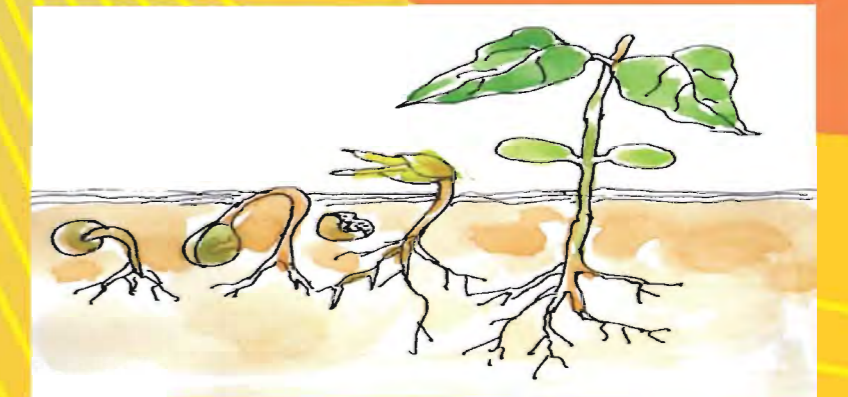


SCIENCE AND TECHNOLOGY

6

SCIENCE AND TECHNOLOGY

Standard 6
(Semester II)



Gujarat Council of Educational
Research and Training
Gandhinagar



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Gandhinagar

Our Ayurvedic Heritage



Sushruta

Sushruta

Sushruta, known as the father of surgery, practiced his skill as early as 600 B. C. He used cheek skin to perform plastic surgery to restore or reshape the nose, ears and lips with incredible results. Modern plastic surgery acknowledges his contributions by calling this method of rhinoplasty as the Indian method.

The Hindus (Indians) were so advanced in surgery that their instruments could cut a hair longitudinally.

Sushruta worked with 125 kinds of surgical instruments, which included scalpels, lancets, needles, catheters, anal speculums, mostly conceived from jaws of animals and birds to obtain the necessary grip. He also defined various methods of stitching: the use of horse's hair, fine thread fibres of bark, goat's gut and ant's head. Sushruta describes the details of more than 300 operations and 42 surgical processes. In his compendium Sushruta Samhita, he minutely classifies surgery into 8 types:

1	आहार्यम्	Aahaaryam	=	Extracting solid bodies
2	भेद्यम्	Bhedyam	=	Excision
3	छेद्यम्	Chhedyam,	=	Incision
4	ऐष्यम्	Aeshyam	=	Probing
5	लेख्यम्	Lekhyam	=	Scarification
6	वेद्यम्	Vedhyam	=	Puncturing
7	विश्राव्यम्	Vishravayam	=	Evacuating fluids
8	सीव्यम्	Sivyam	=	Suturing

The ancient Indians were also the first to carry out amputations, caesareans and cranial surgeries. For rhinoplasty, Sushruta first measured the damaged nose, skillfully sliced off skin from the cheek and sutured the nose. He used medicated cotton pads to heal the operation.

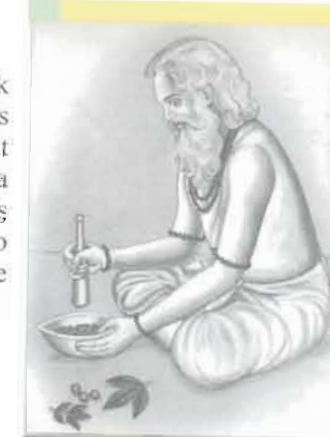
"The surgery of the ancient Indian physicians was bold and skillful. A special branch of surgery was devoted to rhinoplasty or operations for improving deformed ears, noses and forming new ones, which European surgeons have now borrowed." - Sir W. Hunter, British Surgeon, (1718-1783)



Charaka-Founder of Indian Medicine System

Charaka

He is the person after whom the Ayurvedic text Charak Samhita is known. Though the sketch shows Charaka, there is a dispute over whether Charaka is a proper name or whether it represents a group of people, especially as the word Charaka stands for the roving physicians. One of the interpretations is that Charaka was a scholar belonging to the Charaka sect, who enlarged and improved the work of Agnivesa Tantra, the original version of the text Charak Samhita.



Charaka



A set of instruments used by Sushruta

ગુજરાત શૈક્ષણિક સંશોધન અને તાલીમ પરિષદ, ગાંધીનગરના પત્ર-ક્રમાંક
જસીઈઆરટી / અભ્યાસક્રમ / 2013 / 20335 તા. 10-03-2013 થી મંજૂર

Science and Technology

Standard 6

(Semester II)



PLEDGE

India is my country.

All Indians are my brothers and sisters.

I love my country and I am proud of its rich and varied heritage.

I shall always strive to be worthy of it.

I shall respect my parents, teachers and all my elders and treat everyone with courtesy.

I pledge my devotion to my country and its people.

My happiness lies in their well-being and prosperity.

Price : ₹ 27.00



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PREFACE

The National Curriculum Framework (NCF) 2005 and the Right to Education Act (RTE) 2009 recommends connecting knowledge that is provided in school to the life outside the school. This principle marks a departure from the legacy of book is learning which continues to shape our education system and is creating removes a huge gap between the school, home and community.

The syllabi and textbook developed on the basis of above principle signify an attempt to implement it with a considerable change in the textbooks, teaching learning methods, approaches etc. Such textbooks will provide the scope to the students to learn individually, in pair, in group and as a whole class and provide self learning, improve the application and consolidation abilities of the children. In such a scenario, the teacher will be just an initiator, facilitator and guide and will create learner dominant classes.

During the process of designing and developing the textbooks, the core group personnel coordinators, writers and reviewers got a lot of inspiration and motivation from the Chief secretary of Elementary Education.

Also, the guidance from IGNEU and co-operation of UNICEF was easily and continuously available to the group during the entire process of developing the textbooks. After implementing the textbooks as a part of the pilot study, due efforts were done to make it faultless. Now, it is in the hands of the users and beneficiaries.

GCERT welcomes constructive and creative comments and suggestions which will be useful to undertake further revision and refinement.

M. T. Shah

Director

Gujarat Council of Educational
Research and Training
Gandhinagar

Date : 31-7-2013

H. K. Patel GAS

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FUNDAMENTAL DUTIES

It shall be the duty of every citizen of India :*

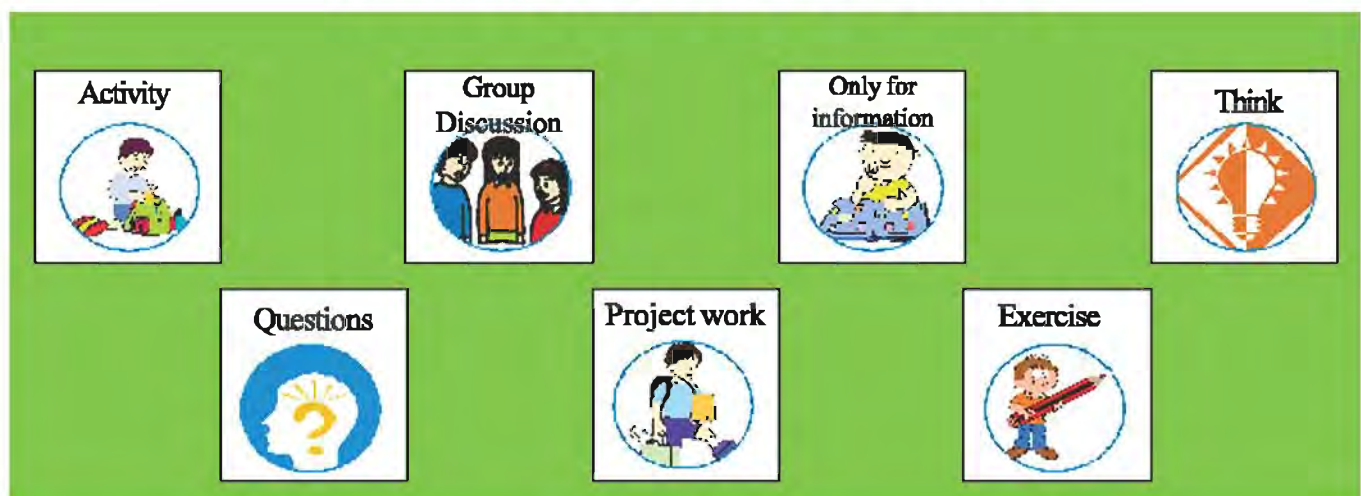
- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend 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 or our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers and wild life, 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.

*Constitution of India : Section 51-C

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Identification of signs used in this textbook.

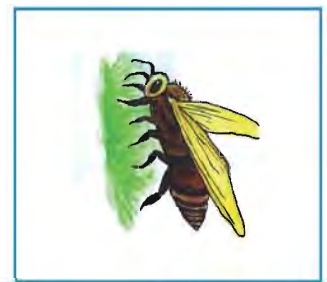
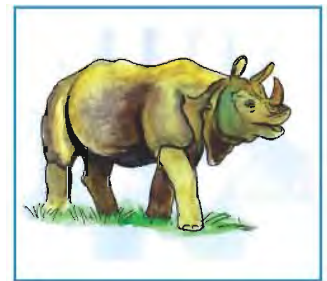


1 Animal World








Observe the given pictures. You may have seen many of these animals or you may have heard about them. Prepare a list of animals having given characters after observing the pictures.

Sr no.	Type	Names of Animals
1.	Living in forest	_____
2.	Living in village	_____
3.	Living in water (Aquatic)	_____
4.	Flying in the sky	_____
5.	Living in burrow	_____
6.	Having two legs	_____
7.	Having four legs	_____
8.	Having six legs	_____
9.	Having eight legs	_____
10.	Having more legs	_____
11.	Devoid of legs	_____



1 ♦ Animal World

Sr no.	Type	Name of Animal	
12.	Herbivores		
13.	Carnivores		
14.	Omnivores		
15.	Having horns		
16.	Having ears		
17.	Without ears		
18.	Laying eggs. (Oviparous)		
19.	Giving birth to young ones. (Viviparous)		
20.	Having fingers		
21.	Having hoof		
22.	Drinking water with lips		
23.	Drinking water with the tongue		
24.	Having eye lashes		
25.	Without eye lashes		

1 ♦ Animal World




Sr no.	Type	Name of Animal	
26.	Having hairs	_____	
27.	Having mammary glands (Mammals)	_____	
28.	Having nose	_____	
29.	Nocturnal	_____	
30.	Having tail	_____	
31.	Without tail	_____	
32.	Having bones	_____	
33.	Without bones	_____	

Figure 1.1



You have prepared list of many animals, birds and insects, Is any name of animal repeated in that list? Why? discuss it.

1 ♦ Animal World



Animals having pinna are viviparous. While others lay eggs.

Most of the animals are vegetarian (Herbivores) who drinks water using their lips.

Most of the animals are non vegetarian (Carnivores) who drinks water using their tongue.



Prepare a coacher

What is required?

A transparent plastic glass, straw, cotton cloth, scissors.

What to do?

- Take a pair of straw. Take one strow with 7 cm long and another 4 cm long - longer than the glass.
- Tie piece of cotton cloth on the lower end of the long strow.
- Take a transparent plastic glass.
- Insert the strow in the glass from the cotton cloth tied on the top of the glass as shown in the figure.

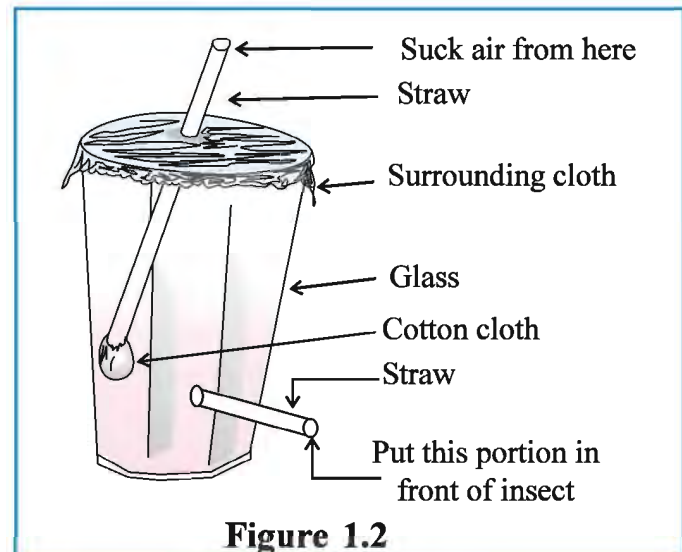


Figure 1.3

- Now tie a cotton cloth surround its open end.
- Now arrange the small straw at the bottom of the glass as shown in the figure 1.2
- Now Coachr is ready.

1 ♦ Animal World

- Put the lower straw near on insect and absorb air from upper straw as shown in the figure 1.3,the insect will immediately come into the glass.
- Observe this insect.



Note your observation in the following table :

Name of the insect	Colour	Does it have wings? If yes, than what is its colour?	Number of legs	From where we get?	Habitat

1 ♦ Animal World



Complete the following project sheet 1, 2 and 3 along with the previous table :

Project sheet-1

Name of the observed animal colour

How many legs does it have?

Does it have a tail? If yes,what is the approximate length of it?

What is its diet?

Other characteristics

Usefulness.

Project sheet-2

Name of the observed animal colour

How many legs does it have?

Does it have a tail? If yes,what is the approximate length of it?

What is its diet?

Other characteristics

Usefulness.

1 ♦ Animal World

Project sheet-3

Name of the observed animal colour

How many legs does it have?

Does it have a tail? If yes,what is the approximate length of it?

What is its diet?

Other characteristics

Usefulness.



Answer the following question after discussion :

1. What happens,if there is no cow or buffalo in the village?

2. What happens,if there is no dog found in your village or city?

3. What happens,if there is no ant?

4. What happens,if there is no animal?



Thumb impression is taken in place of signature of illiterate people. Why? Discuss it and note down.

1 ♦ Animal World



What is required? Stamp Pad, Magnifying glass

What to do?

- Take thumb impression of you and your friend in the below given space and observe them with magnifying glass.

Impression of your right thumb

Impression of right thumb of your friend

Are both the impressions similar?

Thus, the finger print of two persons are neve similar.

Now prepare diagrams of different animals using fingerprints.




			
			

Figure 1.4

1 ♦ Animal World

In short, variety of animals are found in animal kingdom. Identify the animal observing the incomplete picture and write their names.

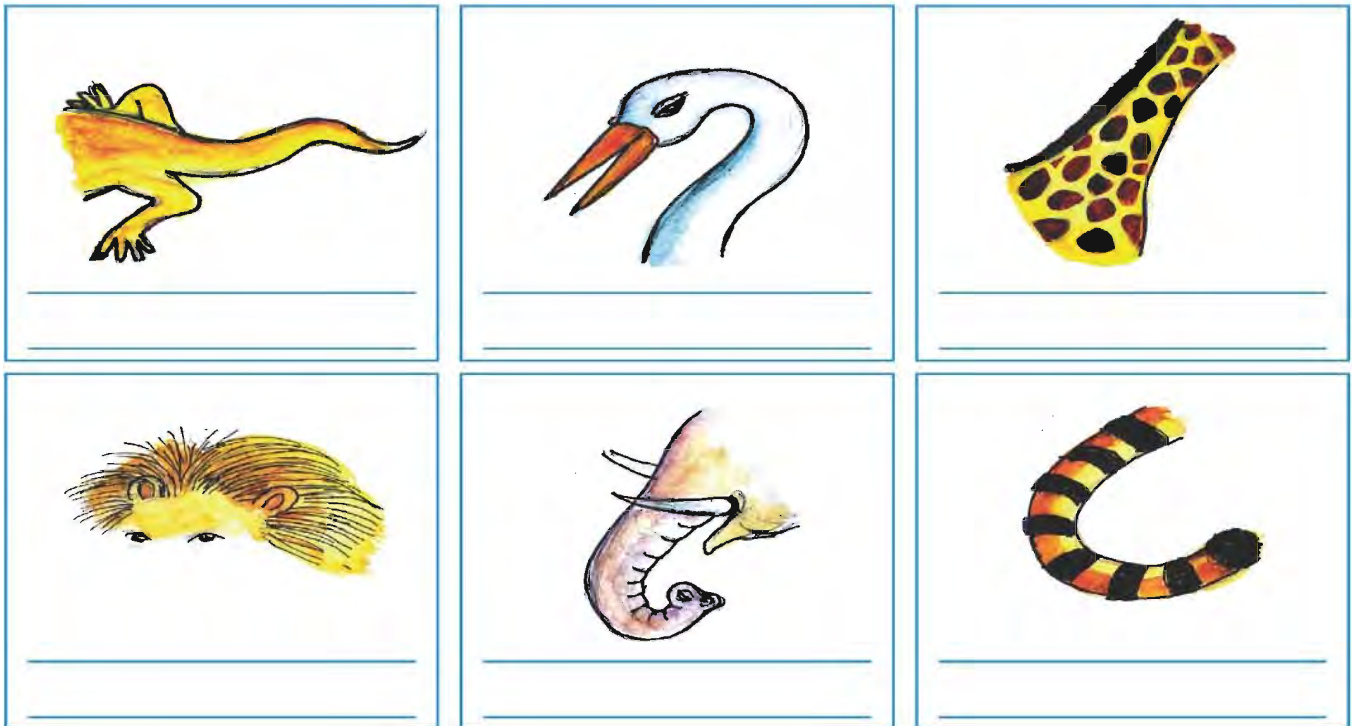


Figure 1.5



First discuss with your friends and note down the puzzles which includes the name of animals or birds.

