
- _____
- _____
- _____

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Facilities are rarely available in areas where people build their own houses. Now-a-days community housing projects have started to meet the needs and demands of the people due to over population. Following pictures are the examples of community housing.





Community houses are constructed for various advantages. Some statements are given below. But some of them are not the correct reasons. Put (✓) mark only for correct reasons.

- Many families live together in community houses. ☐
- The Government provides housing facilities for the poor families by constructing community houses in villages and cities. ☐
- They are constructed to provide systematic basic facilities for a large population in limited space. ☐
- Houses in multistoreyed buildings are constructed and are suitable for the residence of a single family. ☐

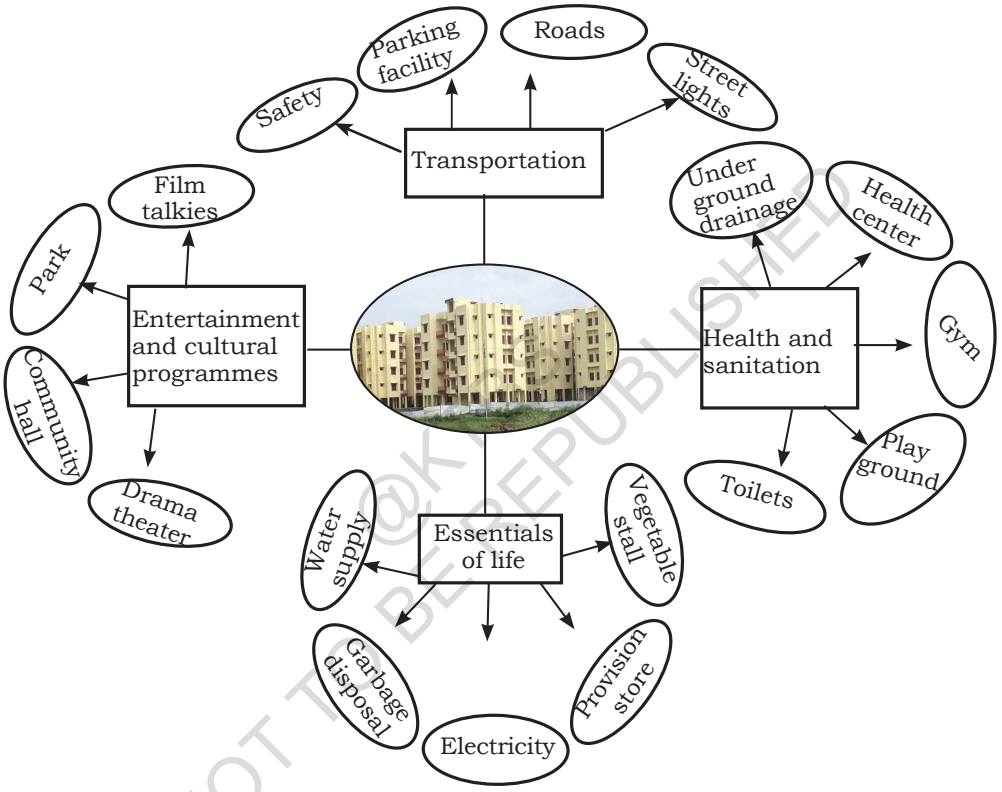
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Objectives of community houses are –

- To provide all the facilities to the houses which are required by families.
- Providing good roads, transportation facilities, electrification, water supply and garbage disposals in a planned way.
- Constructing parks, hospitals, etc., for public needs.
- Connecting community houses to the regional main roads.

Do this : Make groups of four students each. List out the facilities available in community houses. Take the help of your teacher.

The facilities available in community houses are given in this chart. Observe.



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Activity : Is it possible to provide facilities available in community houses to the independent houses? Discuss with your friends.

Usually community housing projects are implemented in suitable places in villages and cities. The Government build community houses in villages. The Government has formed separate housing boards for the construction of houses in cities. Many problems arise during construction of houses in villages or cities.







The above pictures reveal some problems of residential areas

Observe the following statements. Some residential problems of rural/urban areas are given. Write the rest after discussing with your friends (Take the help of your teacher)

Housing problems in urban areas.

* No underground drainage system.
* Garbage disposal problems.
* Frequent fire accidents in multistoreyed buildings.
* _____
* _____

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Housing problems in rural areas

* No bathroom and toilet facility.
* No proper electrification.
* Lack of pure drinking water supply.
* Roads not suitable for the transportation of vehicles.
* No underground drainage facilities.
* _____
* _____

Look at the list of urban and rural housing problems. The facilities that the best city residence/village residence must have are given here. Observe.

Housing features of the best city or village

* Proper ventilation and light.
* Rain water harvesting system from the roof of each house and its storage.
* Electricity by solar energy.
* Closed underground drainage system.
* Proper system for garbage disposal and preparation of manure from garbage.

A good house can provide health, happiness, and peace for the family members and their neighbours.

Houses with the best facilities lead to good health.

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LESSON - 11
NATURE OF MATTER

D2C2U4

We see several materials (objects) in our daily life and use a few of them. These materials are also called matter. These materials are not just like one another. But if you observe keenly, the characteristics of some materials appear similar. Every one is eager to know, what are the constituents of these materials? What are the common characteristics of these materials?

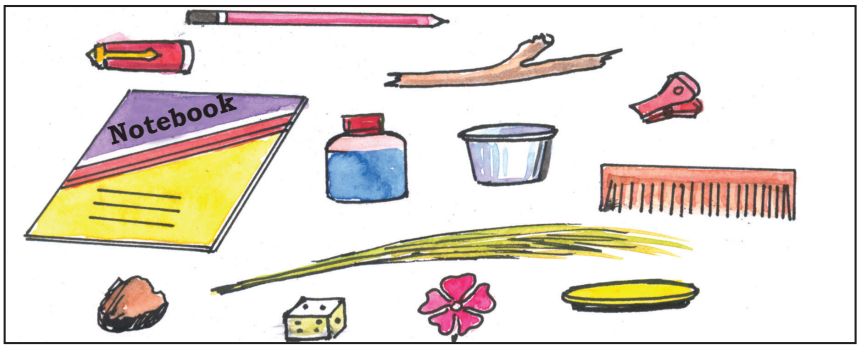
After studying this lesson you,

- understand about matter.
- explain the characteristics of matter
- identify different states of matter
- understand the types of change in states of matter.
- understand about mass, density, pressure, sublimation and buoyancy.

In our daily life, we see objects in different forms.

Activity : Collect at least ten objects in your surroundings.





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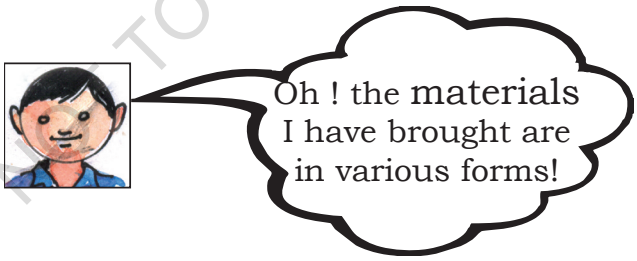
Activity : List out the names of the materials you have collected by arranging them neatly.

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

Observe whether the objects you have collected are as follows. If yes, put (✓) mark and if no, put (×) mark.

• Have you brought hard material?	
• Is there any soft material?	
• Is there any material which could be stored in a bottle or a bowl?	
• Is there any brittle material?	
• Is there any material which can be dissolved in water?	
• Is there any material which turns into manure after mixing with the soil?	



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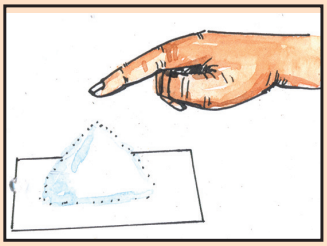
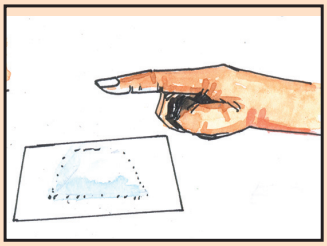
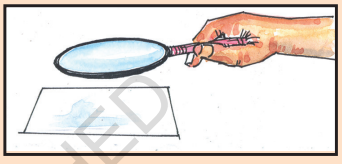
Activity : Observe the differences if any, by comparing the materials collected by you and your friend.

From the above activity you can understand that materials are in different forms in their shape, colour, brightness, solubility, etc., Isn't it?

Matter (object)

How are the materials available in nature created?

Experiment : Take some chalk powder. Dip your finger in it and sprinkle slowly over a plane glass. Observe these minute pieces carefully through a convex lens.

Can these minute pieces be divided further? Think and try.



Is it not possible for us to divide them further?

We can observe that the finest pieces of chalk cannot be divided further, though we try to do so.

Scientifically materials are called matter. Matter is made up of small particles. The smallest piece of matter is called **particle**.

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Think : Read the instances given below and try to remember if you have experienced any.

- How did fragrant particles reach your nose from the opened scent bottle?
- How did your nose feel that the neighbouring room is being swept?
- Did you notice any collection of dark particles when fire wood is burnt or kerosene lamp is lit?

Particles present in the matter are invisible. Matter is made up of very minute particles. Hence visible matter consists of invisible particles.

- What do you mean by matter?

_____

_____

Activity : Collect and paste the available pictures of matter in the following boxes.

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Activity

- Take a material, make it into minute pieces. Write the name of the matter which you have divided into minute pieces.

- Collect the powder of available matter and exhibit it in your class room.

Properties of Matter

Matters have special properties. These properties can be understood with the help of some experiments and activities.

1. Matter occupies space.

Activity : Pour the wheat flour or any other flour into a bowl, from a box. Again try to fill the bowl, so that the flour does not spill.



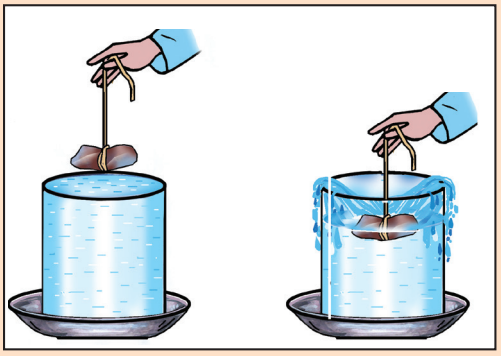
- Was it possible?
- Did you completely fill the bowl?
- What should be done to pour some more flour into the bowl? Why?
- It was impossible to fill the bowl completely with the entire quantity of the flour present in the box Why?

_____

_____

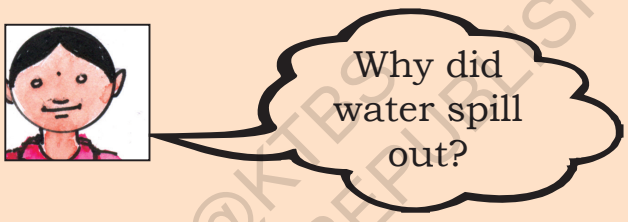
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Experiment : Put a glass beaker completely filled with water on a plate. Slowly immerse a stone of appropriate size tied with a thread into the beaker as shown in the picture.



- What happened when the stone is immersed in the beaker?

_____



- Why it is so? Think and explain to your friends.

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Matter occupies space. A matter cannot occupy the place of another at a same time.

- Write the names of some matter arround you.

_____ _____

_____ _____

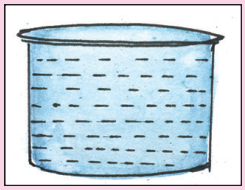
_____ _____

_____ _____

Air is a matter. Air occupies space in its container.

Activity : Blow air into a balloon. Particles in the air are rarely distributed. So particles of one matter can be accommodated in another in which particles are rarely distributed.

Activity : Add some sugar or salt into a beaker fully filled with water, without allowing water to spillout.



- How is it possible? Discuss with your teacher.



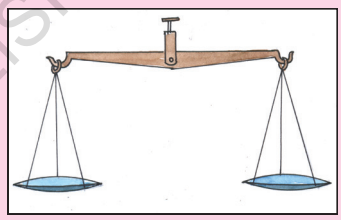
Think : What happens to the tube of a vehicle when it is filled with excess air? Why?

Matter is made up of various visible and invisible particles.

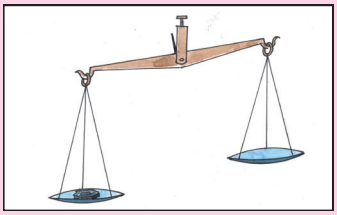
2. Matter has mass.

Activity :

- Take a weighing balance and note down the position of its needle. Write here.



- Put any material of 50 g in one pan and note down the position of the needle. Write here.



Weigh different materials you have or those which are available in your classroom with your friends.



Think

- Is there any matter without weight?
- Place a matter in a pan of the balance. Observe.
- Is it possible to keep both the pans equal? Try. If not, why?

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Activity : Try to lift a bag with 3kg rice and another same type of empty bag. Write your experience here.

_____

_____

Matter is a total sum of many particles. It has mass. Matter is made up of small particles. Total number of particles in a matter depends upon its weight. The material which occupies space and posseses mass is called **Matter**.

Activity : What are the properties of matter? Write here.

_____

_____

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States of matter

Depending upon the arrangement of the particles in a matter, different states of matter are recognized.

Activity : Fill up the following table using the clues.

Required, To burn :	F			E	W			D
To drink :				W				R
To breathe :							I	

Fill up the names of the matter filled above in the following table.

Solid Hard material	**Liquid** which gets the shape of the container	**Gas** which cannot be held/ is invisible/spreads/ can be experienced.

Activity **: List out the materials that you know which are in the form of solid, liquid and gas.**

Solid : _____ _____ _____ _____ _____

Liquid : _____ _____ _____ _____ _____

Gas : _____ _____ _____ _____ _____

Think and group these materials in their particular column; buttermilk, candle, curd, kerosene, charcoal, honey, piece of brick, smoke.

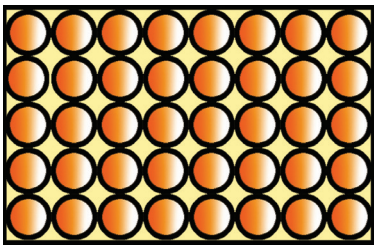
Solid	Liquid	Gas
_____	_____	_____
_____	_____	_____
_____	_____	_____

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Matter is identified in its three forms - Solid, Liquid and Gas.

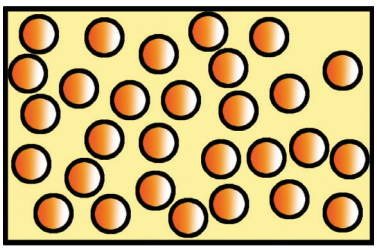
- In solids, particles are densely and orderly arranged.

  Example : stone, iron etc.,



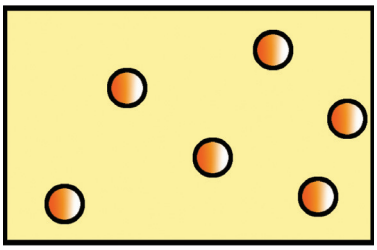
- In liquids, the particles are loosely arranged when compared to solids.

  Example : water, milk etc.,



- In gases, the particles are rarely arranged.

  Example : air, smoke etc.,

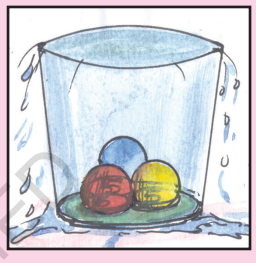




Think : Where have you found the presence of gas?

Activity : Let us conduct an experiment to know that the particles are loosely distributed in a liquid.

- Take a beaker completely filled to the brim with water. Drop three marbles into it. Now water spills out. Why? Think and write here.



_____

_____

- Take another beaker of the same size completely filled with water. Add some sugar powder of equal to weight of the three marbles. Did you find any difference in the water level? Observe and Write here.



_____

_____



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Since sugar particles have combined with the water particles, water does not spill out.

Activity : Place a marble on a table, plate, beaker and so on. Did you find any difference in the shape and size of it?

Shape and size of the solids in any place do not change.

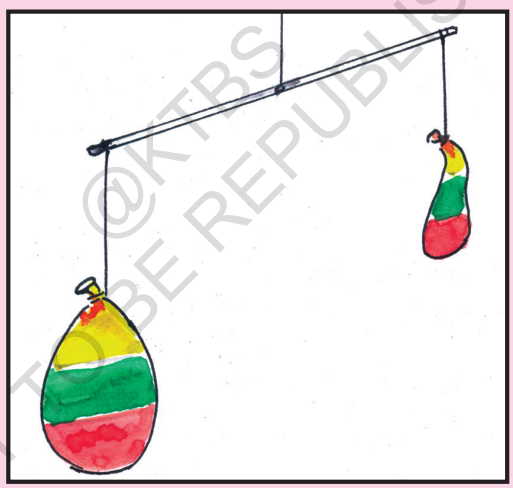
Activity : Pour water into a beaker, plate, polythene bag, etc., Do you find any difference in its shape?

Liquid takes the shape of its container. But does not change in size.

Activity : Light an incense stick and allow its smoke to spread inside a jar. What is the shape of the smoke now?

Gases spread over the entire space of the container and its volume changes.

Activity : Let us conduct an activity to know that the air has weight.



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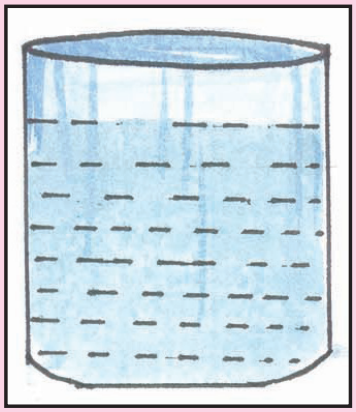
Take a stick of 50cm length. Tie an air filled balloon to one of its end and an empty balloon to the other end. Tie a thread at the exact center of the stick as shown in the picture and hold it freely.

