Periodic and Non-Periodic Changes

Look at the calendar and complete the tabular Column;

Month	New Moon (Date /Day)	Full Moon (Date /Day)

How many days are there between a new moon day and a full Moon day?

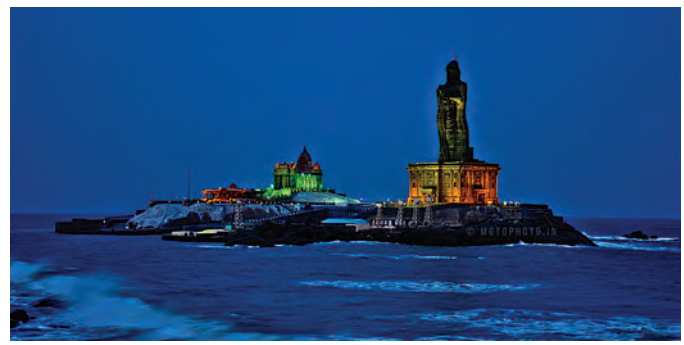
Do the new Moon and full Moon occur at regular time interval?

We understand that the new Moon and full Moon occur at regular time interval. Hence the changes that occur at regular time interval are called Periodic changes.

More examples for Periodic Changes

Pendulum clock

Phases of Moon



Day and Night

Look at the pictures given below.

Can you predict when will these changes happen?
Will they take place at regular time interval?


Eruption of volcano


Earth quake


Land slide


Accident

We cannot predict how and when above given changes will occur. So, the changes that do not occur at regular time interval are called non-periodic changes.

Let us learn the differences between the periodic and non-periodic changes.

S.No.	Periodic changes	Non-periodic changes.
1.	Occur at regular time interval.	Do not occur at regular time interval
2.	Can be predicted e.g. weather.	Cannot be predicted e.g. earth quake.

Exothermic and Endothermic Changes

Do the following activities and record your inference in the table.

Activity 5

1. Take a small amount of detergent powder in your palm and add water? How do you feel?

2. Take a small amount of quick lime in a beaker and add water to it. Touch the beaker. How do you feel?

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3. Take a small amount of glucose in a beaker and add water to it. Now touch the beaker. How do you feel?

4. Take a small amount of water in a beaker. Add Ammonium chloride salt and stir it. Touch the beaker. How do you feel?

Experiment No.	My inference
1.	
2.	
3.	
4.	

Changes in which heat is liberated are called exothermic changes.
Ex . : burning of match stick, dissolution of detergent or washing soda in water.

Changes in which heat is absorbed are called endothermic changes.
Ex. : Dissolution of glucose or ammonium chloride in water.

Let us know.

An invention from Nature.

We can create new things by closely observing the Nature .

Invention of Velcro by George Mestral in the year 1948. is a right example for this.

George Mestral used to go for a walk with his pet dog daily. One day he found that some seeds were hooked on his clothes and on the fur of his dog. He observed these seeds under a microscope and found some hook like structures on them. Based on this he tried to create a new thing.

This led him to the invention of Velcro. It has tiny hooks which can attach to the objects. Today velcro is widely used in bags, footwear and clothes.

Activity 5

Using a thermometer measure the temperature of your class room from morning to evening and record in the tabular column. Know the changes in temperature.

Day	Temperature		
	Morning	Noon	Evening
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			

Activity 6

1.Mention the months during which we have summer season in our state.

_____

2.During which months do we have winter season?

_____

3.During which months do we have rainy season?

_____

4.Do we get the above seasons during the same months every year?

_____

5.Under what type of change do you classify these seasonal changes?