1

2

3

4

1 ♦ Animal World



A thought comes to my mind.....

1. Weather frog and crocodile are aquatic animal or terrestrial animal?

2. Weather a bat is an animal or a bird?

3. Does the tail of a lizard grow again if it is cut?

4. You may have the knowledge of such other animals. Make a note of such animals.

Now you may have got the idea how big and diverse is the animal kingdom. An animal is different from the other animals of its own species.

Requirements.

What is required?

What to do?

- Collect five leaves having similar shape, colour and size.
- Note down the names of two children who appear same/similar/alike.

• Could you do the above activity? Why?

• Could you not able to do above activity? Why?

1 ♦ Animal World

- What have you concluded through the above activity?

Thus animals show diversity. Animals from same species also show diversity. Have you ever found two identical persons? Discuss the similarities and dissimilarities among you and your family members and note down them.

Similarities	Dissimilarities

Get the booklet 'Animal World' from your school library and discuss about their food.



- Q.1** Mention the names and usefulness of the animals found in your surroundings.
- Q.2** Prepare a list of burrowing animals and animals without legs.
- Q.3** Select any two animals and note down the similarities and dissimilarities among them.
- Q.4** Listen to a story regarding animals from your grand father / grand mother / mother / father.



2

Night Sky

There will be hardly a person in the world who hasn't seen the sky. Right! during the day time the sun is in the sky. Now, we have to observe thr sky at night also. We will take the information related to the things which we can see in the sky with necked eye.



What is required ? a Pencil

What to do ? Complete the following figures by joining the dots :

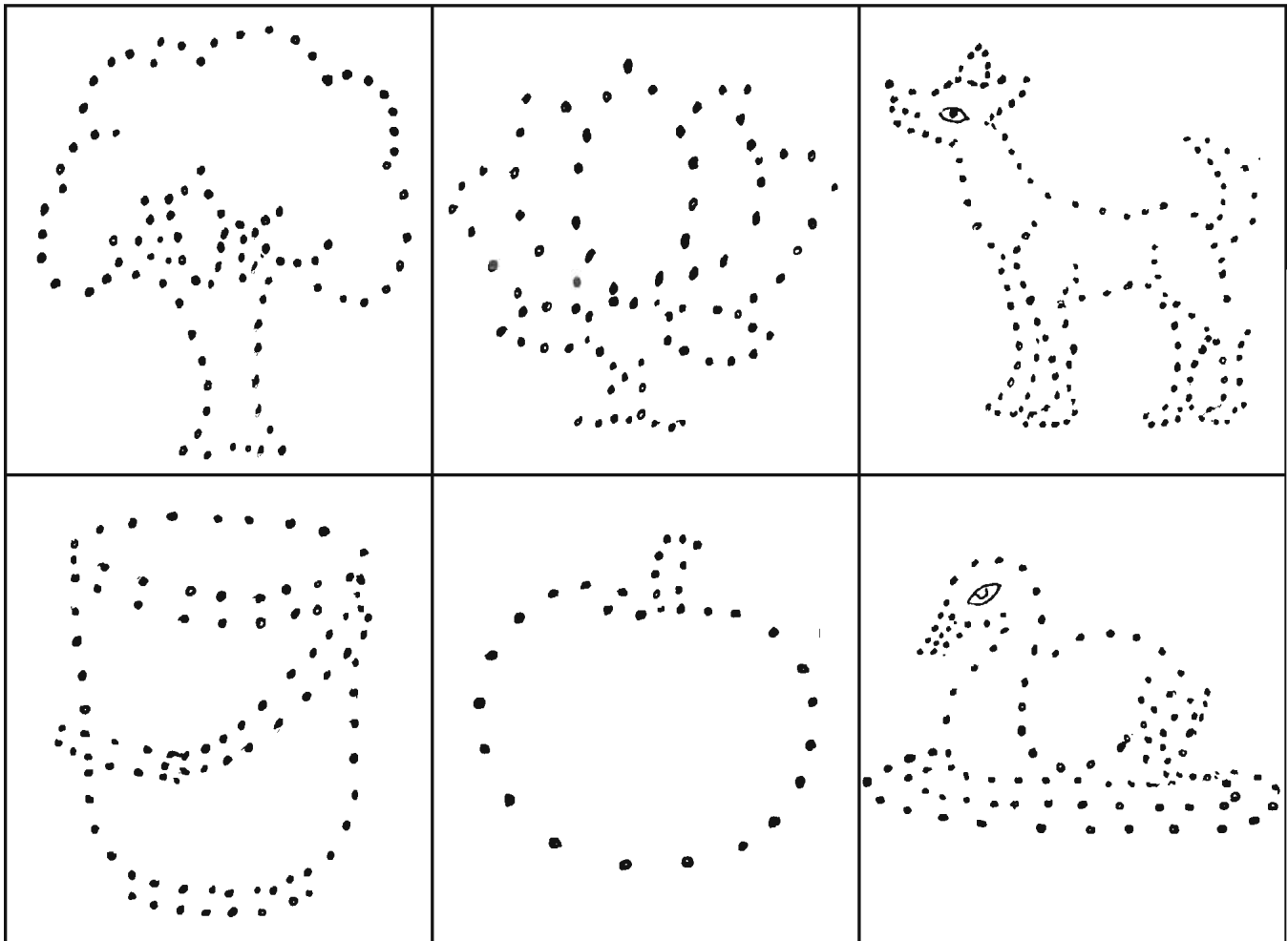


Figure 2.1

Have you seen? By joining dots shapes are formed. If stars in the sky are joined with imaginary lines, some shapes are also formed.

2 ♦ Night Sky

Now observe the given figure of the night sky :

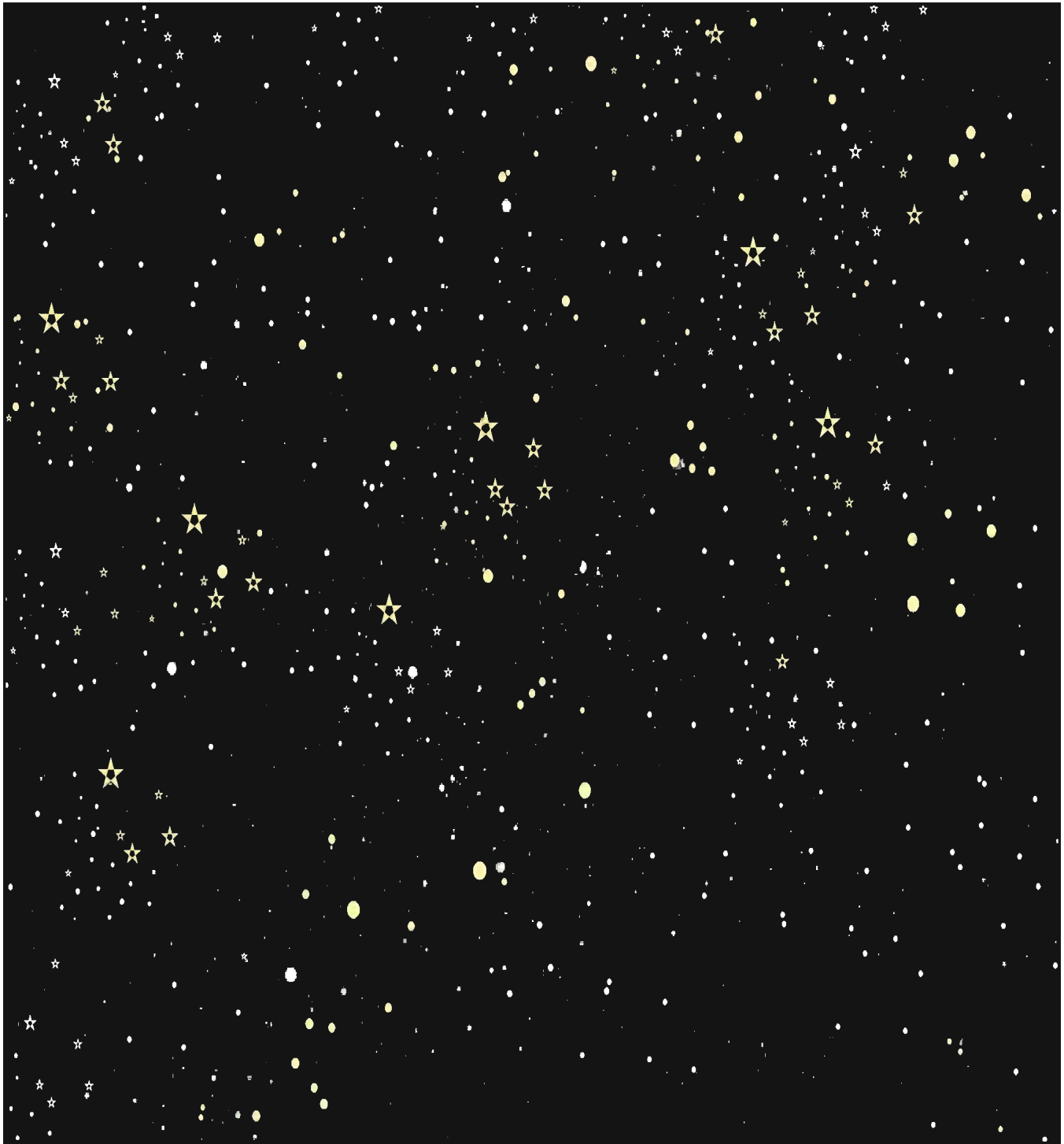


Figure 2.2

- By joining some star clusters with lines, form some shapes.
- Write the name of shapes which you have formed by joining the stars.

2 ♦ Night Sky

(1) The Big Dipper :

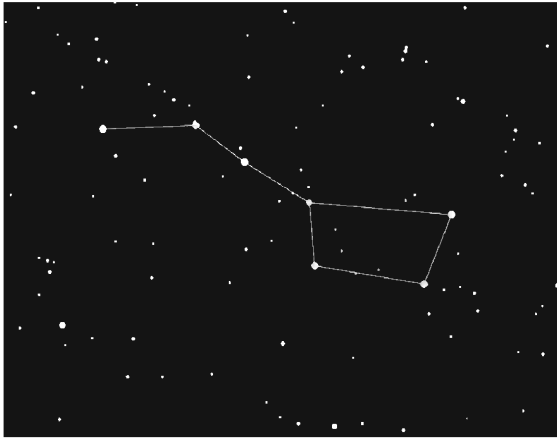


Figure 2.3

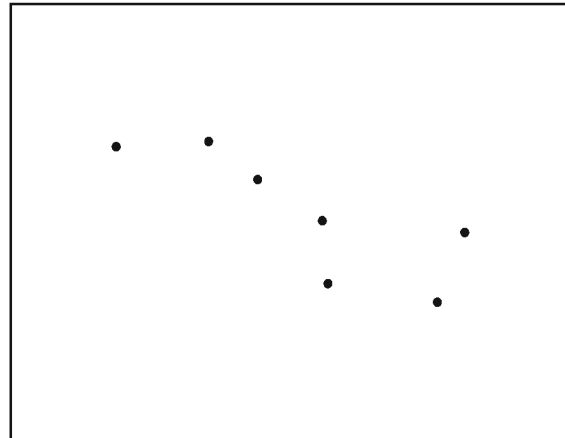


Figure 2.4

- The Big Dipper is observed between **February** to **August** month.
- What is the shape of this star cluster?
- How many stars are there in this star cluster?
- Try to find out the star cluster in the sky like shown in above figure.



This star cluster will be seen over head slightly north word. These stars seem brighter than others. Names of all the stars in this cluster are on behalf of the name of our great saints.

These names are: Marichik, Vashisth, Angira, Atria, Pulah, Kratu, Pulatsya. Due to seven names of saints, this is known as ‘saptarshi star cluster’.

2. Cassiopeia

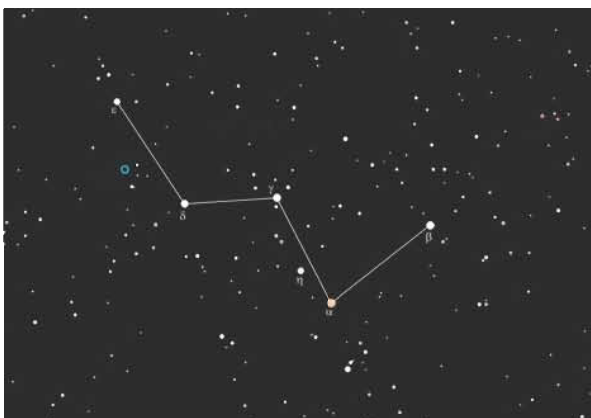


Figure 2.5

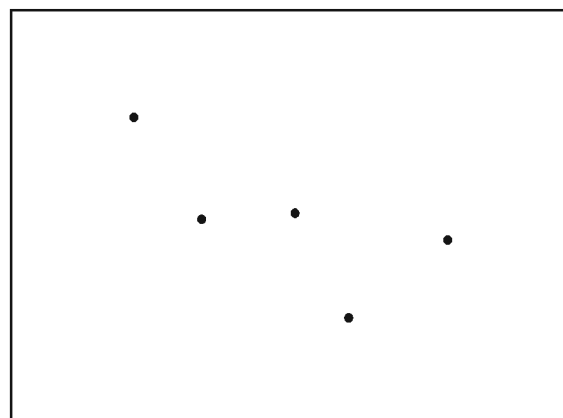


Figure 2.6

2 ♦ Night Sky

- Try to find out the star cluster as shown in the figure 2.5 in the sky.
- This star cluster is seen during **September** to **February** clearly.
- What is the shape of this star cluster?
- How many stars are there in this star cluster ?

Pole star

To observe pole star in the sky, look at the straight line in the direction of line joining the first two stars 1 and 2 of Big dipper star cluster.

What is seen? A sparkling star. Its name is 'Pole'. Pole menas not moving or remain steady.

- Pole star is always observed in north direction. It is mainly used to find other directions.
- In day time, the direction can be found with the help of the sun. At night, direction can be found with the help of the Pole star.
- Pole star can be identified with the help of a Cassiopeia. Look at the direction perpendicular to the imaginary line. joining the stars 3 and 4 in Cassiopeia, the sparkling star observed. It is the 'Pole star'. Now, lets find and know a new star cluster.