What do you observe? Write here

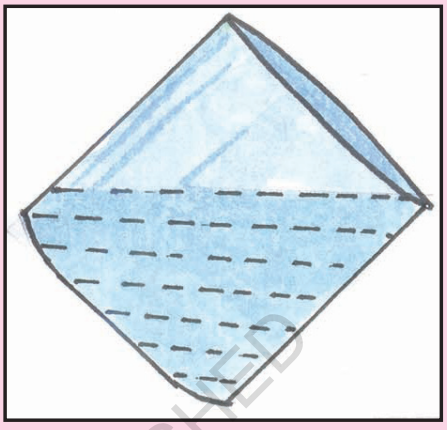
_____

_____

Activity : Observe the picture given below. Do this activity with the help of your teacher.



Place a glass beaker filled with water on plane surface and observe.



Place a glass beaker filled with water in a slant position and observe.

Shape of the liquid changes according to the space available in the container.



Smoke filled jar placed upright.



Smoke filled jar kept slant.

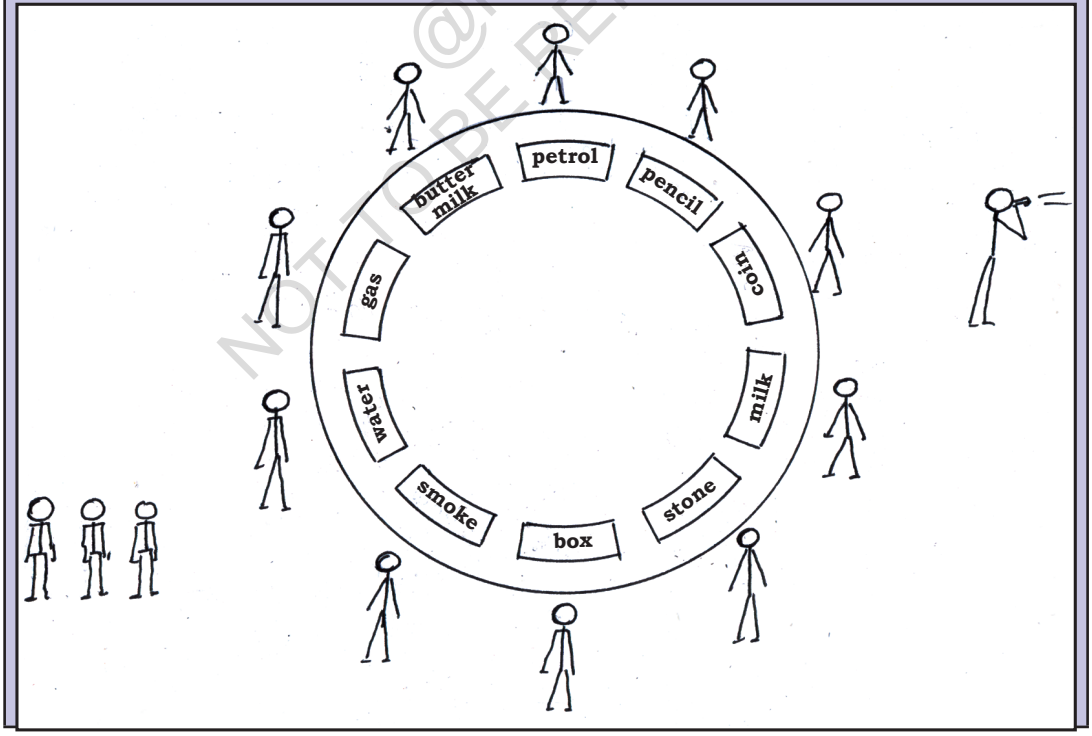
Gas occupies the shape of the container.

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Come, let us play

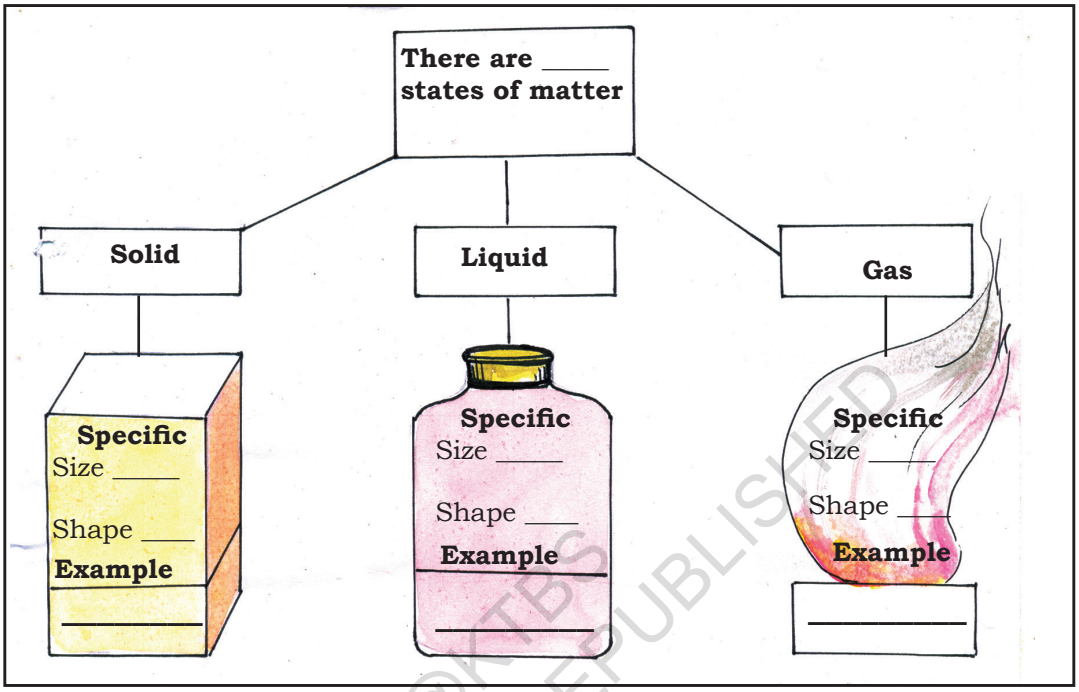
Before you play, write some names of solids, liquids and gases on plain cards.

You and your classmates stand around a circle. Now put the cards inside the circle, and run around the circle. Ask one of your friends to stand outside the circle and stop you by blowing the whistle. When he blows the whistle all of you should stand near the cards inside the circle. Your friend who blew the whistle should call out any one among solid, liquid and gas. If he says solid, the players who stand near the cards of solids will be **out**. Like this continue the game. Ask the last one to give examples for solid, liquid and gas (one for each) and congratulate him/her.



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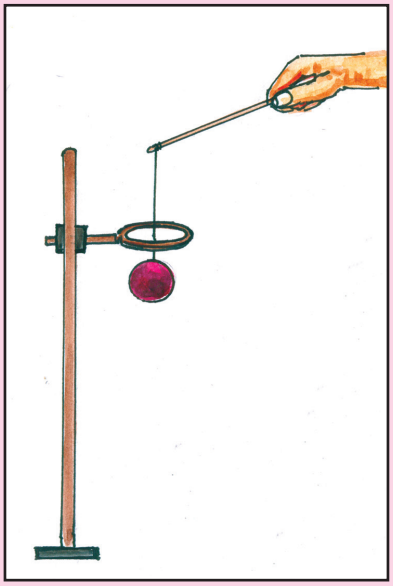
Fill in the blanks with suitable words :



Effect of heat on matter

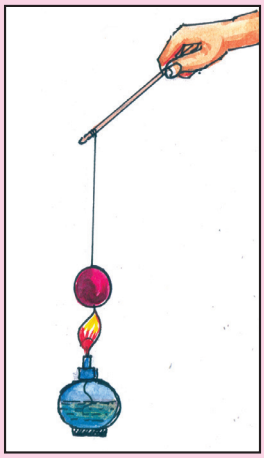
Activity : As shown in the picture, fix a metallic ring to a stand so that a bob can just pass through it. Take a pendulum of an iron bob and try to pass it through the ring.
(Take the help of your teacher)

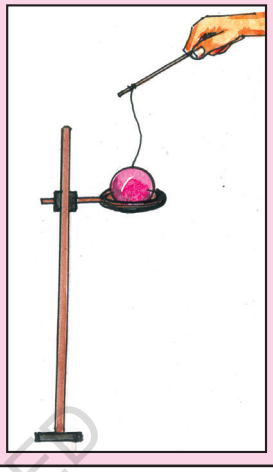
- Did the bob pass through the ring?



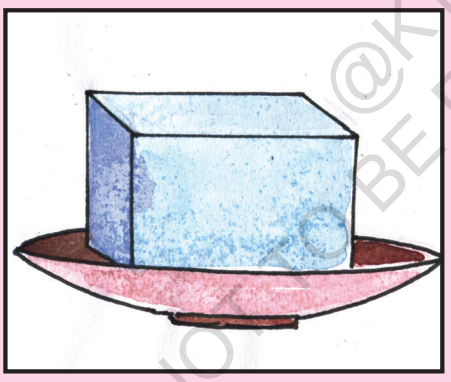
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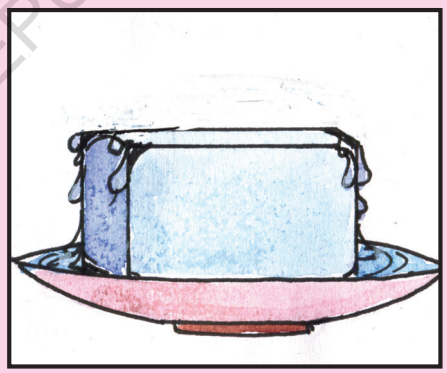
- Now heat the iron bob, and pass it through the ring. Did it pass through? Why?





Activity : Place an ice cube on a plate for 10 minutes.





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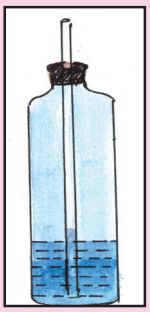
What did you notice? Is there any change in the ice cube? Write here.

_____

_____

_____

Activity : Take a small glass bottle filled with coloured water upto half of its volume, and close it with a single holed cork, as shown in the picture. Insert a thin transparent tube inside the bottle.





- Now roll the glass bottle between your palms as shown in the picture. Observe the water level in the tube, and write here.

_____

_____

- What is the change that has taken place inside the bottle due to rubbing by palms? Why?

_____

_____

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From the above activity, we understood that matter gets changed when heated. Matter expands on heating. Hence solids, liquids and gases expand on heating.

Write what happens when the following objects are heated.

candle	
rice in a cooker	
water	

Change in state of a matter.

When an object is heated, there will be a rise in its hotness. The state of matter changes due to heat.

- Write the states of matter in the following situations.

1. Ice cube on heating _____
2. Water on heating _____
3. Vapour on cooling _____
4. Water on cooling_____

Matter changes its state from one form to another, due to heat. This is called as **change in state of a substance**.

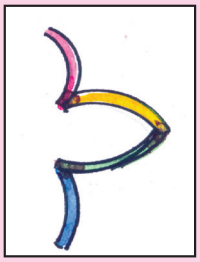
On heating, many solids change into liquid state. Effect of heat on a matter depends upon the level of hotness. On increase in the heat, solid changes into liquid, and liquid changes into gas. In the same way on cooling gas changes into liquid and liquid changes into solid.

Solid $\xrightarrow{\text{heating}}$ liquid $\xrightarrow{\text{heating}}$ gas $\xrightarrow{\text{cooling}}$ liquid $\xrightarrow{\text{cooling}}$ solid

Example : Ice cube (solid) $\underset{\text{cooling}}{\overset{\text{heating}}{\rightleftharpoons}}$ water (liquid) $\underset{\text{cooling}}{\overset{\text{heating}}{\rightleftharpoons}}$ vapour (gas)

Activity : Take a broken piece of a glass bangle. By heating bend it into required shape and stick it on a cardboard.

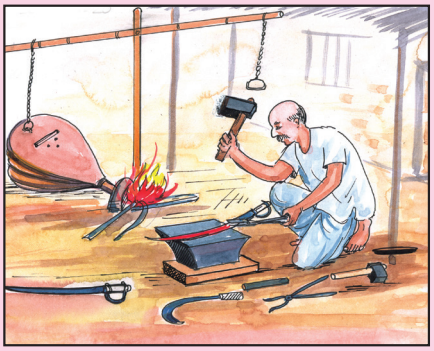
(Take the help of your teacher/parents.)



You have learnt from the previous experiment that objects expand by heating.

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Activity : Blacksmiths change some metals into required shapes by heating.



Why is iron heated?

Think and write here.

_____

_____

_____

Heat transmits from one object to another.

Example : ironing the clothes.

- Write an example for the changes in an object due to heat.

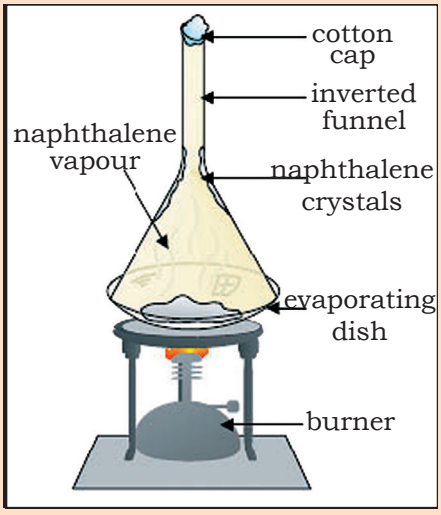
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Sublimation:

Experiment : Take a few naphthalene balls in an evaporating dish. Close it with a glass funnel as shown in the picture. Take some cotton and close the other end of the funnel. Heat the dish slowly. Naphthalene converts into milky vapour and will be collected in the inner side of the funnel. Stop heating and observe what happens? Write here.



_____

_____

We know that, when solids are heated they are converted first into liquid and then into vapour. Similarly, on cooling the vapours are converted first into liquids and then into solids. But some solids on heating directly convert into their vapour state and vice versa without passing through the liquid state and this is called **sublimation**.

Example : camphor, iodine,



Think : What happens to naphthalene balls kept in an almirah after a few days? Why?

Activity :

- Light a wax candle and observe what happens to the wax after sometime. Now putoff the candle and observe what happens to the melted wax and write here.

_____

_____

- Give examples for the following (Take the help of your teacher/parent.)

Solid $\xrightarrow{\text{heating}}$ Liquid $\xrightarrow{\text{cooling}}$ Solid

Solid $\xrightarrow{\text{heating}}$ Gas $\xrightarrow{\text{cooling}}$ Solid

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Mass :

Activity : Measure the weight of different objects using physical balance in your school with your friends, and note down. The weight (see examples given)

rice	duster	groundnut			
5 kg					

Mass is the total quantity of matter cohering together to make an object or a substance. The mass is measured in terms of weight. The SI unit of mass is **kilogram (kg)**

Know this

- 1000 mg = 1 g
- 1000 g = 1 kg
- 100 kg = 1 quintal
- 1000 kg = 1 ton

Activity : Learn from the elders about the tools used to measure the quantity of objects in olden days and write here.

rice-pavu		

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Density

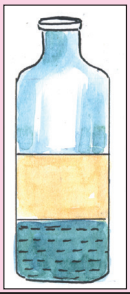
It is generally said that the cotton is light and iron is heavy. Why? Write here.

_____

_____

When two objects of same size are measured, one may weigh more and other may weigh less. Generally we say that the density of less weighting objects will be less, and the density of more weighing objects will be more.

Activity : Pour a cup of water and a cup of oil into a glass jar. They won't mix together and will be seen seperately. Why?



_____

_____

_____



Think : Which one is heavier among 1 kg of cotton and 1 kg of iron?

Density is the amount of mass contained in a unit volume. Generally density of the solid is more than that of the liquid and the density of liquid is more than that of the gas.

The mass of an object (weight in **g**) in 1 cubic meter of its volume is called density. SI unit of density is kg/m^3. (kilogram per cubic meter)

Activity : List the objects with less and higher density

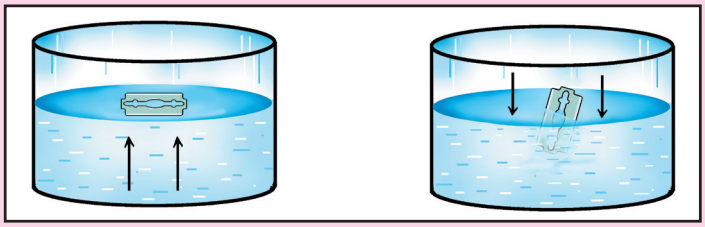
Less Density	oil					
High Density	water					

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Pressure :

Activity : Take a tumbler containing water. Place a blade horizontally. It floats. Place the same blade perpendicular to the surface of water. See what happens.

(Handle the blade carefully with the help of teachers/ parents)



_____

_____

Even though the mass of the blade is same, it floats in the former case, but sinks in the later case.

When the blade is placed horizontally, its mass is distributed over a wider area. Therefore mass per unit area is less and hence it floats.

When the blade is kept perpendicular to the water surface, it sinks since the mass is distributed over a smaller area. Therefore the consequence depends upon mass per unit area. This is called **pressure.** Pressure is the force exerted on a unit area.

Activity : Immerse a stone gently into a glass beaker containing water.

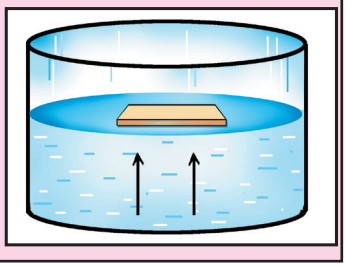


- Write here what you have noticed.

_____

_____

Immerse a wooden plank into the other beaker containing water.



- Write here what you have noticed.

_____

_____

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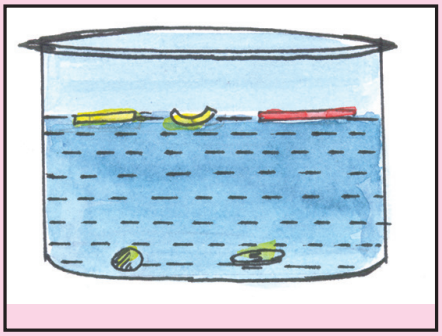
When an object is immersed in water, it exerts a downward force on water and the water in turn exerts an upward force or upward thrust on the objects. If the upward force exerted on the object is more than the downward force, then the objects float. This upward force exerted is called **buoyancy**.

