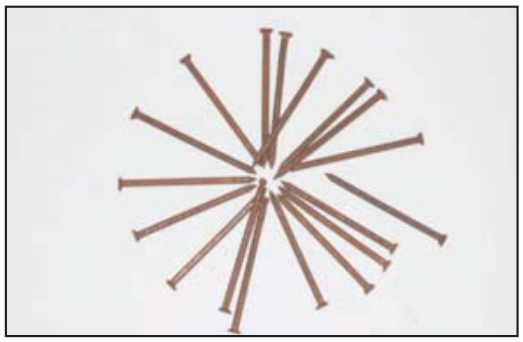
Unit 1 Magnet

What is required ? Cardboard, pins



What to do ?

- ☞ Take a cardboard.
- ☞ Place some pins on it.
- ☞ Move your hand below the cardboard and observe the pins and note it.

Now same activity is done by teacher, observe the pins and note it.

What is required ? Steel glass, magnet and a needle through which thread is passed.

What to do ?

- ☞ Take a steel glass.
- ☞ Take a needle through, which thread is passed.
- ☞ As shown in the figure, press the thread with a finger at the hole of the needle.
- ☞ Put the glass on the needle and raise the glass upward slowly.
- ☞ What happens ? Observe and note it.

Observe the same activity performed by teacher and note it.

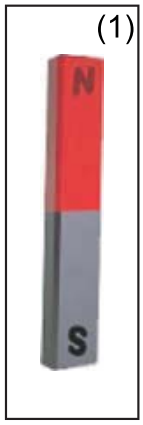
Do the needle stand vertically up without touching the glass ? Why this happnes ?

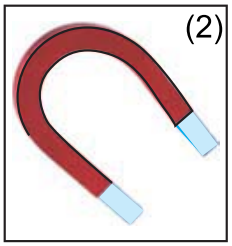
Discovery of magnet :

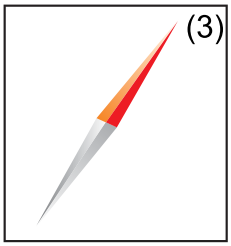
Long year ago in the country Greece a shepherd named Magnus was living in a region called Magnesia. While he pastured his sheeps he observed that the nails of the shoes and the tip of the staff were getting stuck to the ground with black stones on the ground, he got surprised. He showed this substance to other. This substance found in Magnetia region was named magnet.

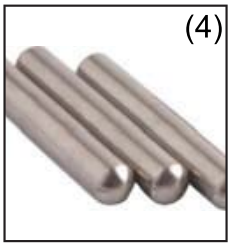
Magnet of different shapes :

Magnet observed in day to day life are of different shapes.









(1) Bar-magnet (2) Horseshoe magnet (3) Needle magnet

(4) Cylindrical magnet (5) Oval shape magnet (6) Ring magnet

What is required ? Magnet

What to do ?

- ☞ Take a magnet.
- ☞ Take the magnet near to the objects surrounding you.
- ☞ What happens ? Observe and note.

The objects attracted by magnet :

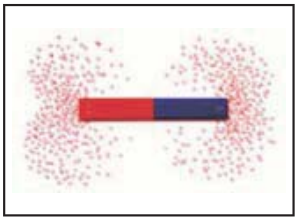
The objects, not attracted by magnet :

The objects attracted by magnet are made up of which substance ?

In addition to iron, magnet also attract substance made from Nickel and Cobalt.

Small particles stuck to the magnet lying on the ground. Of which substance these particles are made ?

What is required ? Paper, dust of iron, magnet



What to do ?

- ☞ Take iron dust on the paper.
- ☞ Place magnet over it.
- ☞ Now lift the magnet, observe on which part of magnet more iron dust is deposited and note it.

Magnetic power at both ends of magnet is more, so at the both ends more iron dust get stucked. These both ends of magnet are called magnetic poles.

What is required ? Magnet, thread and stand

What to do ?

- ☞ Take a bar magnet.
- ☞ Tide it with a thread and suspend it with stand as shown in figure.
- ☞ Let it become steady.
- ☞ In which direction it become steady, observe it and note down.

Slightly rotate the magnet and let to be steady again. Observe the direction in which it becomes steady and note down.

Repeat this procedure two-three times and note down the direction in which it becomes steady.

The end of magnet aligned in north direction (N) is called North-pole of magnet and the other along south direction (S) is called South-pole.

What is required ? Two bar magnet and table

What to do ?

- ☞ Take two magnets and find out North and South-pole of it and write N on North-pole and S on South-pole.

☞ Place a magnet on table. Slowly bring the north pole of other magnet close to the first magnet lying on the table.

- What happens ? Write.

☞ Similarly bring the South-pole of magnet to the North-pole of the magnet lying on the table.

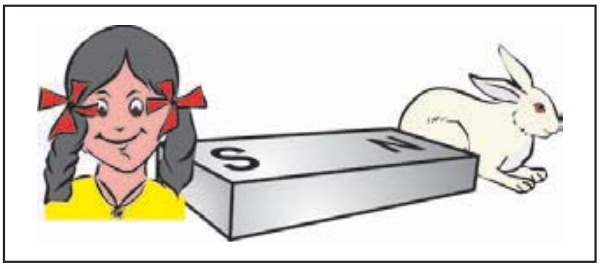
- What happens ? Write.

Like poles (N-N, S-S) repels each other and unlike poles (N-S, S-N) attract each other.

What will be the North-pole and South-pole in the given ring magnet ?

What is required ? Two bar-magnets and pictures (rabbit, grass, girl and kulfi)

What to do ?

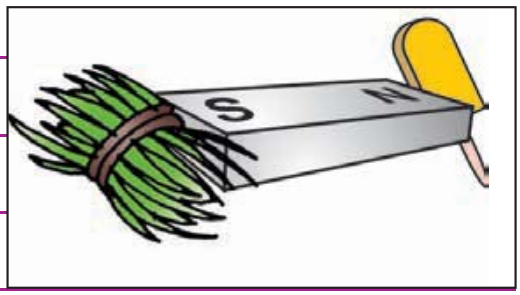


☞ Paste picture of rabbit at one end of magnet and at the other end paste the picture of girl.

☞ Then suspend magnet with a thread.

☞ Now on the other magnet paste picture of kulfi and grass in such a way that, when end of magnet with picture of kulfi is taken close to the first magnet the picture of girl is attracted to it and when the end where grass picture is pasted, taken close to first magnet the rabbit is attracted.

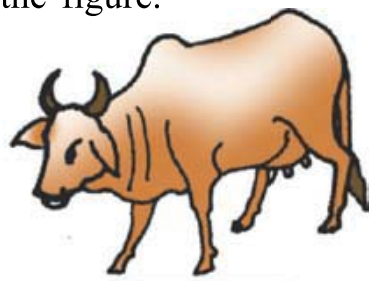
To complete above activity successfully, which thing you have kept in your mind ?

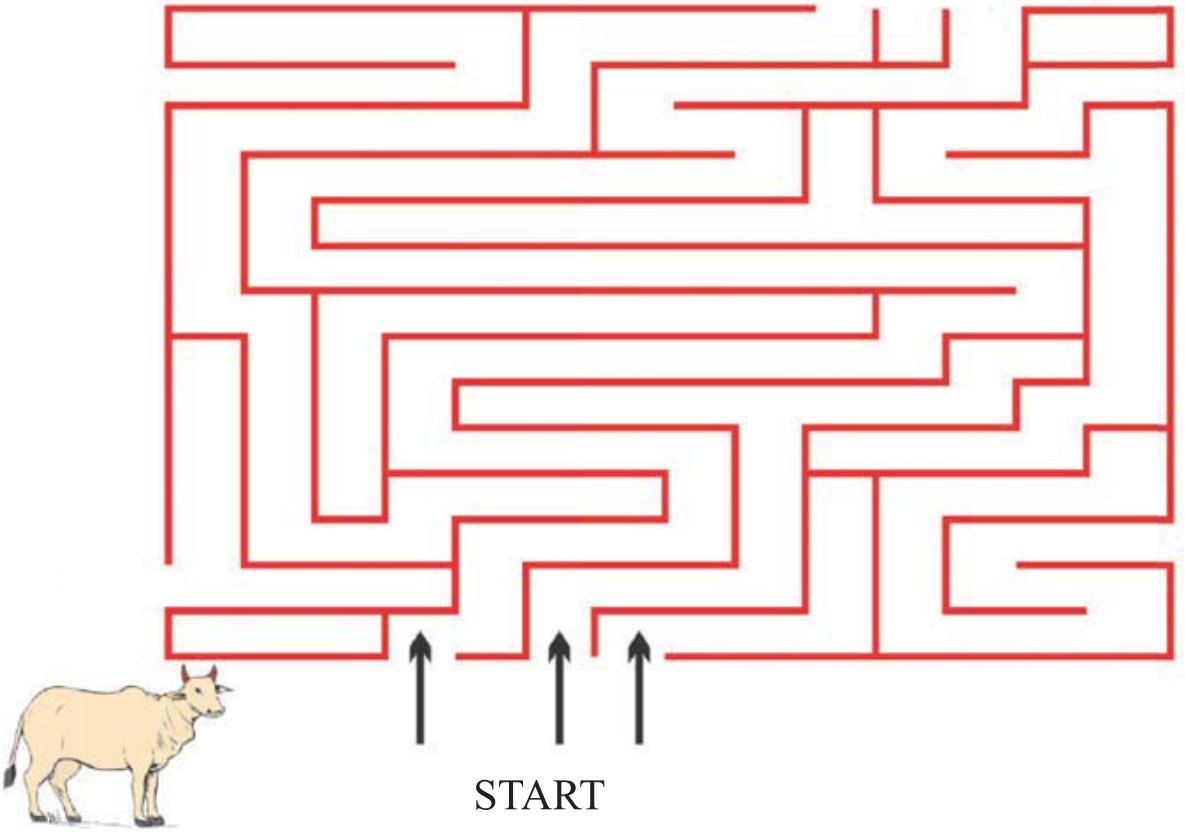


What is required ? Pin, picture of calf, blank paper and magnet.

What to do ?

- ☞ Stick the picture of the calf on the pin.
- ☞ On the blank paper draw the zigzag path as shown in the figure.
- ☞ Now, place the picture of calf at start point.
- ☞ Place a magnet below the paper and move magnet.
- ☞ In this way bring calf to the cow.





Q. 1 Which objects in your house are attracted by magnet ?

Q. 2 Which are N-pole and S-pole for given magnet ?

Q. 3 How N and S poles of magnet are decided ?

Q. 4 If a bar-magnet and a piece of iron is given to you, then how you will decide, which one is a bar-magnet and which is a piece of iron ?

Q. 5 If small nails are spread on the floor, then how can you collect then quickly ?

Unit 2 Living and Non-Living

We are surrounded by many cattle, birds, insects and trees. Have you observed them keenly any time ? Let us observe them keenly.

Write down the names of different things, cattle, birds, insects, plants, etc Found outside your class-room / school. Tick ✓ mark in front of the characters found in them :

Name	Do they take food ?	Do they breathe ?	Do they show movement ?	Do they move themselves from one place to another ? (Show locomotion ?)

Those, found taking the food or showing locomotion or showing movement, can be said to be a living one.

Observe the table and prepare a list of living organisms.

If characters shown by living organism are not found in any one, then they are considered as non-living things. Observe the table and prepare a list of non-living things.

Are there any name of plants in the list of living organisms prepared by you ? Illustrate.

Let us do an activity to show that plants possess characters of living organisms.

What is required ? Lime, water, transparent plastic bag, thread, cup/dish

What to do ?

- ☞ Take one dish/cup.
- ☞ Take some water in it.
- ☞ Dissolve some lime in that water. Let that mixture settle down for some time.
- ☞ Take supernant of that water in another jar.
- ● What is its colour ? Note down.

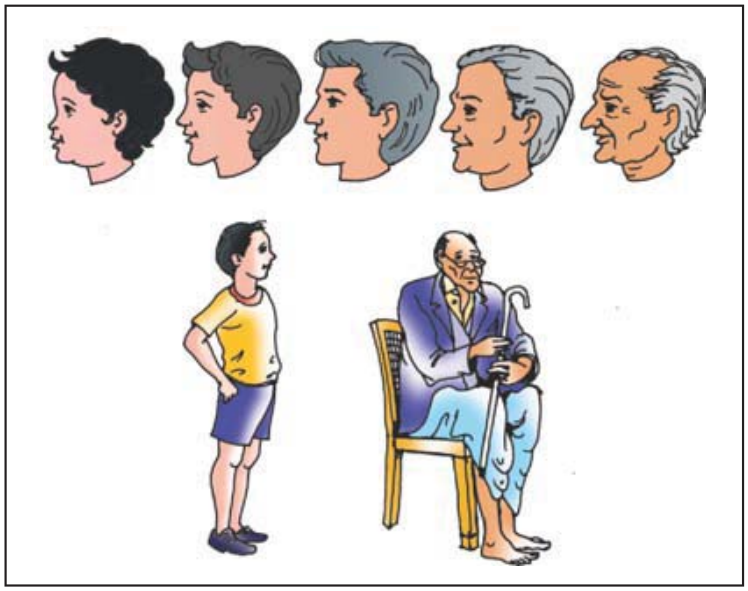
- ■ Take some lime water in a plastic bag.
- ■ Tie that bag with any plant as shown in the diagram.
- ■ Observe the water in that bag after one hour.

Blow some air with the help of a straw in the rest of lime water. Do you find any colour change ? Note down that here.

Why does the water show this type of colour change ? Know it with the help of your teacher and try to get answers of the following questions.

- Do plants respire ? Which organ helps them in that process ?

Let us know the other characters of living organisms.



Observe the given photograph and note down the changes found in the parts of body of child.

Thus, each and every organism shows growth. Just like a child becomes youth.

Which are the other organisms show growth ?

- Oh, this balloon also becomes big. Is it a living organism ?

- How do you come to know that a spine has hurt your feet ?

- Why do you wear woolen clothes in winter ?

Do cow/buffalo/dog feel anything while they are bitten by such spine ? How do they react while such things happen to them ?

- Does the wall feel such emotions while we push a nail into it ?

Pain, hunger, laugh, cry are the senses. All organisms feel senses. To experience heat or cold are one type of senses. Note down your other senses.

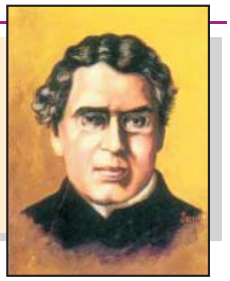
Plant of *Mimosa*
(Touch me not)

Sunflower

Plants also feel this type of sensation. Touch the leaves of *Mimosa* it is available in your surroundings.

- Observe the leaves of trees in the morning and at the night. You will find that the leaves of the trees are more shaded at night compared to that in the morning. Some flowers bloom at night due to sensation.
- Which flowers bloom at night ? List their names here.

