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Our Food

If any one asks you about your favorite food item, what will you answer? The list may include several things like laddu, biryani, idly - sambhar, vussulu-borugulu, cheese, dal, brinjal curry and so on. But if you are asked about their components, sources of ingredients and how they have been cooked, then, it may be difficult for you to answer. Generally we take interest in eating food and don't bother about other things, like what

material we need to prepare brinjal curry or borugulu? How can idly be made soft? We take food for our health and energy. But we should know the sources of the materials required for preparing the food we eat. This type of information is very important. So, we will discuss about the ingredients, processing and sources of food in detail in this chapter. Observe the following food items and name them.



Fig 1 : Variety of food

Banana contains potassium which is useful for us

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Activity-1: Finding variety in our food

Every day we eat different types of food from morning to night. What did you eat yesterday? Make a list. Also discuss

with your friends and collect information about what food they had eaten yesterday.

Record the information in table 1.

Table 1 - What did I eat

Name of student	Food eaten
Ashok	Rice, dal, milk, vegetables, , jam, idly, bread
Neelam	Biryani, Chilli Chatni, Roti

- Are there any common food items in yours and your friends' lists?
- Count the number of food varieties you have listed in the table?
- Do all the students eat the same type of food items?
- What food is served in your school at midday meal?

We eat different types of food material daily but some food items like rice, dal and vegetables are common in the daily menu in large parts of Andhra Pradesh. On special occasions we eat a larger variety of food.

Food ingredients**Activity-2:** Many things are needed to prepare food

Srinivas wants to eat something special on Sunday. He asked his mother to make biryani. Srinivas wanted to help his mother. His mother asked him to prepare a list of materials which would be required to make biryani. Here is the list made by Srinivas - rice, salt, jeera, tomato, potato, onion, etc. Help Srinivas if he had missed any material and complete the list.

Srinivas was surprised that while cooking boiled rice we need only two materials,

Don't eat bananas on an empty stomach; combining them with a bit of protein will help to normalize the insulin response caused by the sugar in the banana.

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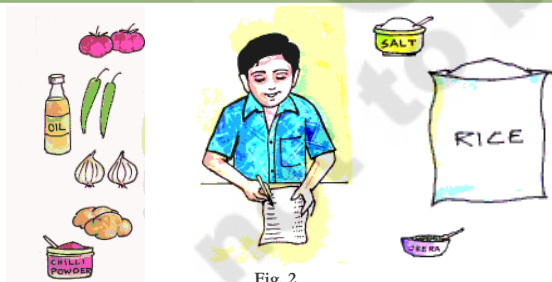


Fig. 2

raw rice and water. But for making biryani we need many materials.

List out some food items you like to eat and try to find out what materials are used to prepare them.

Table 2 - Ingredients of some food items.

S.No.	Food items you like	Required ingredients
1.	Payasam	
2.	Chicken curry	
3.	Pallikaram	

To make different kinds of food we need different materials. These materials which are required to prepare food are known as ingredients. When you purchase packed food, biscuits or any cold drink, you will find their ingredients written on their packets. Have you ever thought from where these ingredients come? Yes,

it will be easy for you to say that we get vegetables and fruits from plants; eggs, milk, meat from animals. Is there any other source you can think of? Some ingredients have been listed below: Find out the source of each ingredient; if it is a plant mark (P) or an animal (A), or something else (E).

Chicory is beneficial for digestion, the circulatory system and the blood

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Name the plant or animal also. You can take the help of your friends or elders.

Table 3 : Who gives us food

Ingredients	P or A or E	Name of plant or animal
Cooking Oil		
Honey		
Chips		
Turmeric powder		
Salt		
Dough		
Meat		
Rice		
Eggs		
Sugar		
Peanuts		

Try to enrich this list as much as you can. You will find that from animals we get milk, eggs and meat. If you observe carefully you will notice that there are a number of animals from which we get different kinds of food. Goats and sheep give us meat. Hens and roosters are used as meat (chicken). Can you elaborate this list? In plants we eat different parts, like leaf of spinach and

coriander plant, flower of cauliflower plant, fruit of tomato and drumstick plant. Table salt is confusing. Actually it is a mineral and obtained from the sea. In later classes you will learn about the components of food. Can you identify which part of the plant is eaten by us in the given table? You can also discuss with your friends.

Beet roots are high in carbohydrate levels and should therefore be used sparingly

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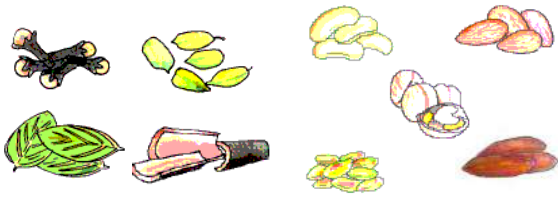


Fig. 3

Do you know?