Write names of any four objects which float on water.

1. _____ 2. _____

3. _____ 4. _____

Activity : Fill water in a glass jar as shown in the picture. Then put marble, coin, dried leaf, wooden plank, straw etc., in the jar. Ask your friends to tell what happened to each object that you have put in water by observing it.



Some objects float in water and some sink.

Activity : Put some small objects in the water. Write what happened to those objects.

Objects that float in water	Objects that sink in water
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

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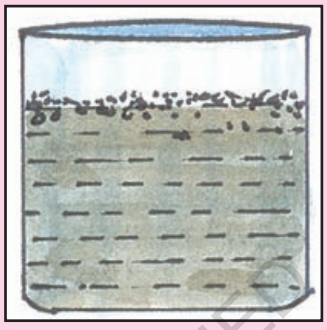


Think :

- A raft does not sink in water. Why?
- What objects are used to immerse the wooden plank in water? Why?

Activity : Fill water in two glass jars as shown in the picture. Now pour sugar to one jar and charcoal powder into another and stir.





Did the sugar and charcoal powder dissolve in the water? Observe and write here.

_____

_____

Some objects dissolve in water. This is called **solubility**. Some objects do not dissolve in water.

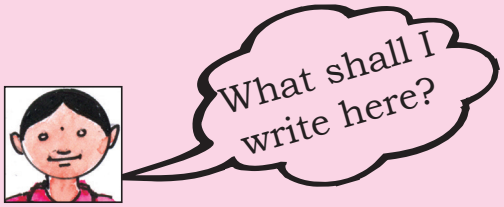
Activity: Put the given objects in the water and stir. Observe and write what happened to these objects.

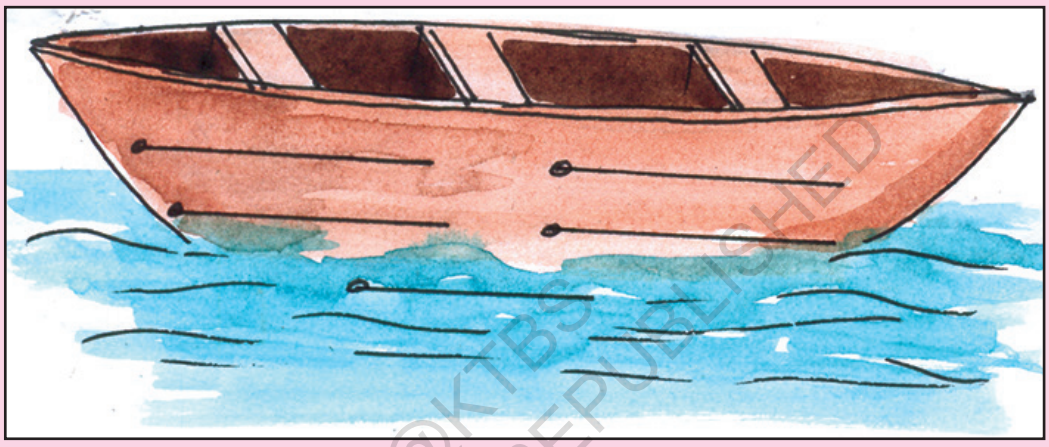
salt, sand, sugar, kerosene, turmeric powder, sugar candy, coconut oil,milk.

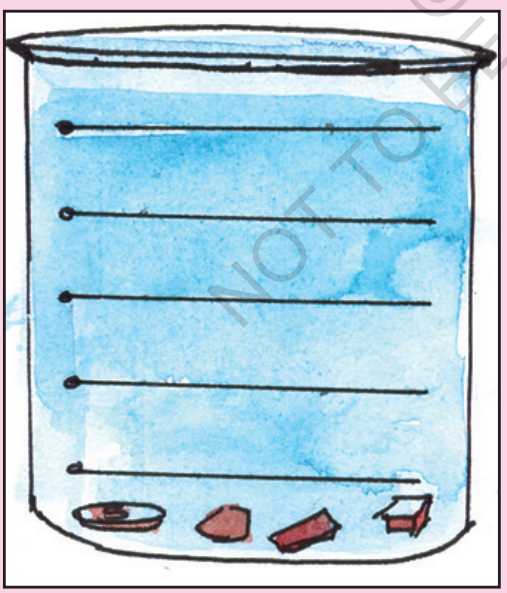
Soluble objects in water	Insoluble objects in water
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

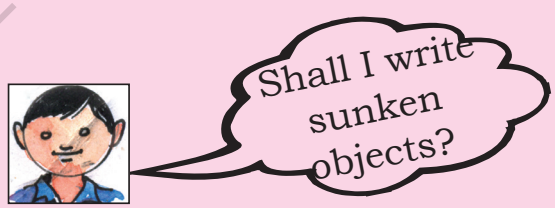
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Activity : Write examples in the space provided.









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Based on the arrangement of particles, matter is identified in three physical states, namely **solids, liquids** and **gases.** Apart from this, matter can be classified as elements, compounds and mixtures. You will learn about this classification in the next lesson.

LESSON -12

ELEMENTS, COMPOUNDS AND MIXTURES

S3U2S9

In our daily life we make use of different kinds of matter. The matters available in nature consist of molecules or compound molecules. When these compound molecules are subdivided, elements are obtained. The smallest unit of the element is called **atom.** Atom is the smallest unit of an element having same properties. Some atoms easily combine with others and form different substances. Depending on the atoms present in the substances, they are classified as **elements, compounds** and **mixtures.**

After learning this lesson you,

- classify the matter into elements, compounds and mixtures.
- recognise the differences between element, compound and mixture.

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Elements

Elements are made up of very small particles. These are formed by particles with same properties.

Example : Oxygen - O
Hydrogen - H

Elements cannot be subdivided chemically and cannot be synthesized by other elements.

Some elements are naturally available whereas some other elements are artificially prepared.

Example : Natural element - Gold
Artificial element - Plutonium.

Elements are classified as metals and non metals. You will learn about metals and non metals in higher classes.

Compounds

When two or more elements combine chemically, compound is formed. There are groups of atoms of different elements in it.

When two are more elements combine chemically in a specific ratio and form a substance of new property it is called a **compound**.

Example : Water - H_2O

Water is a compound formed by the chemical combination of Hydrogen and Oxygen in the ratio 2 :1

Molecular formula is used to represent a compound.



Know this : Representing the number of atoms in a molecule using chemical symbols is called molecular formula.

Molecular formula represents the elements of a compound as well as the number of atoms. A compound does not possess the properties of its constituent substances.

Example : Sugar is made up of carbon, hydrogen and oxygen. But sugar does not possess any of their properties. The constituents of compounds cannot be separated easily.



Know this : Take sodium chloride(salt) which is used in daily life. It is a compound formed by sodium and chlorine. Though both sodium and chlorine are poisonous, the salt formed by their combination is not poisonous. We use this in daily life.

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Mixtures

We see many mixtures in our daily life. Mixtures are substances consisting of two or more substances.

If two or more substances (elements or compounds) are mixed together in any ratio, such that they do not undergo any chemical change, but retain their individual properties, then the resulting substance is called **mixture**.

Example : Soil is a mixture of sand, clay, many types of salts and residues of plants and animals.

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Fill in the blanks with suitable words

1. Element consists of a group of same type of _____
2. Compound consists of a group of atoms of different _____
3. A compound is _____
   _____
   _____
4. A mixture is _____
   _____
   _____
5. Give five examples to each of these.
   (Take the help of your teacher)
   Element _____
   Compound _____
   Mixture _____

Element, compound and mixture may be solid, liquid or gas

	Element	Compound	Mixture
Solid	iron	sugar	soil
Liquid	mercury	water	sea water
Gas	oxygen	carbon dioxide (at room temperature)	air

Differences between compounds and mixture

Compounds	Mixtures
1. When two or more elements combine chemically compounds are formed	When two or more substances mix physically, mixtures are formed.
2. The constituents of compounds are combined in definite ratio or proportion	The constituents of a mixture may be mixed in any proportion
3. The constituent substances of a compound do not retain their original properties after combination.	The constituent substances of a mixture retain their individual properties.
4. The constituents of compounds cannot be separated by simple methods (without chemical reactions)	The constituents of mixtures can be separated by simple methods.

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LESSON - 13

AMAZING ENERGY

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In the previous lesson, you learnt that the world we live in is made up of matter and energy. Human beings are the integral part of nature. They have understood many natural events of the environment and tried to find out the reasons for the changes that take place in the environment. They have learnt to think scientifically about the amazements of nature. We, in our daily life use the words like force, work, energy etc., What are these? Let us know about them.

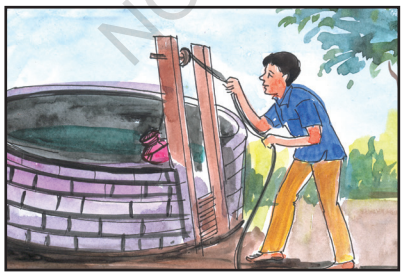
After studying this lesson you,

- understand the meaning of work.
- understand that energy is needed to do work.
- understand the different forms of energy and give examples for the uses of different types of energy.
- recognise the change of energy from one form to another.
- recognise the significance of conservation of energy.

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Work

In our daily life activities, the word commonly heard is work. But the word **work** has a definite meaning.





In the above picture both Ramesh and Rasheeda are doing activities deliberately using force.Ramesh can complete his work of lifting water from a well. But Rasheeda cannot move the wall in spite of several attempts.

It is said that **work** is done only when the force applied on an object makes that object move in the direction of the force.

Activity : Name any five works you do

- Storing water
- _____
- _____
- _____
- _____
- _____

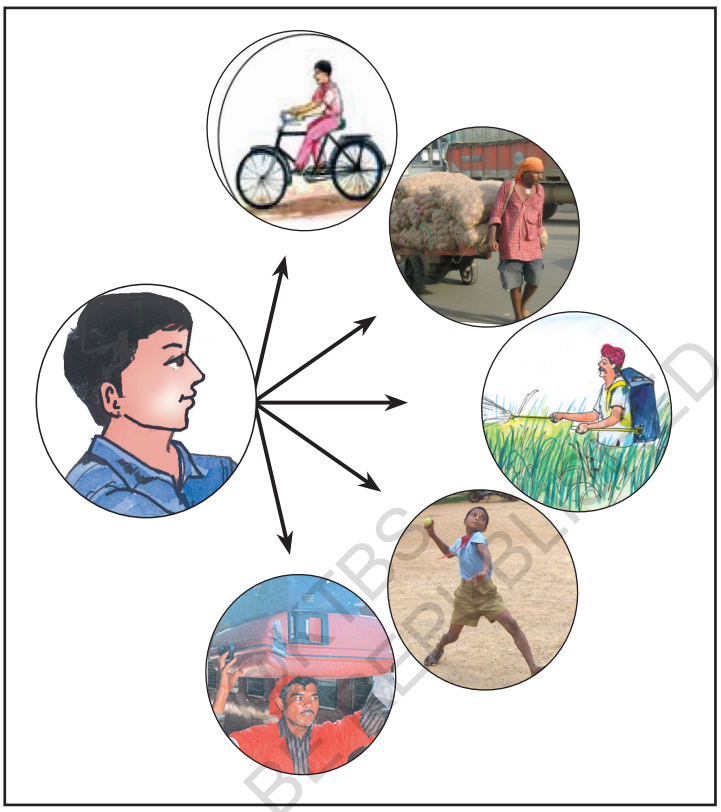
You have done all the above works by applying force. When force is applied on an object the object changes position or gets displaced. Work depends on the quantity of force applied on the object.

Activity : Write the names of three works you have done today.

- _____
- _____
- _____

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Energy is essential to do work.



What works are being done in the above picture. Write it in the space provided below.

- _____
- _____
- _____
- _____
- _____

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Activity : Teacher engages the students in different activities in groups.

For Example,

- watering the plants
- drawing
- arranging desks systematically in the classroom.



Think : Why are the above activities called works?

We are engaged with one or the other activity to fullfil our needs. These activities are called work. We use energy to do work. We get tired when we do more work. People who work hard, use more energy to do work.



Think : Can you lift the wooden table in your classroom, without the help of others.

We will be able to work only when we have energy. Less energy is required to do simple work, more energy is required to do tough work.

Activity : Try to lift your and your friends' school bags. How many bags can you lift at a time?

We get the energy required to do work from food. We get the energy for doing several works from different sources in the environment.

For Example,

We use physical energy. Motor vehicles run by fuel energy to carry loads. Solar energy is essential for plants to grow. Every work is related with the energy required to do it. If work is a needful activity, then energy is essential to complete the work.

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Work is also defined as, making an object move from one place to another. Energy is required to displace any object from one place to another.



Think : Are there any works which could be done without using energy?

Different forms of energy and use.



Flying aeroplane in the space, running vehicle on land, sailing boat/ship on water, electrical appliances which are used to ease our daily works, all use one or the other form of energy.

Observe different forms of energy in the picture given below.



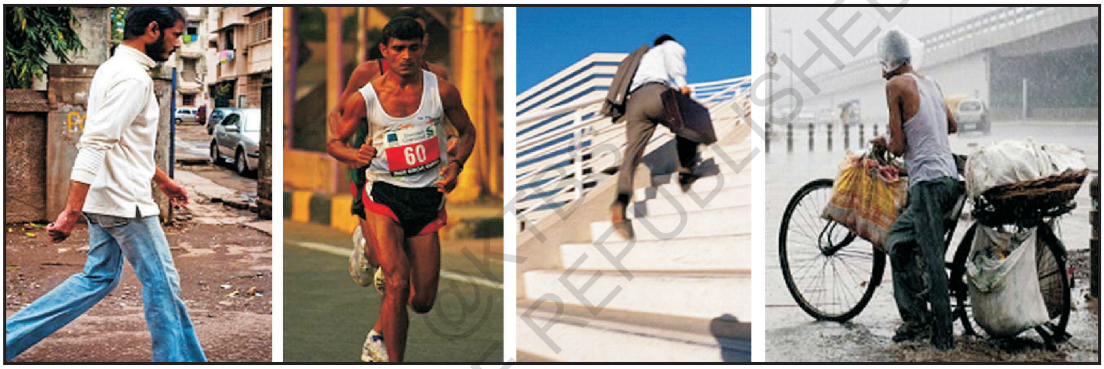
Activities happen not only by human beings but also several activities take place naturally in the environment. Energy is essential for all these activities to take place. Let us know, which is that essential energy?

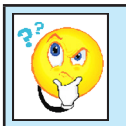
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Different types of works depend upon its related energy. There is a natural energy in the environment. Sun, air, water, coal etc., are the sources of energy used for certain daily activities in the environment. Let us learn about the different forms of energy.

1. Muscular energy

Activities like walking, climbing, pulling, pushing etc., need muscular energy. This energy is released by chemical changes in our body.





Think : Why do our elders insist we take nutritious food?

Write any four works you do using muscular energy.

- _____
- _____
- _____
- _____



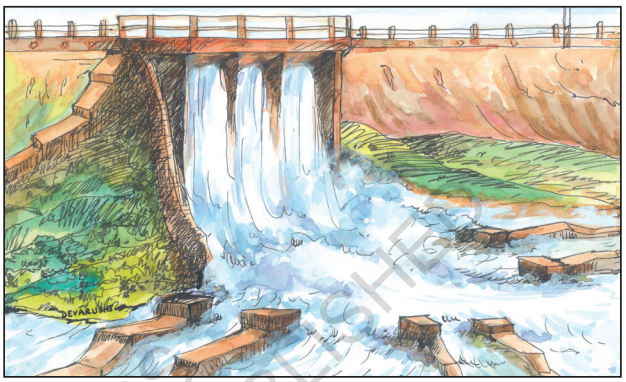
Read and learn : Muscular energy can be increased by proper food and regular exercises.

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2. Mechanical energy

Energy of an object by virtue of its position is called **potential energy** and the energy due to its motion is called **kinetic energy**. Sum of potential energy and kinetic energy is called **mechanical energy**.

Water stored in a dam possesses potential energy. When the stored water in the dam is allowed to outflow through crest gates then potential energy gets converted into kinetic energy.



Write any two works you do at your home using mechanical energy.

- _____
- _____

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Know this

Mechanical energy

- Potential energy → energy possessed by a body by virtue of its position
- Kinetic energy → energy possessed by a body by virtue of its motion

3. Heat energy

We do our daily works by getting heat from energy like fire wood, sun, fuel etc.,



Write any two works done in your home using heat energy.

- _____
- _____

Activity : Rub your palms rigorously for sometime and touch your cheeks. How do you feel?

Here muscular energy gets converted into heat energy.

We cook food, boil water and do other works using the heat energy from fuels, fire wood, gas, kerosene etc.

During winter season condensed oil bottles are kept near the hearth flame or in the sunlight. Why? Think and write.

_____

_____



Think : What would be the reason for the vibration of lids of vessels kept on burning stove for cooking food?

Heat is released when fuel is burnt. Coal is used as fuel in thermal power stations to produce electricity.

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Know this : Thermal power station is established at Raichur.



Think : What is the cause of heat energy in charcoal used iron box?

4. Solar energy

Sun is the main source of all energies on the earth. The energy we get from the sun is called **solar energy**. Living organisms depend on solar energy for their survival. Plants prepare their food using sunlight. This process is called **photosynthesis**.



Think : What would have happened if there was no sunlight?

Activity : Discuss with friends or elders and write.

- During summer, wet clothes exposed to direct sunlight dry very fast. How?

  _____

  _____

- Water level decreases in ponds and wells during summer. Why?

  _____

  _____

- People wait for sunlight during winter season. Why?