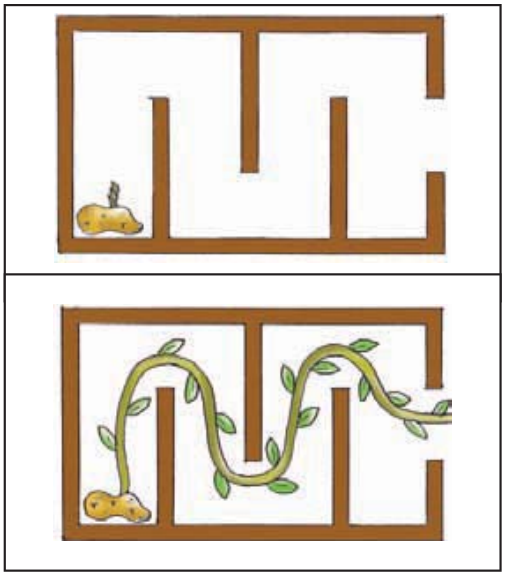
An Indian scientist Jagdish Chandra Bose had discovered that music has effect on the plants. Plants grow better in the presence of music.



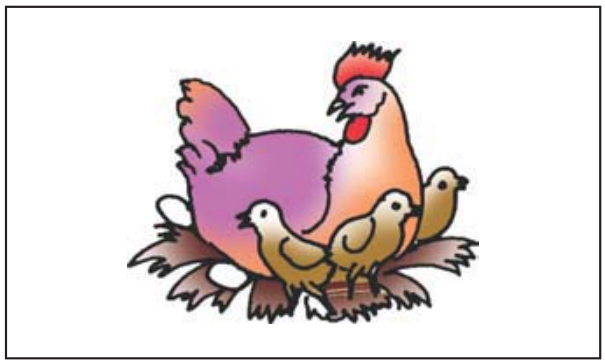
What is required ? Germinated potato, box, card board, scissors, glue

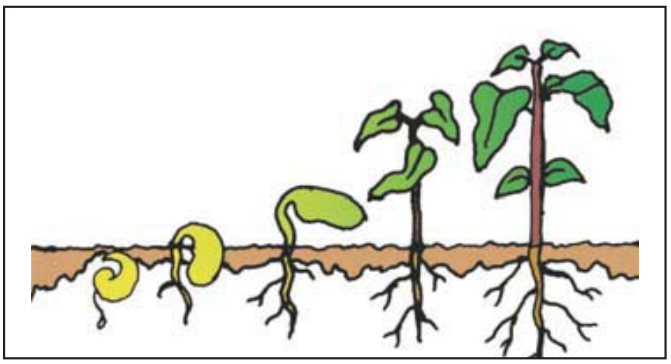
What to do ?

- ☞ Take one box. Put down a germinated potato in it.
- ☞ Make hole in the box and put down hurdles of card-board in the box as shown in the diagram.
- ☞ Observe the potato after 10 days and note down your observation here.



What will you do if you want to grow a mango tree ?



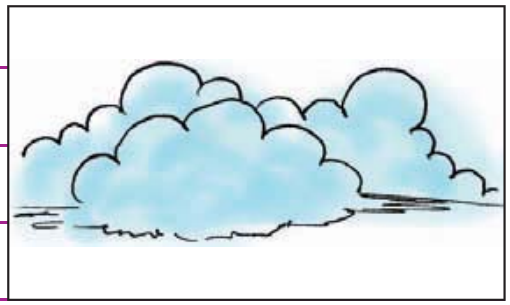


Thus, each organism is capable of producing new organism of its own kind.

Does any bicycle reproduce another bicycle ?

- Thus, organism show specific characters. List out the characters of living organisms.

Now, tell that whether the cloud moving in the sky is living or non-living ? Why ?



Q.1 Tell about the similarities and differences of following things and note down them :

Pictures		Similarities	Differences
			
			
			
			

Play this game with your friends.

Guess - What

Write down names of seven living and non-living things on the blackboard.

- Any one of you take a turn and imagine any name written on the blackboard.
- Rest of the friends will ask questions as follows : The person whose turn is there, will answer in yes/no.

  e.g. (1) Can it walk ? (2) Can it breathe ?
- You have to guess the name on account of the answers given by him/her.

Note : Is it a living organism ? This type of questions can't be asked. It is better to guess with the help of less number of questions. Each member will have his or her turn.

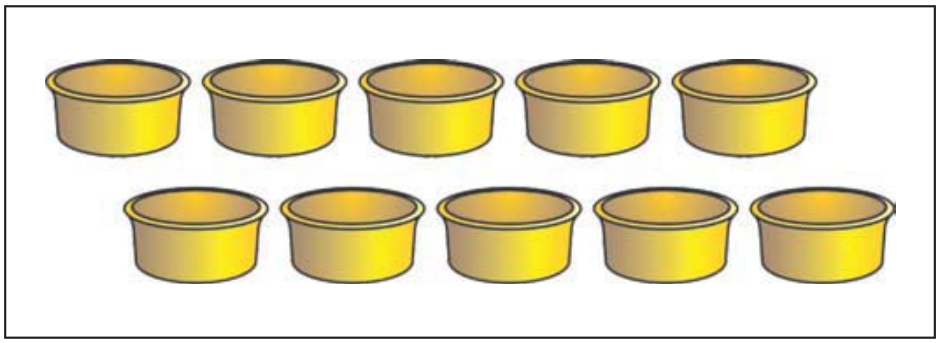
Unit 3 Acid, Base and Salt

You have collected some objects either from the kitchen of your house or from somewhere else. Whichever object, from the objects you have brought falls in the following list, then make the sign against it :

Lemon	☐	Butter-milk	☐	Washing soda	☐
Sugar	☐	Tomatoes	☐	Curd	☐
Lime	☐	Soap	☐	Tamarind	☐
Edible soda	☐	Salt	☐	Citrate	☐

If you have any object other than the above mentioned objects, then make note of it.

What is required ? Objects you have collected, small bowls, red and blue litmus papers.



What to do ?

- ☞ Write down the names of the objects you have collected on each of the small bowl.
- ☞ Now extract juice from the objects like lemons and tomatoes and pour it in the corresponding bowl.
- ☞ Now dissolve in water the objects like tamarind, salt, edible soda, washing soda, soap, citrate (citric acid) and sugar and fill them in the corresponding bowls.
- ☞ Fill in the objects like curd or butter-milk in the original state in the corresponding bowls.

☞ Now dip a blue litmus paper in any one bowl.

☞ Observe whether there is any change in the colour of the litmus paper.

☞ Now dip a piece of red litmus paper in the same solution.

☞ Is there any change in the colour of the litmus paper ? Observe it.

- Whatever you observed, write it down in the following table.
- In the similar way test every solution.

No.	Name of the object	What is the effect on the colour of the blue litmus paper	What is the effect on the colour of the red litmus paper
1	Lemon juice		
2	Tomato juice		
3	Salt solution		
4	Sugar dissolved solution		
5	Tamarind water		
6	Lime water		
7	Butter-milk		
8	Solution of washing soda		
9	Solution of citrate (citric acid)		
10	Soap-water solution		
11	Distilled water		

List of the substances which are acid : **Some substances change the colour of blue litmus paper into red. Such substances are called acid.**

Will you be able to tell which of the substances in your list are acid ?

Properties of acid :

- It changes the colour of blue litmus paper into red.
- It is sour in taste.

Uses of acid :

- It is used in preparation of food.
- It is used to clean tiles.

Soda-water known as a cold drink, fluid used in filling car batteries and human urine all of them possess acidic properties.

Some substances change red litmus paper into blue. Such substances are called base.

Will you be able to tell which of the substances in your list are base ?

- **List of the substances which are base :**

Properties of base :

- It turns red litmus paper into blue.
- It is bitter in taste.
- It is adhesive (feel slippery).

Uses of base :

- It is used in the preparation of food.
- It is used for washing clothes.

Some solutions of substances do not make any effect on either red litmus paper or blue litmus paper such substances are called neutral substances.

Can you tell which of the substances in your list are neutral substances ?

List of the substances which are neutral towards litmus papers :

Some of these neutral substances are salts. E.g. Solution of common salt; but solution of sugar is neutral still it is not a salt.

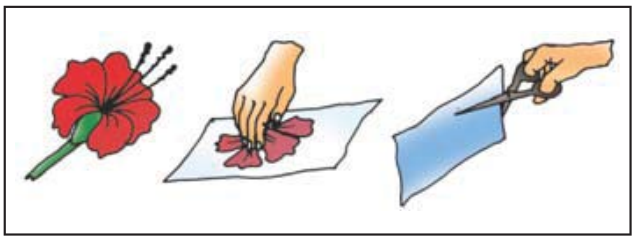
What if you don't have a litmus paper ?

What is required ? Seven-eight hibiscus (jasud) flowers, turmeric, sheet of white paper, a pair of scissors, water and a plate.

What to do ?

☞ **Preparation of hibiscus flower paper :**

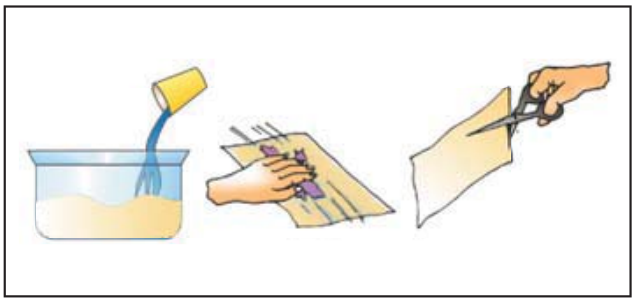
- Rub some of the petals of hibiscus flower on a piece of white paper.
- Carry on rubbing the petals on the white paper until the paper turns blue.
- Now cut the white paper into small stripes by a pair of scissors.



- We call these stripes hibiscus paper.

☞ **Preparation of turmeric paper :**

- Take some water in a dish or a small vessel.
- Add some turmeric powder in it and dissolve in it.
- Dip a paper in turmeric solution and remove it after it is thoroughly drenched.
- Keep this white paper in the sun light for some time and let it be dry.



- After the paper is completely dry, take a pair of scissors and cut the white paper into small stripes.
- These stripes are called Turmeric paper.

Perform an experiment and find out yourself that these hibiscus papers and turmeric papers behave like which of the litmus papers.

Take some other flowers like hibiscus flowers and do the same kind of activities.

Edible soda and washing soda are salts. But while making their solution in water they give chemical reaction with water and due to this the solution possesses the properties of base.

Titration

What is required ? Dilute hydrochloric acid HCl, solution of costic soda (NaOH), Phenolphthalein, litmus papers, test-tube, dropper, tongs, stand for test-tubes.

What to do ?

- ☞ Take a test-tube.
- ☞ With the help of a dropper put ten to twelve drops of HCl in the test-tube.
- ☞ Test it with litmus papers and make your observation and note it down :

  This solution changes [ ] coloured litmus paper into [ ] coloured litmus paper.

  This solution is **acid** / **base** (cross out the wrong word) :
- ☞ Now add two to three drops of phenolphthalein in the test-tube.
- ☞ Now shake the test-tube well.

☞ Did you find any change in its colour ? [ ]

☞ Now take sodium hydroxide solution in a beaker.

☞ Test the solution by litmus papers and note the observation below :

This solution changes [ ] coloured litmus paper into [ ] coloured litmus paper. This solution is **acid / base** (cross out the wrong word).

☞ With the help of a dropper add a drop of sodium hydroxide in the test-tube.

☞ Now shake the test-tube for some time.

☞ Thus slowly go on adding one by one drop in the test-tube and carry on shaking the test-tube.

☞ When the solution in the test-tube turns slightly pink in colour then stop adding the drops in it.

☞ Now examine this solution by both litmus papers and note down your observations. What did you observe ?

☞ What can be said from this ?

Due to chemical reaction taking place between proper portions of acid and base, both the substances lose their own properties and make salt and water. This process is called Neutralization.

We can describe the experiment we performed as below :

Acid		Base		Neutral salt		
HCl	+	NaOH	⟶	NaCl	+	H_2O
(Hydrochloric acid)		(Sodium Hydroxide)		(Salt) (Sodium Chloride)		(Water) (Hydrogen Oxide)

Salts which are used in daily routine :

Name of salt	Uses
Common salt	It is used in - preparation of food. - preserving dry food for long duration. - preparation of washing soda.
Edible soda	It is used in - medicine of acidity - fire extinguishing instruments. - preparation of food.
Washing soda	It is used in - to remove dirt - washing clothes and vessels. - changing hard water into soft water.

Do you like to learn magic ? Let us do a magic today.

What is required ? Sheet of papers, water, turmeric powder, soap-water, a dish

What to do ?

- ☞ Applying soap-water on a sheet of paper and let it to be dry.
- ☞ Now wet both the palms and apply turmeric powder on them.
- ☞ Make impressions of both the palms on a dried sheet of paper and note down your observations.

Discuss the reason for such a happening with your friends.

Q.1 Classify the following substances given below in acid, base and salt :

Lemon, butter-milk, washing soda, sugar, tomato, curd, lime, soap, tamarind, edible soda, common salt, citrate (citric acid)

Acid	Base	Salt

Q.2 Explain the difference between :

(1) Acid and Base

(2) Acid and Salt

(3) Base and Salt

Q.3 Answer in brief :

(1) State the properties of acid and give its three examples.

(2) State the properties of base and give its three examples.

(3) State the properties of salt and give its three examples.

(4) State the uses of acid.

(5) State the uses of base.

(6) State the uses of salt.

(7) Which main salt is in the sea-water ?

Q.4 Give explanation :

"All neutral substances are not salt." Explain.

Unit 4 Seed

You may have seen many plants and their seeds around you. List the names of seeds in the following table :

Sr. No.	Name of the seeds
1	
2	
3	
4	
5	

Sr. No.	Name of the seeds
6	
7	
8	
9	
10	

Now collect all those seeds you have listed.

What is required ? Magnifying glass, collected seeds

What to do ?

- ☞ Take each seed one after another in your hand.
- ☞ Observe it with magnifying glass.
- ☞ Tabulate your observation in the following table :

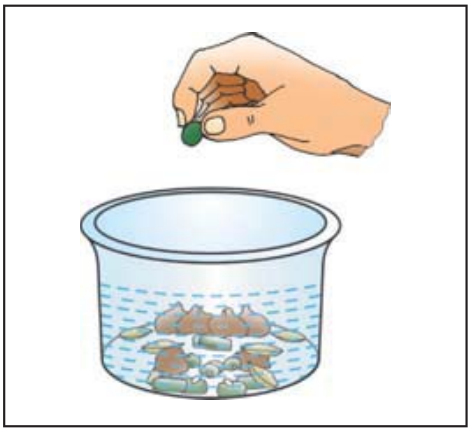
Sr. No.	Name of seeds	Colour	How is its surface ? Smooth or rough ?	Is there any groove on that seed or not ?
1				
2				
3				
4				
5				
6				

Thus, seeds show many varieties. Now, we shall do next activity to know something more about the seeds. Dip the collected seeds in the water for 6 to 8 hours before starting the activity.

What is required ? Magnifying glass, pre-soaked seeds

What to do ?