To make biryani or kheer, we use different types of ingredients such as ilaichi, lavang, dalchini, biryani leaves, pepper etc. They are called condiments (sugandha dravyalu / fragrant material). Cashew nuts, almonds, kismis (dried grapes) etc are also used. These are dry fruits. Condiments and dry fruits grow in particular places only. They are not available in large quantities. They are expensive.

Now look at table 4 and try to fill it as shown.

Table 4 - Eat me/eat me not!

Name of plant	Parts that we eat
Fenugreek (Menthulu)	Leaves, seeds
Mustard (Avalu)	
Sugarcane	
Carrot	
Onion	
Cabbage	
Asafoetida (Inguva)	

Peanuts contain beneficial protein, but many people are allergic to them and find them hard to digest

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- Which parts of the plants do we generally use?
- Do we also use flowers as food? Which plants are these?
- Is there any plant whose whole body is eaten?

We use various parts of plants for our food. Leaves, roots, seeds and fruits of plants are widely used whereas stems and flowers are not so widely used. We need several ingredients to cook different types of food. Whatever may be the source of ingredients - plants, animals or minerals, we use some in plenty but others are needed in only small quantities. Why is it so?

How people develop food habits?

People living in one region usually share common food habits. You might have seen paddy fields near your village. In our state geographical and climatic conditions are more suitable for growing rice so we produce more rice. Even though farmers grow various types of

food crops we generally use paddy. A variety of food items are prepared using rice. We eat more rice and rice products as compared to other cereals like wheat or maize. But in Rajasthan, maize, bajra and wheat is produced more than rice. So the main food in Rajasthan is chapatti or roti.

Many times we hear people saying that "I like this curry ". "I don't like that". This is not a good food habit ,you should make a habit of eating all varieties of vegetable food items. This makes you strong and energetic.

Different methods of preparing food

Preparing food is an extremely important art, essential for life. There are many ways of preparing food. Rice is boiled but idly is not made in the same manner. For making idly, rice and dal are fermented, followed by steaming. Potato chips are fried in oil. Some processes have been mentioned in Table 5. Fill in the food items.

Table 5 - Processes involved in making food

Method of preparing food	Food items
Boiling	potatoes, eggs,...
Steaming	Idlis,...
Fermentation	
Roasting	Chicken ...
Deep Frying	Fish ...

Onions are an excellent antioxidant, and they contain anti-allergy, antiviral and antihistamine properties

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Method of preparing food	Food items
Shallow frying	
Chopping and mixing	
Cutting and mixing	

In table 5, you can also add any other methods of cooking which you know. Don't forget to add the food items prepared by this method.

Tasty Food:-

We usually say food is tasty. But how does food get its taste? The taste of food depends on its ingredients, method of preparation and our cultural habits. Do you know the method of preparation of any food item?



Fig. 4

Joseph knows how to make tomato curry. Listen to him.

"I like tomato curry. I learnt how to make it from my father. To prepare it, we need two tomatoes, one onion, two green chillies, one red chilly, turmeric powder, salt, oil, mustard seeds, black gram and jeera.

First of all, clean all the vegetables in water, and chop them into pieces. place a pan on the flame. Pour three spoons of oil. When oil becomes hot, put one spoon-full of mustard, black gram and jeera. Then add green and red chilli pieces and put a pinch of turmeric powder. Half a minute later add pieces of onion and tomato. Then add some salt and close the lid. After five minutes the tasty curry is ready."

Activity-3: Let us cook

What is your favorite food? Find out how it is prepared. Write the recipe in your note book.

Sweet potatoes are an excellent source of carotenoid antioxidants

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Preservation of food

The discussion about food will be incomplete unless we talk about food preservation. How do farmers protect rice from pests and store it after it is harvested? How is rice stored in your home? Why does curry get spoiled when kept out for a couple of days but pickle stays fresh for so long? It is only because of preservation. For preserving certain food-items, they are salted and dried. In certain areas dried fish is commonly used. Vegetables and meat are also dried and pickled.

- Try to find out how vegetables are pickled at home.
- Find out the ingredients that help to preserve vegetables.

Salt and turmeric powder are used for preservation while making pickles. In

coastal areas it's a common sight to see fish being smoked for preservation.

- Try to find out more about this process.
- What are the other food material preserved by this process?

Do you know?

Sugar syrup or honey is a good preservative. Fruits are often preserved in sugar syrup or honey. Jams and fruit juices are good examples of preservation with sugar.

Activity-4: Let us store food

Discuss in groups and identify examples of different preservatives. Ask your parents other ways of preservation that they follow.

Table 6 - How to preserve food

Types of preservatives	Examples
Adding salt, chilli powder and oil	pickles, ...
Adding only salt	
Drying	
Sugar syrup	

For preserving food we use different types of preservatives. But some food

items which are available in the market have harmful preservatives. So we must

Tomatoes are an excellent source of vitamin C (the vitamin C is most concentrated in the jelly-like substance that surrounds the seeds)

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be aware of the ingredients of packaged food. When you purchase any food item in the market, don't forget to read about its ingredients and manufacturing date. Eating out-dated food material may damage your health.

Do you know?