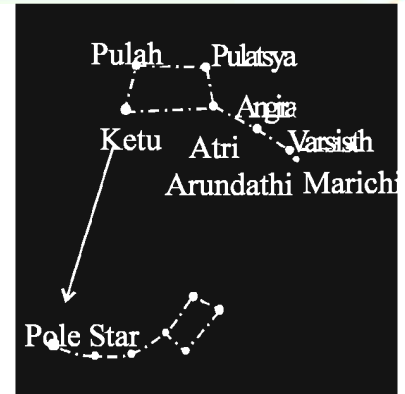


Figure 2.7

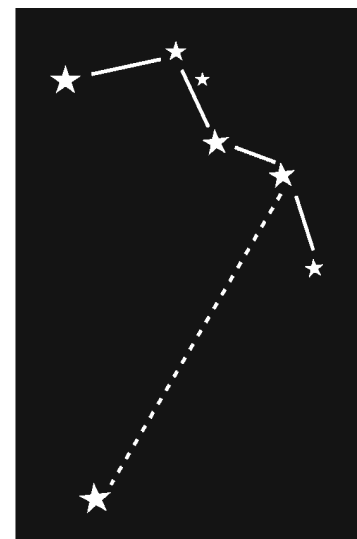


Figure 2.8

3. Orion :

To observe Orion in the sky.

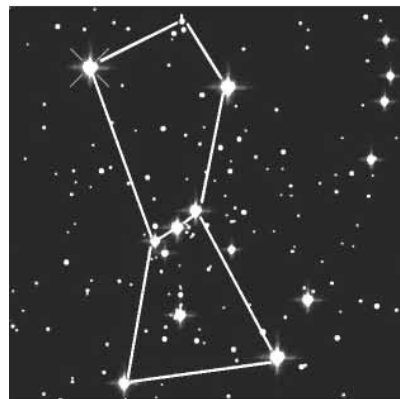


Figure 2.9

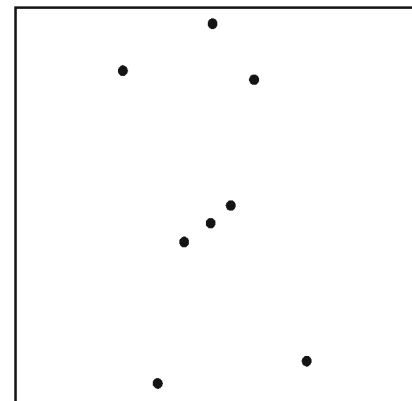


Figure 2.10

2 ♦ Night Sky

- Try to find out the star duster in the sky, as shown in figure 2.9.
- What is the shape of this star cluster?
- How many stars are there in this cluster?
- This star cluster is observed during **December** to **February**.
- During the time intervals of this cluster, a bright star is observed in the East. This is twinkling more than the other stars. So immediately differentiated. Its name is 'Vyadh'. It is also known as 'Shikari'.

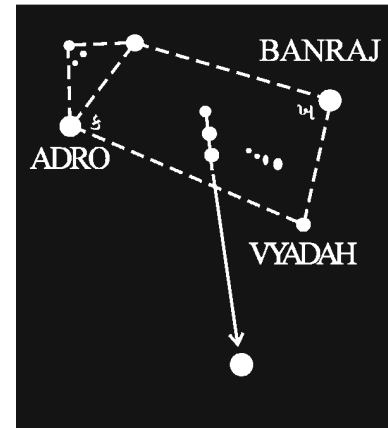


Figure 2.11

**Differentiate stars and planets :**

What is required? Card paper, Pencil, Incense stick, torch

What to do? Draw different star clusters on the card paper as shown in the following figure.



Figure 2.12

- Make a hole at the position of each star in the each star cluster with incense stick.
- Take each prepared card paper in dark room and insert light with torch on each cluster and try to look at the cluster on the wall. Then observe it.
- When stars are observed at night, some of the stars are seen red, some are green, some are bright and some are faint. Some appear twinkling and; some are not. Now think, do all the stars twinkle? you can see some stars twinkle, not all. Observe position of these stars for two to three days. Do they change their positions? If yes, they are planets; They are not stars. It is very easy to differentiate stars and planets in the sky. Studying following table, try to find stars and planets at night.

2 ♦ Night Sky

● Identification of Planets

- They are not twinkling
- Change their position with respect to other star
- Brightness depends on others.

☆ Identification of Stars

- They are twinkling
- Their position are fixed
- They are self bright.



The Sun is a star. It rises in the East. It is very close so it seems large.

- There are eight planets in solar system. They are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. Out of which Mercury, Venus, Mars, Jupiter, and Saturn can be seen with naked eye. Initially Pluto was considered as ninth planet but as per definition of **International Astronomical Union**, it is not a planet but it is known as dwarf planet.
- **Mercury** : During certain days for one and half hour before sunrise and after sunset it is seen with a great difficulty with naked eyes.
- **Venus** : It can be seen before sunrise in the east and after sunset in the west with naked eye. Venus is the brightest star.
- **Mars** : The red coloured object in sky which is not twinkling, is the planet Mars.
- **Jupiter and Saturn** : Find these planets in the sky and observe them under guidance of your teacher



In December / January, the star cluster observed in sky at night at 90° vertical is the Kritika Nakshatra.

2 ♦ Night Sky



Q.1 Filling the blanks in the following, complete them :

- (1) The number of stars in Big Dipper is
- (2) The shape of Cassiopeia is like
- (3) Pole star is always indirection.

Q.2 Answer the following questions :

- (1) Which 'Nakshatra' can be seen with the help of the pole star?
- (2) Which star is known as 'Shikari'?
- (3) By observing the sky at night, prepare a note for the positions of stars and planets.



3 States of Matter



What is required? A small stone, water, incense-stick, match-box, three to four different types of vessels

What to do?

- Keep the small stones in different vessels one by one.
- After that, pour water in each vessel and observe it properly.
- Now keep the lighted incense-stick in different vessels and observe the smoke of it.
- What did you see?
Note down your observations in the table given below.

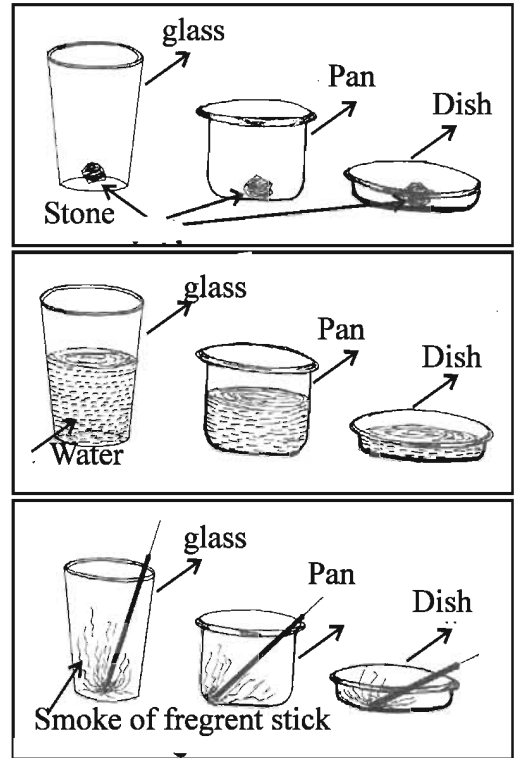


Figure 3.1

No	Name of the matter	Is there any change in the shape? Yes / No
1	Stone	
2	Water	
3	Smoke	

In which matter do you find any change in the shape?

In which matter, there is no change in the shape?

3 ♦ States of Matter

Solid matter has a definite shape, but liquid matters and the matters in a gaseous state do not have any definite shape.



What is required? A plate, two glasses, water, a small stone, a balloon

What to do?

- As shown in the figure 3.2, put a glass filled with water up to the brim in a plate.
- Now slowly put a small stone in it.
- What did you observe? Why did it happen like this?

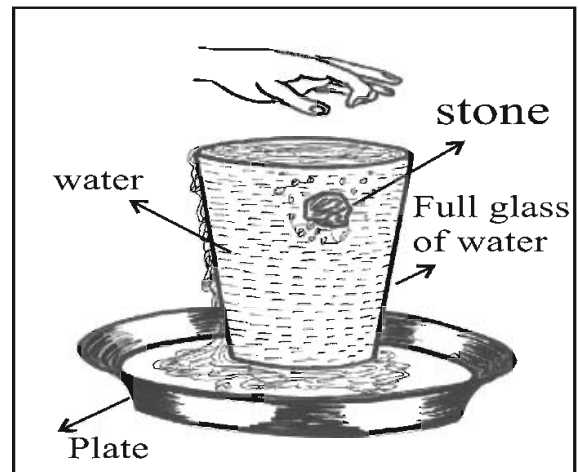


Figure 3.2

- As shown in the figure 3.3, place a glass filled with water up to the brim in a plate.
- Now, try to add some more water in the glass with the help of another glass.
- What did you see? Why did it happen like this?

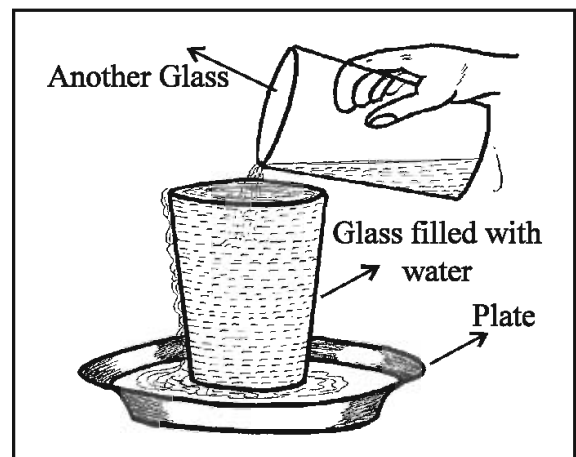


Figure 3.3

- As shown in figure 3.4, take a balloon and observe it very carefully.
- Now, fill it with some air and observe it again.
- What did you observe? Why did it happen like this?

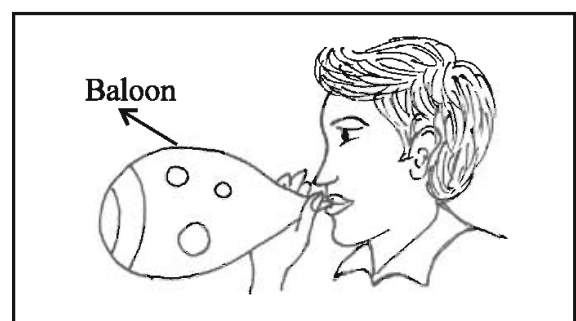


Figure 3.4

3 ♦ States of Matter

What can be said from this activity? _____



What is required? A small piece of chalk, spray bottle, water, lamp, saucer, a match-box

What to do?

- Take a small piece of chalk.
- Convert it into powder.
- Observe this chalk powder carefully.

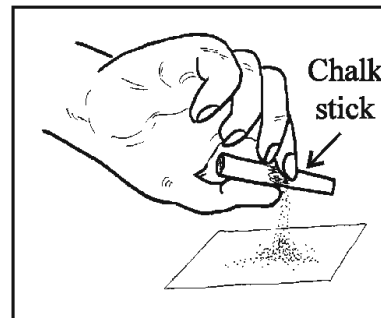


Figure 3.5

- Fill a spray bottle with water.
- Now, spray water with the help of the spray bottle.
- While spraying water from the spray bottle, observe the sprinkled water.

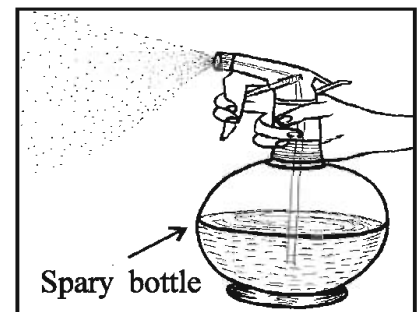


Figure 3.6

- Light a lamp
- Keep a saucer above the smoke coming out of the flame.
- After some times, observe the saucer carefully.

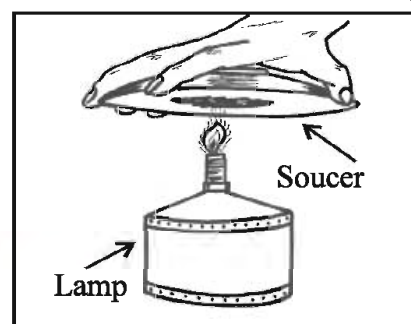


Figure 3.7

Note down your observations here below :

(1) While making powder from the chalk piece,

(2) While spraying water,

(3) While keeping a saucer on the smoke coming out of the flame,

On the basis of this activity, one can say that any matter is made of small particles. These small particles are composed of other minute particles of in bulk like molecules and atoms.

3 ♦ States of Matter

Any matter in the state of solid, liquid or gas is composed of minute particles. Yet the arrangements of the particles in the matters of all the three states are different. To understand these arrangements, let us perform an activity.



What is required? Three transparent glasses, three pieces of cloth, Small balls of thermocol.

What to do?

- Take three transparent glasses.
- Fill one glass completely with small balls of thermocol, fill the other glass up to half the glass and in the third glass put only eight to ten balls of thermocol.
- Now tie a piece of cloth with a string on the open side of the glasses.
- Now shake well all the three glasses turn by turn and then observe the small thermocol balls which are kept inside the glasses.
- What do you observe?

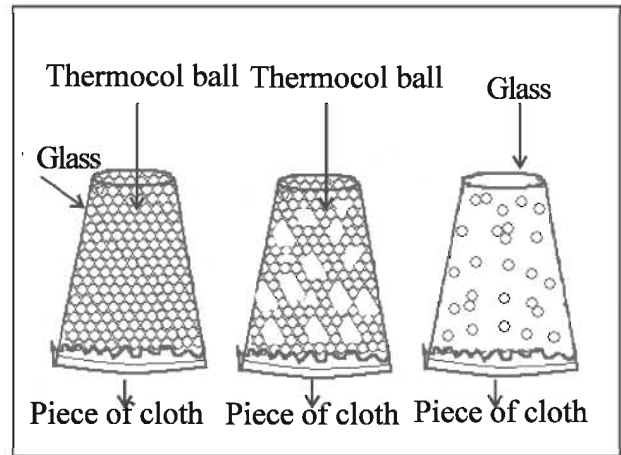


Figure 3.8



In which glass did the small balls jump maximum?

In which glass did the small balls jump minimum?

3 ♦ States of Matter

The arrangement of minute particles in the matters of solid, liquid and gaseous states are like the arrangements of the small balls in all the three glasses.

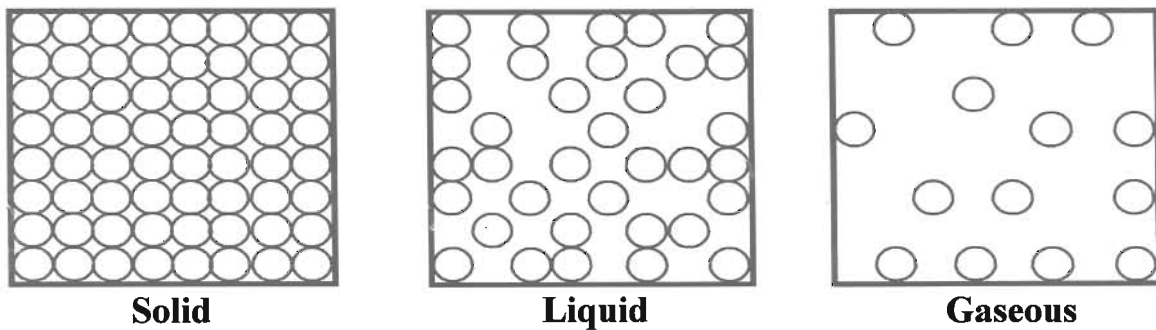


Figure 3.9

- In the solid matters, the molecules of minute particles are arranged very closely to each other.
- In the liquid matters, the particles are arranged very much apart from each other in the comparison of the solid matters, but in the comparison of gaseous matter they are close to each other.
- In the of gaseous matters, the particles are arranged very far apart from each other.



What is required? Incense-stick, a match-box, a test-tube, a transparent glass, a glass-bottle

What to do?