- ☞ Take seed one by one and press it between your fingers.
- ☞ Do seed divides in to two halves ?
- ☞ Tabulate your observation in the following table :



Sr. No.	Seeds which are divided into two halves by pressing them	Seeds which are not divided into two halves by pressing them
1		
2		
3		
4		
5		

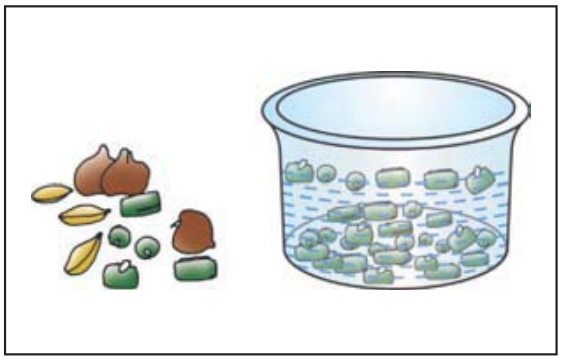
You may have seen that seeds like pea, mung, groundnut etc can be separated into two halves while we press them. These type of seeds are known as dicot seeds.

It is true that if we press any seed having a groove becomes separated into two halves ?

Some seeds like wheat, maize, pearl millet etc. cannot be separated into two halves while we press them. These type of seeds are known as monocot seeds. Which seeds are monocot and dicot amongst the seeds you have collected ?

What is required ? Beaker, water, seeds of green gram, a bowl, clay

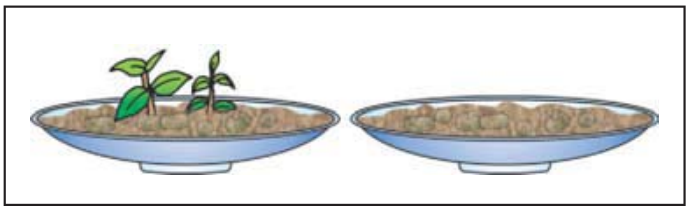
What to do ?



- ☞ Fill some water in a beaker.
- ☞ Drop all the mung seeds into that beaker.

Observations :

- ☞ You may have observed that some seeds sunk in the water while some of them float.
- ☞ Now, separate floating seeds and sunken seeds into separate bowl.
- ☞ Label them as floating seeds and sunken seeds.
- ☞ Provide water to both kinds of seeds regularly in the morning as well as in the evening.
- ☞ Observe both the bowl for five to six days.
- ☞ Which type of seeds can grow better ?



- **Tabulate your observation in the following table :**

Seeds	How many ?	How many of them germinate ?	Observation of seeds and their growth
Floating seeds			
Sunken seeds			

Do it yourself : Collect different type of seeds and repeat the above activity.

Let us do another activity to understand that many other factors can affect the germination of seeds.

What is required ? Glass cup, plastic/steel ruler, seeds of mung or kidney bean, water and three pieces of cloths.

What to do ?

- ☞ Take a ruler. (plastic or steel)
- ☞ Tie four to five seeds on the ruler at its central part as well as at the lateral sides and cover them with a cloth.
- ☞ Now put this ruler into a glass cup.
- ☞ Now, fill the glass with water in such a way that seeds remain at the upper surface of the water.
- ☞ Put this glass in a room.
- ☞ Observe all the seeds after five to six days.

- **Tabulate your observation here :**

Sr. No.	Site of seeds where they tied	What is absent there ?			Seed germination and its growth
		Water	Heat	Air	
1	At the bottom				
2	In the middle				
3	At the top				

What is your conclusion ? What shall we do to germinate seeds ? Not down here.

For germination of seed _____ _____ **and** _____ **are necessary.**

Do it yourself :

Take three cups. Put seeds at the bottom of one cup and cover them with soil. Take some soil in second cup and put seeds on that soil and cover seeds with soil. Fill third cup with soil and put seeds on that soil. Give water to all the three cups for four - five days regularly in the morning as well as in the evening. Observe the germination of seeds in each cup. Which seeds show better germination ? Observe that.

Dispersal of seeds :

Dispersal of seeds in plant shows various methods in various plants. We shall study some of them.

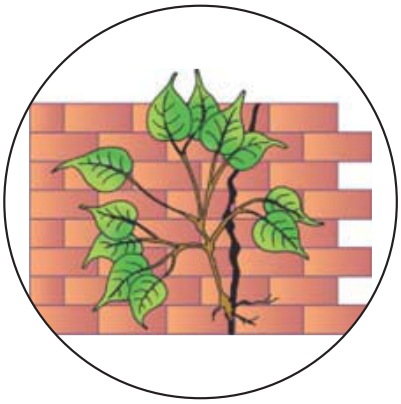
By Human :

We eat fruits and throw away seeds. These seeds grow when they get suitable conditions. Thus, human plays a role in seed dispersal.

By Birds :

Birds eat fruits and swallow seeds. These seeds come out with their stool and they spread at different places. E.g. Seeds of peach, seeds of *Ficus*.

How does the banyan tree grow on the wall ?



By Insects :

Insects like ant use many seeds as their food. They store some food as reserve food material. Sometimes, this bulk of food is forgotten by them. And thus seed dispersal takes place.

By Animals :

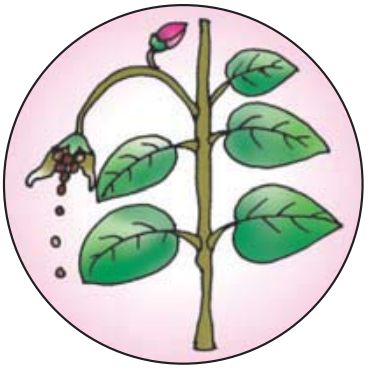
Animals use fruits of plants in their food. Seeds come out with their stool. Thus, seed dispersal takes place. E.g. Seeds of *Acacia* (Babool).

Some plants have thorny seeds. *Xanthium, Hetropogon* and some grasses are examples of such plants. These seeds stick to the body of animals, when they come in contact with them. These animals rub their body with a wall or any other thing and those seeds are sprayed over different places.

Wellcrow which has one surface hairy and another with claw like structures used in things like clothes, shoes, bag etc. Is well-known today. Jeorge de Mustra was inspired to the discovery of wellcrow from a grass known as Hetropogon.

Air :

Some seeds are very light in weight. They can move to many distant places due to wind.



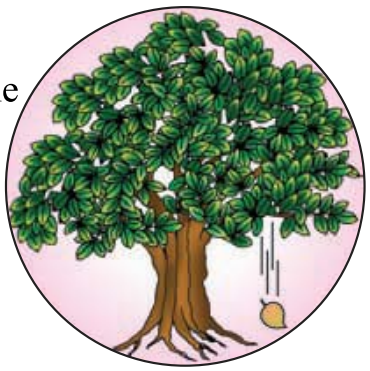
Water :

Some seeds migrate by floating on water e.g. Seeds of Alfa (*Medicago sativa*), Basil seeds (Avchi-bavchi) (*Oscimum gratissiumum*), seeds of coconut etc.

Gravitational force :

Heavy, spherical fruits of some plants ripen and fall on the ground due to gravitational force and role away for some distance.

Thus, along with fruits seeds too spread.



Internal force :

Pods of some plants burst when their water evaporate. Seeds are blown very far from the plants. In this way dispersal of seeds takes place. E.g. Black gram (Udad), Pea etc.

Q. 1 Select the correct option :

(1) Sheela presses a soaked seed and the seed is separated into two halves. Select any one option for that seed. ☐

(a) Wheat (b) Groundnut (c) Maize (d) Pearl Millet

(2) Mahesh pushes a soaked seed and the seed is not separated into two halves. Select any one option for that seed. ☐

(a) Groundnut (b) Maize (c) Green gram (d) Pea

(3) What does a seed need to germinate and to grow well ? ☐

(a) Air (b) Water (c) Heat (d) all of them

Q. 2 Answer the following question in brief :

(1) Give reason : Many plants grow everywhere during monsoon season.

(2) Why does seed dispersal is necessary ?

Q. 3 Give differences : Monocot seed and Dicot seed

Monocot seed	Dicot seed

Q. 4 Classify the following seeds into monocot seed and dicot seed :

Wheat, Green gram, Maize, Turkish gram, Bengal gram, Sesame seeds (Til), Pearl millet (Bajara), Rice, Groundnut, Fennel

Monocot seed	Dicot seed

Q. 5 Observe the dispersal of seeds found around you :

Sr.	Name of seed	Factor responsible for dispersal

Unit 5 Identifying the Plants

Label the plant organ in the given picture and fill appropriate colour in the organs.

Let us observe the surrounding plants. You can observe that some plants are short in size. Let us make a list of these type of plants.

_____

_____

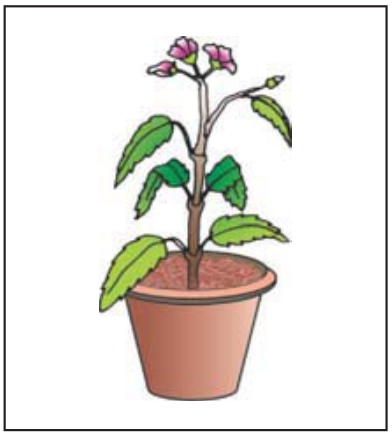
_____

Herbs :

Plant with less than 4-6 feet height is called herb.

- Stem of the plant is generally soft and weak. e.g. _____
- These are short lived plants :

  e.g. Wheat, Jowar (*Sorghum*), Pearl millet (Bajara), *Vinca*, Marigold, Egg plant (Brinjal), Tomato



- Prepare a list of such plants.

_____

_____

Exceptional examples :

- Plant like Tulsi (*Oscimum*) live for more than one year.
- Many herbs give colourful flowers.

  e.g. _____

Shrub :

Plants with 4-6 feet height are considered as shrubs.

Stem of shrub is thicker than that of herb.

e.g. _____

- Life span of shrub is greater than that of herb.

  e.g. Pomegranate, China Rose (Shoe-flower), Custard apple, Guava, Heena, Oleander (Narium).

- Branches of shrub develop from its stem at a remarkable distance from the soil.

Tree :

Plants with more than 4-6 feet height are called trees.

e.g. Neem tree, Banyan tree, Ficus (Pipal tree) tree.

- Trees live for a long time.

  e.g. _____

- Stem of the tree is very strong.

  e.g. _____

- Trees with a big canopy provide shade.

  e.g. _____

Climbers :

Plants with weak stem cannot stand erect. These plants are called creepers.

e.g. _____

- Some plants spread their body on the land. They give big fruits.

  e.g. _____

- Some creepers take support of its surrounding and climb on that support.

  e.g. _____

Clasify the surrounding plants into the following table :

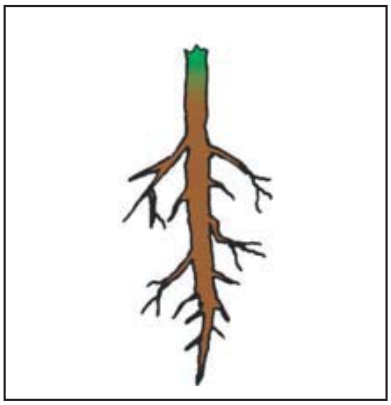
Herb	Shrub	Tree	Creeper

- As we find variations in the height and volume of different plants, in the same way plants show variation in their organs.

Collect information from the book 'Plant world' from your school library.

We find some useless plants growing in our surrounding. With the help of discussion with your teacher, find out them and bring some plants with roots if your teacher permits.

- ☞ Observe the roots of the plant, which you have pulled up.
- ☞ Can you say that the roots shown in the diagram can be pulled or not ?
- ☞ Generally these type of roots anchors plant to deep soil / shallow soil.
- ☞ It possesses a main root and many branches arising from the main root. Such root system is called tap root system.



Which plants show tap root system ?

_____

_____

_____

Can we pull these roots easily / not which are shown in the diagram ?

Generally this type of root anchors plant into deep soil / shallow soil.

It does not have any main root but have many thin, small roots.

These roots are called fibrous root system.

- Which plants show fibrous root system ?

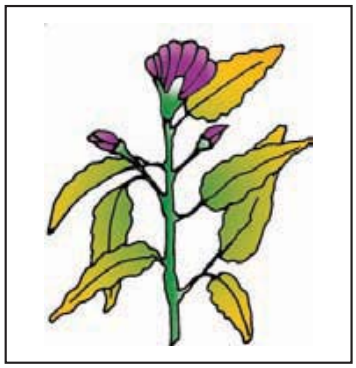
On the basis of this activity you can classify the types of root systems :

(1)

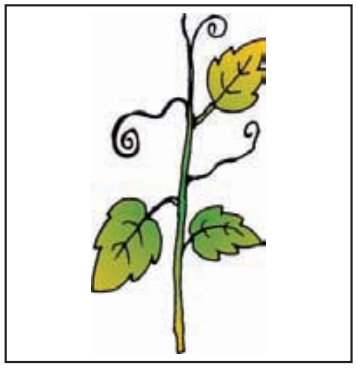
(2)

Types of stem :

(1) Erect stem : Most of the plants posses erect stems.
e.g. : Rose, Neem.

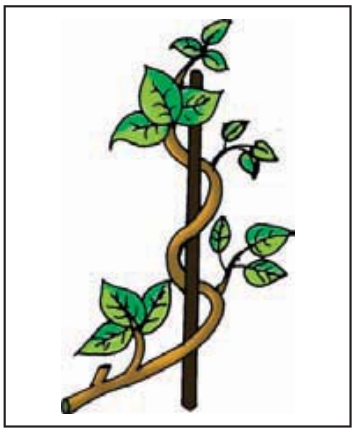


(2) Climbing stem : Some plants take support of some other plants and climb on them.
e.g. : Grape climber, Sweet pea



Some plants produce specific spring like tendrils to climb the support.

e.g. Grape climber, Bitter gourd



In some plants stem itself twines around the support.

e.g. Twiner of Kidney bean

(3) **Creeper stem :** You may have seen Cynodon growing on open land. Its stem run parallel to ground and develops roots at a certain distance. This type of stem is known as creeper stem. Hydrocotly (Bramhi) is also such type of plant.

Have you seen any other plant showing creeping stem ?

(4) **Underground stem :** Observe potato, ginger and colocasia. Do you find nodes on it ? Thus, it is a stem. This type of stem is grown under the soil, which is known as underground stem.

Leaf :

Types of leaf :

When you observe plants in your surroundings, you will find that some of them have simple, independent and big leaves. While some plants show small and oppositely arranged leaflets.

If leaf is divided into small leaflets, then the leaf is known as compound leaf. And if it is not divided into leaflets it is called simple leaf.

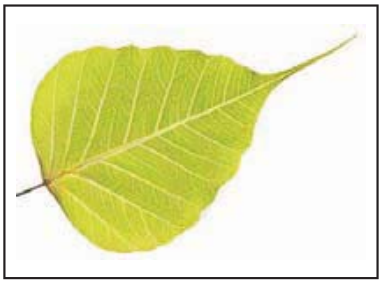
Simple leaf :

Which plants show simple leaves ?

Compound leaf :

Which plants show compound leaves ?

Pluck two to three leaves of a plant. Observe the lateral and dorsal sides of that each leaf. Make a impression of the leaf on a paper by putting that paper on leaf and by rubbing slanting pencil on it.