  _____

  _____

- Why is solar water heater used?

  _____

  _____

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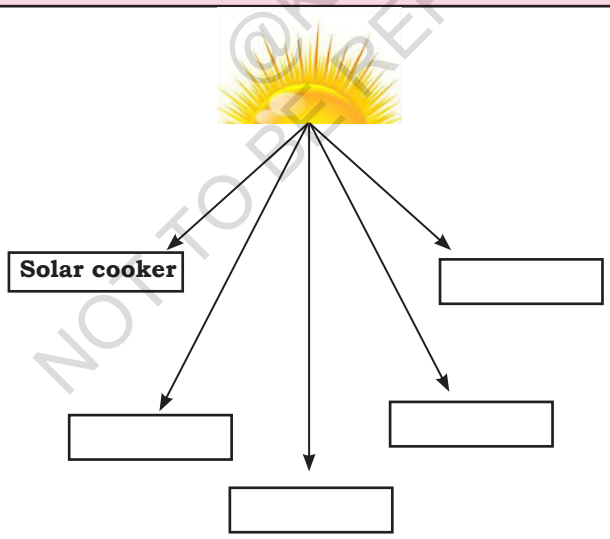
Observe the pictures given below.Identify where solar energy is used.








Activity : Write the names of solar energy devices that you have seen or used.



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Activity

- Collect the pictures of solar energy devices and prepare a chart.
- Collect the information about the use of solar energy and compose a poem or talk about it.

Use of solar energy for different works reduces the use of electricity and prevents pollution of the environment.

5. Wind energy :

Air is one of the sources of energy. Moving air (wind) possesses energy. This is called **wind energy**.



In ancient times, people used to make boats and ships sail on the oceans with the help of wind.

Wind mills rotate due to the fast movement of wind. The turbines rotating due to this wind energy, produce electricity.



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Discuss with friends/elders and write.

• Wet clothes spread over a rope for drying, flutter. Why?	_____ _____
• Why do trees like coconut and arecanut fall down during rainy season.	_____ _____
• What happens when a kite is held against the blowing wind?	_____ _____
• Wind wheel rotates only when somebody runs, holding it. Why?	_____ _____
• Why do lanterns have glass covers?	_____ _____

Write about the works done by wind energy.

Example : Production of electricity from wind

- _____
- _____
- _____

Activity

Make a wind wheel and enjoy running by holding it.



Wind has enormous energy. By using this energy many works could be done. Naturally available wind is used as energy and we must learn to protect ourselves from the disasters caused by wind.



Think : What are the adverse effects of cyclones? Collect the pictures related to it and discuss with friends.

6. Stored energy of water



Flowing water is a source of energy. In order to use water as a source of energy, a dam has to be built across a river and water must be stored in it (potential energy). **Stored water** is allowed to flow from a higher level to fall on turbines. Due to the force exerted by running water turbines rotate fast and produce electricity. These are called **Hydro electric power generating stations**.

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Write the names of dams you know, and put (✓) mark to the ones you have visited.

1. _____ 2. _____

3. _____ 4. _____

5. _____ 6. _____

Visit a library. With the help of books, list out the dams built across rivers and hydro electric power generating stations in Karnataka.

Dams	Hydro electric power generating stations
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____

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Efforts of man in producing electricity by using water energy is to be appreciated.

Name the works which can be done by using water energy.

- _____
- _____
- _____
- _____



Know this : Energy produced by the ocean tides is called **tidal energy.**

Naturally available water is very precious. Hence it must be used moderately. The electricity which is produced with more effort and expense should also be used moderately and energy should be conserved.

Write two situations where we can save electricity.

- _____
- _____



Think : What would have happened if there was no electricity?



Know this : Reservoirs producing Hydro electricity are called **hydro electric power generating stations.**

Do this : (Take the help of elders)

- Collect rain water during rainy season, and use it for some works.
- Make use of rain water harvesting.
- Make use of soak pits for the proper use of water.

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7. Electrical energy

Now-a-days most of our daily work is being easily done by the help of electricity. Is it possible to do more work in less time using electricity.

Write any four works done, using electrical appliances in your home.

Electrical Appliance	Work
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____






Electricity is supplied to houses and other places from electric power generating stations. Electrical appliances must be used carefully.

8. Bio energy

The gas produced by decaying agricultural waste, plant residues, animal dung etc., in the absence of air, is called **bio gas**. It is used for cooking. The energy available from biogas can be converted into electricity and may be used for many works.



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Write here the works you know that can be done using bio energy.

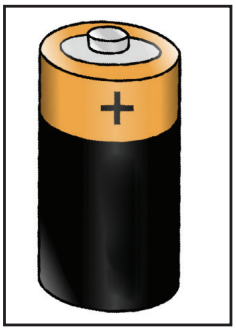
- _____
- _____
- _____
- _____
- _____

Activity : If you know the ways of producing useful things out of wastes, prepare the useful things with your friends.

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Bio energy obtained from agricultural waste helps human beings to maintain healthy environment.

9. Chemical energy



Chemical energy is produced by the chemical reactions that takes place in the substances.

Example : Chemical reaction in electric cell produces electricity.

10. Fuel energy

One more energy available in the nature is **fuel energy.** Fuel is the natural source of energy which is combustible, produces heat and usually gives out light. This can be converted into electrical energy, heat energy and mechanical energy.

Activity : With the help of your teachers/elders, write the fuels used in the following



_____



_____



_____



_____



_____



_____



_____



_____

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If you have appliances which make use of fuels in your home, write them below.

- _____
- _____
- _____
- _____
- _____
- _____



Know this : Fuels are the various minerals and their products. These are available in the earth's crust. These are exhausted gradually and require a long period for their reformation.

Fire wood is also a fuel. Burning of fire wood gives heat. By using this heat energy it is possible to cook and do other works.



Think : Write the instances where fuel is used unnecessarily

- _____
- _____
- _____

Fuel, the natural resource must be used moderately to protect our environment. Solar energy must be used more instead of conventional fuels.

Activity : Arrange a debate in the classroom about the pros and cons of fuel.

Energy is available in different forms from natural sources.

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Write the different forms of energy that you have learnt.

1. _____ 2. _____
3. _____ 4. _____
5. _____ 6. _____
7. _____ 8. _____
9. _____ 10. _____



Think :

- Is it possible to store and use energy?
- Is electricity stored in cells? Is it possible?

Change of energy from one form to another

The energy available from sources like sun, water, wind, food, chemical reaction are present naturally in the nature. The energy found in different forms gets changed and become useful for human life. **For Example,**

- Fuel energy gets converted into mechanical energy (to run vehicles)
- Fire wood gets converted into heat energy (to cook food)

Write the changes in the form of energy in the following activities.

Activity	Form of energy	Form of changed energy
running of petrol car	chemical energy (fuel)	mechanical energy
drum playing	muscular energy	sound energy
ironing the cloths		heat energy
drying up of pappad in the hot sun	solar energy	
cooking food using bio gas		
glowing of an electric bulb by rotating turbine.		

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We learnt from examples that energy gets converted from one form to another form.

Write other examples for change of energy from one form to another form.

- _____
- _____
- _____
- _____

Conservation of energy

Energy can neither be created, nor be destroyed. It can be converted from one form to another form. Energy remains in one or the other form.

If energy released by natural source like sun, wind, water, fuel etc., is used moderately we can save energy.

Use the clues given in the brackets and write which alternative energy can be saved by doing the activities given below. (fuel, chemical, electric, charcoal)

Activity	Saved Alternative energy
travelling by bicycle	_____
washing clothes by hand	_____
producing electricity from wind	_____
cooking food using bio gas	_____
not to put on the radio when there is no electricity.	_____

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Which alternative energy can be used for the following activities instead of conventional energy. Write using clues given in the bracket.

(solar water heater, bio gas, solar cooker, solar cells)

Activity	Alternate energy used
instead of hearth	_____
electric geyser	_____
cooking rice on the hearth	_____
electric bulb	_____
listening to radio by using electricity	_____

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While doing work one can use alternate energy.

Example : Using solar energy instead of electrical or fuel energy.

Energy which fullfils our needs is very essential for the survival of living beings. If we use energy gained by the body from food and energy gained from the environment for other activities carefully, the capacity of work can be increased.

LESSON - 14

THE SKY

L1V9R9

Watch the sky in the evening from the play ground after playing the games. You will see some stars here and there, in the hazy sky. When the sky becomes clear you can see countless stars. You will be also able to see shooting stars. During the rainy season thunder, lightning, cyclonic winds, rains etc., are common. Are you eager to know how all this takes place? It is day when the Sun rises and it is night when the Sun sets. The Moon is seen at night. Shall we find out how these changes take place in the sky?

After studying this lesson you,

- know about the Sun and its family
- understand the shape and size of the Earth, its movements, causes of day and night.
- know about the meteors, asteroids and comets.
- understand the movements of the Moon and its phases
- know why the Earth is an unique planet among the other planets.

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The Sun and its family

The Sun and its family is known as the **Solar System**. It comprises of 8 planets, 173 satellites, thousands of asteroids, meteoroids and comets.



Know this

- The stars are self luminous celestial bodies. The Sun is also a star.
- The solar system is a part of a galaxy which is known as the **Milky way**.

The Sun : The Sun is a star. It is closer to the Earth than any other star. Therefore, it looks bigger and brighter than all other stars. It is the centre of the Solar System. It exerts a gravitational pull on all its members, which orbit around it.

The Sun provides light and heat to us. It appears to rise in the east and set in the west. Do we not feel that the sun is moving around the Earth? Is this true?

The heat and light of the sun is essential for human beings, plants and animals.



Know this

In ancient times people thought that the Sun, the Moon and the planets were orbiting the Earth. This was known as **Geo-centric model**. It was expounded by **Claudius Ptolemy**.

Arayabhata, the first Indian astronomer and mathematician proposed that the Earth and other planets revolved around the Sun. This is known as **Helio-centric model**. **Nicolaus Copernicus**, **Johannes Keplar** also supported this model. Later **Galileo Galilei** an Italian mathematician and physicist invented a telescope and using it, further supported the Helio-centric model of Copernicus.

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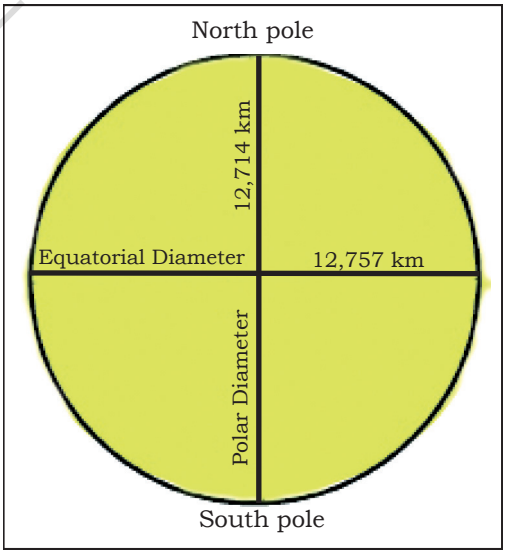
The planets : A celestial body orbiting around the Sun along an elliptical orbit, is called a **planet**. Every planet has its own path of movement which is known as the **orbit.** The Earth also has its own orbit. The planets are non-luminous bodies. They receive light and heat from the Sun.

The Earth : It is our home and it is a unique planet in the Solar System. It occupies the third place from the Sun. It is the only planet of the solar system where there is life, because it has ideal conditions for life, such as temperature, water and suitable atmosphere with life supporting gases.

Here is a picture, viewing the Earth from the Moon.



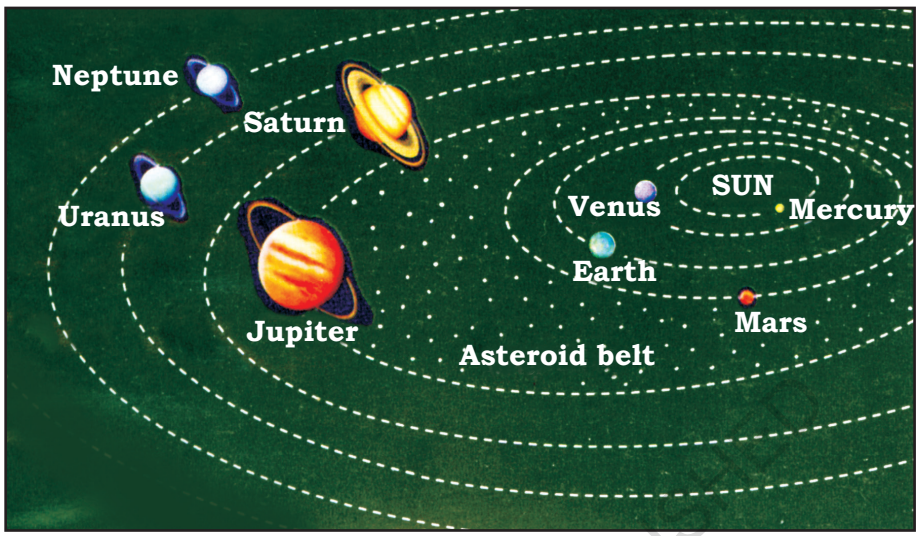
The Shape of the Earth : It is confirmed by the scientists that the Earth is slightly flattened at the poles and bulging at the equator. Such a shape is called **Geoid**, meaning **earth-shaped**. It denotes the earth is not completely round or circular in shape.



Size of the Earth : The Earth is the **fifth largest** planet in the Solar System. Its equatorial diameter is 12,757 km and the polar diameter is 12,714 km. This shows that the polar diameter is less than the equatorial diameter by 43 km. It denotes that the Earth is spherical in shape. The total surface area of the earth is 510 million square km.

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Solar system- Sun's family



Answer the following questions with the help of the above picture.

- How many planets are there in the Solar System?

  _____

- Write the names of planets in order.

  _____

  _____

- Which is the nearest planet to the Sun?

  _____

- In which planet do we live?

  _____

- Which is the biggest planet in the Solar System?

  _____

- Which is the smallest planet in the Solar System?

  _____

- Which is the farthest planet from the Sun?

  _____

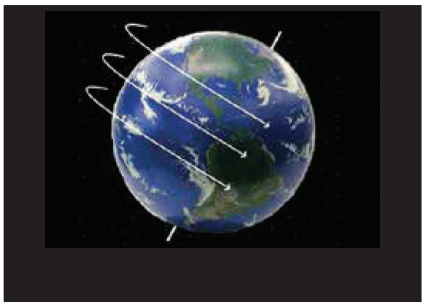
- What position has the planet Earth from the Sun?

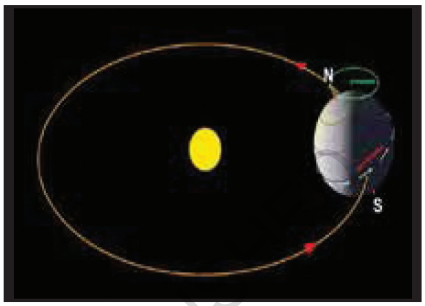
  _____

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The Movements of the Earth

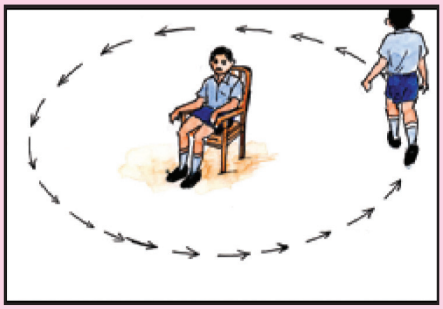
The earth has two movements. They are the rotation and the revolution. The Earth spins continuously on its axis from west to east. This is called **rotation**. The Earth also revolves around the Sun along its orbit. This is called **revolution**. The earth continues to rotate on its axis while it is revolving around the Sun.





Activity : Ask two students to stand a short distance from each other. One student represents the sun and the other represents the earth.

The student who represents the sun should sit on the chair. Mark an elliptical circle around the chair, 2 or 3 feet away from the chair. Ask the student who represents the earth to spin himself and revolve around the chair along the elliptical path. (in anti clockwise direction)



Discuss the following questions.

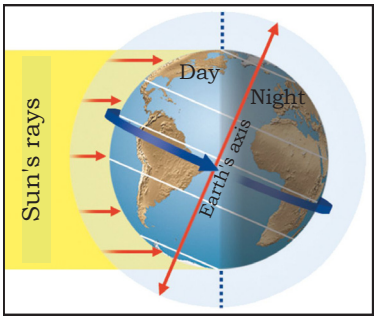
- Is it possible for the student representing the earth to see the student representing the sun by sitting always on the chair?
- How many times has the student representing the earth faced the student representing the sun?
- How many times has the student representing the earth shown his back to the student representing the sun?

When the student representing the earth shows his face to the student representing the sun, then it is assumed that it is day. When he is showing the back, then it is assumed that it is night.

What do you learn from this activity?

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Day and Night : During the Earth's rotation one side of the earth faces the sun and receives light. This part of the Earth has day(light), the other side of earth does not receive light and has night(dark). Since the earth rotates from west to east, the Sun appears to rise in the east and set in the west.





Know this : The earth takes 24 hours to complete one rotation. This is called a day. The earth takes $365\frac{1}{4}$ days to complete one revolution. This is called **a year.** The day and year are a result of the earth's movements.

The Earth is Marvelous : As mentioned earlier the earth is the only planet that has life. Make a list of factors found on the earth to sustain life.

_____ _____ _____

_____ _____ _____



Know this : About 71% of the earth's surface is covered by water and 29% by land. The earth is surrounded by the atmosphere. Atmosphere has oxygen which is very essential for respiration of organisms, nitrogen and carbon dioxide which is essential for the preparation of food and nutrition of plants. The water which is essential for living beings is avaiable on the Earth through the process of water cycle. How is it possible?

Life on earth has become possible because of the suitable distance between the Sun and the Earth, ideal climate, variety of soils, which supply food and water to the plants, suitable environment etc., which are present on the earth. Hence, the Earth is a marvelous planet.