Preparation of food using vegetables and fruits is an art. Some people make different types of designs and decorations with vegetables. This is called vegetable carving. Try to make your own carving (Fig. 5).



Fig. 5

What we have learnt

- We get food from plants and animals.
- For cooking food, we need different types of ingredients.
- We use different parts of plants like stems, roots, leaves, fruits and flowers as food.

Tomatoes are very high in the carotenoid Lycopene; eating foods with carotenoids can lower your risk of cancer.

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- The taste of food is based on its ingredients, method of preparation and cultural practices of the region.
- Boiling, steaming, fermentation are some methods of preparing food.
- We use preservatives to preserve food for some time.

Keywords

Ingredients, preservatives, fragrant materials, dry fruits

Improve your learning

- What are the common food items usually eaten by you?
- Find out the ingredients of the given food items:
Pachipulusu, coconut chutney, jilebi, onion pakodi
- Write down the process of making upma or any other snack of your choice.
- Collect any wrapper of packaged food. Read the information details and answer the following questions.
 - When was it manufactured and how long can we use it?

- What ingredients does it contain, name them?
- Shahina's mother always cooks plain rice! If the same rice is used to make khichdi, payasam or biryani how would you feel eating those?
- List out the names of some plants that grow in your village. Which parts of it are used as food?
- Some food material is given below. What are the different possible ways of cooking them? Find out and write them.
Meat - Groundnuts - potatoes - Spinach
- With the help of your teacher form groups of 5 or 6 students of your class. Make a fruit chat or vegetable salad and eat it.
How do you feel? Write few lines about your experience.
- Ask your friend to think of the name of any food item. Now you have to guess its name. For this you can ask some questions. Your friend can only answer Yes or No. How many questions did you ask before you could guess the name?
- List out the ingredients needed to make vada. Are they same for dosa? Identify the differences in your list.
- Latha's mother has prepared the following statements for you. Find out the wrong ones among these, don't forget to give your reasons.
 - We can get food from plants and animals only.
 - Spices, oils, salt and meat are the ingredients of a chicken curry.
 - Plants are the source of honey.
- Find out from your parents the various methods of preserving food and write a note on them.
- Collect information about the main food habits of different states of India. Refer to the Atlas, library books and discuss with your teacher.
- Suppose if fish / raw mango / lemons are given to you how would you preserve them?
- Make a list of animals and insects from which we get food.
 - Write the names of these animals on slips of paper. On the other side of the slip write the

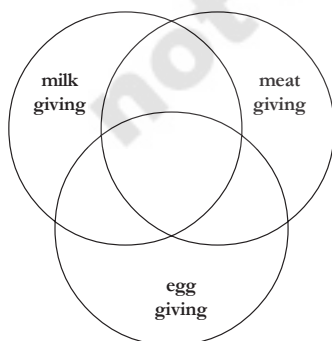
Cakes and cookies contain too much sugar and not enough vitamins and minerals

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names of food we get from the animals - milk, eggs or meat.

- Sort the slips into groups. Write the names of the animals in the correct portions of the circles shown below.
- Are there any portions where none of the animals fit? Explain why?



There is more fiber in an orange than in most other fruits and veggies

Science

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2

Playing with Magnets

All of you would have seen a pin holder in your school office (see Fig. 1 (a)). You may have seen that in this pin holder, some pins are attached to the top or cap.



Fig. 1 (a)

- Why do the pins get attached to the cap of the pin holder?
- What could be there in that cap?
- Does it attract objects other than pins?

You might have seen some metal stickers stuck to the door of an iron almirah or a refrigerator (see Fig 1 (b)).

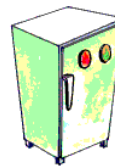


Fig. 1 (b)

- What is there in those stickers which makes them stick to the iron doors?
- Do they stick to wooden doors or plastic doors too?

Activity-1: Finding objects that get stuck to the cap of the pin holder.

Take a pin holder from your school office. Drop some pins, jump-clips, iron nails into it. What do you observe? Do the same with a piece of paper, a pencil and an eraser. What do you observe?

You would notice that some of these objects (pins, jump-clips, nails) get stuck to the top of the pin holder while the other objects (paper, pencil, eraser) fall into the pin holder.

Why does it happen so?

The cap of the pin holder contains a material known as **magnet** which attracts substances like iron pins, iron nails etc.

Similarly, the metal stickers also have a magnet at their back so that they can stick to iron doors.

- What material is needed for making magnets?
- How were these magnets discovered?

Let us try to find the answers to these questions.

Right now, the Neodymium is the strongest magnet currently known

PLAYING WITH MAGNETS

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Story of Magnet

Around 2500 years ago, there lived an old shepherd named Magnus. He used to take his goats and sheep to the hills for grazing. He always carried a wooden stick which had an iron cap on its lower end. One day, while his goats were grazing, Magnus dipped his stick into a spring of water and poked at the pebbles and stones at the bottom with it. Suddenly he felt something pulling his stick. When he took it out of water, he saw a stone stuck to the iron cap. The stone which Magnus pulled out was called lodestone. It is a natural magnet and possesses the property of attracting iron.