- Light the incense-stick.
- Keep it turn by turn in the test-tube, in the transparent glass and the glass-bottle.
- **What do you observe?**

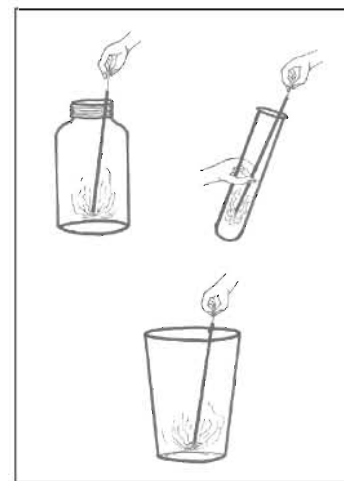


Figure 3.10

Thus gaseous state matters possess the property of spreading themselves all around. Hence it is not definite how much space they need to occupy.

3 ♦ States of Matter



What is required? A piece of ice, a bowl, a saucer, a tripod, gauze of wire, a candle, a match-box

What to do?

- Take some pieces of ice in a bowl.
- Light a candle and place it under the tripod as shown in the figure.
- Place the wire-gauze on the tripod and then place the bowl on it.
- Observe the ice in the bowl for a while.
- What do you observe?

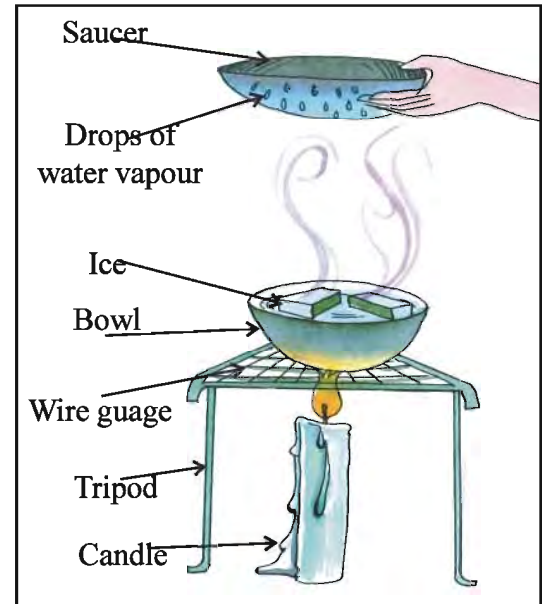


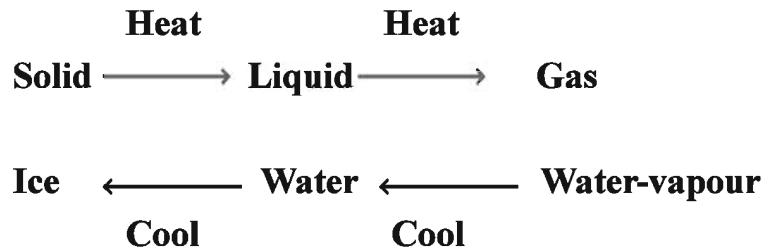
Figure 3.11

- Now observe the water in the bowl for a few moments.
- What do you observe?

- Once the water-vapour starts coming out of the bowl, then close the bowl with a saucer.
- After sometime, carefully lift the saucer and observe the surface of the saucer which was in contact with the bowl.
- What do you observe?



What should we do to change water into ice?



Thus matter can be changed into another state by giving heat or by absorbing heat (cooling it down).



Think and say :

- (1) “If a lighted incense-stick is kept in one place of a room, still the fragrance is spread all over in the room.” Why?
- (2) “Water fallen on a floor spreads slowly all around.” Why?
- (3) “Coconut oil kept in a bottle with narrow opening gets frozen in winter, then what do you do to remove it out.” Why?
- (4) While cooking, if you have kept a lid on the vessel, and when it is removed out, what did you see on the surface of the lid which was in contact with the vessel? Why?
- (5) In summer, if more time is taken to eat culfi, ice-cream or crumbled ice ball, what have you observed ? What happened ? Why ?



4

Heat



Put your palms on your cheeks. What do you experience? Now rub both the palm and put on your cheeks.



Figure 4.1



Figure 4.2



What is your experience on cheek after rubbing the palm?

There are so many objects around us. Out of which, some are hot and some are cold. Note whether the following are hot or cold.

Objects	Hot or Cold
Ice cream	
Cup of tea	
Iced water	
Stone placed in sun light	
Wet clothes	
Piece of Ice	

4 ♦ Heat

We come across many objects in our daily life. Among them, some are hot. Hot thing means which have heat.

“Heat means kinetic energy of constituent particles of objects”.

Heat has capacity to do work. Heat is a form of Energy.

There are solid, liquid and gaseous objects in the surrounding of us. Effect of heat takes place on those objects.



Lets do activity to observe effect of heat on the object

What is required? Metallic sphere, a chain with circular rings, spirit lamp, fork

What to do?

- Take a metallic sphere and a circular ring
- Check whether the sphere passes through circular ring or not.
- Make sphere hot with spirit lamp.
- Hold hot sphere with fork and try to pass it from circular ring.

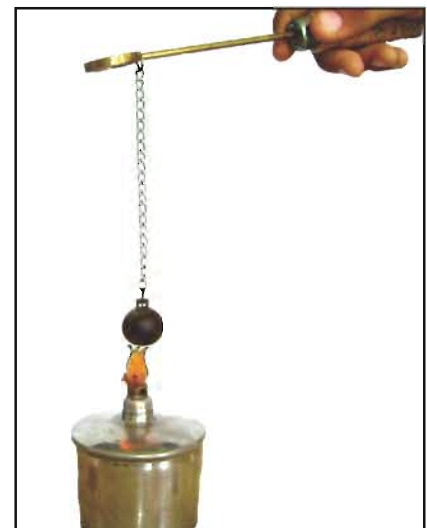


Figure 4.3



Figure 4.4



Figure 4.5



Can heated sphere pass through ring ? Why?

- Now let the sphere cool down.
Can the cold sphere passes through the ring? Why?

When heat is supplied to object, it expands and when it is cooled down, it contracts.



If cold metallic sphere can't pass through the ring, how will you do this activity?



At the joint of two rails of railway, a small gap is kept. Why?



Figure 4.6

- Why is the cable more bent between two electric poles in summer compare to winter?



Figure 4.7

4 ♦ Heat



To cover a wheel of bullock cart with iron ring at first, it is heated and then water is poured on it. Why?

Like solid substances, liquids are also affected by heat. To know this lets do the activity.



What is required? A small glass bottle, a rubber cork, an empty refill, water, colour, a candle, a fork, a paper.

What to do?

- Take a small glass bottle. Fill it with coloured water.
- Make hole at the centre of the rubber cork.
- Pass empty refill from the hole of the rubber cork.
- Make the bottle air tight and observe the water raised in the refill.



Figure 4.8

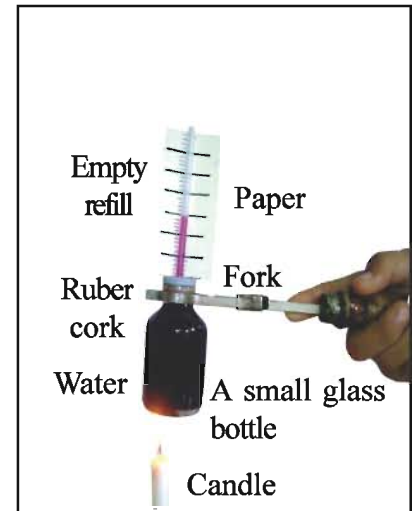


Figure 4.9

- Make a scale on paper, place it behind the refill and note down the position of the surface of water.
- Hold bottle with fork and supply heat to it with candle. Then observe.



What is the change in the surface of water?

- Stop the supply of heat. When water is cooled, observe the surface of water in the refill, waht change takes place? Why?

4 ♦ Heat



When, a liquid is heated, it expands and when it is cooled down, it contracts.



In a thermometer, when liquid gets heat, it expands and when it is cooled down, it contracts. It is used to measure temperature.



Like solid and liquid objects, the effect of heat is also observed on gaseous objects.

What is required? A big bottle, a balloon, threads, candle, water, fork

What to do?

- Take one big bottle, and fill some water in it.
- Attach one balloon on the mouth of bottle and fix it with thread.



Figure 4.10

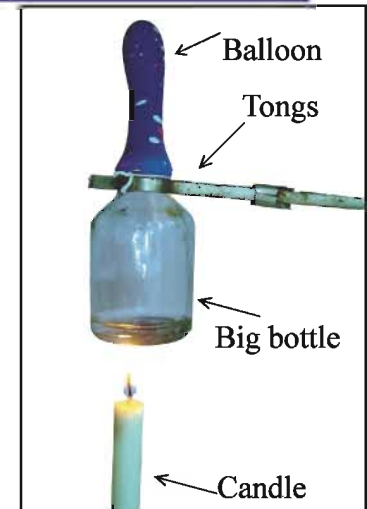


Figure 4.11

- Hold bottle with a fork. Heat the bottle with a candle and take observation.



What change occurs in the state of balloon after heating the bottle? why?

- Now, let the bottle get cooled down.
What change occurs in the state of balloon after bottle gets cool down? Why?

When gases substance gets heat, it expands; when it cools it contracts.



Why does a tyre get burst in summer?



Why does whistle of pressure cooker raise up?



Figure 4.12

Volume of solid, liquid and a gas increases after heating them.

By applying heat, space between molecule increases and due to that volume of object increases.

When object gets heat, thermal transformation takes place in it.

Thermal transformation in solid, liquid and gas takes place in different ways, Three methods of thermal transformation are :

- (1) Conduction of heat
- (2) Convection of heat
- (3) Radiation of heat



How does thermal transformation takes place in solids?

What is required? Two bricks, metal wire or strip, a candle, pins, wax

What to do?

- Take a metal wire or strip.
- Attach pins at the distance of two inches on it with wax.
- Keep one of metal wire or strip between two bricks as show in fig. 4.13
- Heat other end of metal wire or strip with candle and take observations.

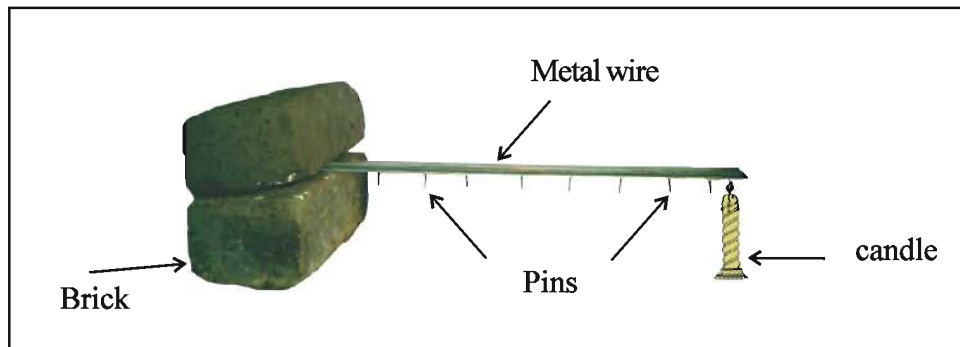


Figure 4.13



Pins on which end of the wire falls down first ? Why?

- Which pin on the wire falls down last? Why?

Why do all pins on the wire not fall down simultaneously?

4 ♦ Heat

In solid, the molecule which get heated, heats other nearby molecule and conducts heat from one molecule to other molecule. This way transformation of heat takes place in solid. For heat conduction the following points are important :

- When two objects are in contact, only conduction of heat takes place.
 - If there is temperature difference between two objects, only in that situation conduction of heat takes palce.
 - Conduction of heat takes place from hot substance to cold substance or from more hot substance to less hot substance.
 - Which equipments used in day to day life are heated by conduction process?
-
-
-



Now let us understand transportation of heat in liquids.

What is required? Two glass Jars, Potassium permanganate, Two Spirit lamps, Two Tripods, wire gauge, water

What to do?

- Take a galss jar and pour water in it
- Arrange apparatus as shown in fig.
- Start applying heat to jar with spirit lamp.
- Immediately, pour two three pieces of potassium permanganate and observe carefully.

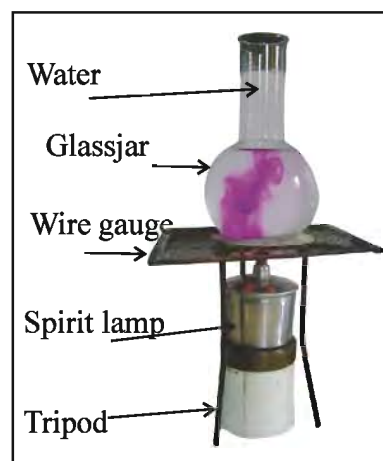


Figure 4.14



Figure 4.15



How does diffusion of colour take place in water in the jar?

- Why does motion of water molecules in jar take place from down to up and from up to down?

In liquid and gas, heated molecules becomes lighter and move upward, and heavy molecules moves downward to occupy position of them, such transportation of heat takes place in liquid and gas, which is called convection of heat.

Heating of tea-milk, heating of bath water, wind blows from sea to land in summer are examples of convection of heat.

View and discuss the following pictures :



Figure 4.16



Figure 4.17



All liquid get heated by the way of convection of heat. Mercury is liquid yet it is not heated by convection, because as mercury is metal exceptionally it gets heated by conduction of heat.

4 ♦ Heat



Let us do an activity to understand transportation of heat by heat radiation.

What is required? A dish

What to do?

- Take dish and put it outside the class room in sunlight
- Touch the dish after some time. _____
- Whether dish is cool or hot? _____
- How did the dish get heated? _____



Figure 4.18

For heat transfer, solid, liquid or gas medium is required, But in some region between the sun and the earth, there is no medium is there, still heat energy from the sun reaches to the earth in the form of light. Heat energy emitted from the sun without affecting the earth atmosphere incident on the earth, such transfer of heat is called radiation of heat.

You have seen instruments given below. Discuss their uses.



Figure 4.19



Figure 4.20



Figure 4.21



Figure 4.22



Figure 4.23

4 ♦ Heat

Other than these, which are the instruments transporting heat by heat radiation method?



In daily life, which substance do we keep to make them dry in sunlight?
By which method of heat transfer do they get dried?



Why do people go to a hill station for outing in summer?



Make a list of the instruments which are used in a kitchen got heated by heat conduction and the substances which are got heated by heat convection.

Instruments heated by heat conduction	Substances heated by heat convection
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>



Around us some substances get heated fast and some get heated slowly.

What is required? One small tin box, cardboard, water, wood, aluminum, copper, iron, plastic, stripes of cardboard of equal measure, a spirit lamp, a tripod, a candle.

What to do?

- Take a small tin box. Make a hole on one side of it so that vapour comes out from it when water get heated.
- Fill water up to half level in tin box.

4 ♦ Heat

- Now take stripes of wood, aluminum, copper, cardboard, plastic of equal measure.
- At any end of each strip leaving one inch space, put a drop of wax.
- Now, take a cardboard close to tin box.
- Make holes into it so that strips can pass through it and pass strips.
- Keep the end of each strip which has drop of wax outside the tin box.
- Make sure that strips can not touch the bottom of the box.
- Now arrange the instruments as shown in the figure and heat the box and note down observations.



Figure 4.24

- On which strip does the wax melt first? _____
- On which strip the wax does not melt last? _____
- On which stripes does the wax melted? _____

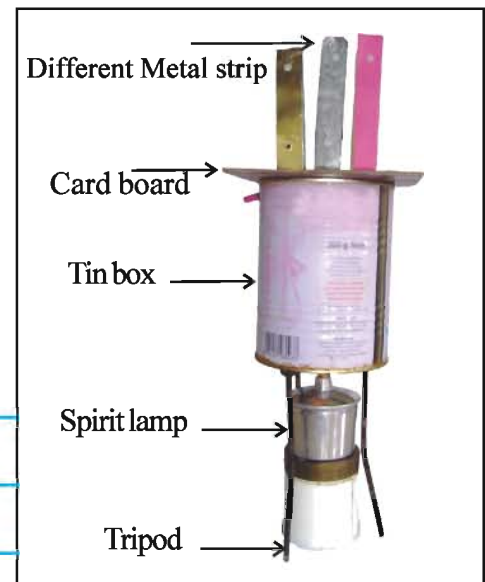


Figure 4.25

The substance in which conduction of heat is slow are poor conductors of heat. The substance in which conduction of heat is fast and easy are called good conductor of heat.