So far we have learnt about the earth which is the third planet from the Sun. Now let us learn about the other members of the solar system.

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You have learnt that there are 8 planets in the Solar system. In the order of their distance from the Sun, the names of the planets are - **Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune**. Earlier Pluto was the 9th planet of the solar system. Recently it has been considered as a dwarf planet and is no more a planet of the solar system.



Know this : Till 2005, Pluto was considered as the 9th planet. As it did not have all the characteristics of the planet it was considered as a dwarf planet.

Mercury : It is the nearest planet to the Sun. It has no water and is the hottest planet. So it has dry climatic conditions. It has a rocky surface, large craters and mountains. It revolves around the Sun faster than any other planet. It is brown in colour.

Venus : It is the second planet from the Sun and smaller than the earth. It is the brightest planet in the solar system. It is also known as **morning star, silver star and evening star**.

Mars : It is the fourth planet from the Sun and is also known as the **Red planet.** Its red soil is formed because of iron oxide. It has huge volcanic craters, giant canyons and canals. The canals are now as dry as dust. Thus it looks like a desert.

Jupiter: It is the fifth planet from the Sun and the **largest planet** in the solar system. It is 1300 times bigger than the earth. It is a gaseous (gas) giant planet. It has a Great Red Spot. It is three times the size of the earth. There are thin icy and dusty rings around this planet.

Saturn : It is the sixth planet from the Sun and the second largest planet in the solar system after Jupiter. It is also made up of gases. It has thousands of rings of ice, rocks and dust. That is why it looks beautiful and attractive.

Uranus : It is the seventh planet from the sun. Like Jupiter and Saturn it is made up of gases. It is seen as a blue-green disc. It has rings, which are opaque. It is covered by thick clouds.

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Neptune : It is the eighth planet from the sun. Its composition is similar to that of Uranus. Its colour is bright blue. It is one of the coldest planet in the solar system due to its great distance from the sun.

A list of period of rotation and revolution of the planets is given (on the basis of Earth's timings) With the help of this table answer the following questions.

Planets	Duration of earth's rotation	Duration of earth's revolution
Mercury	59 days	88 days
Venus	243 days	225 days
Earth	24 hours	$365\frac{1}{4}$ days
Mars	24hrs, 37min	686 days
Jupiter	10 hrs	12 years
Saturn	10hrs.39min	$29\frac{1}{2}$ years
Uranus	17hrs.13min	84 years
Neptune	16hrs.23min	165 years

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1. Which planet takes the least time to complete one revolution around the sun? Why?

_____

_____

2. Which planet takes the most time to complete one revolution around the sun? Why?

_____

_____

3. Which planet takes more time to complete one rotation than its revolution.

_____

- **Features of some planets are given below. Mention the name of the planets against each of them.**

1.	red planet	
2.	brightest planet	
3.	biggest planet	
4.	blue-green colour planet	
5.	only planet that has life	
6.	its day is longer than its year	

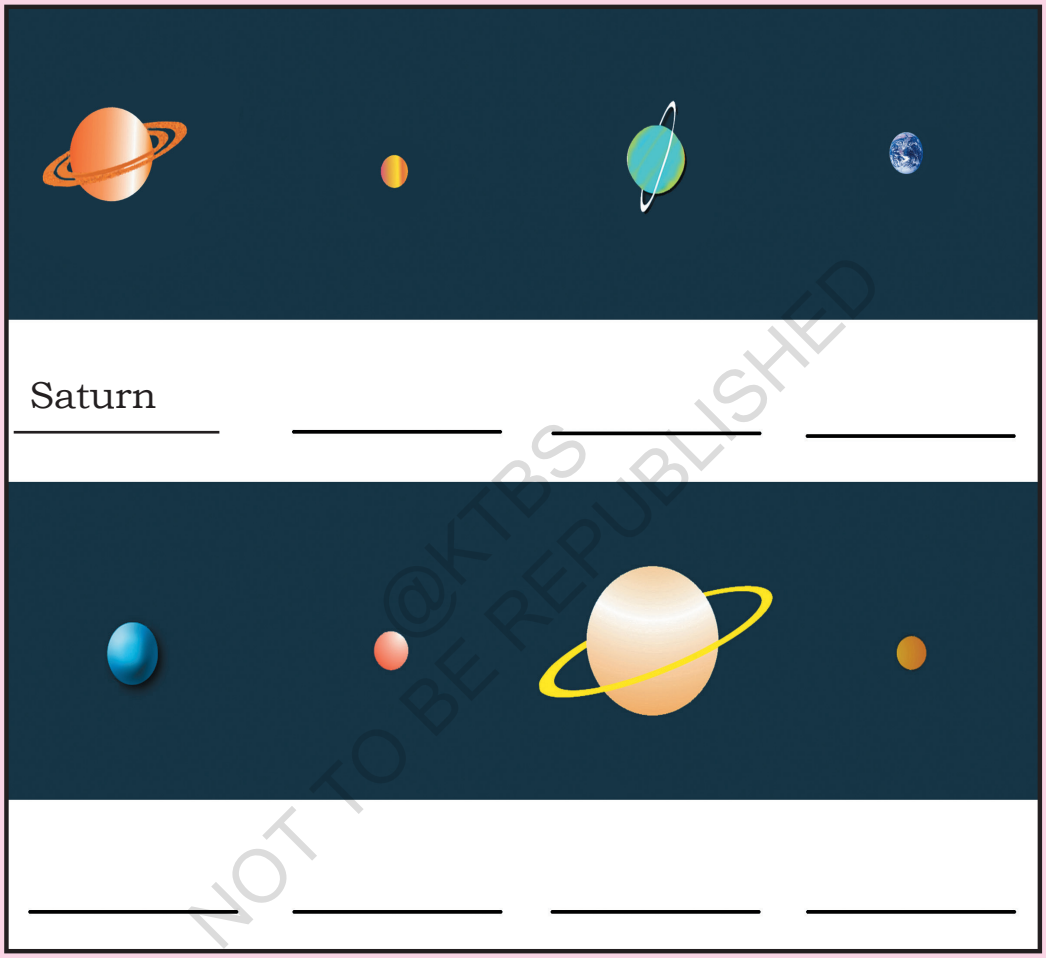
- **Identify the name of the planets in the letter grid given below.**

Example; Jupiter.

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

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Activity : Observe the pictures of the planets and write their names in the blank space. One Example is given.



Saturn _____ _____ _____ _____

_____ _____ _____ _____

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Meteoroids : Small fragments of rocks and debris in space are called meteoroids. When they enter the earth's atmosphere, they burn up in the atmosphere due to friction and a streak of light is produced. They are known as **shooting stars.**

Asteroids : Small rocky celestial bodies revolving around the sun are called asteroids. Most of them are located between the orbits of Mars and Jupiter.



Know this : The elliptical path followed by a celestial body revolving around the sun is called orbit. i.e the orbit.

Comets : A comet is an icy body that gives out gas or dust. They revolve around the sun. They can be seen in the night, when they come close to the earth. When they come close to the sun they produce a long tail which is made up of gas and dust. Some comets appear at regular intervals. Hailey's comet appears once in 76 years. The last time it appeared was in 1986. When will it appear again?



Activity : Draw a picture of the solar system in a chart or prepare its model with the help of your teacher. Exhibit it in the classroom.

Activity : Under the guidance of the teacher along with your friends draw 8 elliptical circles on the ground. You stand in the centre of the circle representing the sun. Ask your friends (8 members) to stand on each circle and revolve along their own orbit to represent the planets in the solar system. This activity will help you to understand the movements of the planets in the solar system.

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The Earth's Satellite - The Moon :

A celestial body revolving around the planet is called a **Satellite.** The Moon is the only natural satellite of the Earth. It revolves around the earth. It does not have light of its own. It reflects the light from the sun during the night.



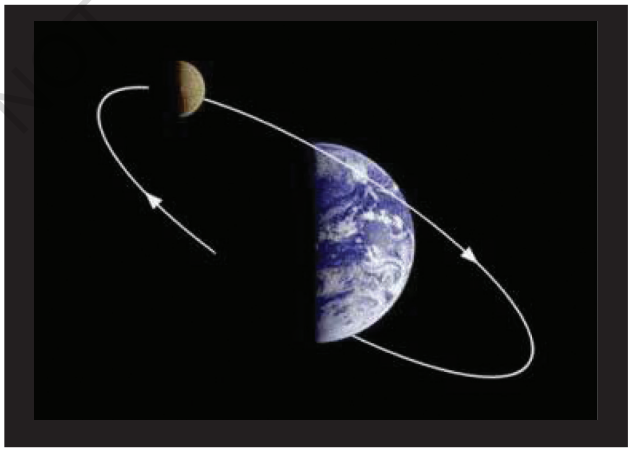
Think : If you are living on the Moon, will the earth appear as the Moon to you?

Movements of the Moon : The Moon has two movements. One is **rotation** on its axis and the other is **revolution** around the earth.



Know this : The Moon's rotation takes 27.3 days and its revolution around the earth takes 29.5 days.

As the moon revolves around the earth, its position in relation to the sun changes from night to night. As a result we can see the Phases of the moon. The changes in the moon's visible face is known as **phases of the moon**. You will learn more about this in the higher classes.



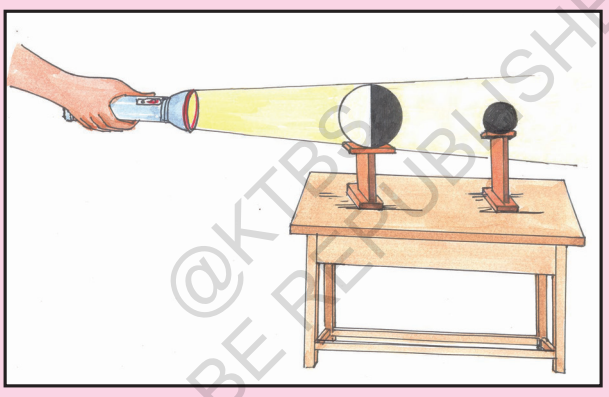
When the moon is completely dark we call it **New moon**. When we see its bright side totally, we call it **Full moon**.

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Know this :

- **One day** : The duration taken by the earth to complete one rotation on its axis is called as day.
- **One year** : As the earth rotates on its axis the duration taken by it to complete one revolution around the sun is called a year.
- **One month** : The duration taken by the moon to complete one revolution around the earth is called one month.

Activity :



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As shown in the picture keep one bigger ball 4cm away from a smaller ball on a flat surface. Darken the room, take a torch and spread the light from different angles on the plain surface. Discuss the activity with your friends and answer the following questions.

- Is the light falling completely on the outer surface of any ball?
- When the light falls on one ball, is it possible to make complete darkness due to its shadow which falls on the other ball?
- Consider the torch light as the sun light, big ball as the earth, small ball as the moon, discuss about the light - shadows.

Do this : Look at the sky every day at night. Observe the shape and direction of the visible part of the moon. Notice the glittering stars. Keenly watch one particular galaxy and its movements. Then answer the following questions

1. Is the shape of the visible part of the moon always the same?

_____

2. On which day is the moon fully visible? What is that day known as?

_____

3. On which day is the moon not visible? What do we call that day?

_____

4. Is the moon visible daily at the same place and at the same time?

_____

5. Are the stars located in the same place? or Is their location changing?

_____

6. Can we get a particular shape by joining some stars. Draw a diagram of stars and display it in the class room.

_____

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Observe : For the above activity you should watch the clear sky at night at a particular time for a minimum of 30 days. Then answer the above questions.



Think : When we watch a live broadast of Olympics or other global level games, it was day in different countries of the world while it is night in our country. How is it possible?

Activity : The name of the planets and duration visiblity are given below. Observe this along with your friends.

Planet	Morning	Evening
Venus	April to June	_____
Mars	January to March	May to December
Jupiter	February to May	September to December

Who belongs to which category? Write in the table.

Sun, Moon, Mars, Mercury, Jupiter, Venus, Saturn and pole star

Star	Planet	Satellite

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- **Answer the following questions.**

1. What is solar system?

_____

_____

2. Which is the natural satellite of the earth?

_____

3. Explain the characteristics of the following celestial bodies.

Celestial bodies	Important characteristics
Meteoroids	_____ _____
Asteroids	_____ _____
Comets	_____ _____

Do you know this?

- The Sun and other celestial bodies orbiting the Sun is called Solar System.
- The two natural satellites of Mars are Phobos and Deimos
- Jupiter has more than 67 natural satellites and Saturn has more than 62 natural satellites.
- The Uranus has minimum 27 natural satellites whereas Neptune has 14 natural satellites.
- Mercury and Venus do not have any natural satellites.
- As we know, the earth is the only planet of the solar system on which there is life.
- The artificial satellites which revolve around the Earth are prepared by man for multiple purposes. Aryabhata is the first man-made satellite of India.
- Neil Armstrong was the first human being to land on the Moon.
- Jupiter, Saturn, Uranus and Neptune are called **Gas giant planets**.

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LESSON - 15

OUR INDIA - PHYSICAL DIVERSITY

A4R5Y1

India is our country. It has a variety of physical features such as Himalayan mountain ranges, very high peaks, plateaus, vast plains, river systems, deserts, coastal plains and islands. Together they make India-our country, which is unique in its natural setting. Besides, India is the home for a variety of plants and animals.

After studying this lesson you,

- understand the physical map of India.
- know about the Himalayan mountains, plateaus, plains, coastal plains, river basins and desert.
- understand how the factors of natural environment influence the life of the people.
- know the effects of physical factors on art and architecture.
- know about the important characteristics of weather and the climate of India.
- know about the plants and animals of India.

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Physical divisions of India

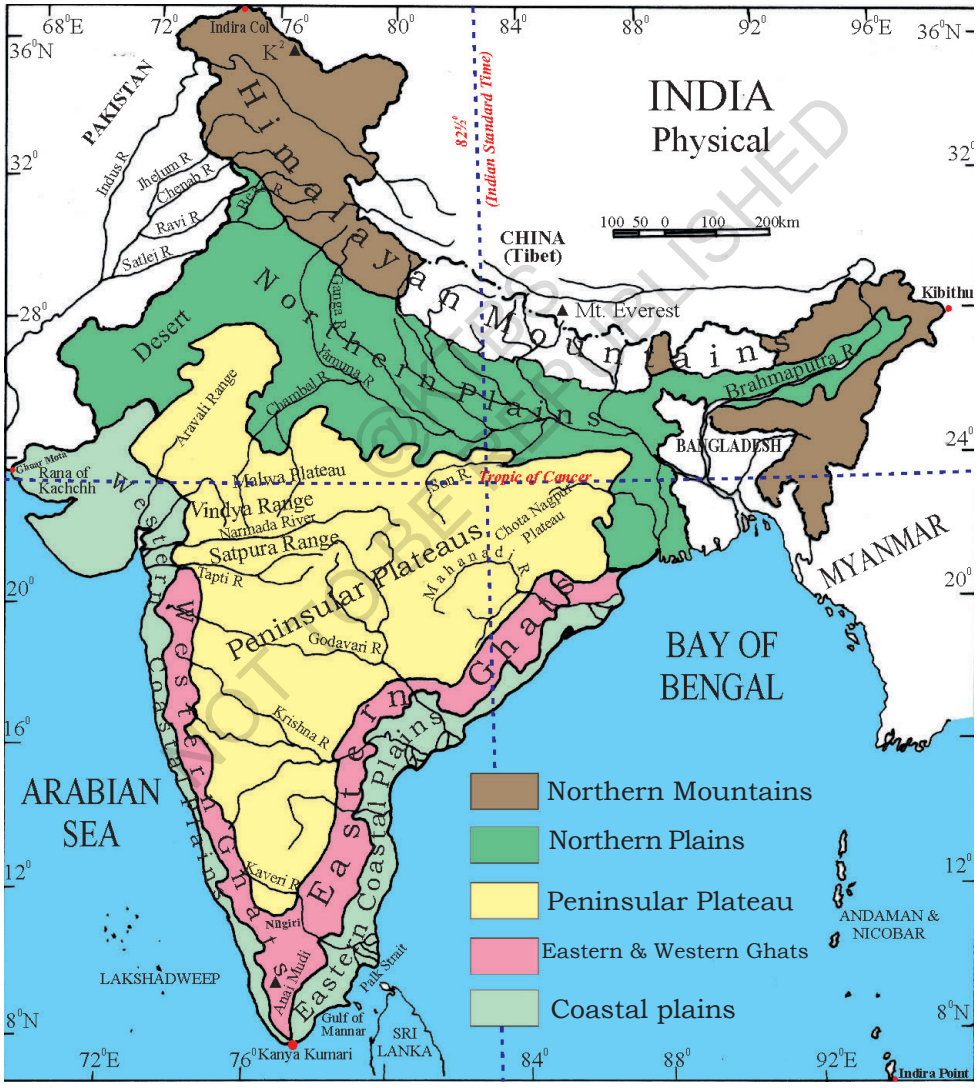
Look at the map given in the next page. It shows the major physical divisions of India. With the help of this map you can easily identify the varied physical features of India.

Instruction to the Teacher

Provide the facility to the students to refer to the Geo-maps on the computer by downloading the maps to understand the abstract concepts.

What do you see in the map?