The magnets we discussed are not natural magnets. These magnets are man-made magnets.

Magnets of different shapes

The magnets we see and use in our daily life possess different shapes. Some of the usual shapes of magnets are shown in Fig. 2.

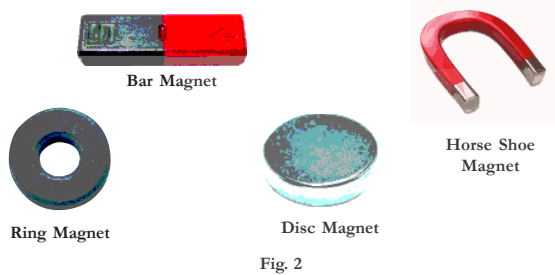


Fig. 2

Think: Can we make a magnet in a required shape?

Usually, magnets are made of steel or iron. However, special alloys of iron, nickel, copper, cobalt, and aluminum can be made into powerful magnets.

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Activity-2: Finding materials attracted by magnets.

Take a bar magnet, nail, jump-clip, plastic scale, a piece of glass, key, paper, iron bolt, pen, blade, pencil, knife, stainless steel spoon, piece of chalk, wood and

touch the magnet to each item. Does the magnet attract every object? Observe and record your observations duly mentioning the name of the material of which the object is made in table 1.

Table 1

Name of the object	Material of which the object is made (Iron/plastic/aluminum/wood/glass/ any other)	Attracted By Magnet (Yes/No)
Jump Clip	Iron	Yes
Scale	Plastic	No

• Which materials are attracted by a magnet?

• Which materials are not attracted by a magnet?

The materials that are attracted by magnets are called **magnetic materials**. The materials that are not attracted by magnets are called **non-magnetic materials**.

• Give your own examples for magnetic materials.

• Give your own examples for non-magnetic materials.

Magnets have the property of attracting materials like Iron. Based on this

property of magnets they can be used to separate some mixtures.

Activity-3: Can we separate iron filings from soil?

Take a bar magnet and roll it in the soil in your school ground for some time. Pull out the magnet. What do you find? Does anything get attached to the magnet?

You may find some dark particles of soil sticking to the magnet.

Now gently remove these dark particles from the magnet and collect them in a sheet of paper. These are iron filings.

Once the Greek scientist Archimedes of the "Eureka" used lodestone to win enemies in battles by using lodestone to get the nails from the ship. So the ship would sink.

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(Keep these iron filings in a box to use in further activities.)

- Which part of magnet attracts more iron filings?
- From which part of the magnet do you feel more difficulty in removing iron filings?

Poles of a Bar Magnet

Does the property of attracting iron filings remain same for all parts of a bar magnet?

Activity-4:

Spread some iron filings uniformly on a sheet of paper. Place a bar magnet below this sheet.

- What do you observe?
- Do you observe any change in the pattern of iron filings spread over the sheet?

You will observe that the uniformly spread iron filings concentrate at two points of the paper sheet. At some

distance you will find some scattered iron filings between these two points. (see Fig. 3)

This change in the spread of iron filings on the sheet of paper is due to the magnet present below it. The iron filings move towards its ends because of this magnet. Thus the ends of the bar magnet attract more iron filings than the middle part of the magnet.

By this activity we can conclude that every bar magnet always has two ends whose attracting capacity is more than its other parts. These ends are called **poles** of the magnet.

Activity-5: Finding directions with a bar magnet.

Suspend the bar magnet freely with the help of a thread tied around its center as shown in Fig. 4. Does the magnet remain stationary? Wait for some time. What do you find now?

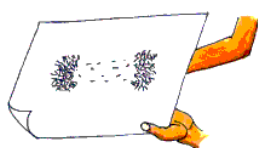


Fig. 3



Fig. 4

Electromagnets are made up of an arrangement of wire coils; often, the wire is wound around a ferromagnetic substance such as steel.

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You will notice that the magnet finally takes a position in the North-South direction. Mark the end that points towards the North with some colour. Now disturb the magnet and again wait for some time.

- Where does the coloured portion come to rest?
- Repeat this experiment at another place. What do you observe?

Magnets always come to rest in the North-South direction. In each case the marked end points towards North. This end is known as North pole of the magnet. The other end, which points towards the South is known as South pole of the magnet. This property of magnets is called **directional property**. It is exhibited only by magnets. We use this property to make the *magnetic compass*.

Magnetic Compass

A compass is usually a small box with a glass covering it. A magnetized needle is pivoted inside the box in such a way that it can rotate freely. The compass also has a dial with directions marked on it. The compass is kept at the place where we wish to know the direction. Its needle indicates the North-South direction when it comes to rest. The compass is then rotated until the north and south marked on the dial are exactly below the two ends of the needle. To identify the North pole of the magnetic

needle, it is usually painted in a different colour (see Fig. 5). Then we identify north and south at that place. After that we can also identify the East and West between them.