Thread like structure found in a leaf is called veins and the arrangement of veins is called venation.

Some leaves show reticulate impression. This type of venation is known as reticulate venation.

- Which plants show reticulate venation ?

In impression of some leaf we can't find a reticulate structure. Here veins are arranged in parallel fashion. Such arrangement is known as parallel venation.

- Which plants show parallel venation ?

Cut all those leaves you have collected for previous activity. Are you able to cut all leaves in same pattern ?

- Which type of venation is found in the leaves which cut unevenly ?

- Which type of venation is found in the leaves which can be cut parallel ?

Which type of venation is found in leaves of dicot plants ?

Which type of root system is found in those plants ?

Which type of venation is found in leaves of monocot plant ?

Which type of root system is found in those plants ? (monocot)

Plants like tulsi (Oscimum), neem, ginger, Adhatoda (ardusi), jamun, turmeric, garlic, onion, nut meg, carom seeds / thyme (ajwain) etc. are very useful as medicines.

Prepare a list of medicinally useful plants by collecting information from elders, family members, doctors, teachers etc. and find it from books found in school library too.

Sr. No.	Name of medicinal plant	Useful part	Effective in which disease	How to use it ?

Collect more information from the book 'Plant World'.

Q.1 Prepare a leaf-book of simple leaves.

Q.2 Prepare a leaf-book of compound leaves.

Q.3 Prepare a leaf-book of leaves with parallel venation.

Q.4 Prepare a leaf-book of leaves with reticulate venation.

Q.5 Give an example of a herb showing compound leaf.

Q.6 Prepare list of herbs, shrubs, trees and twiners/creepers/climbers.

Herb	Shrub	Tree	Creeper/climber/ twiner

5th June is celebrated as 'World Environment Day'.

Unit 6 Water

What is a vital necessity in our life. Water is very essential for all living beings to live.

Due to some reasons if the source of water is exhausted then what difficulties do we face ?

Make note of the water we use in activities throughout the day and household activities in the following table :

Sr. No.	Activities throughout the day	How much water is used ?
1	To clean teeth / to brush	
2	Daily morning routine and toilet	
3	To take a bath	
4	For drinking purpose	
5	For washing clothes	
6	For preparation of food	
7	For cleaning utensils	
8	For house-cleaning purpose	
9	For animals	
10	For other works	

From the above table we come to know that water is very important in our daily life.

- Besides these activities, in which other works do we use water ? Make a note of it.

- From where do we get water ?

The place from where we obtain water is called a source of water.

We know that the water we get in our homes comes from a main tank in our village or city. In this tank water may be coming from a well, a tube-well, a river, a lake or a dam.

Sources of water :

From where does water come to wells, tube-wells, rivers, lakes and dams ?

- Which is the main source of water ?

Now collect the information about the water sources found in your village or city. Answer the following questions :

1. From where do you get water in your house ?

2. Write the name of the source ?

3. Where does the source get water from ?

4. Do you get enough water for the whole year from this source ?

5. Where do we use the water obtained from these sources ?

Now discuss with your teacher about the importance of water and prepare a note of it :

Get more information from the book 'Jilla ni Visheshata' from school library.

Thus, water is the life

We came to know that the main source is rain. Let us perform an activity (experiment) to understand the process of rain fall.

What is required ? Tea-kettle, stove, a big plate, a glass, a bucket, a stand, water

What to do ?

- As shown in the figure approximately take two glasses of water and add in it two to three spoons of common salt and dissolve it. After that put the kettle on the stove and heat it still vapour comes out.
- As demonstrated in the figure put a big plate on the stand, pour some water in it and keep an empty bucket just below the plate.

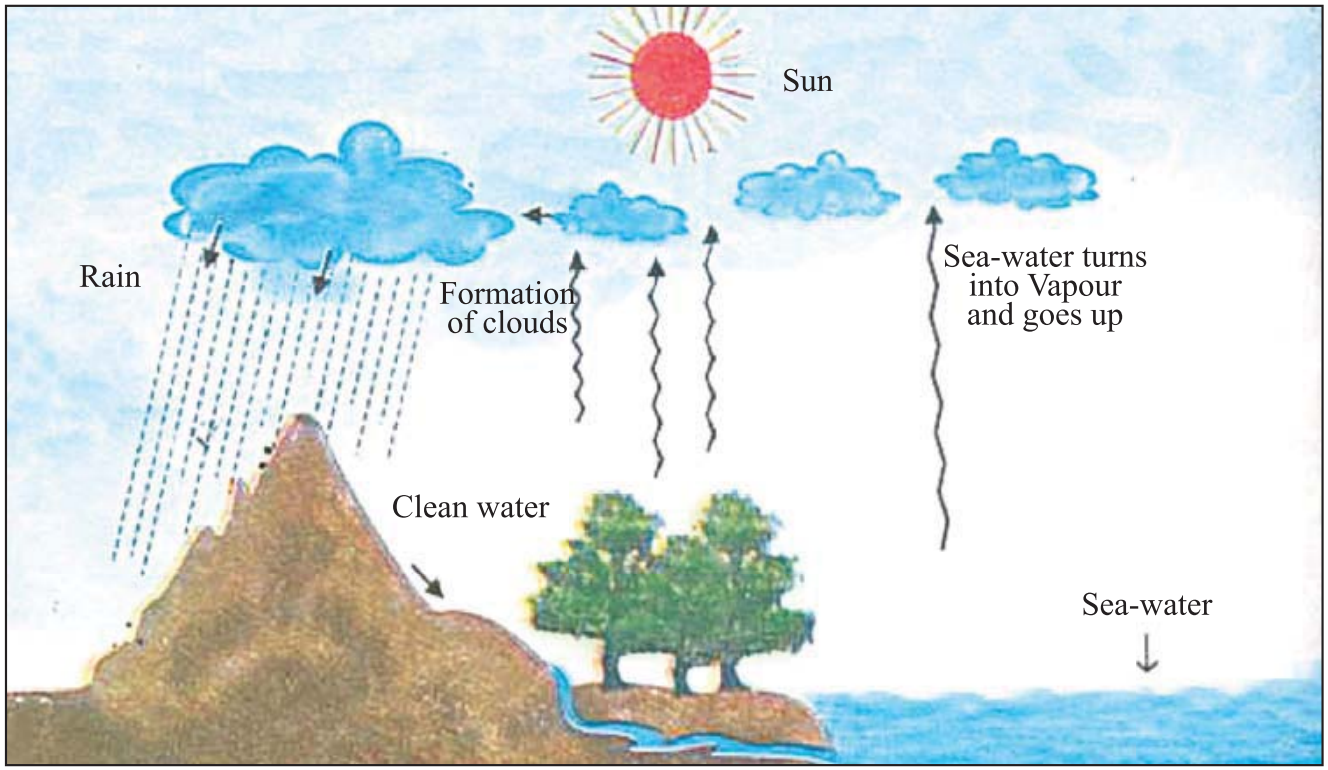
- Arrange the kettle as shown in figure in such a way that the vapour coming out of it just goes below the plate kept on the stand.
- Now observe what happens.

- Taste the water obtain in this way. Taste the water in kittle after it's call down.

Now, you must have understood that the rainfall occurs in such a manner.

Water Cycle :

Due to excess heat in the summer, the water from the sources mainly sea water turns into water-vapour. **The process of any liquid turning into vapour is called Vaporization**. Water-vapour is light in weight, hence it rises high up in the sky. As we go up higher and higher the temperature of atmosphere goes on decreasing. Therefore if the vapour goes up very much high, it cools down. The cooled vapour turns into water drops. This cooling process is known as Solidification.



Waterdrops freeze around dust particles in the atmosphere and thus clouds are formed. Due to powerful winds clouds move from one place to another. When the portion of frozen water around the dust particles increase in water, it falls down as rain on the earth.

Thus, the water of the earth forms clouds by evaporation and returns to the earth in the form of rain.

Water-Harvesting

Water is a precious wealth. Preventing the flow of rain-water from going away in waste, we should diligently make use of it in an excellent way.

Instead of lifting go away the rain-water in waste, to make the collection of it is called 'Harvesting'.

Harvesting the rain-water, we can make use of it in other seasons besides monsoon. Now you obtain the information about harvesting and write it down below :

1. Write the names of the places, where the rain-water is harvested in your village or city.

2. Visit as many places as possible from the places which are mentioned above and obtain the information as below :

(1) How is water harvested there ?

(2) For how long a period, water is available there during the year ? Specify the duration of it and make note of it.

(3) Which are the uses where thus harvested water is utilized ?

(4) Write the benefits of water-harvesting.

Now discussing about water harvesting with your teacher, write down the different ways of it :

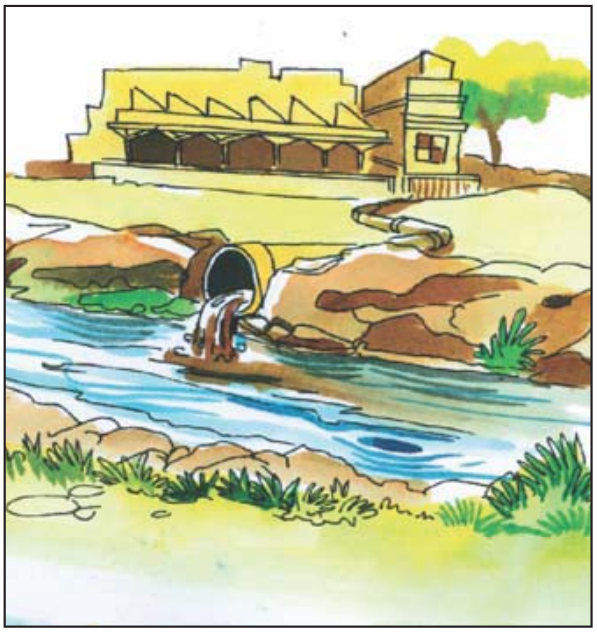
1.	2.
3.	4.
5.	6.

Write the advantages of water-harvesting :

Is there any provision of water harvesting in your school ? If there is no such provision then what can be done for water-harvesting ?

Water-Pollution :

Useless waste materials, several gases and some chemicals all mix in the flow of water and thus it is polluted. This is known as water-pollution. This water is very harmful for use :



Collecting the information of water-pollution in your village or city, write the answers of the following questions :

1. Write the names of the places where water is polluted in your village or city.

2. How does water get polluted ?

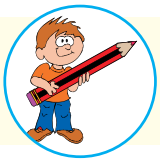
3. What are the effects of water-pollution ?

4. What can be done to prevent pollution ?

Now discuss in details about pollution with your teacher and make a note of it in detail.

22nd March is known as 'Water-day'.

Get information of pollution from the book 'Jilla ni Samasya' from your school library.



Q.1 What will you do, if people in your village or city pollute water in your lake ?

Q.2 How will you harvest water in your house ?

Q.3 What will you do to save water in your school ? Discuss with your friends and make note of it.

Q.4 Answer the following questions :

1. Write about the importance of water for our life.
2. How will you harvest water ?
3. Sea-water is very salty but the water vapour formed from it and getting back in the form of rain water is not salty. Discuss with your friends.
4. Draw a picture regarding the topic "Water is the life".

Unit 7 Measurement

You will observe it in your day to day life, the measurements are necessary in different ways in different phenomena's. If you want to tide a hanging at the door of your class-room then how long thread is required ? How you will decide the length of pitch to play cricket ? How much cloth you buy to stitch your clothes ? At what time you will start from home, if your school starts at 12:30 pm ? In early days approximate measurements were taken by using footsteps, hand, palm, finger etc. In different regions the devices for measurements were different. Let's see, with those devices how the measures were taken.

Take idea about the length of your textbook of science and technology, in terms of your finger.

What to do ?

- ☞ Measure length of your hand. The measured length is ..... figures.
- ☞ Is your measured length is as per your idea ?
- ☞ Is your measurement, measured by each student is same ? Why ? Discuss it...

With above discussion we can say that the length of finger, palm, hand of each person are not same. So in this way standard measurement of any object is not possible.

If such approximate units are used for the measurment of length then which problems can be created.

The measurement and units should be definite so if anybody use any instrument or unit the measure should be same. To get perfect measure of any quantity some standard units and instruments are developed. So above difficulties can overcome.

The standard measure of length is meter. Its small units are centimeter (cm) and millimeters (mm). Large units of length is kilometer (km). To measure length of different objects, different units and instruments are used.

Write as per your day to day life observation :

(1) What is used by the cloth-merchant to measure cloth ?

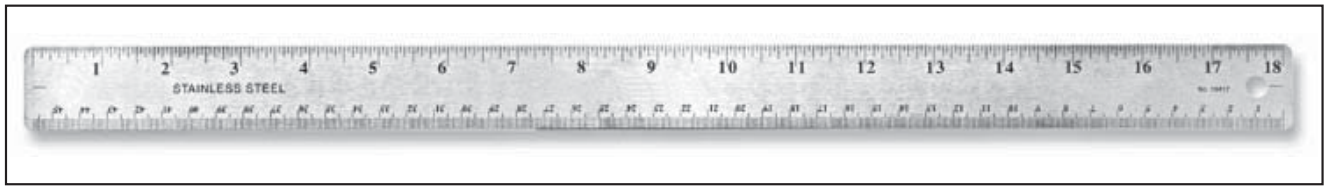
(2) What the tailor master use to measure your cloth ?

(3) What you use to measure the length of line element which you draw or pencil ?

In day to day lite for measurement of different object different scales are used. Let's take idea to take perfect measurement with it.

Measurement of Length

Observe the scale which you have and adjust it as shown in figure.



In the scale upper digits represents measure in centimeter. Calculate the number of small digits in one centimeter. This small division represents the measure in millimeter.

You see ..... Millimeter = 1 centimeter

Similarly, 1000 mm = 100 cm = 1 meter

And 100000 cm = 1000 meter = 1 kilometer

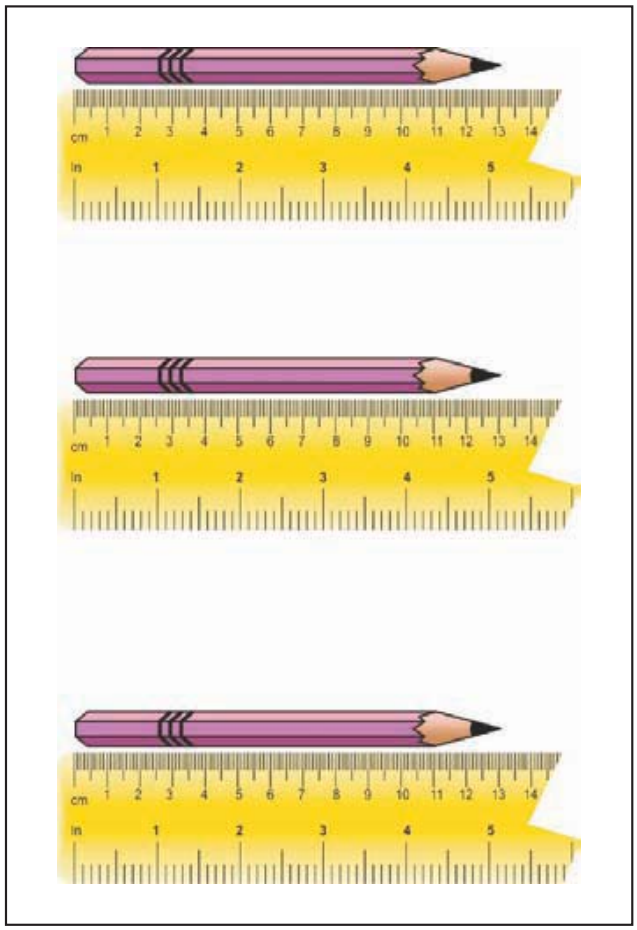
To measure large distance between stars and milkyways the unit "light year", is used.