_____

Activity 7

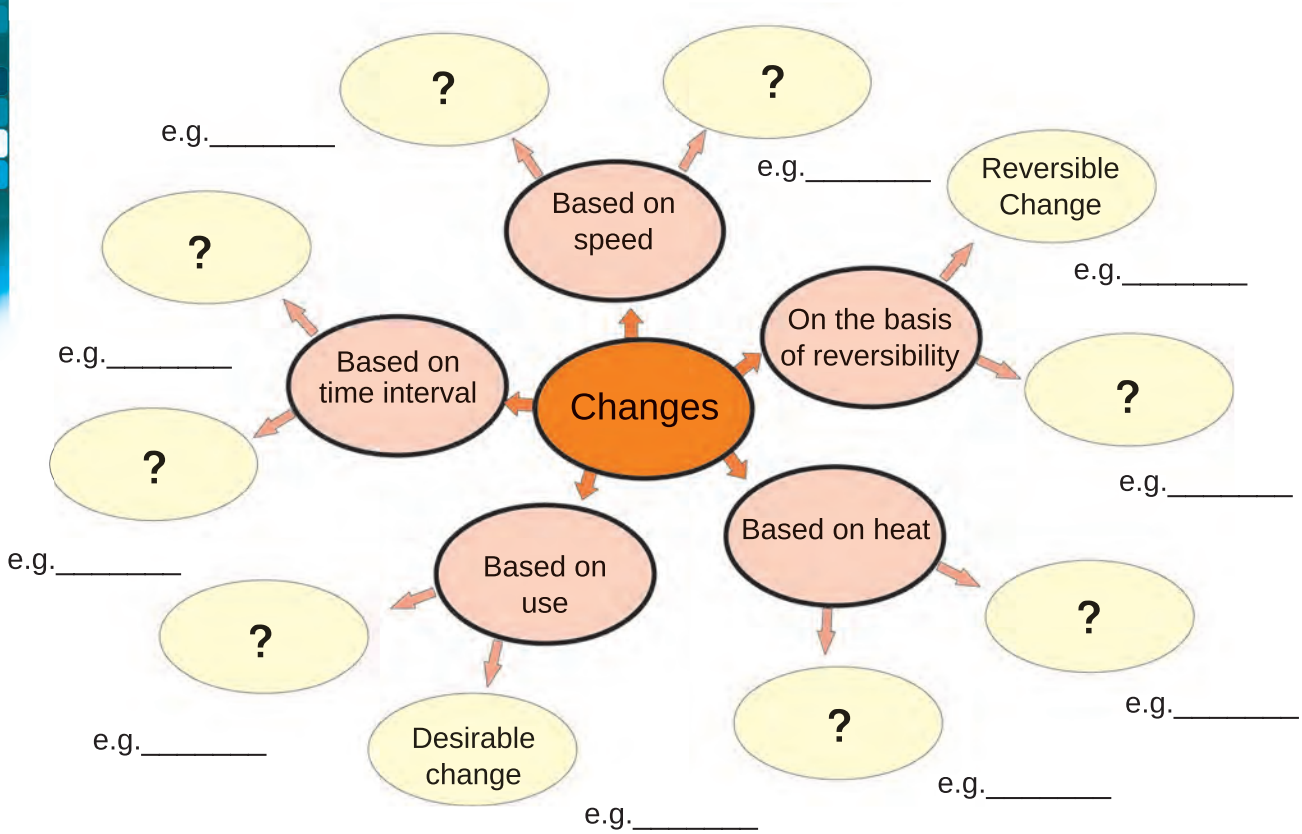
Select two students from each class of your school and record their age,height, and weight. See the changes in their height, weight with the increase in their age.

Activity 8

Have you seen pot making? The potter is making the pot by heating wet clay. When can you get back the wet clay from the pot? (before heating / after heating) Discuss in small groups and find the changes that take place in this process.

Evaluation

I. Fill in the blanks and question marks:



II.Choose the correct answer

1.Release of the compressed spring is _____

a)irreversible change b)reversible change

c)non-periodic change d)undesirable change

2. Spoilage of food is_____

a)reversible change b)fast change

c)undesirable change d)periodic change.

3. Dissolution of washing soda in water is_____

a)exothermic change b)irreversible change

c)undesirable change d)slow change.

4.Which of the following changes is non-periodic?

a)heart beat b)earth quake

c) occurrence of day and night d)oscillation of pendulum.

III. Identify the changes in the following..

a)Tsunami

b)Swinging

c)Occurrence of New Moon and Full Moon

d)Melting of wax

IV. Answer the following.

1. Give five examples for desirable and undesirable changes.
2. What type of change is an earthquake? Why?
3. What is meant by slow change?
4. What is an irreversible change? Give example.

V. Reason out the following questions

1.You have broken your favourite toy. Can you mend it ? What type of change does this belong to?

2.Meena and Nisha were about to have their lunch in their school. Nisha was not able to eat her lunch as her food was stale and spoiled. So Meena shared her food with Nisha . In the above situation,

a)What kind of change is spoilage of food?

b)What are the possible reasons for the spoiling of food ?

c)What are the evil effects of consuming of spoilt food?

d)Mention some of the methods adopted at your home to preserve food from spoilage.

3. Mention any five changes that take place in your kitchen. Identify the kind of changes each belong to.

e.g.Preparation of chapathi - Slow change, desirable change, irreversible change.

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Further reference

Websites:

www.simplescience.net

http://www.bbc.co.uk/school/scienceclips/ages/10-11/rev-irrev-changes.htm

http://www.learnnext.com/class6/science/changes-around-us.htm

Measurement and Motion 4

Measurement

On a holiday Ezhil went to market with his father. First they went to a grocer's shop. Ezhil's father asked for the following.