Fig. 5

A compass is used to find directions. It is mostly used in ships and airplanes. Mountaineers and army people also carry a compass with them so that they do not lose their way in an unknown place.

Note: Don't place compass and magnets together.

Activity-6: Attraction and Repulsion Between Two Magnets

Take two similar magnets, place them in four different ways as shown in Fig. 6 and record your observations.

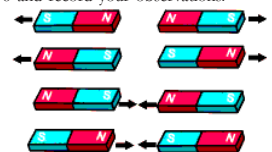


Fig. 6

Some vets use magnets to retrieve wire and metal from animals stomachs

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- What do you observe?
- When do the magnets attract each other?
- When do the magnets repel each other?

You notice that **like poles repel each other and unlike poles attract each other.**

Earth as a Magnet:

We saw that a suspended bar magnet always comes to rest in the North-South direction.

- Why does it come to rest in that particular direction only?
- What force is acting on it?

Activity-7:

Place a bar magnet on a table in any direction. Suspend another bar magnet over it as shown in Fig. 7. The suspended bar magnet should be fairly close to the one kept

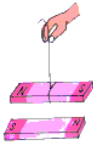


Fig. 7

on the table. Observe in which direction the suspended bar magnet comes to rest.

Change the direction of the bar magnet placed on the table.

- Do you find any change in the direction of suspended bar magnet?

- Is there a change in the direction it comes to rest? What is that change?

The suspended bar magnet always comes to rest in the direction of the bar magnet placed on the table. But the north pole of the suspended bar magnet points towards the south pole of the bar magnet placed on the table and south pole of the suspended bar magnet points towards the north pole of the bar magnet placed on the table.

- What happens if you remove the bar magnet placed on the table?

In this case the suspended magnet comes to rest in the North-South direction. We can say that there is some magnet below the suspended bar magnet which compels it to come to rest in that particular direction (as in above two cases). Where does this invisible magnet come from? The earth possesses magnetic property which acts upon the suspended bar magnet (see Fig. 8).

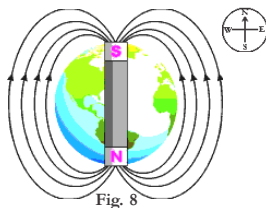


Fig. 8

Magnets attracts only magnetic objects

Activity-8: Finding out whether the given object is a magnet or not
You have been given three objects of same size, shape and colour and a bar magnet. You have to decide which one among them is a magnet, which is not a magnet but made up of a magnetic material or a non-magnetic material.

Bring three objects one after the other close to one pole of the bar magnet and observe whether they get attracted, repelled or not attracted. Record your observation in table 2. After that bring those objects close to the other pole of the bar magnet in the same way and record your observations.

Table 2

Observation	Object - 1	Object - 2	Object - 3
	Attracted / Repelled / Not Attracted	Attracted / Repelled / Not Attracted	Attracted / Repelled / Not Attracted
Changes observed when brought close to one pole of the bar magnet.			
Changes observed when brought close to other pole of the bar magnet.			

What do you conclude by comparing the recorded observations?

By the above observations we conclude the following:

If an object is attracted by one pole of the bar magnet and repelled by the its other pole, then you can say that it is a magnet.

If an object is attracted by both the poles of a bar magnet and not repelled by any pole, then you can say that it is not a magnet but a magnetic substance.

If an object is neither attracted by magnet nor repelled by it, then you can say that it is neither a magnet nor a magnetic substance.

Activity-9: Make your own magnet

Take an iron nail and place it on a table. Make sure that the nail neither attracts nor repels iron pins or iron filings. Take a bar magnet and place one of its poles near one edge of the nail. Without lifting the bar magnet, move it along the length of the iron nail till you reach the other end. Then lift the bar magnet, bring it to the first end of the nail and move along the length again as shown in Fig. 9. Repeat this process 20-30 times. Always move the magnet in one direction, don't drag the magnet back and forth.

The compass was used hundreds of years ago by chinese sailors



Fig. 9

Now remove the bar magnet and bring some iron filings or alpins close to the nail. What do you notice?

The iron filings or alpins get attracted by the nail. Thus you have succeeded in making your own magnet by magnetizing the nail. What will happen if the nail is now suspended freely?

Activity-10: Make your own magnetic compass

Take a magnetized needle. Tape the needle to a light cork. Float the cork in a glass of water as shown in Fig. 10.

Add a little detergent to water to help the cork float freely. In what direction does your magnetized needle point?

It points in North-South direction. Thus it acts as a magnetic compass.



Fig. 10

Activity-11: Magnetic induction

Take a safety pin and bring it close to an alpin. Does it attract the alpin? Why?

Bring the safety pin close to one pole of a bar magnet and see how it gets attached to the magnet. Now bring an alpin and touch it to the safety pin as shown in Fig. 11 (a). Does safety pin attract the alpin? Why?

In the above two cases, we notice that the safety pin acts as a magnet when it is in contact with another magnet. Magnetic property is induced in safety pin due to the bar magnet.