Write names of good and poor conductors of heat in following table :

Good conductor of heat	Poor conductor of heat
Iron, copper	Paper, Leather
_____	_____
_____	_____

4 ♦ Heat



Figure 4.26

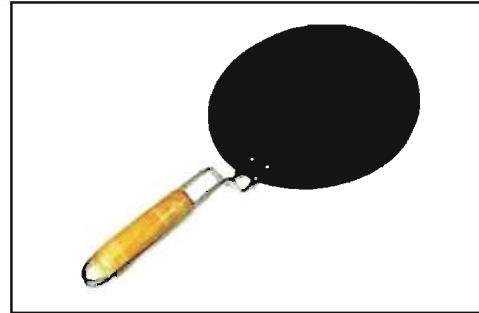


Figure 4.27

Why are handles of given appliance made of plastic, wood or ebonite?



Sometimes we use thermos to keep milk or tea hot for longer time. Let us make a thermos like cold water bottle.

What is required?

A 500 ml plastic bottle, a 1.5 L plastic bottle, shining paper, old news paper, a sellotape, a cutter, a small ribbon strip

What to do?

- Take a 500 ml plastic bottle. Wrap shining paper on it.
- Then wrap half fold news paper on it and fix it with sellotape.
- Take a 1.5 L plastic bottle and cut it as shown in fig.4.30
- Cut the mouth of this bottle.
- Fix small bottle in the lower part of the big bottle.
- Close the upper cut part as shown in fig. part of big bottle with lid and fix sellotape. Thus the small bottle inside the big bottle arrangement is ready.



Figure 4.28



Figure 4.29

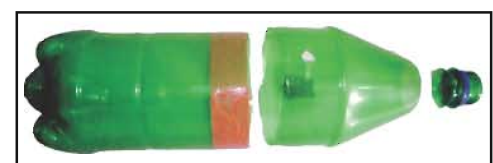


Figure 4.30

4 ♦ Heat



Figure 4.31



Figure 4.32



Figure 4.33

- To hold this bottle, fix a ribbon strip with sellotape as shown in fig. Thus your cold water bottle is ready.
- Fill cold water in this water bottle. Touch the water after two hours.



(1) Do you feel any change in coldness of water?

(2) Why does water inside bottle remains cool for longer duration?

(3) Why is paper used in your bottle?



Poor conductor of heat are used to keep substance cooler or hotter for long duration. For example, thermocol box, glass wool, Jute bag.

4 ♦ Heat

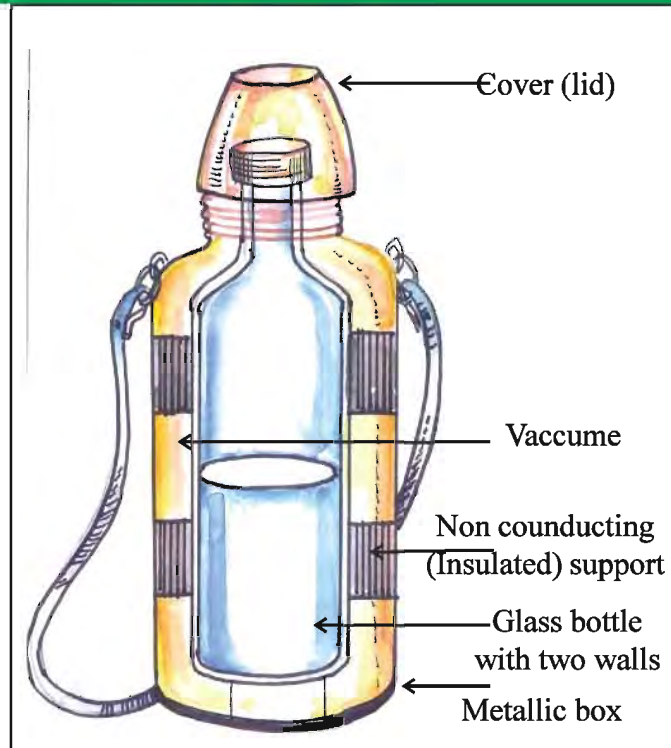


Figure 4.34



Why ice is placed in a box of thermocol?



Can hot object be placed in box of thermocol? why?

- See the objects in figure and write uses of those objects.



4 ♦ Heat

S.N.	Instrument	Good conductor or poor conductor of heat	Uses
1	Thermos	poor conductor	To keep cold object cold and Hot object hot.
2	Leather boot-chappal		
3	Steel pan		
4	Cotton clothes		
5	Handle of a pan		



Q.1 How does transfer of heat take place?

Q.2 Is transfer of heat possible between two objects that are not in contact having different temperature? How?

Q.3 See the window in figure. Why is ventilator kept?



Q.4 Differentiate as poor conductor and good conductor of heat.

Paper, leather, plastic, iron, cloth, Asbestose, wool, feathers, a cardboard, a cork, abonite.

Q.5 Think and write :

- (1) What do we do to take away the pan from stove? Why?
- (2) In summer, cotton cloths and leather chappals should be used. Why?

Q.6 Give answer to following questions :

- (1) To observe the transfer of heat by convection, which object from KMnO_4 or ink drops can be used?
- (2) Which object like thermocol can keep things cold or hot for long time?



Revision

1

Q.1 Prepare a list of viviparous animals found in your surroundings.

Q.2 Which similarities are found between an elephant and mosquito?

Elephant	Mosquito
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>

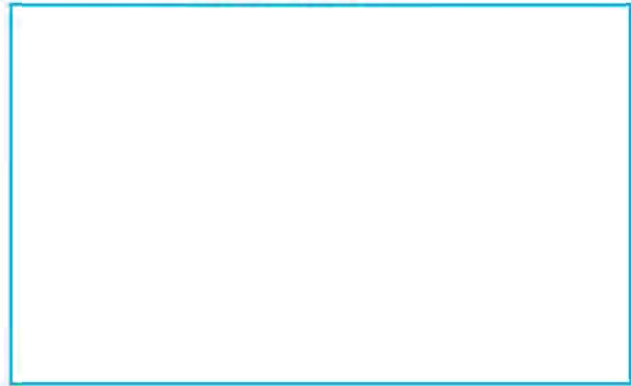
Q.3 Prepare a list of animals found especially in the monsoon season?

Q.4 Draw Diagram :

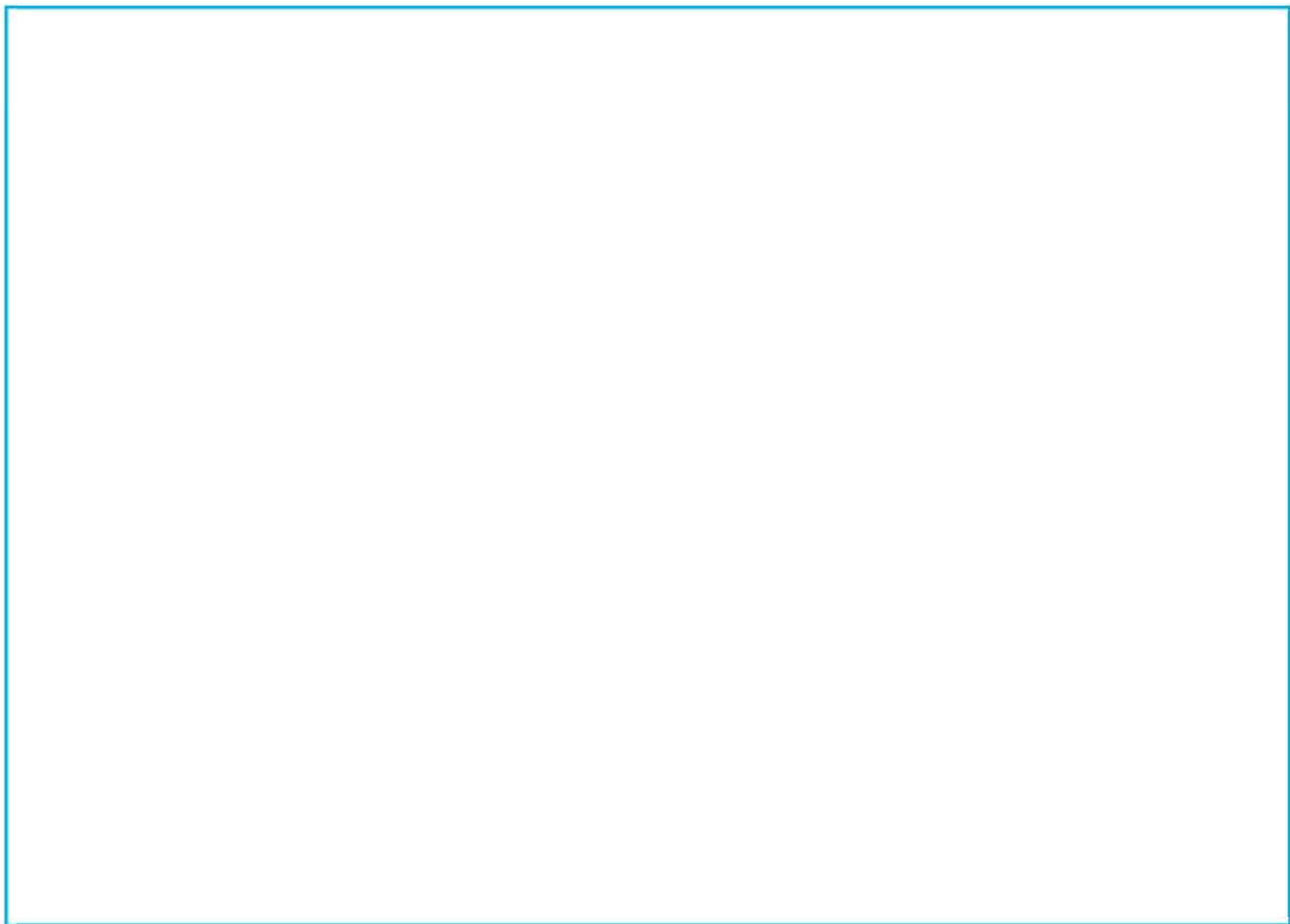
The big Dipper



Cassiopeia



Orion



Q.5 Do following activity and note observation :

What is required? Small plate, marbles

What to do?

- Take a plate. Fill it completely with marbles.
- Give oscillation to plate with your hand.
- Observe whether the change in position of marbles takes place or not.
- Now remove half of the marbles.
- Oscillate the plate again.
- Observe whether the change in position of marbles takes place or not.
- Now keep only three or four marbles in the plate and remove rest of marbles.
- Give oscillation to plate with your hand.
- Observe whether the change in position of marbles takes place or not.
- How can you associate your observations with the arrangement of atoms in solid, liquid and gaseous state?

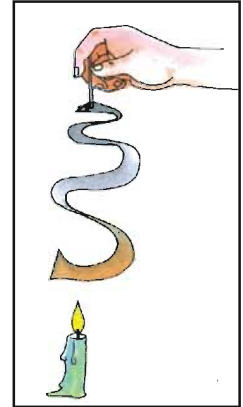
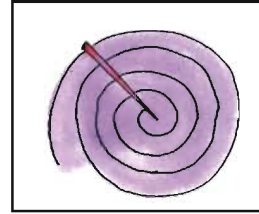
Q.6 “If heat is supplied to object or absorbed from object its form is changed”. Explain this with three examples which you know.

Q.7 Do following activity and note observation :

What is required? A card paper, scissors and a candle

What to do?

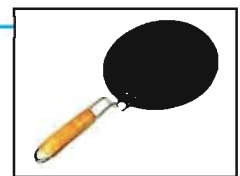
- Take a card paper.
- Cut it as shown in the figure.
- Insert a pin at the centre of a spiral ring of card paper.
- Light the candle.
- Hold the ring above the candle and note observation.
- Why does the ring rotate continuously?



Q.8 Think and write :

- (1) A ring is heated and then inserted on the wheel of bullock cart and then cold water is poured on it. Why?

- (2) What is the benefit of a pan with wooden handle?



- (3) Tea is boiling in a steel pan. How does heat transfer in it? Why?



5

Changes Around Us



Watch the two pictures given below and make the note of the differences which are found in them :



Figure 5.1



Figure 5.2

5 ♦ Changes Around Us

In the first picture, you must have noticed that there is a plant which has buds on it. In the second picture, these buds have blossomed into flowers. In the same way, the rising of the Sun, appearances of the different phases of the moon day-to-day, change of different seasons, all these changes occur naturally by themselves. Such changes are called 'Natural Changes'.

Make a note of the other examples of such natural changes :

In the differences of the pictures, you must have found that in the figure: 5.1, there is an incomplete built house. In the figure: 5.2 the house is completed. This kind of change does not happen naturally. This kind of change is done by men, hence such changes are known as 'Manmade changes'. To prepare furniture from wood, to make utensils from clay etc. are all manmade changes.

Take a square piece of paper. Fold it as per the instruction given by your teacher and make a boat. What type of change is this?

Make a note of other examples of manmade changes :

5 ♦ Changes Around Us

You must have noticed that when cold water is heated, it turns into water-vapour and if it is cooled down it turns again in water. Water turns into ice and water is obtained again from ice. Thus in many changes, we get a new thing from the original thing and again we can get back the original thing. Such changes are called 'Reversible changes'.

Note down some other changes like these changes :

Some changes cannot be reversible. It means we cannot get the original thing back by changes, such as milk turns into curd but we cannot get milk back from curd.

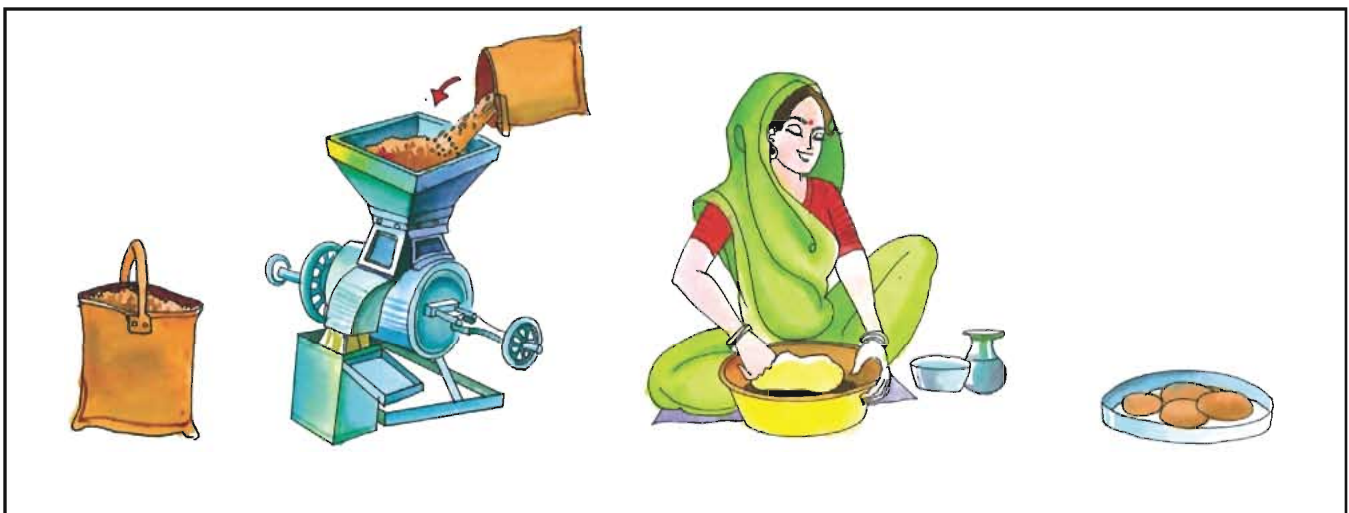


Figure 5.3 (Non-reversible changes)

Grinding wheat, we get flour and from it we make Chapattis (bread). But from Chapattis we cannot get back wheat again. Such changes are called 'Non-reversible changes'. Note down some other examples of such changes.