The distance travelled by light in one year is called 1 light year.

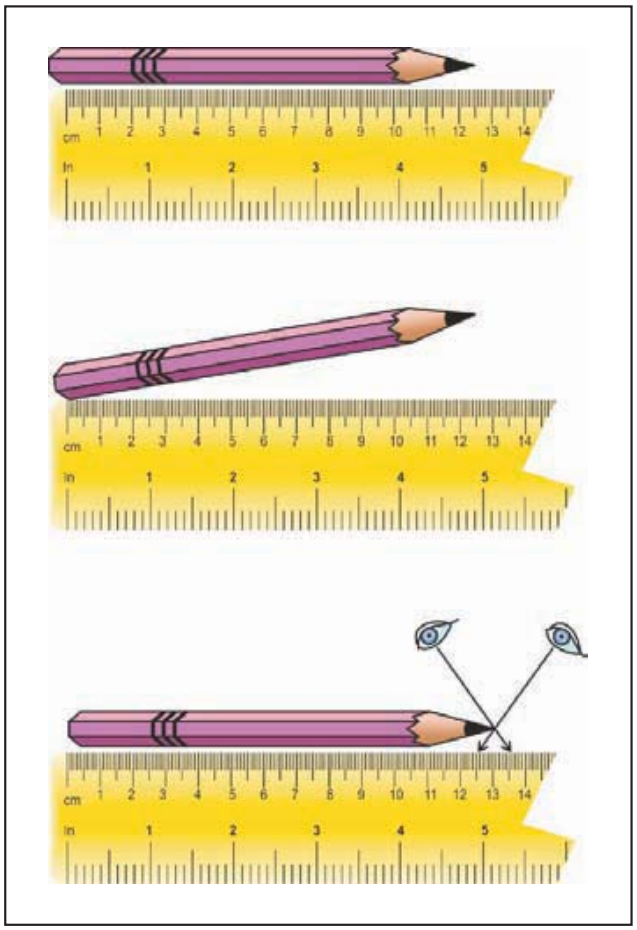
1 light year = 9.46×10^{12} km

Note down from the observation of following pictures that which thing you have to keep in your mind while measuring length of any thing :

Right method



Wrong method

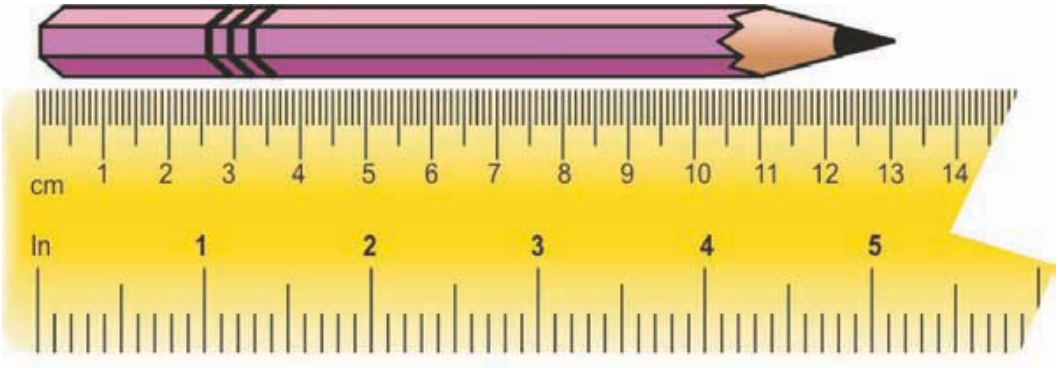


What to do during measurement	Don't do during measurement
1. The starting end of object whose measurement is taken.	1.

What to do during measurement	Don't do during measurement
2. During the measurement, object should be ..... to scale.	2.
3. At the time of the measurement your eye should be...	3.

Adjusting the object as discussed in correct method the digit where other end of object coincide, gives the measure of that object in centimeter. If the other end lies between two embossed digit then calculate numbers of minimum division after first digit. Then the measure is represented in cm-mm or with decimal point.

Measure the length of following object in centimeter and note down it.



Length of pencil ..... cm

Sr. No.	Name of object	Length	Unit
1	Length of the textbook 'Science and Technology'.		
2	Length of your pen/pencil		
3	Breadth of mathematics textbook		
4	The object which you like...		
5	The object suggested by your teacher		

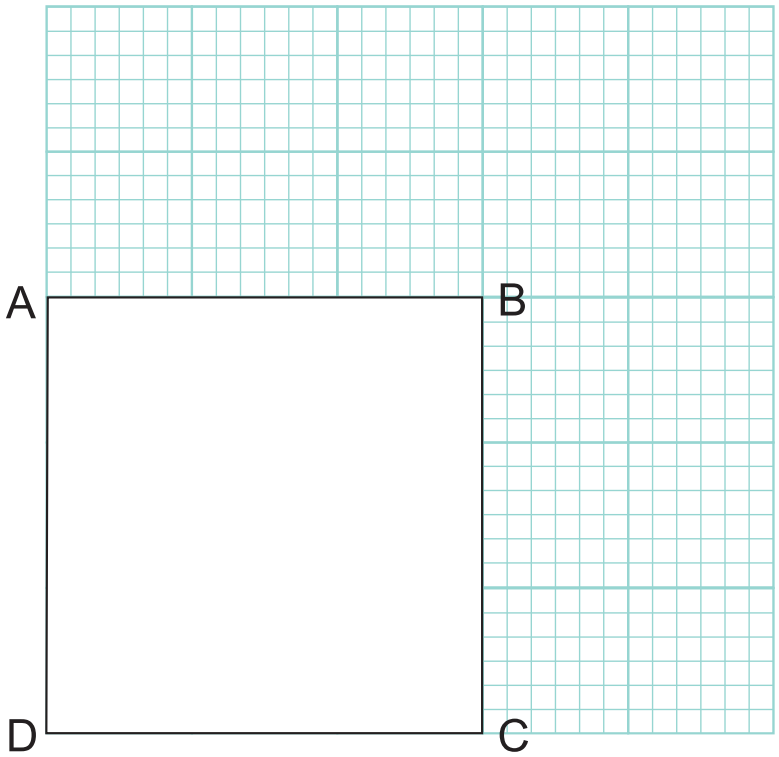
How you will take above observation if your scale is broken at zero ?

What is required ? A graph-paper, three rectangular or square card-piece of different measure.

What to do ?

- ☞ Adjust the piece of card-sheet on the graph-paper as shown in the figure.
- ☞ Draw this borders with pencil.
- ☞ Then remove the piece of card sheet.
- ☞ Name the four point A, B, C, D. Fill the required information in table.
- ☞

Repeat the process for other pieces of card-sheet.



No.	Name	The number of squares in the length of card-sheet	The number of squares in the breadth of card-sheet	Total number of squares occupied by card-sheet
1	Piece 1			
2	Piece 2			
3	Piece 3			

Note down, what is relation between, number of squares in length and breadth and total number of squares occupied by card-sheet ?

If total number of squares occupied by the card-sheet is called area of it in square cm then using length and breadth derive the equation for area.

Area =

The space occupied by any object on the surface is called area of that object. The product of the length and breadth is taken to calculate area. Therefore the unit of area of cm × cm = $(cm)^2$ or square cm, its larger unit is $(meter)^2$ or square meter.

To purchase, the carpet for a room, to buy cloth for uniform, to measure land or form, to fix tiles at home, measure of area is required. Give two more examples where you observed the use of measure of area.

What is required ? Square or rectangle shaped different objects, scale.

What to do ?

- ☞ Collect the objects from your teacher and find the area of those objects.
- ☞ How much time is taken by you to find area, that will be measured by another group.

Name of group	Name of object	Time taken to find area	
		Second	Minute

In this way in your routine life, in many cases you have to measure time. Let's see how this measure is done.

Sit in meditation position.

What to do

- ☞ When your teacher say start the calculation for second as one, two, three by closing your eyes.
- ☞ Stop after one minute when your teacher say.
- ☞ How many seconds you calculated for one minute ?
- ☞ Now calculate the seconds for one minute from the clock to get correct answer.
- ● You will see, 1 minute = ☐ second

You approximate seconds for 1 minute like that in early days when clocks were not discovered people were measuring approximate time with the help of natural phenomenon.

Time duration between two flowering seasons for a tree is approximately one year. Time-interval between two full moon is one month. As per the phase of moon fifteen days interval was decided and two such interval is one month and time-interval between consecutive sun rising is one day. This type of time measuring phenomena was used in early day. Find out such other phenomena and note down.

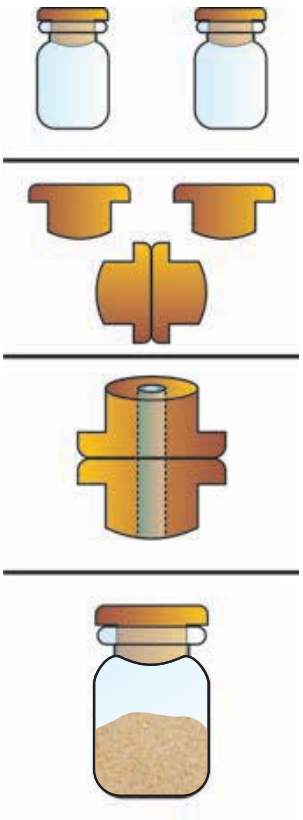
Moreover, the ancient people had developed some time measuring instruments. One such instrument is sand clock. Let's make such sand clock.

Make a sand clock.

What is required ? Two same glass bottles with cork, thin glass tube, sand (or powder of gypsum), gum

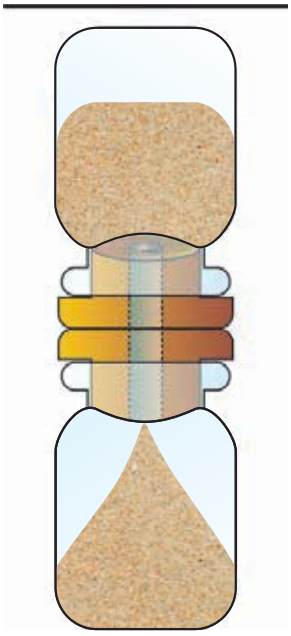
What to do ?

- ☞ Remove the cork of the both same bottles and stick them as shown in figure.
- ☞ From the center of both the cork pass the glass-tube and break its excess part.
- ☞ Fill the sand in one bottle.
- ☞ Insert the cork in it.
- ☞ Fix the another empty bottle on it in inverted position.

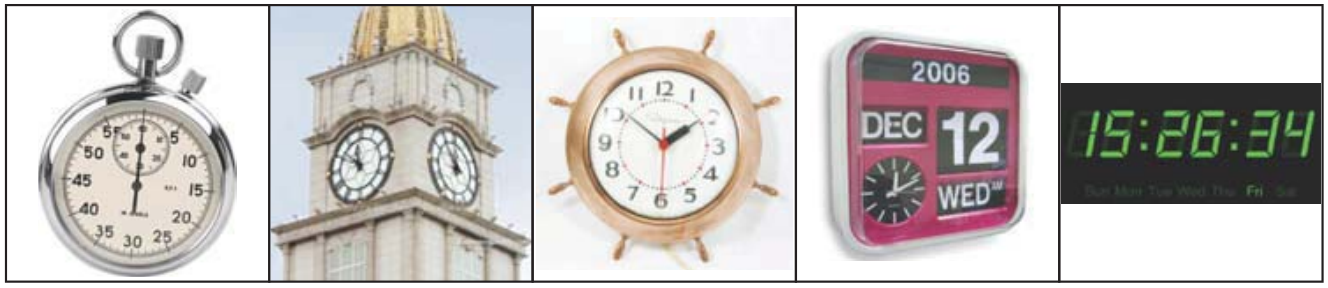


☞ Invert the sand clock and allow the sand to fall from upper bottle to lower bottle. After 1 minute remove the upper bottle and take out the remaining sand from it then again fix it.

Again place it in inverted position and note down the time taken by sand to move in lower bottle. In this way prepare a sand clock of 1 minute.



By inverting this sand clock measure the time to reach the sand in lower bottle. In this way by keeping different amount of sand, the sand clock for different time measurement can be made. When your sports day is celebrated, at the time of running, kabbadi and kho-kho, accurate measure of time is necessary. For this type of accurate measurement digital clock, cell-phone, stop-watch can be used. Different types of watches are shown in the figure. Get the information for those with the help of shown in the following figure. Get the information for those with the help of your teacher or parents.

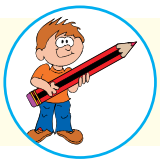


Second is a standard measure of time. Some modern clock can measure time of 1000^{th} part (millisecond) of second. Moreover minute and hour are also unit of measure of time. To measure long time interval, the units like day, month, or year are used. Following are the relation for units.

60 seconds = 1 minute | 60 minute = 1 hour | 24 hour = 1 day | 365 days = 1 year

Using proper instrument and unit, measure the time for your day to day work and note down in the following table :

Sr. No.	Activities in day to day life	Time taken		
		Hour	Minute	Second
1	To brush	00	05	
2	To take bath			
3	For reading			
4	For play a game			
5	For watching TV			
6	To study in school			
7	For breakfast, lunch, dinner			
8	For sleeping			



Q.1 Give answer of the following questions :

(1) Which thing to keep in mind while measuring the length of any onject ?

(2) With the help of which natural phenomena's, one can take idea about the completion of one year ?

(3) Measure the circumference of the trunk of a tree near by your school. Explain how your measure this length.

(4) In the classroom at your seat draw square or rectangle around it and find the area covered by you to seat.

Q.2 Do yourself :

☞ Take thread.

☞ Stretch it from both ends and make red sign at each 10 cm with your sketch pen and scale.

☞ Between two such sign make a black sign at 5 cm.

– In this way make such sign up to 1 meter length

– Keeping some string on both the side to hold it, cut excess string and make knot at both the ends.

– In this way your measuring instrument is prepared, which you can keep in your pocket.

– With the help of this string measure length of any ten objects on the way of your school and note it.

No.	Name of object	Length

Q.3 Can the water-clock be made using plastic bottle and I.V. Set ? How ? Write method of your water-clock and draw the figure.

Unit 8 Simple Machine

Write, which instruments you use, to do following works :

(1) To remove nail from the plank.

(2) To cut cloth.

(3) To sharpen the pencil.

Why you choose particular instrument to do work ?