Magnetic property possessed by a magnetic substance due to the presence of a magnet near it, is called magnetic induction.

- If the safety pin is not in contact with the bar magnet, can it attract the alpin?

- What happens if we place the bar magnet very close to the safety pin but not touching it?

Let us find out.

Take a bar magnet in one hand and a safety pin in the other hand, hold them in such a way that they are close to each

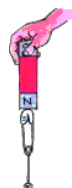


Fig. 11 (a)

other but not in contact as shown in Fig. 11 (b).

Ask your friend to bring an alpin and touch the safety pin. You will notice that the alpin will stick to the safety pin. This shows that due to magnetic induction safety pin acts as a magnet.

Fig. 11 (b)

Keywords

Magnet, magnetic material, non-magnetic material, North Pole, South Pole, Magnetic compass, like poles, unlike poles, attraction, repulsion, magnetic induction

What we have learnt

- Lode stone is a natural magnet.
- Magnets are of different shapes i.e. bar magnets, horse shoe magnets, ring type magnets, etc.
- The materials that are attracted by magnets are called magnetic materials. The materials that are not attracted by magnets are called non-magnetic materials.
- A bar magnet always has two ends whose attracting capacity is more than other parts of it. The

poles of the magnet lie at these ends.

- Each magnet has two magnetic poles : North and South.
- A freely suspended magnet always aligns in the North-South direction.
- Unlike poles of two magnets attract each other; whereas like poles repel each other.
- Magnetic property possessed by a magnetic substance due to the presence of a magnet near to it, is called magnetic induction.

Improve your learning

1. Predict which of the following material are magnetic and non-magnetic material. Test with a bar magnet and check your predictions. What do you say after testing all materials?
Plastic, Iron, Stainless steel, Wood, Aluminium, Gold, Silver, Copper, Paper, Cloth.
2. List out the magnetic and non magnetic materials in your class room.
3. For which purposes do people use magnets in their daily life? Ask your family members and other

The earths magnetic field is like a bar magnet at the center

Earth magnets can be 20 times more powerful than a fridge magnet

elders and collect the information and prepare a list of uses of magnets.

- Draw a bar magnet and locate the poles.
- Observe and locate North and South poles for the second bar magnet shown in the figure given below.



- Think and say, in which direction your house is facing? Use the compass and find out the exact direction of your house and compare it with your prediction. Similarly predict and find out in which direction you keep your head while sleeping at night, the directions you face while you are reading, eating etc.
- Prepare a toy using magnets and write the procedure of preparation briefly.
- Think and say where the poles will be located in a ring magnet? Try to find out its poles using a bar magnet and check your prediction.
- Magnetize a needle using a bar magnet. Make a compass with that needle by following the

- process explained in activity 10.
- Sometimes people use magnets to keep the doors open and some times to close the doors firmly. Think and say how is it possible and how we should arrange the magnets in each case.
- Does the Earth behave as a magnet? How do you prove it?
- If you have two similar bars, one a magnet and another a piece of iron. can you find out which one of these is a magnet? Explain the process.
- Teacher said that Earth is a magnet. But Sreevidya has some doubts and she asked her teacher some questions. What may be the questions?
- Surya was wonderstruck to know that Earth is a big magnet and appreciated efforts of scientists to discover this. Do you notice any such things in magnets to appreciate? Explain.
- Kiran wants to prepare a toy using some magnets to make people understand the slogan "Reject bad food and accept only good food". Can you help him to prepare the toy? If yes, how?

It is believed that the earth's magnet power comes from a current in the liquid center of the Earth causing it to become a gigantic electromagnet!

Science

VI Class

3 Rain : Where Does It Come From?



Fig. 1

Ramya and Sowmya were getting ready to go to school. Their mother advised them to keep an umbrella with them. Ramya asked her mother why the umbrella was needed as it was not raining. After looking at the sky, mother told them that it was likely to rain as it was cloudy and windy weather. They started to school wondering about how their mother was able to predict when it could rain.

- Why do we get rains?
- Where do the rains come from?
- How did mother know that it was likely to rain?
- Do all the clouds formed in the sky cause rain?

Rain is a common phenomenon like air and sunlight in our daily life. We generally get more rains in rainy season. Our general observation is that if the sky is cloudy then there is a possibility of rain. But clouds do not lead to rains every time. Some times we witness sudden rains.

- Why do clouds cause rain?
- What is the relation between rains and clouds?
- Why don't all clouds cause rain?

To understand about clouds and rains we need to first know something about water.

Forms of Water

All of us know that water is available in nature in three forms.

Solid Form

We call solid form of water ice.

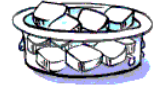


Fig. 2 : Ice

Snow occurs naturally.

Rain drops are not shaped like this, they are shaped like this as they fall. Raindrops vary in size from 0.02 inch to about .031 inch diameter.

RAIN: Where Does It Come From?

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Can we convert water into ice? Explain what we should do?