You must have noticed that in the above changes the form of the matter is also changed. Take a chalk-stick and break it into two pieces. Take a piece of paper and tear it. What did you observe? You will see that the shape of the object also changes. Such changes are called 'Physical changes'. Give some other examples of such changes.

5 ♦ Changes Around Us

In the first picture (figure 5.1), you must have noted down the difference of the cracker. When a cracker is cracked, a match-stick is lighted, then the changes taking place are called 'Fast changes'. A tree grows or an animal grows, iron getting rusted etc. are the changes happening so slowly that they cannot be observed at first sight or cannot be noted down immediately. Therefore these changes are called 'Slow changes'. If you know some other examples of such fast changes or slow changes then note them down.

Fast Changes	Slow Changes

In the second picture (figure 5.2) you saw that the changes like cutting of a tree affect the environment in getting harmed. Some changes like these which are either manmade or natural harm us. Such changes are called 'Non-agreeable changes'. Braking of glass cup, rusting of iron etc. are the examples of such changes. Make a note of the other such examples.

Raining, healing of a wound, ripening of a fruit, growth of a living being etc. are all called 'Desirable changes'. Make a note of such changes which you may have come across in your day-to-day life.

Thus you must have observed that the motion of a pendulum in a watch, high tide and low(ebb)tide, motion of the hands in a watch, all such changes get repeated at certain intervals, hence such changes are called 'Periodic changes'.



Figure 5.4



Figure 5.5

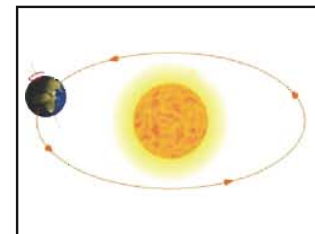


Figure 5.6

5 ♦ Changes Around Us

After watching the figure: 5.4 to figure: 5.6, make a note of such other periodical changes.

Some changes are such that they do not happen after definite interval of time. Such changes are called 'Non-periodic changes'. eg. rusting of iron, ripening of fruit, blowing of wind, healing of a wound etc.



Figure 5.7



Figure 5.8

After watching the above figures carefully, make note of other such non-periodical changes.

Have you noticed any examples occurring in nature than one type of changes? Discuss with your teacher.

Observe the changes given in the following pictures and then decide in which of the groups of changes they can be placed.

(1)

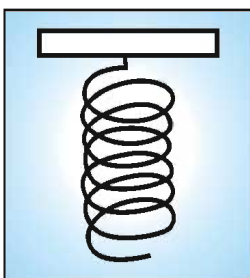


Figure 5.9

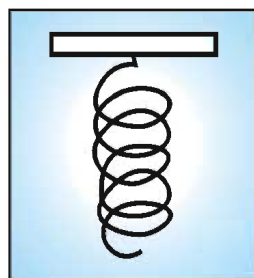


Figure 5.10

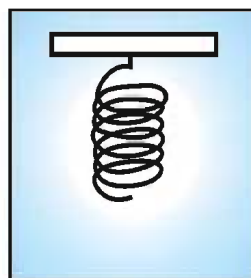


Figure 5.11

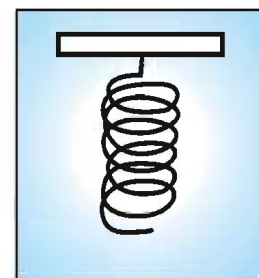


Figure 5.12

5 ♦ Changes Around Us

(2)



Germination of a broad bean (Vaal)

Figure 5.13

(3)



Figure 5.14

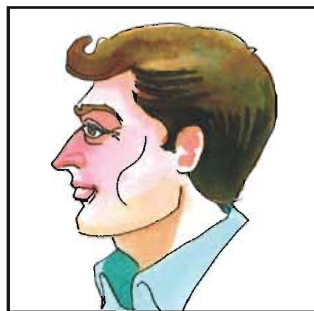


Figure 5.15

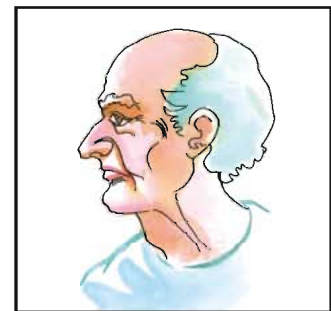


Figure 5.16



What is required? Slaked lime, water, common salt, test-tube, a glass

What to do?

- Take a small amount of slaked lime in a test-tube. Add some water in it. After a while, touch the test-tube from outside.

5 ♦ Changes Around Us

- What did you experience? Note your observation.

- Instead of slaked quick lime, add some common salt in the second test-tube filled with water. Touch the test-tube from outside and note your observation.

Why does this happen? Get information about it. Think, why does wax melt, on heating? Why does a spring gets pulled up? What is the reason for a living being to grow? Why do rocks and the sides of the ravines and valleys get worn out? You will see that with each of these changes there is some energy associated with it. When we run or work, some changes take place in our body. The energy for this. Is obtained from our body itself. Energy is also associated with slow or natural changes like blossoming of a flower, change of seasons, growth of living being etc. Make a note of some other such changes and the energy associated with them, which you may have noticed.

5 ♦ Changes Around Us



Some changes are given below. Classify them, in different type of changes. Mark it with the sign \checkmark in the given box :

No	Change	Natural	Man made	Slow	Fast	Rever -sible	Non-Rever -sible	Physical	Desir -able	Un-desir -able	Periodic	Non- Periodic
1	Blowing of Wind											
2	ebb-tide											
3	Formation of curd from Milk											
4	Rainfall											
5	Heating of wax											
6	Pressing a rubber ball											
7	Preparing Organic manure											
8	Frying Puris											
9	Ripening of Mangoes											
10	Contamination of Food											



6

Air

We know that there is air surrounding us in the surroundings. Air cannot be seen but it can be felt. Do you know what is air and what it consists of?

Constituents of Air :**Oxygen****What is required?**

A transparent glass, a candle, a match-box .

What to do?

- After lighting a candle, keep it erect on a flat surface.
- Cover the candle with a transparent glass.
- What do you observe?
- There is air in the glass, yet why does this happen? Think and then make a note of it below :

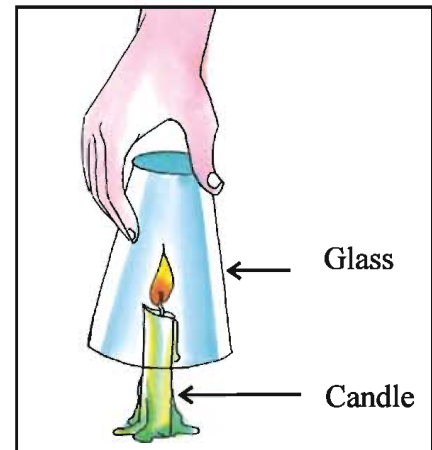


Figure 6.1

Oxygen helps in combustion.

**Carbon dioxide****What is required?**

Quick lime, water, a cork with two holes on it, two straws, a transparent glass bottle.

What to do?

- Make solution of quick lime in water and let it settle down for a while.
- After a while, decant the clean water from the solution.

6 ♦ Air

- This is known as decanted lime-water.
- Take the lime-water in a bottle. Fix a cork and two straws as shown in the figure 6.2.
- Keep one end of the straw immersed in the water lime the bottle.
- Keep the other straw in the bottle in such a way that its end remains above the lime water.
- Now suck the air from the bottle with the help of the straw having one end of it outside water.
- How does lime-water appear?
- What is the reason for this?

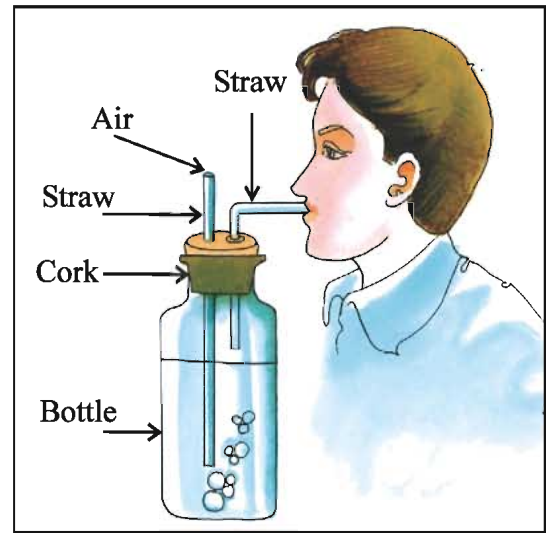


Figure 6.2

Carbon dioxide gas turns lime-water milky.

In the air besides Oxygen and Carbon dioxide gases, there are other gases like Nitrogen, Helium, Neon, Argon, Krypton, Xenon and Ozone



Humidity

What is required? A steel glass, pieces of ice / cold water

What to do?

- Clean the outer surface of the steel-glass properly.
- Fill half the glass with ice pieces / cold water.
- Observe carefully the outer surface of the glass and note your observation.

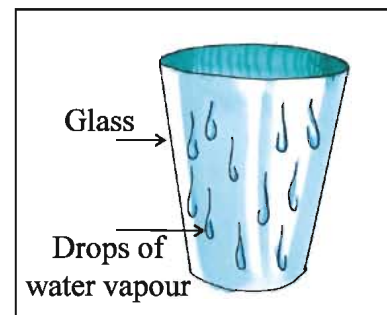


Figure 6.3



From where do these drops of water come? Discuss with your teacher and make a note of it.



Without looking into steel-glass, can you say how much water is there in the glass? How?

You must have experienced at home also, while cold water taken from fridge and pouring in a glass, some drops of water are visible on the outer surface of the glass.

Due to the heat of the Sun, the waters of the sea, rivers, lakes and dams change into water-vapour and spread in the air in the atmosphere. The quantity of water-vapour contained in the air is called humidity. Rainfall, hailstorms or dew-drops are all the result of the humidity (moisture) in the air.



Ice itself is cold, yet why does it appear as if water-vapour comes out of it?



Particles and other dirt (filth)

What is required? Oily substance and three pieces of cardboard.

What to do?

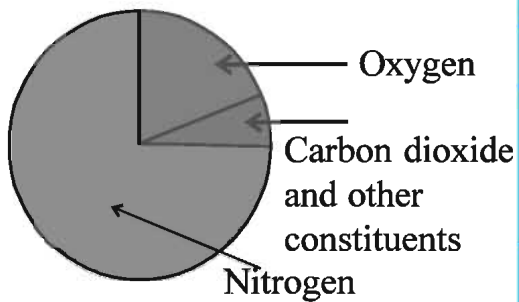
- Apply the oily substance on all the three cardboard pieces.
- Keep one cardboard in the class-room, place the second cardboard near a road and the third one keep in the place of your choice.
- After one hour, examine all the three cardboards.

6 ♦ Air

- What do you find on the cardboards?
- The substances found on the cardboards are also a part of air.
- On the basis of the above activities, note down all the components of air.

There are various components in the air, so the air is a mixture.

Just for Knowledge



No.	Name of the components	Percentage (%)
1	Nitrogen	78.00
2	Oxygen	21.00
3	Helium, Neon, Argon, Krypton , Xenon, Ozone Moisture, Particles.	00.96
4	Carbon dioxide	00.04



Moving tree leaves, kites flying in the sky

Figure 6.4

Properties of Air



What is required? A transparent flask (bottle), a funnel / nozzle, straw, wheat flour, water.

What to do?

- As shown in the figure, apply wet wheat flour between the mouth of the bottle and the funnel, in such a way that it is completely air-tight.
- Keeping a finger on the opening of the funnel, close its mouth. Now fill it with water and then take away the finger.
- Observe carefully and make a note. Does water enter the bottle?

- As shown in the figure, pass a straw in the funnel.
- Does water enter the bottle?
- Why?

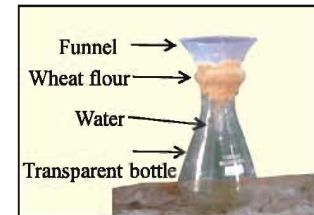


Figure 6.5

In the empty bottle, there was air in it, hence it can be said that air is everywhere. As long as there was air in the bottle, water did not enter the bottle. Therefore it can be said that Air occupies space.



If you have gone to a shop to buy kerosene, you must have noticed that the shopkeeper while pouring kerosene in a tin, he keeps the nozzle of the container filled with kerosene little higher up above the tin. Why?

Properties of Air



What is required? Empty injection syringe.

What to do?

- As shown in the figure, go on pressing the injection syringe from both the ends.
- Can the syringe be pressed?
- Why?
- If the syringe is kept open in the front side, can it be pressed ?

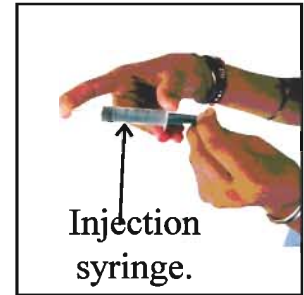


Figure 6.6

- Why?

- Find few examples in day-to-day life showing. Make a note of such examples

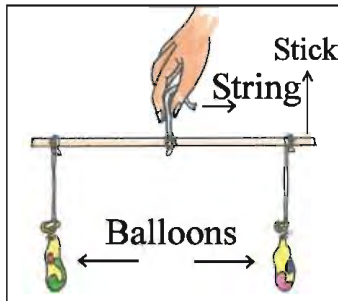


What is required?

Two big balloons of the same size, thread a small straight stick.

What to do?

- As shown in the figure 6.7, tie a balloon with a string in such a way that the knot can be easily opened.
- As shown in the figure 6.8, make a weigh balance with a stick and balance both the balloons perfectly.
- Leaving one balloon as it is, untie the other balloon, blow some air in it and tie again with a string.

**Figure 6.7****Figure 6.8****Figure 6.9**

- Now tie the blown up balloon in its place in the balance as it was before.
- Watch carefully and see on which side the balance tilts.

- Find some examples in your day to day life which manifest that 'Air has mass'. Make a note of such examples.

Hence it can be said that air has mass.

- **Uses of Air in everyday life :**

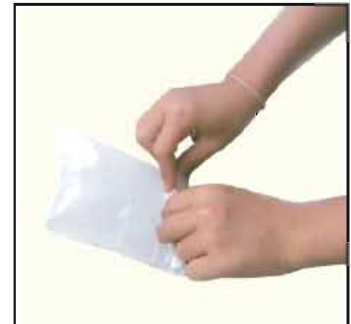
For every existence of living being respiration of air is necessary. Think, where do we use air in our daily life? Make a note of it.

**Q.1**

What is required? An empty plastic bag

What to do?

- Take an empty plastic bag.
- Keep on folding the bag from the open end.
- As you go on folding the bag, the fold becomes small and then if you press it, **what do you feel?**
- What is there in the fold?

**Figure 6.10****Q.2**

What is required? An empty match box, balloons, string

What to do?

- Take an empty match box.
- Fill the empty box with as many balloons as possible which as possible are not blown up.
- Count the balloons contained in the match box.
- Take one balloon and fill it with air and tie it with a string .
- Now try to insert the blown up balloon in the match box.

**Figure 6.11**

6 ♦ Air

- Were you able to insert the balloon in the match box?
- Think of the reason for this and make a note of it.

Q.3 Explain: 'Air is a Mixture'.

Q.4 Do as per the given figure and observe :

- Fill water in a transparent vessel (bucket).
- Immerse a glass upside down in it such that air remains inside it.
- Immerse another glass in such a way that it is filled with water.

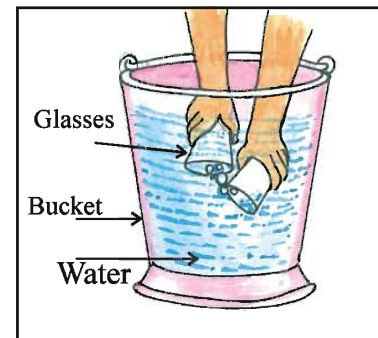


Figure 6.12

- As shown in the figure, hold both the glasses immersed in water with hand.
- Now slightly tilt the glass filled with air and try to fill the air in the inverted glass filled with water.
- Can air be filled from one glass to the other glass?
- From top to bottom or from bottom to top?