The instruments with the help of which our work can be easily done are called simple machines.

Simple machines are of six types :

1. Lever :

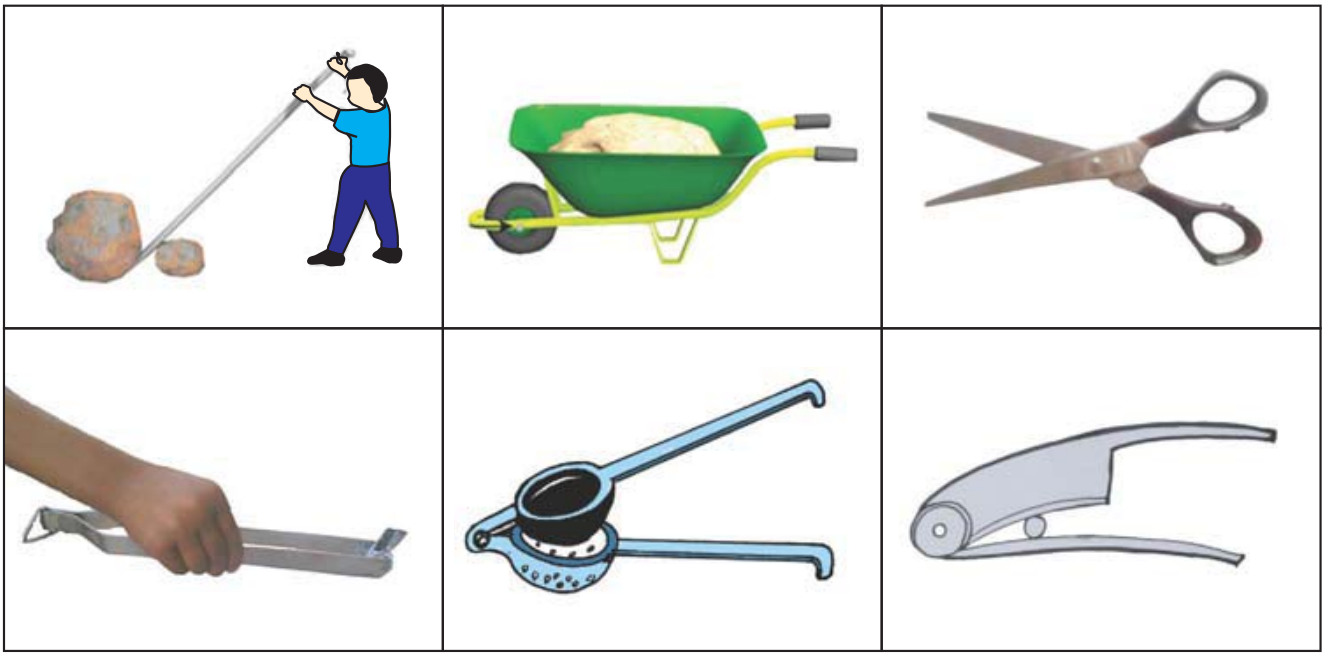
Sometimes we have to lift up or to move the object of more weight then our capacity or sometimes to cut hard object. Let's see how these works becomes easy.

- Take nail-cutter and cut nails.
- Using nail-cutter we can cut nails easily.
- Can we open the bottle of cold-drink, shown in figure with hand ?

- Now open it by using opener.
- How the cold drink-bottle can be easily opened ?

The instrument used to lift up or to move heavy object or to cut hard object using less force is a lever type simple machine.

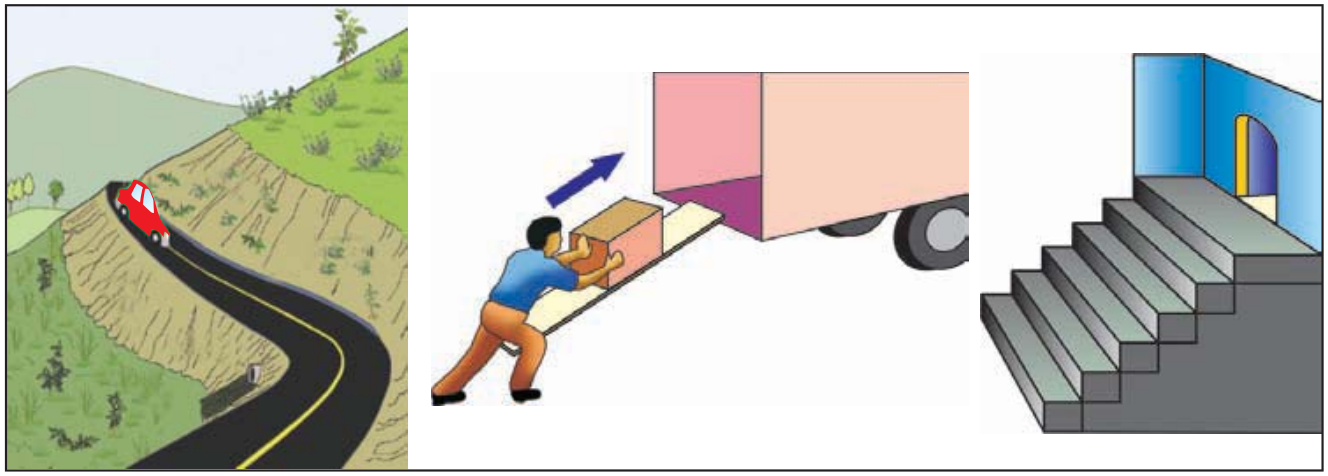
See the following picture of lever and know their uses :



2. Slope :

- ☞ Place bicycle on the veranda by lifting it.
- ☞ Take help of your friend if necessary.
- ☞ Now place this bicycle on the veranda using ramp.

- In which method cycle can be easily placed on veranda, write.



Work can be done easily using slope.

What is required ?

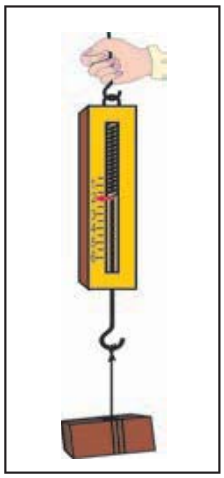
Brick, spring-balance and plank.

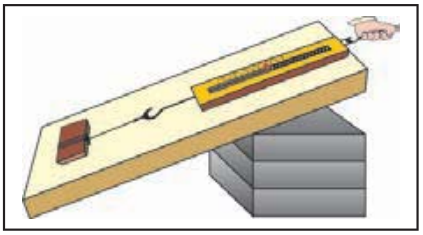
What to do ?

- ☞ Tide a brick with string.
- ☞ Measure its mass using spring-balance and note down.

- ☞ As shown in the figure make a slope with plank and move the brick up to top of the slope using balance and measure it's Mass.

The force required to do work decrease due to slope.





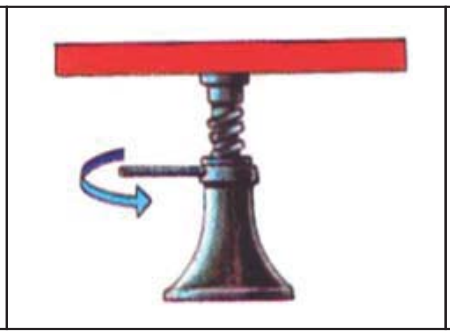
3. Screw :

Make a list, where the screw is used in your class-room.

Why screw is used in all these objects ?

The object can be strongly joined and separated easily using screw.

In the following instruments the principal of screw is used :



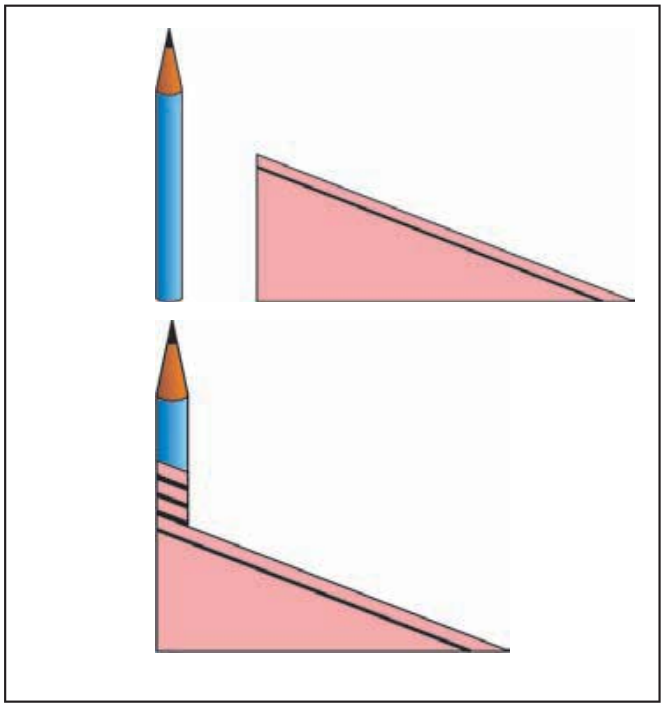
Screw is one type of slope. Let's do one activity to know this.

What is required ?

Paper, pencil, scissor, scale

What to do ?

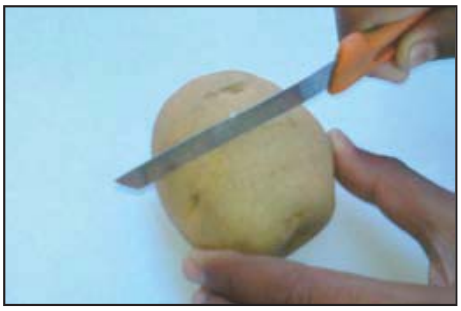
- ☞ Cut a right angle triangle from the paper.
- ☞ Draw a line on the hypotenuse of the triangle.
- ☞ Wrap the paper on the pencil so that the part of paper with line should remain outside as shown in the figure and observe it.

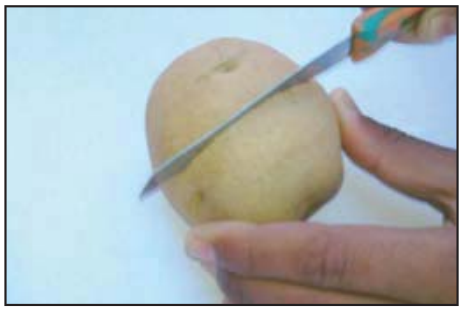


☞ The hypotenuse in right angled triangle is slope. When it is wraped on the pencil its look like a screw.

4. Wedge :

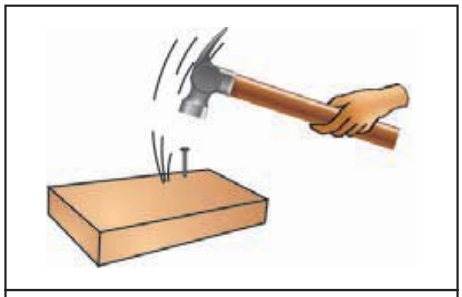
- Take one potato and cut it with blunt side of knife.
- Now cut it with sharpen side.

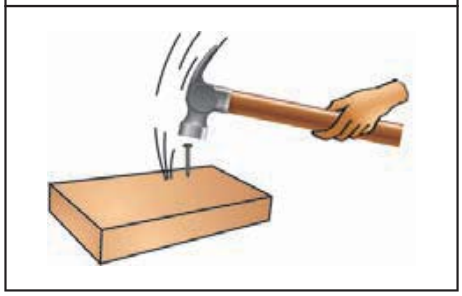




- With which method potato can cut easily ? Why ?

- Take a blunt nail.
- Try to fix it in plank of wood using hammer.
- Take a sharp nail.
- Fix it in the wooden plank using hammer.
- Which nail can be fixed in the wooden plank easily ? Why ?





In the following picture different uses of wedge are shown :

Note other illustrations, in which wedge is used.

5. Wheel and Axle :

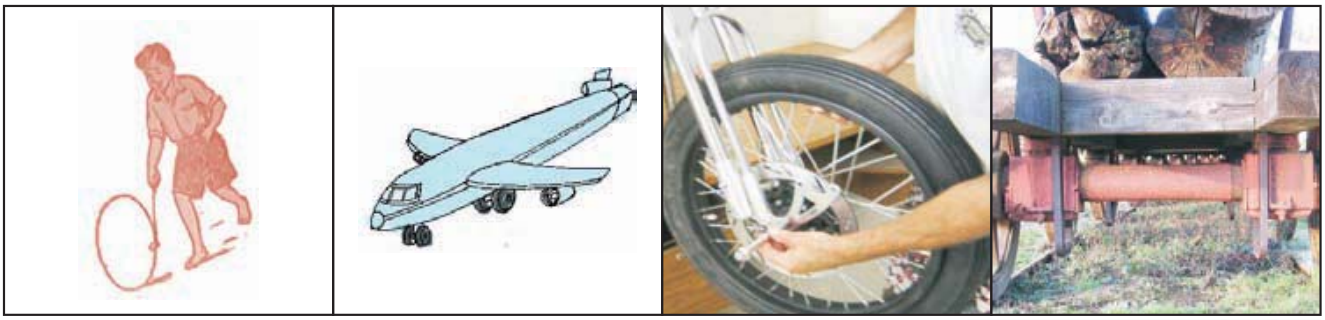
Wheel is very important invention of mankind. To be aware about simplicity of work using wheel, do one activity.

What is required ? To equal match-box, wooden stick as per width of box, two lid of cold-drink bottle, nail and hammer

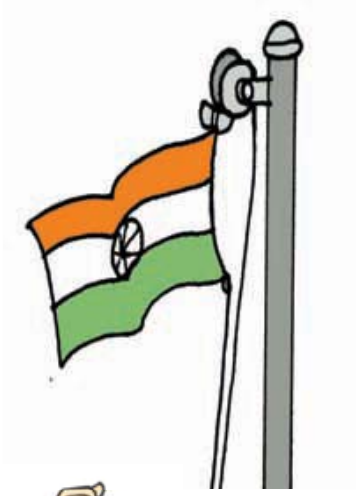
What to do ?

- Take a match-box and pass wooden stick from it as shown in figure.
- Attach lids with holes at both the ends of stick as shown in the figure.
- Stick will be called axis and lid will be called wheel.
- Take another empty match-box.
- Pull both the boxes by placing equal mass on them.
- Which box can be pulled easily ?