Liquid Form

What happens if ice is kept in the open air?

If we heat ice, it will change into water. Water in liquid form is present in oceans, seas, lakes, rivers and even underground.



Fig. 3 : Water - Liquid form

Gaseous Form

What happens when water is heated? The gaseous form of water is water vapour which is present in the air around us.

We know that when ice is heated it converts into water and if water is heated it turns into water vapour. Similarly when water vapour is cooled we can get back



Fig. 4 : Vapour - Gaseous form

water. If water is cooled further we will get ice.



So, we understand that these three forms of water are interchangeable.

Evaporation and formation of clouds



Fig. 5

What happens to the water in wet clothes when they are kept in sunlight? When we want to dry clothes quickly we wave them about or keep them under a fan.

- Does the water in wet clothes dry up only due to sunlight or due to other reasons?

You must have seen that water on wet roads, roof tops and some other places dries up after some time though there is no sunlight.

- Where does this water go after drying up?

If you heat water kept in a bowl by using a stove, you may notice water vapour coming from the bowl. Thus, when water is heated, it gets converted to vapour and mixes with the air. This is

what happens to the water in wet clothes also.

The process of water changing into water vapour is called "evaporation"

If water is gently heated it will become warm. Some vapour is produced. If it is heated more, it starts boiling. If we heat it further, it evaporates and converts completely into water vapour.

We know that the amount of heat absorbed by water affects its evaporation. If water is heated more, it will evaporate faster.

- You might have observed evaporation in many situations in day-to-day life. Discuss them with your friends and prepare a list.

Evaporation is a natural process which takes place on the Earth. Water evaporates continuously from the surfaces of water bodies like seas, oceans, rivers, ponds etc. and changes into water vapour due to the heat supplied by sunlight.

- Where does this water vapour go after evaporation?

The water vapour formed due to evaporation becomes a part of air and cannot usually be seen. The water vapour which enters into air through the process of evaporation forms clouds in the sky.

- What is a cloud?
- How are clouds formed?

Condensation

It is our common experience that on cold winter mornings when we speak,

we observe smoke-like vapour coming out of our mouths (Fig 6).

- Why does smoke-like vapour come out of our mouth in winter?
- Do we experience this in summer as well?

In winter, the air in our atmosphere is very cool as compared to the air coming out from our mouth. Water vapour present in the air coming out from our mouth gets cooled suddenly to form very tiny droplets. These tiny droplets concentrated in a limited area, appear like smoke or a small cloud near our mouth.



Fig. 6

You might have observed that during mornings in winter, some fog is formed and small dew drops appear on grass, leaves of plants etc.

- From where do these water drops come on the leaves and grass?



Fig. 7 : Dew on grass

The umbrella was originally intended for shade from the hot Egyptian sun.

Science

VI Class

Some monkeys are omnivores which eat other animals.

RAIN: Where Does It Come From?

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Activity-1: Condensation

Take some water in a glass. Add some pieces of ice to it. Observe for few minutes.



(Fig. 8)

- What changes do you observe on the outer surface of the glass?

You would observe formation of small drops of water on the outer surface of the glass.

- Why are these drops formed?
- Do they get formed if there is no ice in the glass?

Ice-cold water in the glass cools its surface. Air around the glass contains water vapour which is warmer than the surface of the glass. Due to the cold glass, air close to its surface will also become cooler. This changes the water vapour in the air around the surface of the glass into water and forms small drops on the outer surface of glass.

Have you ever observed in your daily life where water vapour changes into water? List them out.

The process of conversion of water vapour into water is called "condensation".

Clouds and rain

On a warm day, the sun heats up the ground as well as the water in seas, oceans, rivers, ponds etc. This water converts into water vapour by the process of evaporation.



Fig. 9

This water vapour rises up into the atmosphere. As we move away from the surface of the earth, the air becomes cooler. Hence, when water vapour reaches higher levels it condenses due to contact with cool air and forms small drops or water droplets. These tiny droplets remain floating in air at higher levels of the atmosphere and appear as clouds.

Activity-2: Clouds in kitchen

Take a vessel filled with water. Keep it on a stove and heat it slowly. Observe for some time. Now cover the vessel with a plate. Remove the plate after a

couple of minutes (Fig 10). Do you see any changes on the inner surface of the plate?



Fig. 10

Pour some cool water on the plate and observe what happens?

What similarities do you find between evaporation of water from surface of water bodies and evaporation of water from a bowl heated in the kitchen? From both cases discussed above, we know that water vapour helps to form clouds.

The clouds formed on the surface of the different water bodies do not stay there. They start to move from one place to another in the direction of winds.

As more clouds together they become laden with water vapour. Winds bring the clouds from the sea to the land. The colder air in the upper layers of the atmosphere cools the clouds.

- Have you observed the colour of a cloud before rain?
- How are clouds converted into rain?

We all know that without clouds, it will not be possible to get rains and that all clouds do not cause rains. Some changes take place in the clouds before they cause rain.