Q.5 What does a puncture repairer do to find a puncture in a tube of vehicle? Why does he do like this?



7

Energy



- What would happen if there is no petrol in scooter?
- What would happen if there is no cell in clock?
- What would happen if there is no electricity in home?



Now look at the toy your teacher shows you. Observe it and answer the following question :

(1) Why does this toy start moving?

(2) Why did this toy stop moving?

We take food to get energy to do different activities e.g. to walk, to run etc. in our day to day life. To do work, energy is required. Capacity to do work is called energy.

Energy : capacity to do work is called energy.

7 ♦ Energy



Observe the following picture. From where different objects gets energy to do their work. Note in table.

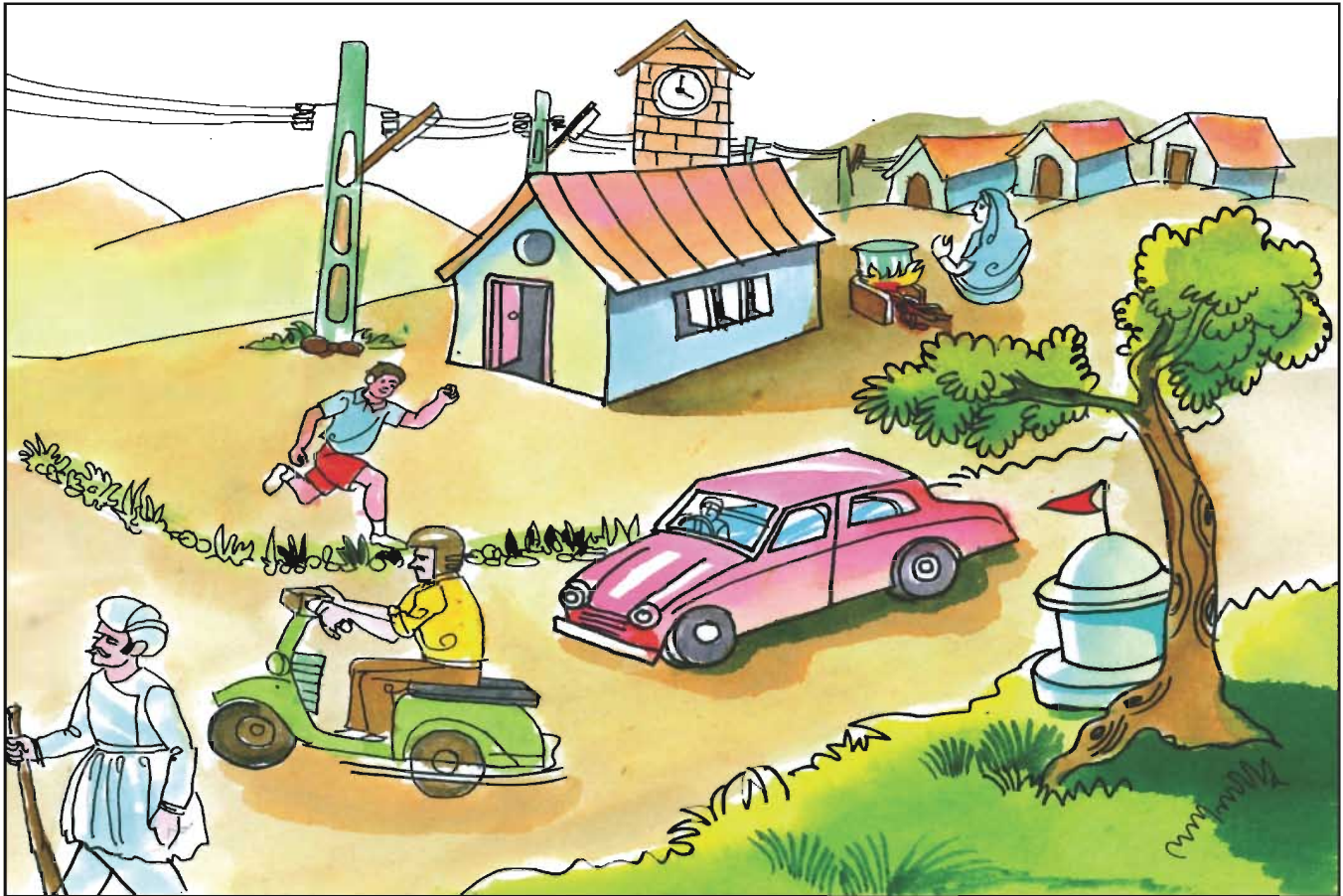


Figure 7.1

No.	Name of object or thing	Its use	From where it gets energy

7 ♦ Energy

We all require energy continuously. Everybody requires energy to do their work, to ride vehicle ,to cook food. Hands of clock requires energy to move. When we are sleeping energy to required for pumping of heart breathing and to digest food in stomach. Look at the picture and think from where do the objects or living being get energy?

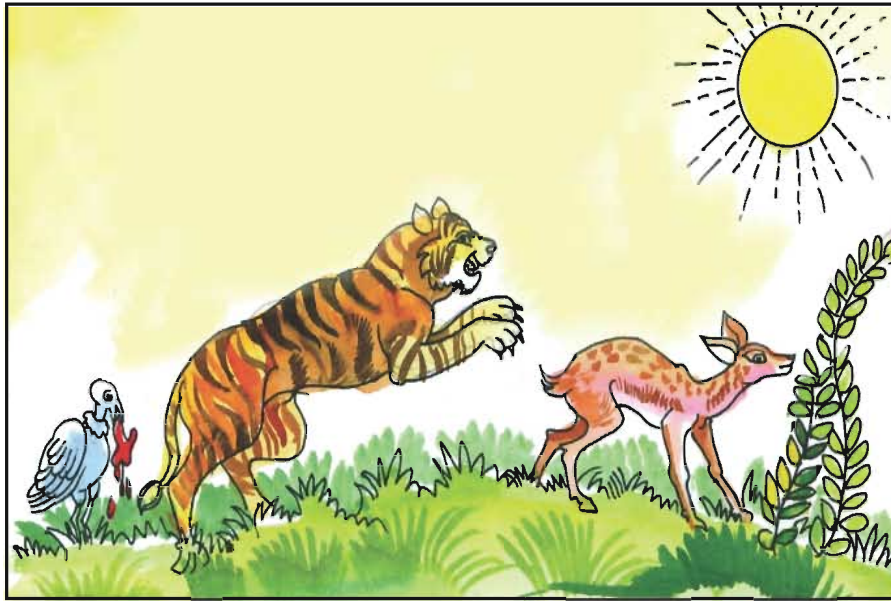


Figure 7.2



Figure 7.3

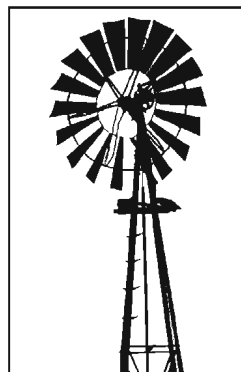


Figure 7.4



Figure 7.5



Prepare the list of the objects from which energy is obtained.

The objects from which energy is obtained are called sources of Energy.

7 ♦ Energy



What happens if we don't get energy?



Sun : Main source of energy.

Look at the following pictures and find their source of energy and fill the empty space :

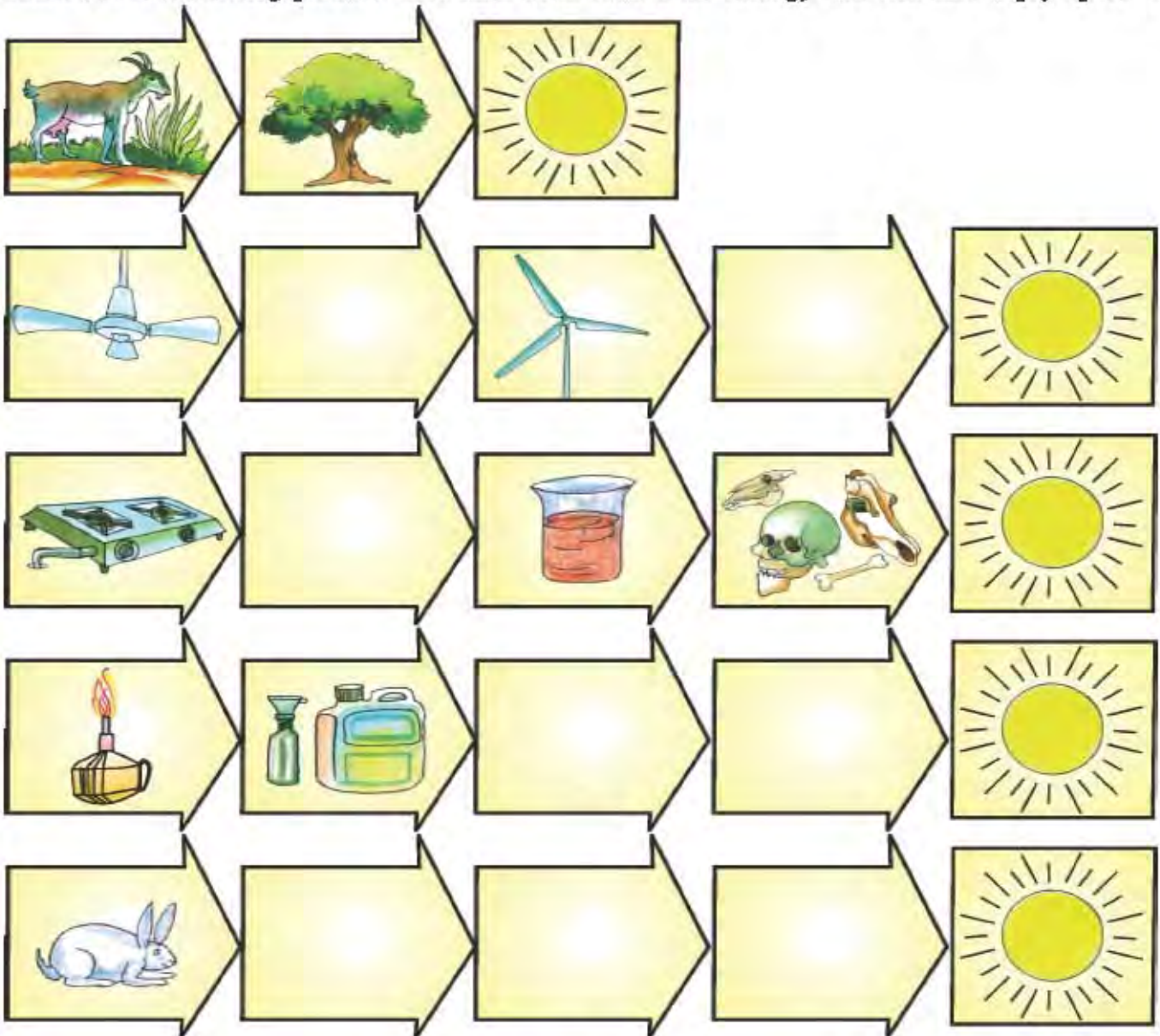


Figure 7.6

7 ♦ Energy

The main source of energy, for the energy of plants animals, wood, coal, kerosene, diesel, petrol, wind flowing water, is the sun. The sun is the main and in exhaustible source of energy.

Think, why wet clothes placed in open sky during quickly? which things are placed in sun light to dry at your home? In previous semester you studied about water wheel. Observe the following pictures and think about the use of solar energy in water wheel. Then prepare a list of uses of solar energy.

Uses of solar energy :



Figure 7.7

7 ♦ Energy

Go to your school library; collect the books related to solar Energy, and gather the information regarding the equipments run by solar energy.



- Q.1** What is Energy? Which is the main source of Energy?
- Q.2** Prepare a list of energy sources which you know.
- Q.3** Prepare a list of energy sources in following which are used by your family members in day to day life :

Source of energy	Name of object / appliance	Use

- Q.4** What happens if energy sources like petrol, diesel, kerosene or gas decreases ? Represent your thoughts.
- Q.5 Explain with reason :**
- Energy obtained from wood is a form of solar energy.
 - Energy obtained from petrol is a form of solar energy.



8

Conservation of Environment

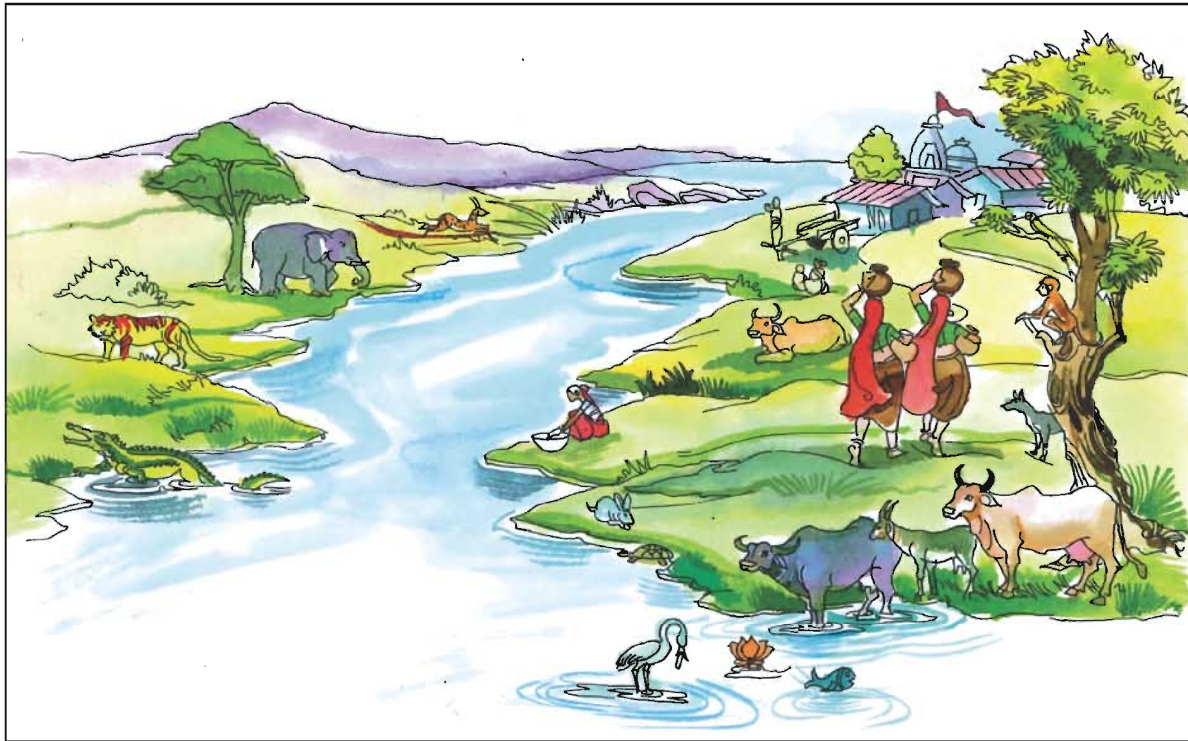


Figure 8.1



Look at the above picture. Prepare a list of different creatures you see.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

8 ♦ Conservation of Environment

Your list contains some living and some non living things. Living and non living are important factors for environment. Environment means the world surrounding us. **Environment is an invaluable gift of God to man.**



Which organisms are there in the previous picture? (Figure 8.1)

All those organisms found in the environment are called biotic factors.



Which non living things are there in that picture?

Air, water, soil, light, temperature, salt etc are abiotic factors, affecting the environment.



What happens, if we don't get air?

All the factors of environment are essential to live life.

- Unwanted changes in the air, water or soil is known as pollution.
- Pollution is harmful to entire living world.

8 ♦ Conservation of Environment



What happens, if we get impure air in our breathing?

Air is essential for every organism to sustain. We should stop air pollution to get pure air.