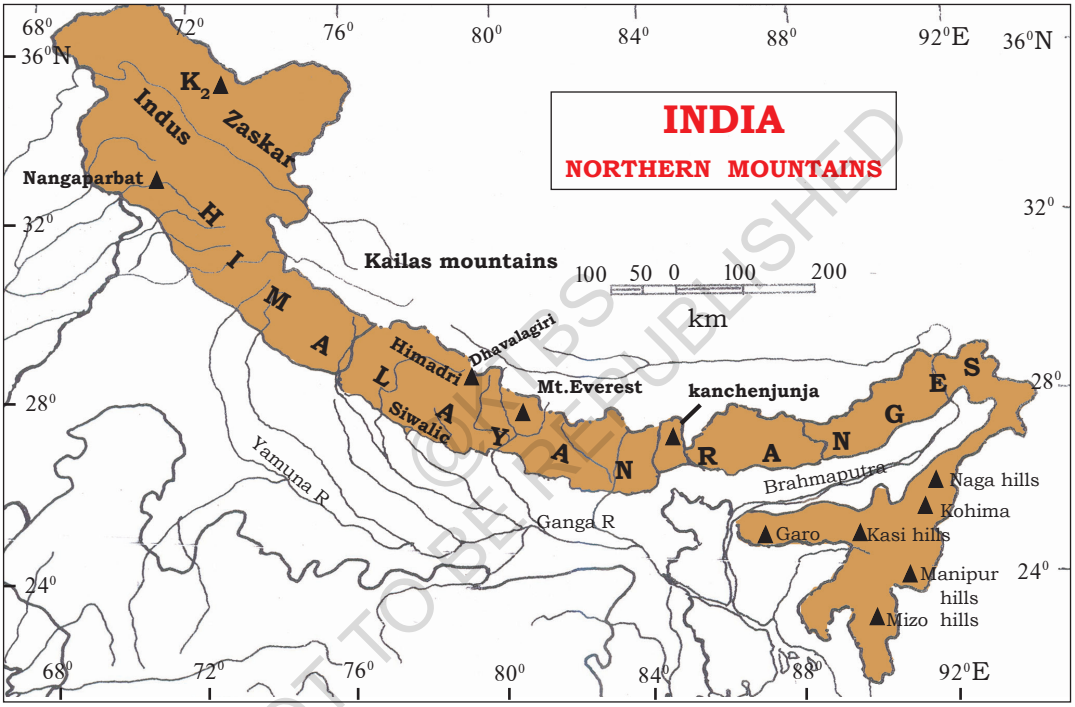
When you look at the land surface of India, don't you notice the differences from one region to another? You see various types of landforms such as mountains, hills, plains, plateaus, valleys, gorges etc. These differences, that we see on the land surface are known as **physical features**.



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Now let us study about the major physical divisions of India.

1. **The Northern Mountains :** They consist mostly of the **Himalayan ranges.** When you look at the northern part of the map you will notice that the Himalayan ranges extend from Kashmir to Meghalaya. The Himalayas are the highest mountains in the world.



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Characteristics of the Himalayan ranges.

- They are covered with snow. Hence they are called **Himalayas**.
- They have many high peaks.
- There are many deep valleys and gorges.
- There are glaciers and the highest mountain passes.
- There are hot springs.
- There is a variety of plant and animal species.





Advantages

- Himalayas prevent the cold winds from central Asia blowing into India.
- They are the source of many North Indian rivers.
- They check the monsoon winds and cause heavy rainfall.
- They are like a gigantic wall and are natural northern frontiers to control foreign invasions.

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Know this

- A **mountain range** is a group of or chain of mountains found close together and extend to thousands of kilometes.
- The Aravalli, the Western Ghats, the Eastern Ghats, Vindhyas, Satpura ranges are the other important mountain ranges in India.
- The population is less because of the severe cold in the Himalayan ranges.
- The Indus, the Ganga, the Yamuna and the Brahmaputra rivers have their source in the Himalayan ranges.

Answer the following questions.

1) Find out the names of animals which live in the foot hills of the Himalayas and make a list of these animals.

_____

_____

_____

_____

_____

2) An unusually wide and long valley in the lower Himalayas is called **Doon**. **For example, Dehradun** in India. It is a popular tourist place. During summer people visit this place. Why do they visit it?

_____

_____

_____

3) If there are mountains/mountain ranges/ghats near or surrounding your place, write their names.

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

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4) Collect a picture of any one animal living in the foot hills of the Himalayas. Paste it in the blank box. Write about it in 3 sentences.

_____

_____

_____

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Do you know this?

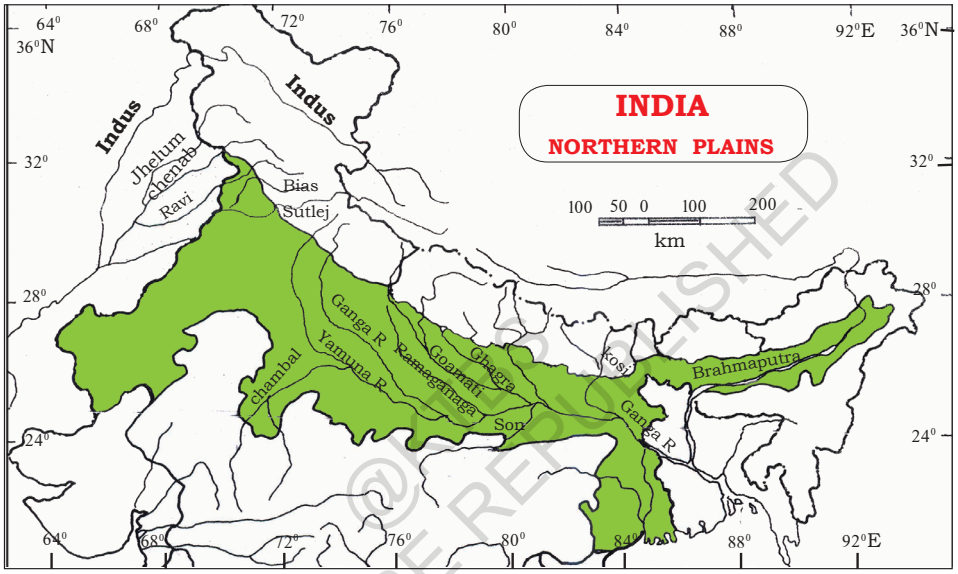
- Mt. Everest is the highest peak (8,848m) in the world.
- Mt. Godwin Austin or Mt. K_2 (8,611m) is the highest peak in India.
- Mullayanagiri (1,913m) is the highest peak in Karnataka
- Annaimudi (2,665m) is the highest peak in South India.



Know this

- Air cools as we climb higher places.
- The rivers which have their source in the foot hills of Himalayan ranges have plenty of water even during summer.

2. The Northern Plains : When we talk about the plains, we remember a playground. Usually a playground is plain in level with no obstruction to play games. Similarly, there are plains located to the south of the Himalayan ranges. They are very vast, fertile and in level. Locate this physical division on the map.



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Know this

- The Northern plains of India are formed by the deposition of alluvium carried by the rivers while flowing from the Himalayan ranges. These plains are known as **Indus, Ganga and Brahmaputra plains.**
- These plains are situated between the Himalayan mountains and Peninsular plateaus.
- The Sutlej, the Ganga, the Brahmaputra and their tributaries flow through these plains.
- The soil of these plains is very fertile due to the deposition of alluvium by the rivers.
- Crops such as wheat, paddy, maize, sugarcane etc., are grown here.
- These fertile plains are known as the **Food store house of India.**

Observe : Wherever there are river plains, there is plenty of water. Therefore agriculture, rearing of animals, transport facilities, trade and commerce and industries are developed. Hence these plains are densely populated.

The different types of physical features have influence on the tradition and culture of the people of that area. Many towns and cities of Harappa civilization have developed on the river banks. Even now there are many famous historical cities and pilgrimage places situated on river banks. On account of the ideal conditions for settlement many empires ruled in the Northern plains. **For example,** Maurya, Mughal and Gupta empires. You will learn about this in the higher classes.

Observe these pictures. Where do you find them in India? Mention the places. (Take the help of the teacher)











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The plains are more helpful for the growth of architecture. Since these regions have level land it is easy to construct big buildings. The availability of different types of rocks, sand, metal, wood, plant fibres, soil, ideal site, craftsmen etc., also helped in the development of architecture. **For example**, huge palaces were constructed in Rajastan, the Taj Mahal in Agra was built by using marble rock.

Observe

- The inner walls of Kollur, Dharmastala, Kukke Subramanya temples in Karnataka are made of wood.
- Houses in Kashmir valley are built using logs.
- Buildings were constructed using Kadapa rock in Raichur district(Karnataka) and parts of Andhra Pradesh.
- In recent years red granite rocks are used for the construction of buildings in Bagalkote and surroundings.
- Belur and Halebidu in Karnataka and most of the temples of Tamil Nadu are built by using soapstone.
- Sandstone cave temples are found in Badami of Karnataka.

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Answer the following questions :

1. The Northern plains are fertile. Give reasons.

_____

_____

2. The people prefer to live in the plains of a river. Why?

_____

_____

3. Make a list of the important rivers and crops of our state.

Rivers	Crops

4. Mark the river Ganga, Brahmaputra and Yamuna on the outline map of India.
5. A challenge to you (discuss in groups)

It is very essential to maintain cleanliness on the banks of rivers. Now the rivers of India are affected by water pollution. The harmful activities of human beings destroy the sources of drinking water which is essential for life.

Do you know how the rivers are polluted?

- Plastics, several types of toxic waste and effluents of industries are dumped into the river water.
- Idols or images, painted with different chemical paints are immersed in the river water.
- The chemical effluents which are released by industries are let into the river water.
- Big cities produce a large amount of garbage in different forms which is thrown into the rivers and the water gets contaminated.
- Mining activities also cause pollution of rivers. **For example,** river of Kali, Bhadra etc.,

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Now the Ganga river water cleaning programme is under progress. Is it not correct to do this? What are the benefits of cleaning river water? Write here.

_____

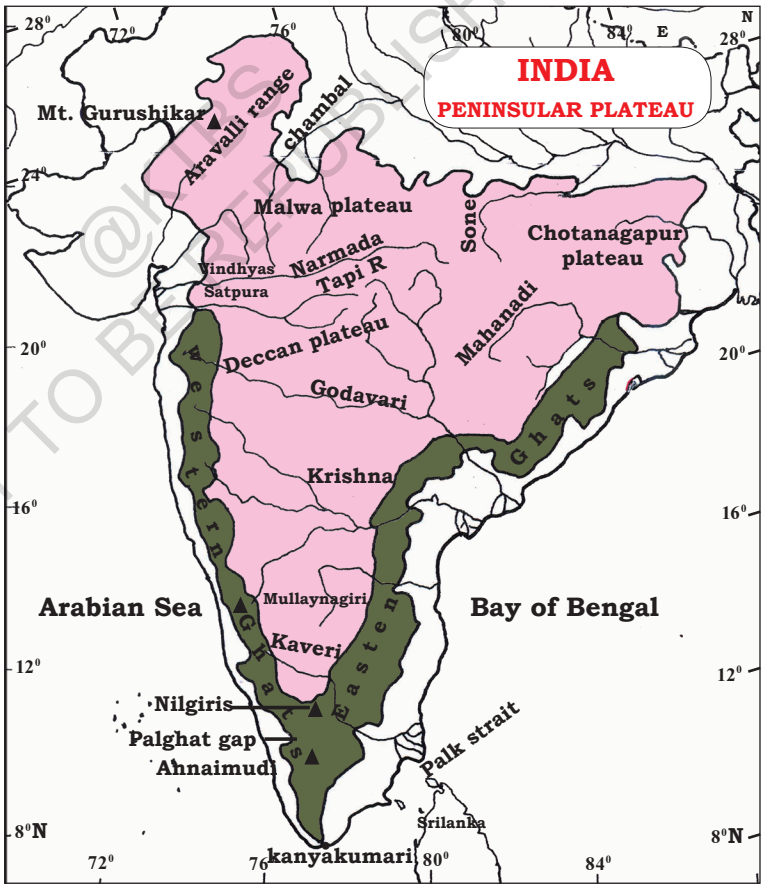
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3. The Peninsular Plateau : Identify the Narmada river on the map of India. The Narmada-Sone rift valley divides the Peninsular plateau into two major parts. The northern part is called the **Malwa plateau** and the southern part is called the **Deccan plateau**. The Aravalli range lie to the north-west of Malwa plateau and the Vindhyas lie to the south. **Mt.Gurushikhar** (1722 m.)is the highest peak in the Aravallis.



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The Satpura, Maikala, Rajmahal, Amara Kantaka ranges lie to the north of Deccan plateau. The Western Ghats are in the west and the Eastern Ghats are in the east. The Annamalai, Cardamom and Palani hills are to the south of Western Ghats. The Western ghats and the Eastern ghats meet at the Nilgiri hills. Udhagamandala (Ooty), a famous hill station, is situated here. Many rivers of peninsular India have their source in the Western ghats.

Characteristics of the plateau

- It is an upland with an extensive, almost level surface which is bounded by steep slopes.
- This landform is an extensive area of relatively flat land.
- The Deccan plateau is the largest plateau in India. It is made up of the ancient hard rocks.

Advantages

- The peninsular plateau is rich in minerals.
- The rivers flowing across it are helpful for the cultivation of crops.
- There are many waterfalls which are useful for the generation of hydro-electricity.
- It is favourable for agriculture, rearing of animals and industries.

Several empires also ruled in the peninsular plateau. The Rashtrakutas, Chalukyas, Hoysalas, Vijayanagaras, Kadambas, the Gangas and Bahamani sultans established their empires here. You will be studying more about them in the higher classes.

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Answer the following questions.

1. Mention the names of the two important plateaus in India.

_____

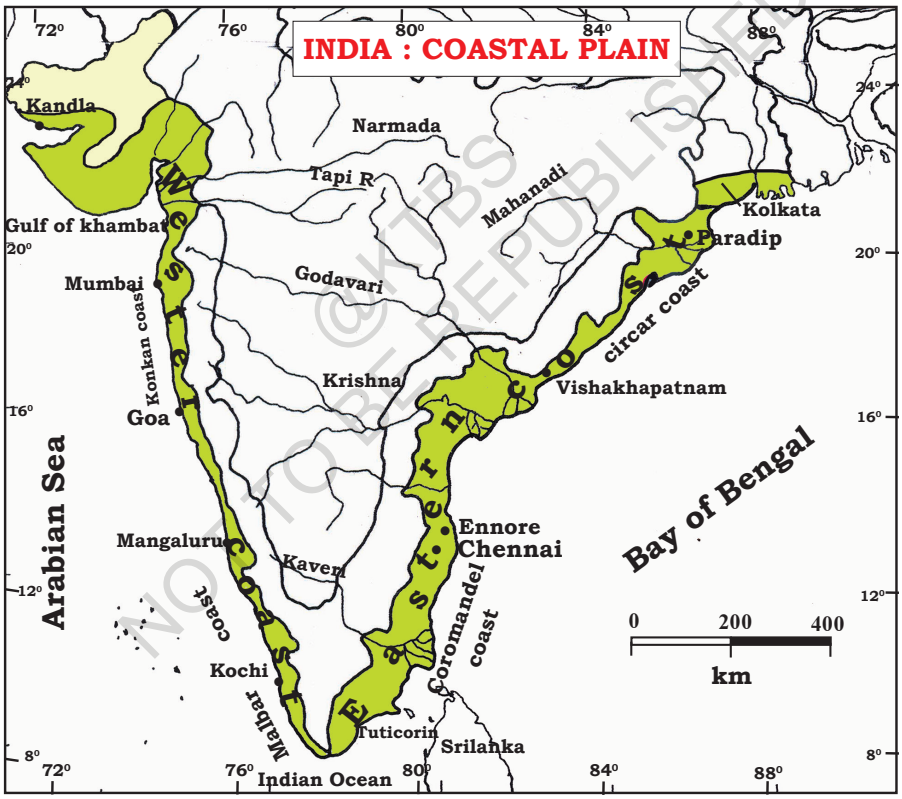
_____

2. Mention the important historical places located in the peninsular plateau.

_____

_____

4. The Coastal plains : Now let us study about the coastal plains. A flat low lying land between the coast and higher land in the interior is called **coastal plain**. India has a long coastal plain. Let us see where they are located in our country.



How is the coastal plain extended?

Observe the map. The western coastal plain lies between the western ghats in the east and the Arabian sea in the west. It extends from the Gulf of Kuchh (Gujarat) in the north to

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Kanyakumari in the south. The eastern coastal plain lies between the eastern ghats and the Bay of Bengal. It extends from the Gangetic delta in the north to Kanyakumari in the south.

Both the coastal plains of India have major ports. Kandla (Gujarat), Mumbai, Nhava sheva (Maharasthra), Marmagoa(Goa), Nava Mangaluru (Karnataka), Kochi (Kerala), Tuticorin, Chennai, Ennore (Tamilnadu), Vishakhapatanum (Andhra Pradesh), Paradip (Odisha), Haldia and Kolkata (West Bengal) are the major sea ports of India.

New Mangaluru port ranks 9th (in importance). It is known as the **Gateway of Karnataka**.

The important features of the Coastal Plains

Fishing is the main occupation of the people living in the coastal plains. So, most of the people eat fish and prawn. Spinach, ivy gourd, black eyed peas and sambar cucumber are also eaten for food. Paddy, arecanut, coconut, cashewnut, cardamom, banana and vegetables are grown here. The use of boiled rice is very popular. The houses here have steep sloping roofs, due to heavy rain.

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Answer the following questions

- Which sea borders the coast of Karnataka?

  _____

- Which districts of Karnataka have coastal plain?

  _____

- Make a list of major crops grown in the western coastal plain of India.

  _____

  _____

- There is a demand for coastal food items of Karnataka. These are exported to other countries. What are they?

_____

_____

- The gently sloping strip of land bordering the sea, usually composed of sand and gravel is called **beach**. You can watch the sea as far as you can. The striking sea waves bring great delight to your mind and eyes. The Ullal, Malpe, Kapu, Om and Maravanthe beaches of Karnataka are attractive and beautiful. Which are the other famous beaches of India? Know and write here.

_____

_____

_____

- Observe the dress style and food habits of the fishermen living in coastal plains. Write 4 sentences about this.

_____

_____

_____

_____

- The sea coasts are highways for trade and commerce. Some ports provide shelter for ships. On the outline map of India mark and name the major ports along the eastern and western coasts.

_____ _____ _____

_____ _____ _____

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- Collect pictures of a ship. Paste it in the given space. Write 3 sentences about its use.