Following are the pictures of the axis and wheel :



6. Pulley :



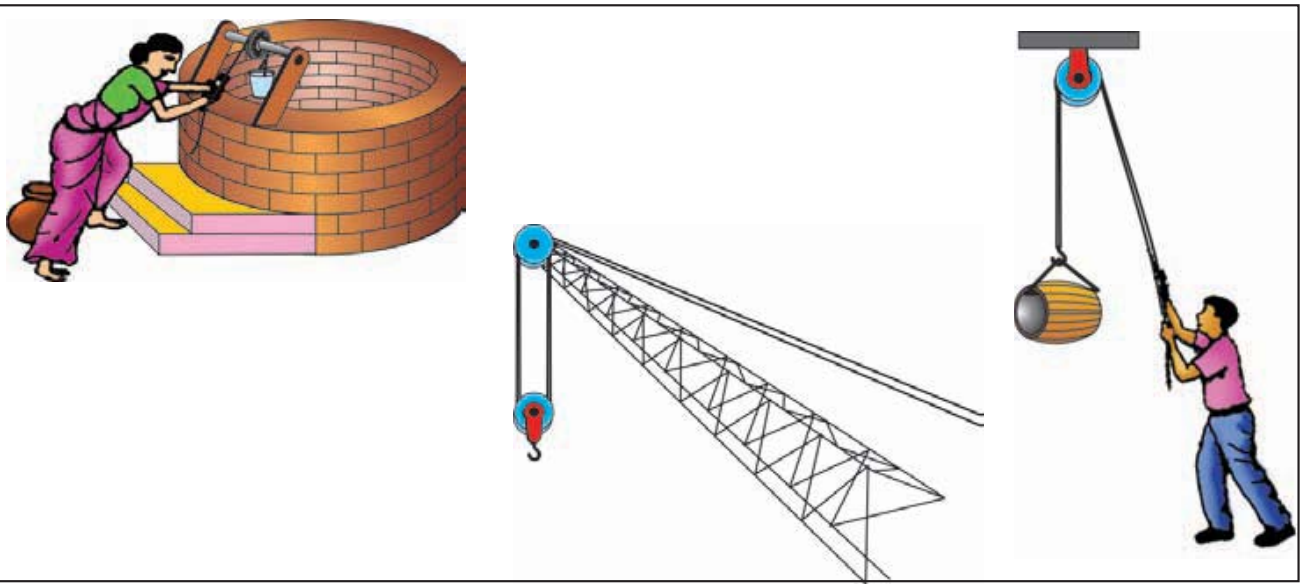
You have to see the use of pulley to hoist national flag. Use of pulley make work easy.

Is the change in force takes place due to use of pulley ?

With the help of bobbin used in sewing machine, make pulley as shown in the figure. Now tide a stone tightly with the thread. Measure mass of it with the help of spring-balance.

Tide other end of the thread with spring-balance. Now pull the stone using pulley as shown in figure. Note down the mass measured by spring-balance when it is pulled using pulley.

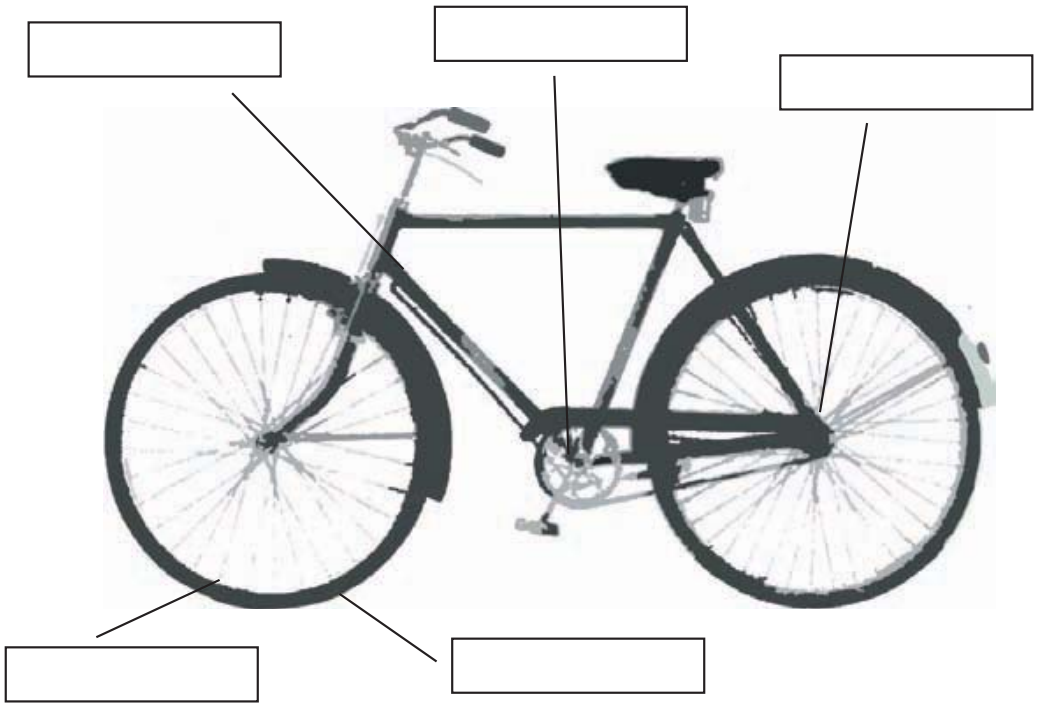
Use of pulley does not decreases the force required but it change the direction of force.



For simplicity and speed of work, we use such instrument in which two or more than two simple machines are used.

Bring the bicycle in your classroom and observe its different parts.

Which types of simple machines are the following parts of bicycle, write it ☐ (In box).



The machine made with the help of two or more than two simple machine is called complex machine. Prepare list of such complex machine.

Q.1 Give answer in short :

(1) Give name of five simple machines used in kitchen.

(2) Write name of five simple machines, which you use in you routine life.

Q.2 Give reasons :

(1) Wheel is very important simple machine.

(2) To load the truck a plank is used.

Q.3 List the type of simple machine used in the different part of sewing machine shown in the figure :

No.	Type of simple machine	Name of part of sewing-machine

Q.4 What is your suggestion to simplify the work of person shown in the picture ?

Q.5 Do as directed :

1. As shown in the picture prepare a card using large box.

2. As shown in the figure prepare a cart using old slipper.

Unit 9 Light

Two friends were finding something below the light pole of village/city in evening time. At that time Meena was passing from that place. Meena asked, what are you finding ?

One answered that, we are finding the coin of 1 rupee of my friend lost before some time. Meena said, let I find also. After some time to one was able to find a coin, so Meena asked, rupee was lost here ?

One friend said, "No, it was lost in that dark corner."

Meena asked with surprise, then why you are finding it here ? Both friends laugh loudly on Meena's talk and told her, see there is dark and here is light. Meena told, "Yes, you are right, but you have to find the think where it is lost! Come on, I help you."

- What Meena have to do to find rupee in dark corner ?

- Why ?

- Which thinks will be helpful to Meena to light up ?

Sources of light :

				
Sun	Bulb	Lantern	Candle	Fire

Thing in our list produces light. So are sources of light. Some items in list produces light naturally, are called natural sources. Some items produces light artificially are manmade. So are called artificial sources of light.

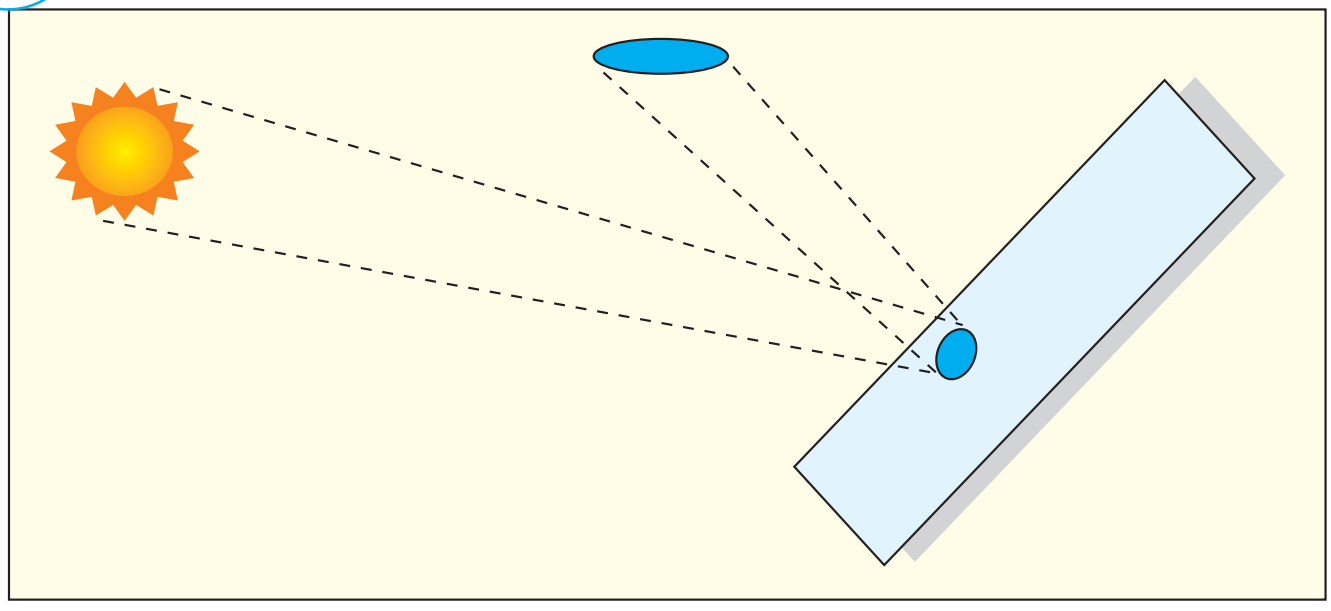
Now, write the sources of light in following table :

Natural sources	Artificial sources

- Do you know ? Moon is not a source of light!

Moon is not a source of light; it does not produce light, but sun light incident on it. Light reflected from it reaches to us. So it seems bright. Let us try to understand this with activity.

What is required ? Mirror



What to do ?

- ☞ Go in the ground with mirror.
- ☞ Using mirror obtain the reflected spot of sun in your classroom. Keeping mirror stationary in the ground observe it from the reflected spot in the classroom.
- ☞ From where you see the light is coming ?

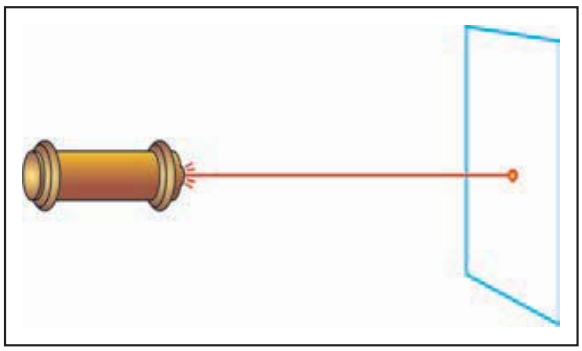
☞ Can the mirror be said a sources of light ?

☞ We feel that mirror produces light, but sunlight incident on it which after reflection incident on wall.

- **The light of sun which incident on the Moon is not totally reflected to the Earth but 93 % absorbed and only 7 % reaches to the Earth.**
- **A glow warm is cold natural source of light It contains the enzyme named luciferin, which chemically react with the element named lucin in air and produce light.**

What is required ?

L.E.D. (Light Emitting Diode) Torch



What to do ?

- ☞ Take L.E.D. Torch.
- ☞ Using it incident the light on the wall of your classroom.
- ☞ Note down your observation.

- ☞ Is the bright circular spot seen on the wall ? Yes / No
- ☞ Is the beam of light seen between wall and torch ? Yes / No

Light is not seen, but the object is seen when light incident on it.

What is required ? Rubber-tube of length 2 foot, candle and match-stick.

What do to ?

☞ First light up the candle.

☞ By keeping the rubber-tube straight. See the flame of candle through it.

☞ Is the flame seen ? Yes / No ☐

- Now, bent the rubber-tube from centre as shown in figure. See again the flame of candle.
- Is the flame of candle seen ? Yes / No ☐
- **Why ?**

Here different objects are placed in three different polythene bags. Observe the bags.

What you see in the bag ? Note down here.

The bag in which objects are seen is transparent. The bag in which objects are not seen is opaque and the bag in which objects are seen faint is translucent.

– The object through which light can pass is called **Transparent object.**

– The object through which light cannot pass is called **Opaque object.**

– The object through which light can pass partially is called **Translucent object.**

The air and gases in it, can be considered as transparent because, from it total light passes. For all other objects more or less light is reflected and reaches to our eye. So we can see that object. Then also the object through, which we can see is considered as transparent object.

List out such objects in your surrounding in the following table :

Transparent object	Opaque object	Translucent object

What is required ? Transparent plastic and torch

What to do ?

- ☞ Take a torch. Keep transparent plastic against it and make spot on wall.
- ☞ Now, fold the plastic one time and observe the spot on the wall and note down the observation.

Then again fold the plastic and observe the spot on wall and note down the observation.

Repeat this process five to six times. Each time note down your observation.

You can see that as the plastic is folded more times the spot on the wall becomes faint and when it is disappeared the back part becomes darken.

We observed that, when light is obstructed by object the shadow of object is formed. Normally the shadow is in opposite direction of light.

See following pictures. By making such shapes are formed different figures of shadow.

If the opaque object is between us and light and the shadow of that opaque object incident on our eyes then we can't see the source of light.

Some important phenomena's takes place in our surrounding due to shadow. Like solar eclipse, lunar eclipse etc.

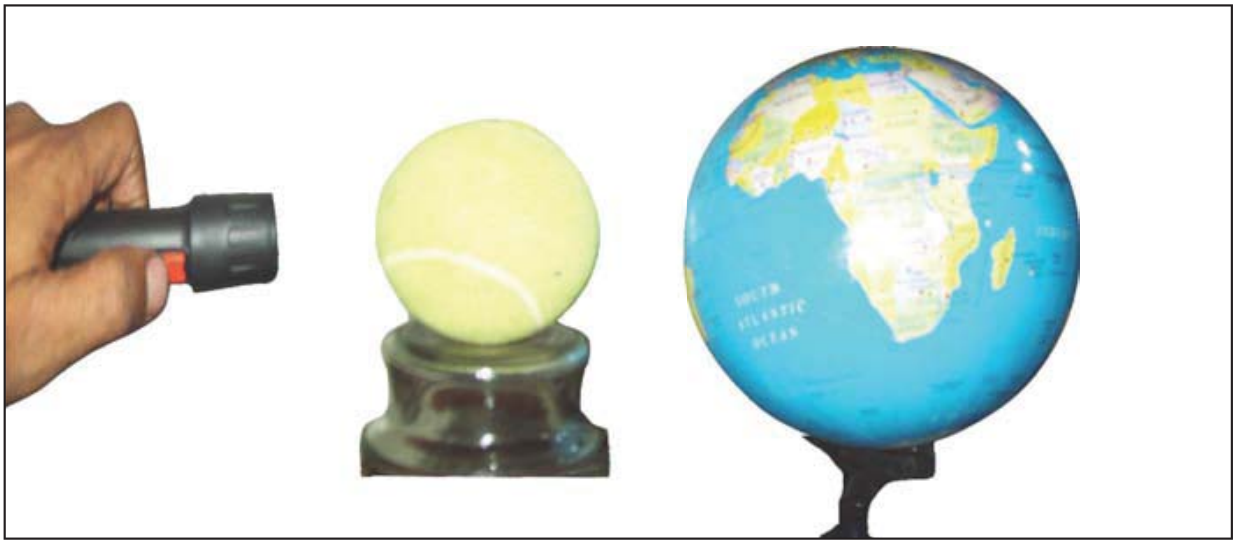
What is required ? Torch, cricket ball and a model of Earth sphere.

What to do ?