Observe the following picture :

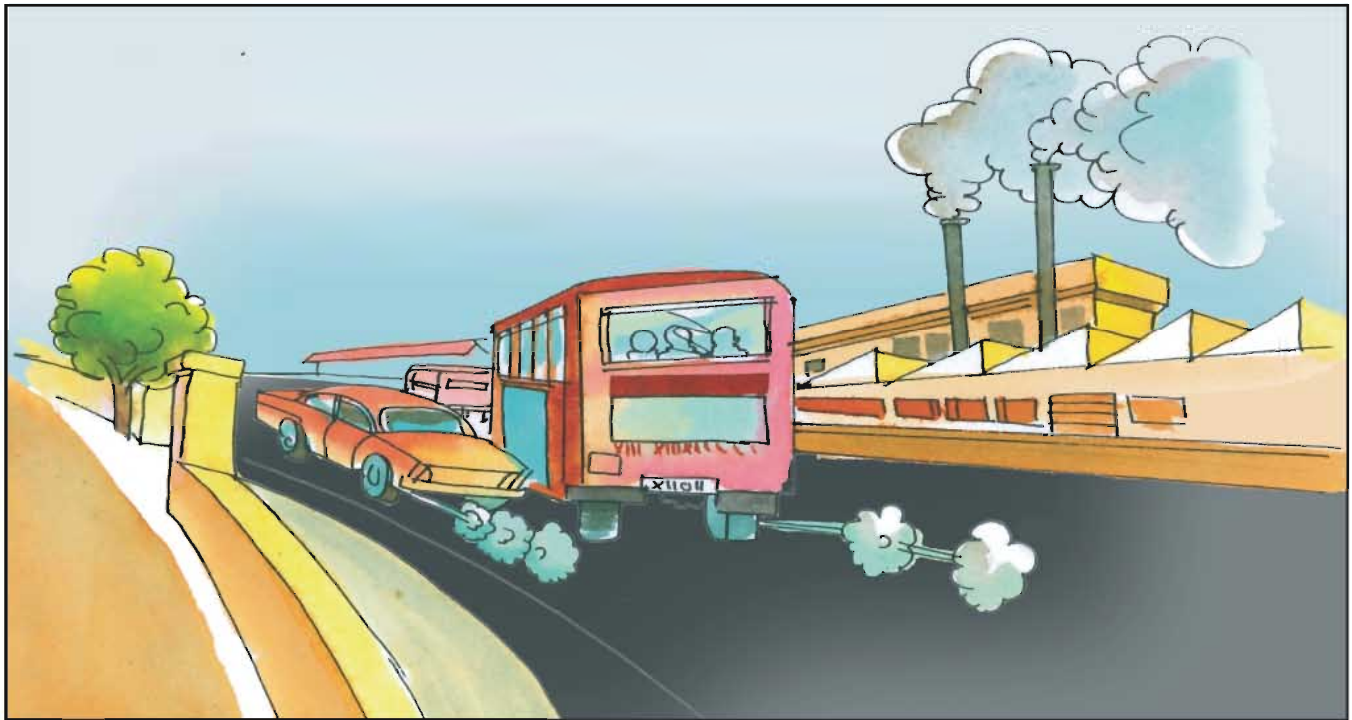


Figure 8.2



How does the air get polluted ?

8 ♦ Conservation of Environment



What can be done to stop the air pollution? Discuss it with your teacher and note down it.

Natural factors purifying the air :

- Sun - Micro organisms are killed due to the heat of the sun and thus air is purified.
- Plants - Plants absorb carbon dioxide through their stomata from the air and prepare their food. Thus, poportion of carbon dioxide decreases from the air which decreases pollution and air becomes pure.

Importance of trees :

Environment is incomplete without plants. Plants play an important role for the living world. Can we imagine the world without plants?



What happens if there is no plant on this earth?

Look at this picture carefully and understand : →

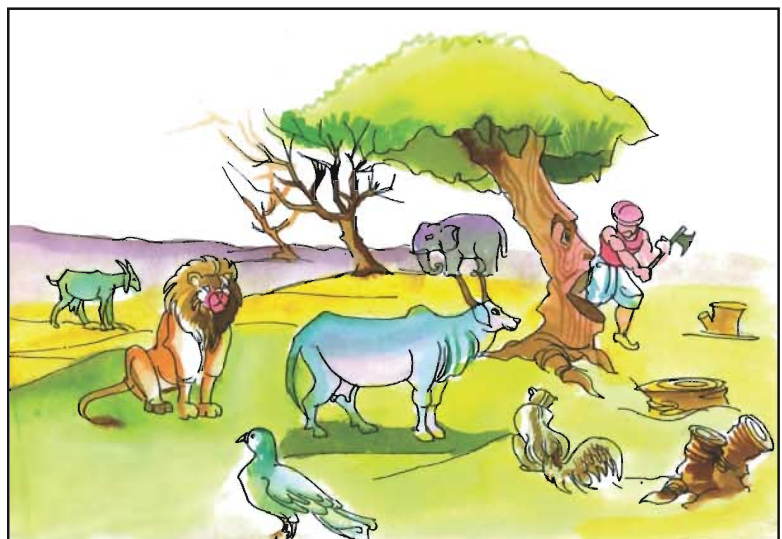


Figure 8.3

8 ♦ Conservation of Environment



How do plants help us?



What should we do to conserve trees?

Trees are the invaluable gift from the nature to the human. Human being, birds, cattles and many insects are dependent directly or indirectly on plants. So we must grow more trees and conserve them.



Role of a tree in the life of a human being :

Prof. T. N. Das of Indian Science college, Kolkata has studied deeply and calculated the price of a tree. According to him, a middle class tree which has 50 ton weight and provides services for 50 years has a price of 1.57 million rupees. thermocol box, glass wool, Jute bag.

S.N.	Function	Price
1.	Production of oxygen.	2.50
2.	Control of air pollution	5.00
3.	Enhancement of soil fertility and control of soil erosion	2.50
4.	Upliftment of under ground water level and maintenance of humidity.	3.00
5.	Providing habitat to animals and birds	2.50
6.	Conversion of protein	0.20
	Total	15.70

8 ♦ Conservation of Environment



Note down your today's water consumption.

S.N.	Aim of using water	Consumption of water in litre
1		
2		
3		
4		
5		
6		
7		
8		

Thus, water is an important factor of the environment. The water is an unavoidable factor for organisms.



What will happen if we do not get water?



What can we do to stop wastage of water?

8 ♦ Conservation of Environment

Look at the following picture carefully :

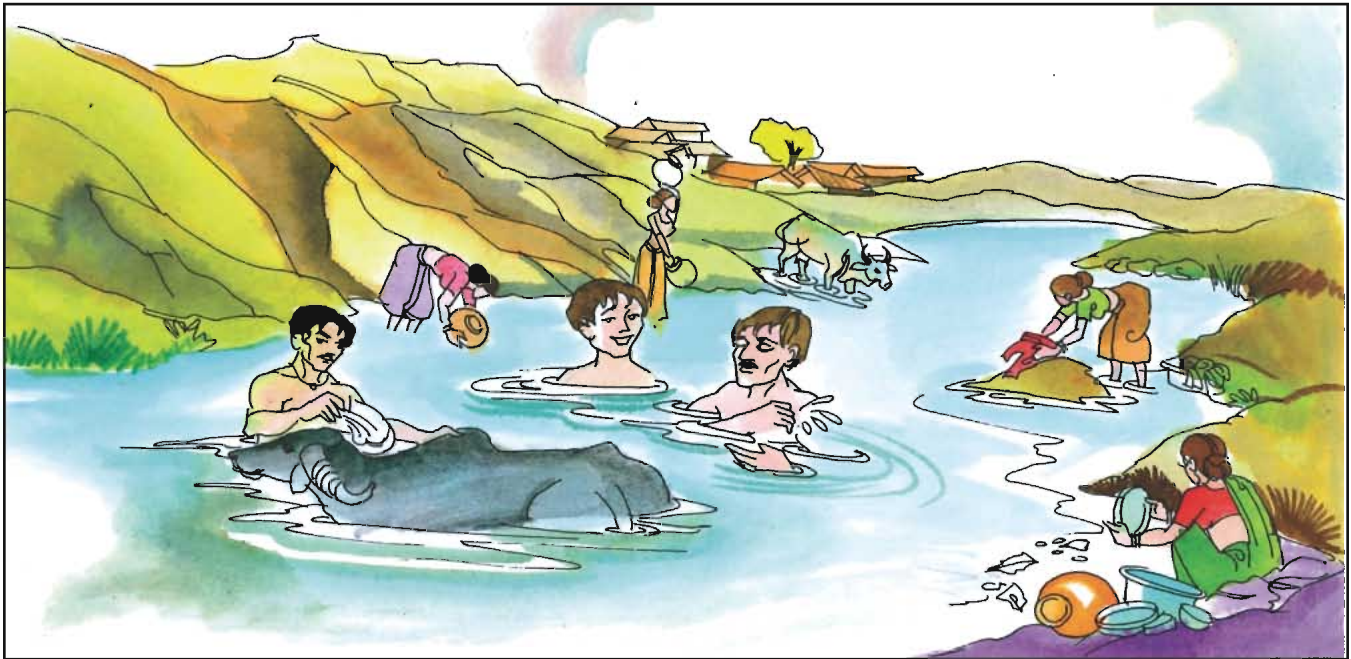


Figure 8.4



Note down the ways of water pollution in the above picture.



What are the other probable ways of water pollution? Discuss with your teacher.



What type of effects are found on the health when one drinks polluted water?

8 ♦ Conservation of Environment



What should we do to stop water pollution?



What are the uses of land (Soil)?



What is required? Thread (1 m long), Note book, Pen

What to do?

- Divide students in different groups.
- Ask each team to go to the nearby open field.
- Each team will draw a 1 x1 m² on the open land.
- Collect all those things found in that drawn square.
- Now classify these things in following two categories.

No.	Natural things	Manmade things
1	Stone	Plastic
2		
3		

8 ♦ Conservation of Environment

No.	Natural things	Manmade things
4		
5		
6		



Discuss with your teacher which thing is useful to improve soil fertility and which one is harmful.

Useful things

Harmful things



Now you can tell what can be the reason for the soil pollution.



What should be done to stop soil pollution?

8 ♦ Conservation of Environment



Soil nourishes us from our birth to our death like our mother. Hence we call her mother land. It is a living place for all organisms. We should conserve it.

Collect the book '*Problems of our District*' from your school library, collect information regarding the problems of your district and discuss them with your teacher.

Relation between energy and environment :

- Energy is equally important like other factors for organisms.
- We use energy in various activities like to play, to run, to ride a bicycle or perform any work.



Which are the sources of our energy?

Strength obtained from the food is called energy.

Observe the following picture. Understand and think :

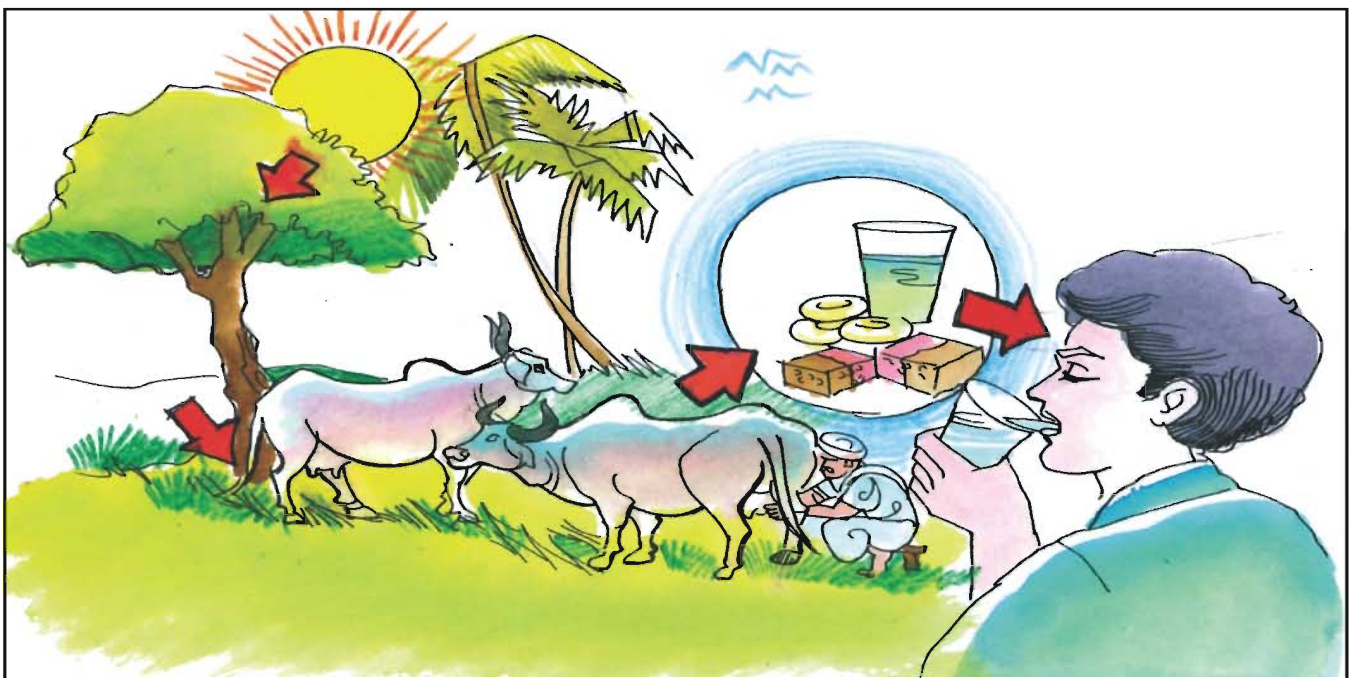


Figure 8.5



Discuss the flow of energy on basis of above picture and discuss with your teacher.

8 ♦ Conservation of Environment

How much energy is lost during the transfer of energy from one level to the next level?



Perform an activity to understand the loss of energy :

What is required? Two equal bowl, water, 4 to 5 spoons

What to do?

- Arrange four to five students in a horizontal row.
- The first student will give a spoon fool of water from its bowl to the student next to him. And the spoon will reach to the last student and he will pour the water in his empty bowl.
- This process will continue till the full bowl becomes empty.
- Now measure the water collected in the empty bowl.
- Is the last bowl filled completely with water?



Figure 8.6



Now tell, why does the last bowl does not get filled completely?

Energy is wasted during the transfer

8 ♦ Conservation of Environment



Where does the energy get wasted? Note down.

- Energy is essential for the life of each organism? We should use it carefully.



What should we do to stop wastage of energy? Note down after discussing it with you teacher.

- Thus we should understand the importance of each and every component of the environment and conserve them to participate in the conservation of the environment.



Q.1 Write down the importance of the component of environment given below in short.

Air : _____

Water : _____

Soil : _____

Engery : _____

8 ♦ Conservation of Environment

Q.2 Write about ‘Trees are our friends’

Q.3 What role can we play to conserve our environment?

Q.4 Which factors are responsible to pollute air, water and soil together?

Do this

- Prepare an album of picture of various plants and trees.
- Develop a medicinal garden in your school compound and take care of it.
- Celebrate the days related to conservation of the environment.

5th June World Environment Day

Celebration of Forest Festival in the month of July

21st March World Forest Day

Revision

2

Q.1 Note down any five changes you have seen during the entire day and classify them

Changes you observed	Type of Changes

Q.2 Note down the involvement of energy for each of the changes you noted above :

Q.3 Take decanted water of limestone in a saucer and keep it open for an hour :

- What type of color change is found in the decanted water after an hour?

- Why?

Revision ♦ 2

Q.4 Mention the elements of air.

Q.5 What type of energy source is used by the following things to work?



Q.6 Give two examples of equipments using following source of energy each :

Source of the energy	Equipments using them
Petrol	<hr/>
Diesel	<hr/>
Kerosene	<hr/>
CNG	<hr/>

Revision ♦ 2

Source of the energy	Equipments using them
Solar energy	
Wood	
Coal	

Q.7 The use of solar energy and other natural sources is far better than the source like petrol, diesel and kerosene. Arrange a debate on the above said topic and note down your conclusions.

Q.8 What types of efforts have you tried at your school to protect environment? Note down the details.