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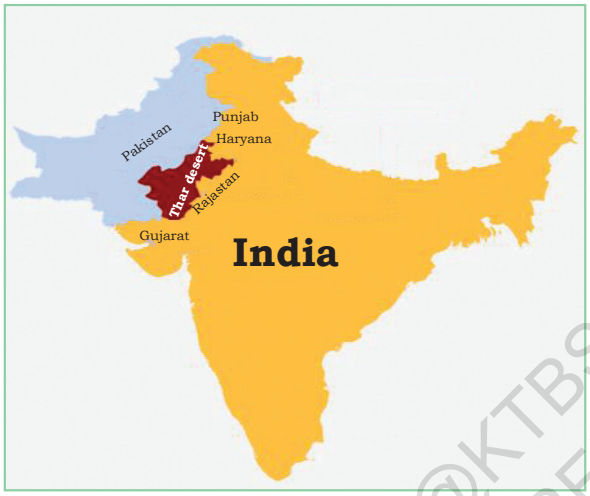
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- Locate the following on the outline map of India - Mumbai, Nava Mangaluru, Chennai, Vishakhapatnam and Marmagoa.

Desert of India

Locate the state of Rajasthan on the map of India. One can notice that a large part of Rajasthan is a desert. This desert is named **Thar desert**. A part of this desert also extends into Punjab, Haryana and Gujarat states.





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Features of deserts

- A desert is a vast, dry and sandy area with very little vegetation.
- The temperature is high and climate is dry.
- Scarcity of water due to scanty rain. A fertile area in a desert is formed where the water comes up to the ground surface. This is known as **Oasis**.
- Those plants and trees which have special devices to withstand the long drought conditions are grown here. They are scrubs, cactus, accacia, thorny bushes etc.,

The Aravalli range extends into the eastern fringe of the Thar desert. It prevents the winds blowing from the east and this causes scanty rain fall. Therefore this part has dry climate. Find this area on the map and mark it.

Is there any relationship between desert and these pictures? Think about it.



The dry climate and the hot sun causes a feeling of severe burning in the body. For some relief from the heat, people wear long robes and turbans.

Lack of water and the blazing sun determine the type of desert animals. Camels are able to survive in the desert, because they have broad flat toes which are comfortable to walk on the sand. Their **humps** store fat and sufficient amount of water which lasts for many weeks. Camels are useful for transporting goods and carrying passengers in the deserts. That is why camel is called as **Ship of the desert.**

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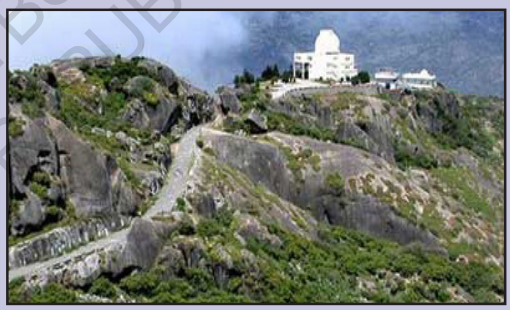
Do you know this?

- Agricultural activities are found around the Oasis. Bajra, jowar, maize, sesame, dates and chillies are grown here.
- There are some salt lakes in these deserts, known as **playas. For example,** Sambhar, Didwana and Sargol lakes.
- The **Sambhar** lake is the *largest salt lake* in India.

Know this

You have learnt that the factors of environment and climate have an effect on art and architecture. There are big and beautiful palaces built by experts which are the best examples of rare architecture in the desert. **Jaipur, Ajmer, Pushkar and Mt. Abu** are places, famous for such architecture in Rajasthan.



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Answer the following questions

1. What is an Oasis?

_____

_____

_____

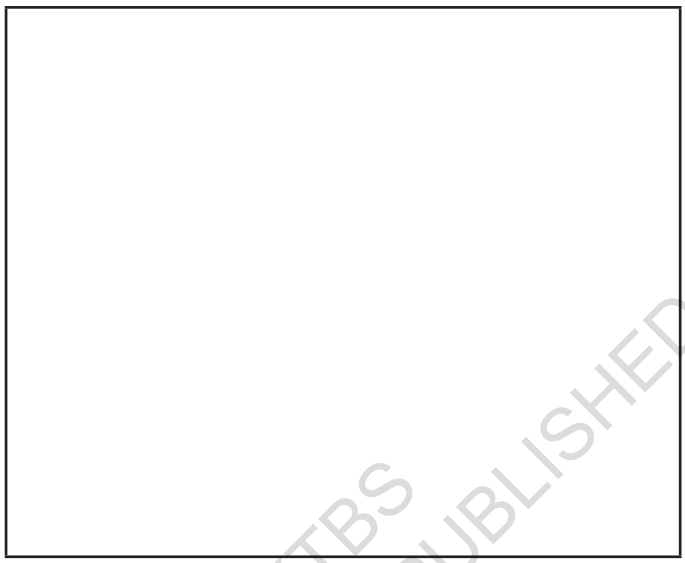
2. Write any 3 features of the deserts.

_____

_____

_____

3. Paste a picture of a camel in the given space and write 4 sentences about it.



_____

_____

_____

_____

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Rivers of India

There are many river systems in India. They are one of the natural resources. There is diversity in their origin, direction of flowing and volume of water. Thus the rivers of India can be classified into two groups-rivers of North India and rivers of South India.

The Rivers of North India : The major river systems of North India are the Indus, the Ganga, the Brahmaputra and their tributaries. Most of them rise in the Himalayan mountains. They are perennial rivers. The northern plains are fertile due to the deposition of alluvium carried by the rivers of North India. They are best for agricultural activities. Famous ancient historic and pilgrim centres are situated on the banks of these rivers. **For example,** Delhi, Agra, Varanasi etc.,

The Rivers of South India : These rivers can be divided into the east-flowing and the west-flowing rivers. The important east-flowing rivers are the Mahanadi, the Godavari, the Krishna, the Kaveri, the Palar and the Pennar. They flow south east and eastwards and join the Bay of Bengal. The important west flowing rivers are the Narmada, the Tapi, the Sharavathi, the Kali, the Netravathi, the Zuari and the Periyar. They flow westwards and join the Arabian Sea. These rivers are short and swift, suitable for the generation of hydro-electricity as they have rapids and waterfalls.

In recent years the rivers, specially the Ganga-Yamuna rivers have been heavily polluted which has affected their purity.

The Climate of India

You have already practiced marking the Havaguna Nakshe (weather map). You have also learnt how to understand the daily weather conditions. What do the following pictures indicate?






India has a tropical monsoon type of climate. The term **monsoon** is derived from the Arabic word **Mousim** meaning periodic. Thus, the speciality of the climate of India is that it changes from one season to another.

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Hence we can see the diversity in the climate of India. There are 4 seasons in India-winter season, summer season, south west monsoon season and retreating monsoon season. The weather changes from time to time during the day. Sometimes it is cool, another time it is hot and sometimes it is cloudy. Think. Why is it so?

The dry air, the changing monsoon winds and the natural hazards like cyclones adversely effect the climate of India. Consequently we find the sudden changes taking place in the climate.

The climate of India can be classified into 4 distinct seasons. They are

Seasons	Duration (months)
1. Winter	December, January, February
2. Summer	March, April, May
3. South-West monsoon (Rainy season/Kharif)	June, July, August, September
4. Retreating monsoon (Rabi season)	October, November

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Identify the direction of South-West, South-East, North-East and North-West on the map of India. India receives heavy rain from the south west monsoon winds.

The movement of air over the earth's surface, from high pressure area to low pressure area is called **wind**. The winds which change their direction from one season to another are known as **seasonal winds**. **For Example,** monsoon winds.



Know this

- There are two rainy seasons in India. They are South West Monsoon Season from June to September and Retreating Monsoon Season from October to November.
- The Western coastal plains, western parts of the Western Ghats and North-eastern states receive heavy rainfall.
- **Mawsynram** in Meghalaya receives the highest rainfall in India.

Activity : The situations related to the effects of heavy rainfall are given here. Put (✓) mark to the suitable situation. If not suitable put (x) mark.

1. The people are very happy. ☐
2. The roads are flooded by water. ☐
3. No water is flowing in the streams and rivers. ☐
4. Electricity is cut off. ☐
5. Fodder is available for livestock. ☐
6. It is easy for fishing in the sea. ☐
7. The people may lose their houses and become refugees. ☐

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- Collect the information which you have gained from the study of weather conditions in school. Explain about the changes in weather conditions in your school surroundings.

_____

_____

_____

- Which parts of India were affected for the last two years by cyclones. Collect information on them and write here.

_____

_____

_____

_____

_____

- Select a suitable picture, which shows destruction after heavy rain or continuous downpour. Paste it in the blank space.

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Observe : Drought occurs when there is a failure in timely rainfall. There is no water for crops. Livestock and other animals wander about in search of water and may die. Due to lack of drinking water and excessive heat people are in distress and migrate to other places etc. These are the effects of drought.

A challenge to you

The earth is heating. The ground water is dried up and there is melting of snow in the Himalayan mountains. What are the reasons for this? Think about it and discuss with your friends. Write here.

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How are we benefitted by the broadcast of weather report in radio, TV and news papers? Make a list of the benefits.

Diversity of plants and animals in India

Read the instructions about how you have seen the animals and plants given below. Mark (✓) to the applicable. If not, put (×) mark.

Animals	Actually seen	Seen in pictures	Never seen
			
			
			
			

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Plants	Actually seen	Seen in pictures	Never seen
			
			
			
			

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Just as there is a diversity in the physical features of India, there is diversity in the types of plants and animals found in India.

Instruction to the Teachers

Use geo maps, provide facility to the students to watch thick forest areas. Facilitate to look at the forests of Assam, Gir forest of Gujarat, Vegetation of the Himalayan mountains, forests of the Western Ghats, the Eastern Ghats, Anantha giri forests etc.

India has its own plant and animal resources. There are thick monsoon forests, grasslands, thorny bushes, scrubs, evergreen forests and mangrove forests. The deciduous forests are largely found in India. They are known as **monsoon forests.**

There are animal and bird sanctuaries, where elephants, tigers, lions, cheetas, bisons, deer, peacocks etc., and various birds are found. They are the major natural resources of India.

Remember : The forest areas in Malnad or Sahyadris, reserved forests of Nagarahole, Bandipura and Bhadra are the main natural resources of Karnataka.

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Learn and write :

1) Mention the names of any 3 protected forest areas in India.

_____

_____

_____

2) Discuss with your friends about the endangered animals in India. Mention any 3 names of such animals

_____ _____ _____

Do you know this?

In order to conserve the biodiversity, census work of the biodiversity is under progress.

3) What are the problems arising from deforestation. Discuss with your friends and write here.

_____

_____

_____

_____

_____

4) What animals are living around your environment? Observe and make a list of them.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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Project work :

- To show the physical features of India, prepare a model of the landform of India under the guidance of your teacher.

  Required materials : cardboard, clay, cotton, gum, sand, red soil, water, colour etc.
- Collect information about Salumarada Thimmakka, Nagesh Hegde and Dr. Madhava Gadgil.

Children, recall what you have studied in this unit. Isn't the natural environment of India beautiful? We should appreciate its diversity. India's climate needs to be appreciated. We should protect our resources and prevent their destruction through harmful human activities.

LESSON - 16

OUR INDIA-POLITICAL AND CULTURAL

A6U8C7

India, our country has its own geographical, historical, political and cultural background. It has a rich heritage. History has recorded that India was ruled for many centuries by several foreign rulers. Among the Europeans who came to India, the British ruled for a long period of 200 years. As a result of the fight for freedom from the British rule, India became an independent country on 15th August, 1947. Until then, India did not have a definite boundary. But after independence, it has a definite boundary. At present, India is one nation with the union of states. Let us be proud of our great country-India. Let us know about India.

After studying this lesson you,

- know about the geographical location of India in the world.
- understand the latitudinal and longitudinal extent of India.
- know about the neighbouring countries and water bodies surrounding India.
- identify the states and union territories on the map of India and name them.
- understand about Unity in diversity of India.
- know the significance of the national emblems.
- understand the diversity of India's art, literature and culture.

Let us take an oath for our country. All stand up.

India is my country. We Indians are brothers and sisters. I respect my country. I shall protect its varied resources and rich heritage. I am proud of my country.

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Location of India

Let us learn about the geographical location of our great India. If anybody asks for your home address, would you not give the name of your village/town/city, its taluk, district, state and country? (Also you would give your post office pin code) In this manner, you can find out in which part of the world India is located. Observe this map.



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India is situated in the southern part of Asia, which is the largest continent in the world. Latitudinally India extends from 8° N to 37° N. latitude and longitudinally it extends from 68° E to 97° E longitude. (See map of India, page 231) It shows that India lies entirely in the Northern Hemisphere and is at the centre of the Eastern Hemisphere. The Tropic of Cancer($23\frac{1}{2}$°N), a special latitude, passes through the middle of the country. It divides India into almost two equal parts, North India and South India. Hence India has tropical climate in the southern part of it and subtropical climate in the northern part.



Know this

- A set of imaginary lines drawn on the globe from west to east are called **Latitudes**. They are measured in degrees. There are 90° north and 90° south latitudes from the equator.
- A special latitude which divides the earth into two equal halves is called **Equator** (0°). The half of the earth to the north of it is called **Northern Hemisphere** and to the south of it is called **Southern Hemisphere**.
- The special latitudes are - the Equator (0°), the Tropic of Cancer ($23\frac{1}{2}$°N), the Tropic of Capricorn ($23\frac{1}{2}$°S), the Arctic circle ($66\frac{1}{2}$°N) and the Antarctic circle ($66\frac{1}{2}$°S)
- Longitudes are imaginary lines drawn on the globe, from the north pole to the south pole. They are also known as **meridians**. The longitude that passes through Greenwich in England is called the Prime Meridian (0°). The half part of the earth to the east of Prime meridian is called **Eastern Hemisphere** and to the west of it is called **Western Hemisphere**.
- There are 180° of east longitudes to the east and 180° to the west of **Greenwich Meridian**.
- There is a relationship between longitude and time.
- The latitudes and longitudes help to understand the position, distance and direction on the earth's surface

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India is the 7th largest country in the world with respect to area and the second populous nation after China.



Know this

- Area of India : 32,87,263 square km
- Population of India : 121 crore (census 2011)
- The southern most point of India : Indira point
- The northern most point of India : Indira Col
- The western tip of India : Ghuar Mota
- The eastern tip of India : Kibithu

In the previous class you have learnt about Karnataka state. Let us once again recall what we have learnt.

- In which part of India is Karnataka state located ?

_____

- How many districts are there in Karnataka state? List them.

_____

_____

_____

_____

_____

- Which are the neighbouring states of Karnataka? Mention.

_____

_____

_____

Let us know the facts about India just as we have studied the facts about our state.

Instruction to the teachers

You should practice the use of Atlas by the students. Arrange to provide at least one Atlas for a group of 3 to 4 students.

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1) India and its Neighbouring Countries

The neighbouring countries of India are - Pakistan and Afghanistan to the north-west, Nepal, Bhutan and China are to the north, Bangladesh and Myanmar to the east and to the south - east is Srilanka. It is an Island and it is separated from India by Palk Strait and the Gulf of Mannar.

Frontiers of India

Look here! Now let us look at the political map of India. In this map let us study how the states, islands and water bodies are distributed.



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- Peninsular India is surrounded by the seas and ocean and has 7,516.6 km long coastline. This helps the growth of foreign trade, shipping, fishing and shipbuilding.
- The water bodies which surround India are the Bay of Bengal in the east, the Arabian Sea in the west and the Indian Ocean in the south.
- The Andaman-Nicobar Islands are in the Bay of Bengal and the Lakshadweep Islands are in the Arabian Sea.
- Observe the map of India where you can locate the water bodies surrounding India on three sides. Such a landform is called a **peninsula**. So South India is a peninsular.
- A piece of land surrounded by water on all sides is called an **island**. The Andaman-Nicobar and Lakshadweep are the islands of India.

Activity : Take the map of Asia or an Atlas. With the help of this, mark the neighbouring countries of India on an outline map of Asia and write here.

_____

_____

_____

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2) Administrative Divisions of India

Look at the map of India once again. You can see the state boundary on the map. But there was no boundary line on the earlier maps, because, as mentioned earlier, before independence, India was ruled by several native dynasties and external forces. The country was fragmented into hundreds of small princely states.

After independence, in order to carry on smooth administration, the boundary lines of the states were reorganised.

The States Reorganization Act of 1956 was a major reform of the boundaries of the states of India, on the basis of languages.

There are a large number of languages in India. This indicates the diversity of languages. Of these, 22 languages have been recognised as official languages. 15 languages are printed in the language panel on the back side of Indian currency.

Activity **:** Get a currency note from your parents. Make a list of languages printed on it.

_____

_____

_____

- Which is the official language of our state?

_____

- Which are the languages of your neighbouring states?

_____

_____

- Which is the language you speak at home?

_____



Know this : We use a language in our day to day activities. Understand the feelings of others and maintain harmony.

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India is the 7th largest democratic country in the world. It is divided into 28 states and 9 union territories. Since the states are divided on the basis of languages it becomes easy to understand their environment, economic, cultural and regional traditions. Every state contributes its speciality towards the building of a great India. With the help of a map let us learn about the different states.

Activity : With the help of a map prepare a chart including the States and Union Territories, their capitals and mother tongue. Then display it in the classroom.

The Government of India is officially known as Central Government. It is the governing authority of the country's states and union territories. Its main offices are located in **New Delhi**, the capital of the country. The administration of the states is managed by the states themselves. This system is called **State Government.** Every state has its own capital for the purpose of administration. Then,

- Which is the capital city of Karnataka state?

_____

- With the help of your teacher/parents collect facts and complete the following sentences with suitable answers.