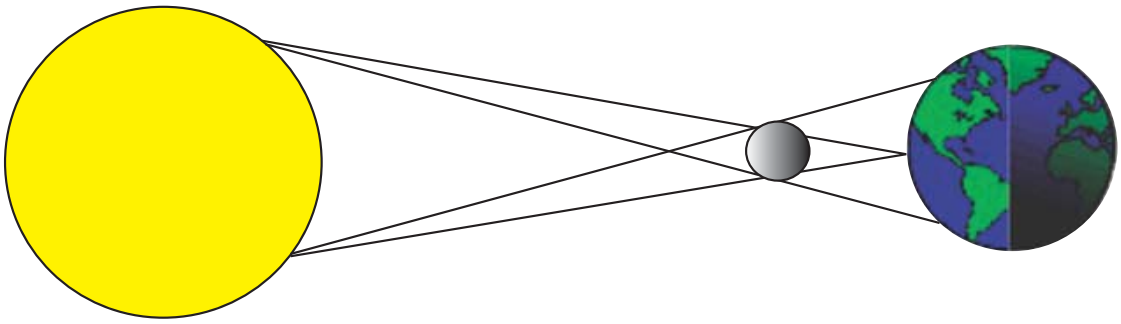
☞ Light up the Earthsphere using torch as shown in figure.

Then after place cricket ball between lighten torch and Earth sphere.

Adjust the ball between Earth and torch in such a way that shadow of ball incident on the sphere of Earth.



If any planet or moon is between earth and sun and it's shadow incident on the earth then the people in that shadowed part can't see the sun. This phenomenon is called solar eclipse.

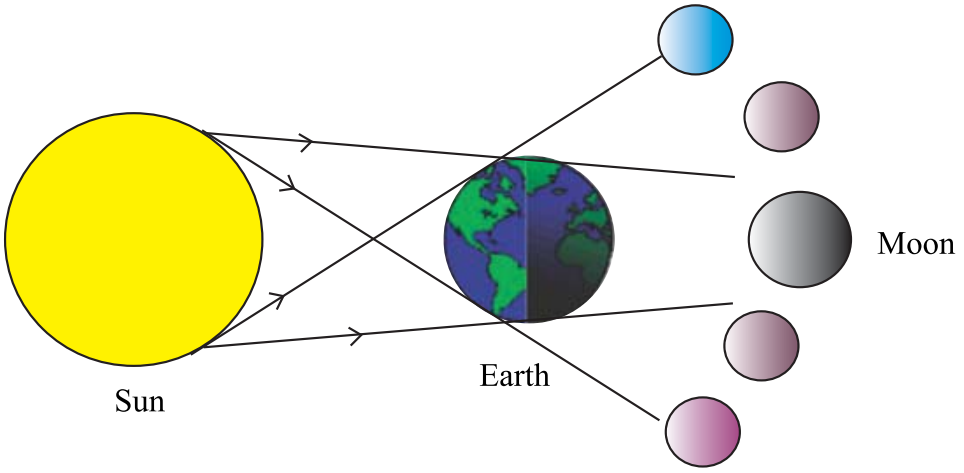


Sun **Moon** **Earth**

Earth is revolving round the sun and moon is revolving round the earth in space. In this phenomenon some time moon comes between sun and earth. When moon is on the path of sunlight, the light is obstructed and shadow of moon incident on the earth. The region of the earth on which shadow of moon incident, the people of that region can't see sun. This phenomenon is called solar eclipse. Solar eclipse takes place on no moon day.

Why solar eclipse does not take place on each no moon day.

Why moon covers entire sun being very small compared to sun ?



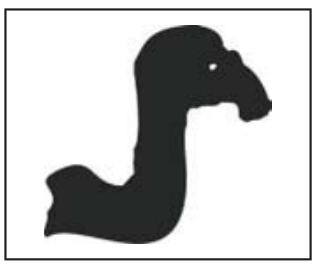
Observe the figure of lunar eclipse. Which phenomenon takes place during lunar eclipse ? Note down it in detail :

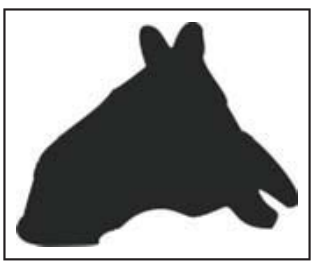
Q.1 Observe the objects in your school and list our in following table :

Transparent objects	Opaque objects	Translucent objects

Q.2 Prepare a list of artificial sources of light in your house.

Q.3 Form the shapes of shadow with the help of fingers of your hand as shown in following pictures :





Q.4 Play a game to put leg on the shadow of each other with your friend.

Unit 10 Sound

You enjoy clapping. Now, open a palm of your one hand. Clap with one finger of your other hand. Then clap with two fingers. Then clap with three and four fingers. Now, clap all the friends jointly. Every time different sound heard ? We hear different sounds in our surroundings. We can get information about sound after hearing it. Like, sound is of what ? From where it is produced ?

What to do ?

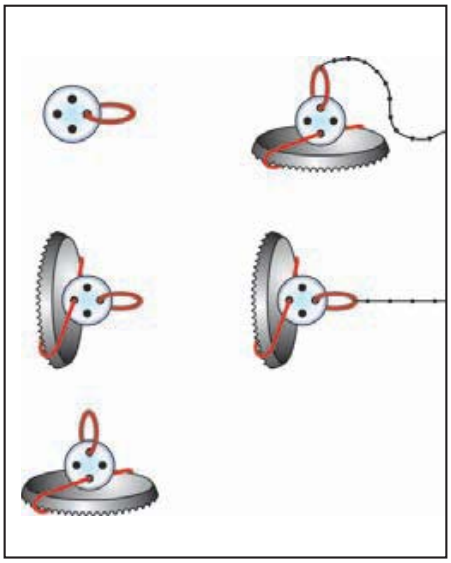
- ☞ Close your eyes.
- ☞ Peacefully here the sounds from your surroundings with concentration.
- ☞ Which sounds you hear ?
- ● Prepare the list of heard sounds :

e.g. Sounds of fan		

- ● Produce different sounds using objects with you. What you done to produce sound ?

What is required ? Button, lead of cold drink-bottle, thread and rubber-band.

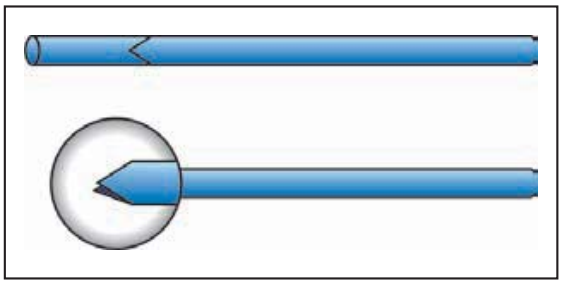
What to do ?



- ☞ Pass the rubber from one hole of button. Make knot of both the ends of rubber.
- ☞ Keep the button on the upper part of lead.
- ☞ As shown in figure pass another rubber from the other hole and tide a thread with it.
- ☞ Make two-three knot at different distances of thread.
- ☞ Hold the lead in your one hand. Pull the thread from the knot and release the rubber.
- ● Repeat the process two-three times. What happens when the knot is released from the fingers.

What is required ? Straw, scissor

What to do ?



- ☞ Take a straw.
- ☞ Cut it in 'V' shape from one end.
- ☞ Compress the 'V' shape of straw by teeth.

What happens when you blow the air in the 'V' shaped part ?

Now, keep 'V' shape of part outside and suck the air from another side and now observe the 'V' shape. What happens ?

What is required ? Balloon

What to do ?

- ☞ Take a balloon.
- ☞ Blow the air in balloon.
- ☞ Now, slowly remove the air from balloon.
- ☞ Again blow air in balloon.
- ● Now, softly remove the air by stretching the mouth of the balloon with pinch of the fingers. Now, observe the opening of the balloon and note down.

What will you do ?

Do the following things :

(1) Rub palm of your hands.

(2) Keep the pencil horizontal and rub on your book.

(3) Rub the compass-box on tiles.

There are three basic reasons for producing sound :

(1) By colliding two things.

(2) By vibrating the things.

(3) By rubbing the things.

How the sounds are produced by following musical instrument ?

- Guitar _____
- Tabla _____
- Harmonium _____

What to do ?

- How the sound is produced by musical instruments which you see ?
- Write the name of musical instrument in following table and fill another information.

Name of musical instrument	Reason of a producing sound		
	By colliding	By vibrating	By rubbing

What is required ? String, match-boxes and empty ice-cream cups and match-sticks.

What to do ?

- ☞ Take two empty cups.
- ☞ Make hole in the base of ice-cream cup.
- ☞ Pass string from the base hole of a cup.
- ☞ From the inside of both cup tie a knot of string with match-stick.
- ☞ Now this telephone is ready.
- ☞ Now, talk with your friend by a telephone.

- Can you hear clear sound ?

- By removing cup from ear, can you hear sound ?

- While your friend is speaking, touch the string lightly, what you feel ?

- Keep the string of telephone loose, can you hear sound ?

- How the sound of your friend reaches to you ?

Do yourself :

Now, prepare a telephone with your friend in this way. Now, do something by which three or four friends can talk together.

What is required ? Long stick and pencil

What to do ?

- ☞ Take one long stick.
- ☞ Keep one end of stick near your ear.
- ☞ Now tell your friend to tapping pencil slowly on stick.
- ☞ Can you hear sound ?

What is required ? Bucket, two small stones and water

What to do ?

- ☞ Take a bucket.
- ☞ Fill the water in the bucket.
- ☞ Ask your friend to keep his ear on the outer surface of the bucket.
- ☞ Now, take the stones in your hands and collide the stones inside the water 2-3 times.
- ☞ Can the sound be heard?

- ● By passing through which medium sound is heard ?

- Through which medium you can hear the sounds in your surroundings ?

In these ways the sound can pass through solid, liquid and gas medium. **Hope you understand that sound require medium to propagate.** While the sound cannot propagate through vacuum.

Through which medium sound is heard clearly ?

Why can't we hear the blasts on the surface of the sun and the moon ?

What is required ? Small ball

What to do ?

- Take one ball. Throw it on the wall.
- What happens ?

The way in which the ball comes back, in the same way, **the sound waves comes back after colliding with the wall or other surfaces and we can hear the sound again. That is called Echo.**

Speak loudly in the classroom, auditorium or the prayer-hall of your school. Can you hear your words again ?

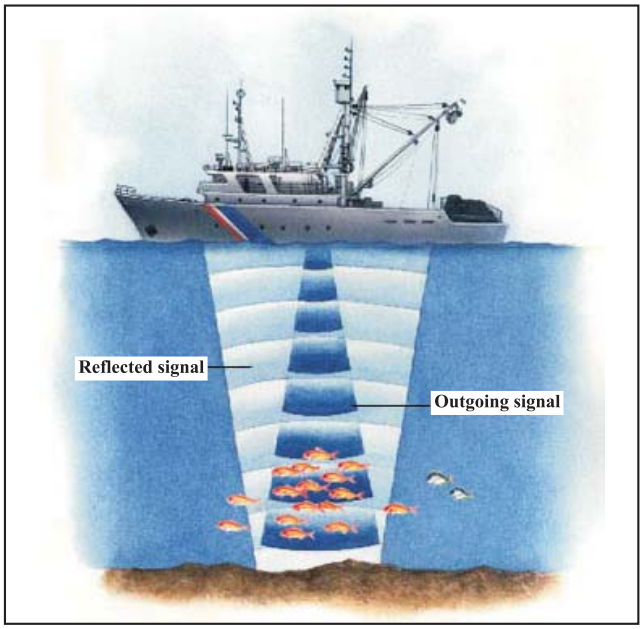
When you go to any hill-station and if you see any hill in front of you, then speak loudly. After some time can you hear your sound back ?

Why sound doesn't echo in the small room ?

If the time difference between the original sound and the echo is more than $\frac{1}{10}$ second than both can be heard separately. The speed of sound is 330 meter per second. So the distance of 11 meters is required for the time more than $\frac{1}{10}$ seconds. In small rooms the distance is less than 11 to 17 meters, due to this reason the sound reflecting from the wall or any other substance mixes with the original sound. Thus, there is no echo.

Uses of echo :

To measure the depth of the sea, to find the minerals present inside the earth or at the bottom of the sea. The sound waves are sent in, the sea by use of the loud speakers and in the earth by blast. The depth of the sea or the layers of the minerals present at the bottom layer can be found by measuring the time taken by the sound waves to travel back.



What is required ? Chits of papers on which different words are written.

What to do ?

- ☞ All friends speak the written words together loudly.
- ☞ Can you hear the different words clearly ?

_____

_____

- ☞ Why we cannot hear the words clearly ?

We like to hear the melodious voice, but we don't like to hear random voice. Thus, the voice which we don't like to hear is called noise.

Noisy places

Note down the places where there is noise-pollution.

Effect of noise :

(1) Due to noice the nature of the person becomes irritating and person may get headache.

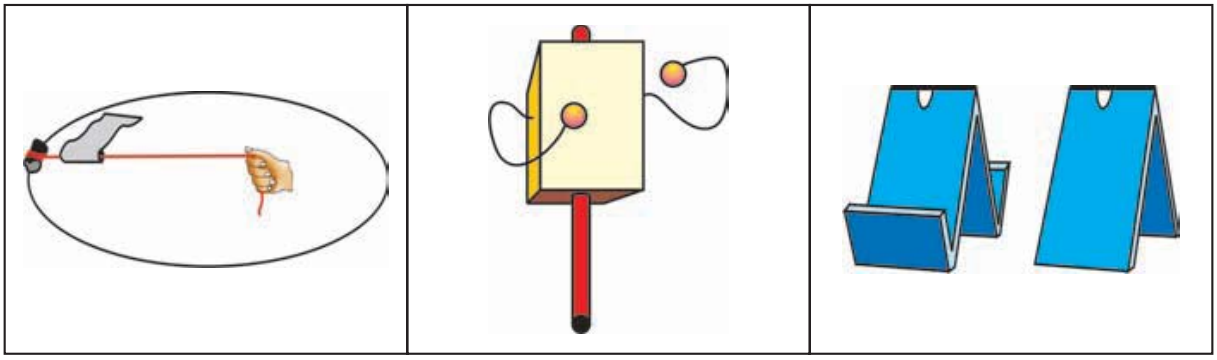
(2) To be in noisy atmosphere for long time cause hearing defect.

(3) We can't do work with concentration because of noise.

Cotton, cloth, thermocol, paper and soil absorbs noise. In the large auditorium and cinema halls, there are sound absorbing materials and walls are kept rough, so that sound doesn't echo. To decrease the noise due to the vehicles, trees are planted on both side of the roads.

What can we do for the protection from noise ?

Q.1 Do the following activities as shown in the figures :



Q.2 Prepare the list of sounds you like and sound you do not like.

Sound I like	Sound I don't like

Q. 3 What will you do to reduce sound in the vegetable market ?

Q. 4 By using following things prepare a toy as shown in figure.

Outer shall of coconut, paper, gum, small stick, thin wire, nails, bamboo sticks.