- What changes do you notice in the sky and in the atmosphere before it rains?
- What changes take place in clouds before raining?



Fig. 11

The clouds moving in air are generally at higher levels. Sometimes the cool breeze coming along with air makes the clouds cooler. This leads to water droplets present in the clouds to condense and form large water drops. Further cooling of clouds increases the size of their water drops and clouds become heavy and descend towards the earth. The colour of such clouds changes from white to gray giving us the feeling

In some rainforests there are flying animals such as squirrels and snakes.

Acid rain is the combination of sulphur dioxide and nitrogen dioxide from polluting clouds from nuclear reactor and other fossil fuels.

of dark clouds gathering. When the size of the water drops increases further it becomes difficult for the cloud to hold them and water drops begin to fall. This is called "rain". (Fig 11)

In our daily life, we observe that before raining, clouds descend towards the earth's surface and we experience a cool breeze before rainfall.

In very cold conditions, the drops of water turn into crystals of ice and fall as snow. Sometimes big drops of water solidify into ice and fall as pieces of ice known as hailstones.

Do you know:

Generally, we get rains in some particular months during the year. In our state, rains occur normally from June to September. During that season you might have observed in the sky that clouds are moving along with the winds blowing from western direction (South West side). These winds are called "South West monsoon". Similarly, we observe in the months of November and December rains occur due to movements of clouds in the direction of winds blowing from Eastern side (North East side). These winds are called "North East Monsoon". Now a days we are not getting timely rains and seasons are also changing slightly. Think, why is it happening so?

Water cycle

When it rains ponds, lakes etc are filled with water. Water from rainfall runs down as small streams. These small streams join together and make bigger streams. These bigger streams join the rivers. The rivers flow down to seas and oceans. Some of this rain water seeps into the ground and becomes ground water.

As it is very hot during summer, large quantity of water evaporates from seas, lakes, rivers etc. and converts into water vapour. This goes up into the air to form clouds. These clouds again cool and produce rain.



Fig. 12

The circulation of water into water vapour by evaporation, water vapour to clouds and clouds to rain by condensation is known as "water cycle"

This cycle of evaporation and condensation takes place continuously in nature. (Fig 12)

If the rain drops are very small, they are collectively termed drizzle.

Deforestation and pollution from factories are now causing global warming. So, the atmospheric conditions are not favourable for clouds to get cooled. Consequently, there is a decrease in rainfall. This disturbs the water cycle and causes either floods or droughts.

Keywords

Evaporation, condensation, water cycle, cloud, water vapour, atmosphere, stream, droplets, dew, rain, hails, breeze, wind

What we have learnt

- Water on the Earth can exist in 3 forms: ice (solid form), water (liquid form) and water vapour (gaseous form).
- The process of changing of water into water vapour is called evaporation.
- If water receives more heat, it evaporates faster.
- Clouds are formed from tiny droplets of water vapour.
- Evaporation of water from the surface of seas, lakes, ponds etc. is part of cloud formation.

- All clouds do not always cause rain.
- As we move up from the surface of the Earth, air becomes cooler.
- The process of conversion of water vapour into water is called condensation.
- The cycle of evaporation and condensation of water, present on the Earth's surface, causes rain.
- The conversion of water into water vapour, water vapour to clouds and clouds to rain is known as water cycle.

Improve your learning

1. How are clouds formed? Explain?
2. How does the rain water reach from clouds to rivers or oceans?
3. When do clouds become cool?
4. Explain the relationship between the heat of sun and evaporation.
5. Why do we experience cloud like smoke near our mouth while we speak during the winter season?
6. Correct the given sentence if necessary. "If the size of water drops decreases in the clouds, they can no longer hold the water drops."

Raindrops fall between 7 and 18 miles per hour (3 and 8 meters per second)

7. Which of the following days is more suitable for drying of washed clothes? Explain why.
(a) Windy day (b) Cloudy day
8. Which of the following statements are right or wrong ?
(a) evaporation takes place quickly when more heat is supplied.
(b) for condensation of water, it should be cooled.
(c) water vapour is obtained from water by evaporation.
9. Visit your school library or internet, collect information about (Kashmir) Dal Lake regarding in which season water in the lake becomes ice and snow fall is very high and why the place attracts more tourists?
10. Draw a diagram to explain the water cycle.
11. How do you feel when you see the beauty of Rainbow in the sky? Express your feelings in the form of a song or a poem.
12. Why do clouds, once seen at a particular point, may not be there after some time?
13. How do you appreciate the contribution of water cycle in making water available for various needs of plants and animals?
14. Revanth blew air from his mouth onto the mirror while he was getting ready to go to school. He observed that the image in the mirror was not clear. Do you have any doubts to raise in this situation? Prepare questions on your doubts.
15. Why does the driver of a vehicle wipe the glass inside, even if the wiper is working on the outer surface of the glass when he drives in rain?
* * * *

A monsoon is a seasonal wind, found especially in Asia that reverses direction between summer and winter and often brings heavy rains.