1. The official language of Goa is _____
2. The capital city of Nagaland is _____

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3. The present President of India is _____

4. The present Governor of Karnataka is _____

5. Recently Andhra Pradesh state was divided into _____ and _____ states.

6. The present Prime Minister of India is _____

7. The present Chief Minister of Karnataka is _____

The 9 union territories of India are - **Jammu and Kashmir, Ladakh, Delhi, Diu-Daman, Dadra - Nagar Haveli, Chandigarh, Lakshadweep, Puduchery, Andaman and Nicobar islands**. All union territories except Puduchery and National Capital Territory of Delhi are directly ruled by the Central Government. Locate the union territories on the map.

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Know this

- The 4 administrative divisions of Puduchery are : Puduchery, Mahe, Yanam, and Karaikal districts.
- New Delhi is the national capital of India.
- Chandigarh is the capital for both Punjab and Haryana states.
- In 2019, Jammu and Kashmir state was divided into two union territories namely, Jammu and Kashmir and Ladakh.

Activity

Observe the relationship of first two words. In the same way, write the fourth suitable word for the third word.

Example :

India	: Delhi	:: Karnataka	: Bengaluru
1. Kerala	: South	:: Ladakh	:
2. India	: Peninsula	:: Andaman	:
3. Union Territories	: 9	:: States	:
4. Bay of Bengal	: East	:: Arabian Sea	:

- **Complete this exercise with the help of an Atlas**

1	Neighbouring countries of India	_____ _____ _____
2	Islands of India	_____ _____ _____
3	Union Territories of India	_____ _____ _____

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4	Northern states of India	_____ _____ _____
5	Southern states of India	_____ _____ _____
6	Small states to the North-east of India	_____ _____ _____

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3) Unity in Diversity and Integration

Observe these pictures. Discuss with your friends about the diversities in these pictures.








The dress - costumes of the people seen in the pictures are different.

India is a land of many religions. Hence people follow variety of customs. Hinduism, Islam, Christianity, Sikhism, Buddhism and Jainism, are the major religions of India. Besides, followers of other religions are also found in the country. Thus, India is a land of many religions.

Project work :

There is also diversity in the culture of our state. Prepare a project on the basis of specialities in culture found in North Karnataka, South Karnataka, Coastal plain and Malnad region

(collect facts about food, clothes, festivals, folklore, games, art, crops, important celebrations, rivers etc.,)



Know this

- People belonging to different religions live in the same street/road with love and affection.
- The people of all religions travel together in the bus, train, aeroplane etc.
- People of various religions participate in one another's religious festivals and functions and greet each other.
- The people belonging to different religions participate in the urusu, fairs, festivals and processions with devotion and excitement.

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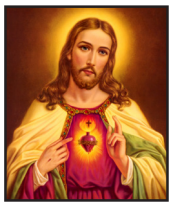
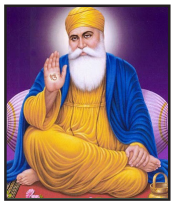
Respecting all religions, living together in peace and having the feeling that we are all indians is integrity.



Know this

In our country, there is diversity in landforms, river system, climate, types of soils, plants and animals, natural resources and methods of agriculture. Our occupations, religions, caste systems, languages, food habits, dress, customs and regional culture also have diversity. But we live together as people of one country. This is known as **Unity in diversity.**

Observe the pictures. Match the following by drawing lines.

	Christianity
	Sikhism
	Buddhism
	Hindusim
	Islam
	Jainism

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Activity : Discuss with your friends and write the solutions for the following.

- Disputes of language, land-water, religion, border disputes of state/country.
- Water disputes of rivers flowing across two states.

_____

_____

_____

_____

Do this

- Wear the costume of different states for your school functions and exhibit integrity.
- Once in a week sing a song of good will with your friends.

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4. National Emblems

- Name the national festivals of India.

_____

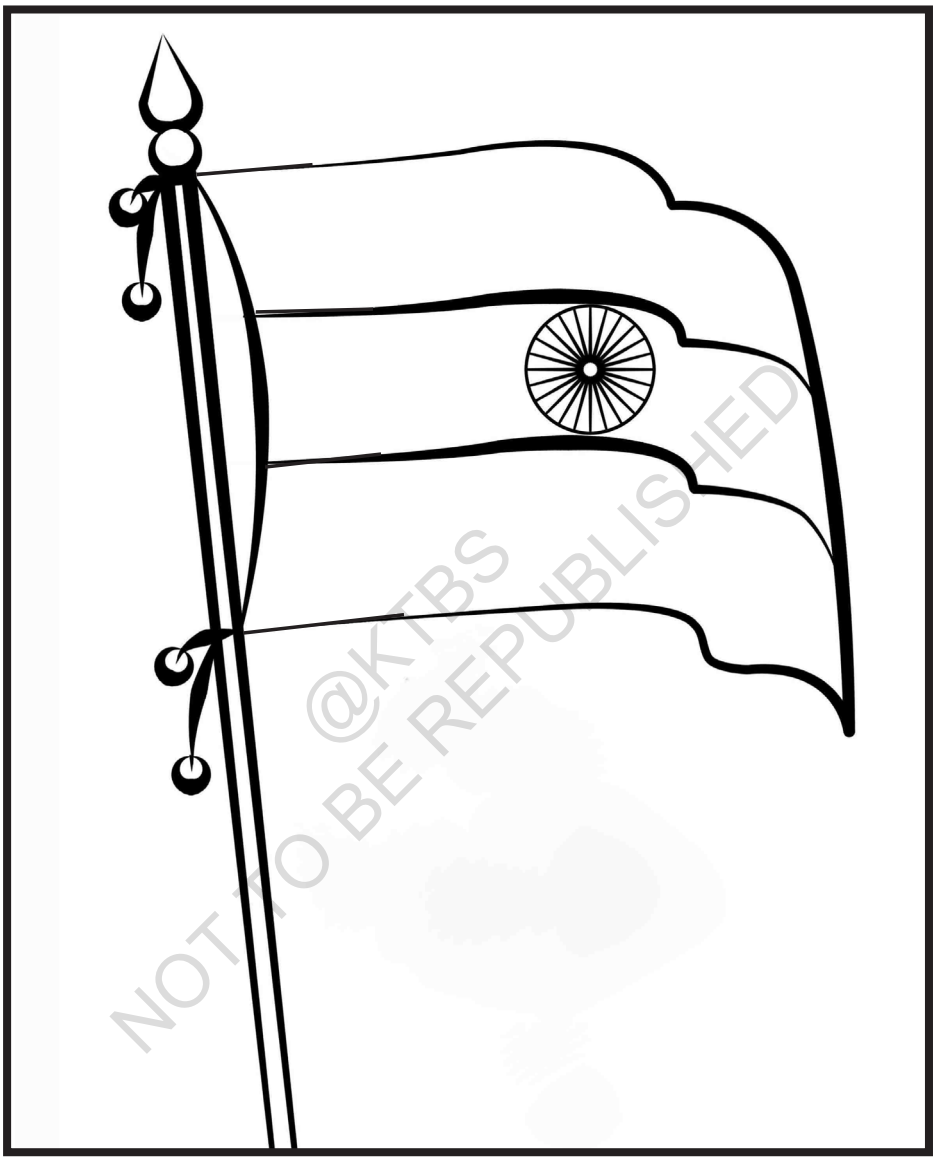
_____

- Do we not hoist the National Flag on national festivals? What are the colours of our National flag?

_____

The National Flag is one of the national symbols of our country. It is a horizontal rectangular tricolor(Tiranga) of saffron, white and green. Saffron stands for courage and sacrifice, white colour symbolises peace and purity and green is the symbol of fertility. The Ashoka Chakra is at the centre of the flag. It is the symbol of progress and movements. Our national flag represents India and has a special recognition in the international level.

- Paint the flag given below with suitable colours.



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Observe

- Care should be taken to prevent the National flag from falling to the ground.
- The use of plastic national flag is an offence.
- National flag should be hoisted only after sunrise and lowered before sunset.

Do you know this?

- Our national flag was initially manufactured at **Garaga**, a small village in Dharwad district. Now Karnataka Khadi Gramodyoga Samyukta Sangha, based in Hubballi is the only licensed manufacturer of the national flag and is the supply unit for India.

ನಮ್ಮ ಬಾವುಟ	**Namma Baavuta**
ಏರುತಿಹುದು ಹಾರುತಿಹುದು ನೋಡು ನಮ್ಮ ಬಾವುಟ ತೋರುತಿಹುದು ಹೊಡೆದು ಹೊಡೆದು ಬಾನಿನಗಲ ಪಟಪಟ	Erutihudu Harutihudu Nodu namma baavuta Thorutihudu hodedu hodedu baaninagala patapata
ಕೇಸರಿ ಬಿಳಿ ಹಸಿರು ಮೂರು ಬಣ್ಣ ನಡುವೆ ಚಕ್ರವು ಸತ್ಯಶಾಂತಿ ತ್ಯಾಗಮೂರ್ತಿ ಗಾಂಧಿ ಹಿಡಿದ ಚರಕವು	Kesari bili hasiru mooru Banna naduve chakravu Satyashanti tyagamurthy Gandhi hidida charakavu
ಇಂತ ಧ್ವಜವು ನಮ್ಮ ಧ್ವಜವು ನೋಡು ಹಾರುತಿರುವುದು ಧ್ವಜದ ಭಕ್ತಿ ನಮ್ಮ ಶಕ್ತಿ ನಾಡಗುಡಿಯ ಮೆರೆವುದು	Intha dwajavu namma dwajavu Nodu haarutiruvudu Dwajada bhakti namma shakti Naadagudiya merevudu
ಕೆಂಪುಕಿರಣ ತುಂಬಿ ಗಗನ ಹೊನ್ನಬಣ್ಣವಾಗಿದೆ ನಮ್ಮನಾಡ ಗುಡಿಯನೋಡ ನೋಡಿರಣ್ಣ ಹೇಗಿದೆ.	Kempukirana tumbi gagana Honnabannavaagide Nammanaada gudiyanoda Nodiranna hegide.
–ಕಯ್ಯಾರ ಕಿಞ್ಞಣ್ಣರೈ	**(Sing this poem in group)**

Meaning : The poem speaks about the splendour of our national flag and the essence of its grandeur. It depicts the truth, peace and sacrifice of great leaders like Gandhiji. It inculcates a sense of devotion in its patrons and gives strength to build our nation stronger.

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Look here! This is the picture of a monolith pillar at Saranath. This pillar was installed during the reign of Ashoka the Great, in North India. The lion capital of Ashoka with four lions atop the Ashoka Piller at Saranath has been adopted as the National Emblem of India.





The lion capital with four lions is our National Emblem. You can observe this national emblem on the coins and currency notes. Our emblem is the symbol of identity and heritage of India. You sing the National Anthem during the school assembly. Is it not so? Who has written it? Understand the theme of our national anthem. It represents the diversity and regionalism of India. While you are singing this national anthem, you feel patriotic.

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Do you know this?

The National Anthem of India is taken from the first few stanzas of the poem written by Rabindranatha Tagore.

Observe :

- When the Indian sports persons win medals at the international sports competition they are honoured by being wrapped with the National Flag and the National Anthem is sung.
- In the 2016 Olympic games the badminton player P.V.Sindhu won the silver medal and wrestling player Sakshi Malik won the bronze medal. On that occasion they were honoured by the hoisting of the National Flag.
- When the Indian soldiers sacrifice their life for the nation, they are buried with full state honours.

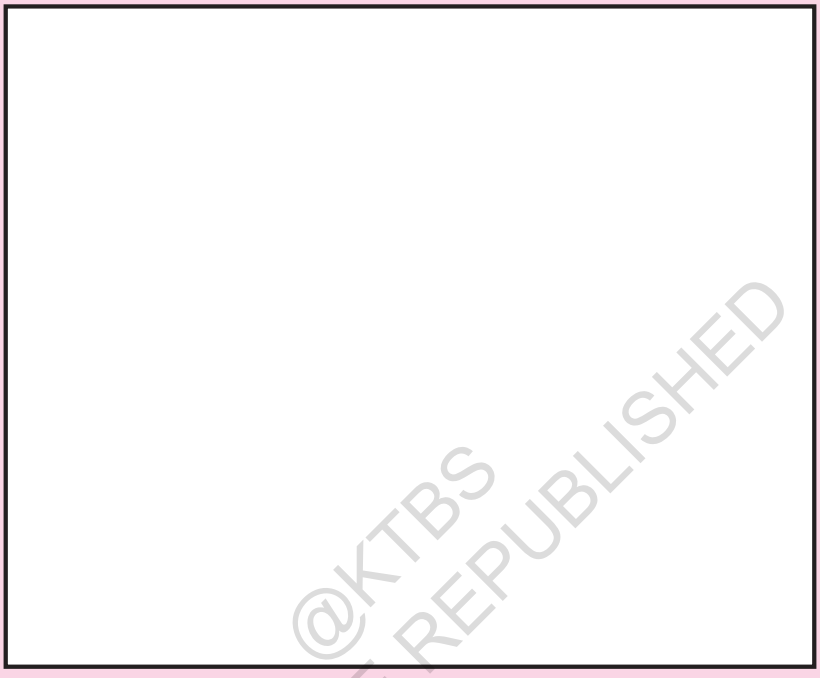


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Know this

The National Flag, National Emblem, and National Anthem are our National symbols.

Activity : Paste a photo of **Rabindranatha Tagore** in the space provided



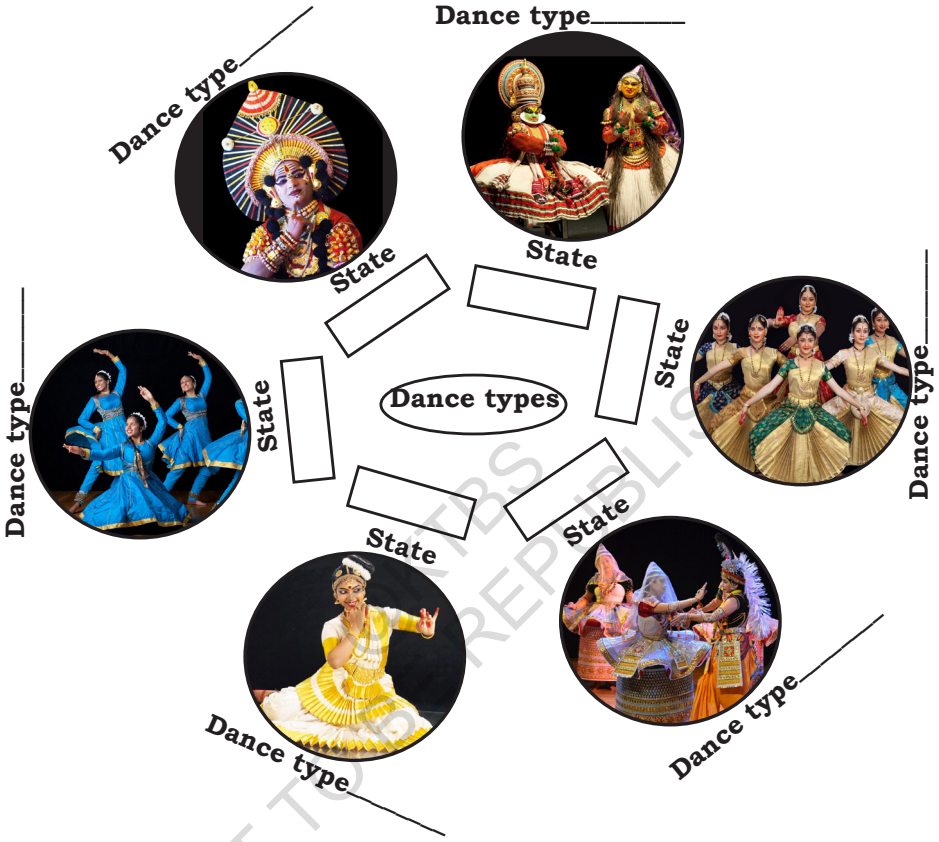
- With the help of your teacher learn how to fold the national flag and tie a knot of the thread before hoisting.
- You should practice singing the National Anthem in correct rhythm within the specified time (52 seconds).

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5. Art, Music and Literature

Who does not like dancing? Every body likes it. Is it not so? Culture and art differs from place to place. Every state is identified by its own dance style. It is based on the culture of that locality. Dance styles can help in spreading the glory of India's heritage in foreign countries.

With the help of your teacher complete the following activity



Are not the postures, expressions of dance, costume designs, ornaments, proficiency, facial expressions, gestures etc., very distinctive? In India, there are different types of dances. You can also practice them. Among the many dance forms in Karnataka, **Yakshagana** has been selected as an important one.

Project work

- Prepare an Album regarding different types of dances or folklore art (Take the help of your teacher/parents).

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Activity

Name this dance type and colour with suitable colours.

Name: _____



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- Mention the popular folklore dance/art around your place.

_____

_____

_____

- Mention the name of any 3 famous folklore sports in Karnataka state.

_____

_____

_____

- Collect a photo of a famous dancer of India and paste it in the space provided. Write 3 sentences about him/her.

_____

_____

_____

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Music and Literature

India is rich with litterateurs, great artist achievers, saints and monks and social reformers. Every state contributes its own music, literature, art, sports, cinema, science and technology. The Government of India rewards great personalities, by awarding **Padmashree**, **Padmabhushana**, **Padmavibhushana** and **Bharath Ratna** to acknowledge their achievement in their concerned field.

Activity **: Write the names of two recipients of the following awards. (Take the help of your teacher/parents)**

1.	**Padmashree**	_____	_____
2.	**Padmabhushana**	_____	_____
3.	**Padmavibhushana**	_____	_____
4.	**Bharath Ratna**	_____	_____



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- Who is this? Write 3 sentences about her.

_____

_____

_____

Write 5 sentences about any one popular litterateur/sports person/poet/writer/dancer/stage artist from your locality.

_____

_____

_____

_____

_____

Wherever we are, however we are, we should cultivate patriotism. We should all come together in the name of our motherland when needed. India has become an independent country because of its integrity, nonviolence and sacrifice. Let us develop India and make it a strong nation at the global level. It is the responsibility of every Indian to make India a strong nation.

Mera Desh Mahan

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NOTE

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