Rice	- 10 kg
Bengal gram	- 500 gm
Groundnut oil	- 2 litre
Ghee	- 200 millilitre

The shopkeeper used a balance for measuring rice and bengal gram. He measured oil and ghee with a measuring jar.

They went to a flower shop and bought 5 cubit garland. Then they went to a textile showroom and selected a shirt material and asked 2 metre. The shopkeeper measured 2 metre of the cloth with a metre scale and gave them.

They went to a vegetable shop and asked for the following vegetables.

Lady's finger-1kg

Green chillies-100gm

Onions-2kg

The shopkeeper weighed the vegetables with the help

of a balance. On their way, they went to a fruit stall and asked for a dozen bananas.

The shopkeeper counted and gave 12 bananas. After buying fruits they returned home. Ezhil had a doubt and asked his father, "Why do we need to order different items in different terms?"

In order to clear his doubt, his father asked him to prepare a list of the items purchased, their quantities and the instruments used for measuring them. Ezhil started preparing the list. Shall we help Ezhil?

Electronic balance

Activity 1

Item	Quantity	Measuring Instrument

Activity 2

What are the instruments used to measure the following? Discuss in small groups and write them down.

1. Shirt material: _____
2. Sugar: _____
3. Cooking oil: _____
4. Tomatoes: _____
5. Length of your science text book: _____
6. Time taken to reach school: _____
7. Kerosene: _____
8. Duration of tamil period: _____

From the above activity we have learnt that metre scale, balance , clock, measuring jar, etc. are measuring instruments.

What is measurement?

Now, shall we measure the length of our class room cupboard using a metre scale? Have you measured the length? If it is 2 metre then 2 is the magnitude and metre is the unit of length. Metre is a fixed quantity but the quantity 2 is to be determined. Here the length of the cupboard is two times length of 1 metre.

Can we measure the mass of your school bag using a balance? If it is 3 kilogram, here 3 is to be determined. Kilogram is the unit of mass. That is, the mass of the bag is 3 times the mass of 1 kilogram.

Similarly, if it takes 20 minute to reach your school from home, then 20 is to be determined and minute is the unit of time.

Measurement is a process of comparison of an unknown quantity with a standard quantity of the same kind. Here metre, kilogram and minute are units. We have learnt that many physical quantities have both magnitude and unit.

The need for Standard Unit

Activity 3

Each of you, measure the length of the table in your classroom in terms of hand span. Fill up the following table.

Name of the Student	Length of the table in hand span
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____

In the above activity even though length of the same table is measured, each one gets a different value. It is because the length of hand span differs from person to person. That is why measurement of length of garland in cubit by you and shopkeeper differs. Now can you measure the length of the same table by metre scale. Did all of you get the same value? what do we infer from this?

Hence cubit, hand span are not standard units. Metre, kilogram and second are the standard units Measurement of a quantity by different people should give the same value. This is called standard measurement. The units which are used for standard measurement are called standard units. Now shall we learn about fundamental quantities?

Fundamental quantities

Length, Mass and Time are called as fundamental quantities, because they are not to be expressed in terms of other physical quantities

The units which are used to measure the fundamental quantities are called fundamental units.

SI system (System International Units)

In early days people in different parts of the world used different system of units for measuring length, mass and time. A few systems of units are,

1.FPS system

(Foot, Pound, Second)

2.CGS system

(Centimetre, Gram, Second)

3.MKS system

(Metre, Kilogram, Second) In order to overcome the difficulties of using different systems of units, an International system was adopted in 1960. This was accepted by scientists all over the world.

This system is called SI System. Shall we know the SI units of length, mass and time?

Physical quantity	SI Unit	Symbol
Length	Metre	m
Mass	Kilogram	kg
Time	Second	s

Measurement of length

Draw a straight line in your note book. Plot two points A and Bon the line.

Measure the distance between the two points using a scale. What you have measured now is length. The distance between two points is called length. The SI unit of length is metre.

To measure length we use measuring tape, metre scale etc.

Multiples and submultiples of length

In the above activity, larger distances such as the distance between two places are expressed in

Activity 4

Shall we measure the length of the following and write them in proper units?

Length of your pencil _____

Length of your thumb _____

Length of your eraser _____

Length of a leaf _____

Length of your pen nib _____

Length of the nail of your little finger _____

Know yourself

- Length of cloth required for stitching your shirt
- Distance of your home from school
- Distance of your neighbouring town from home.
- Distance of the state capital from your place.
- Shall we write down the different units of length used in the above activities?

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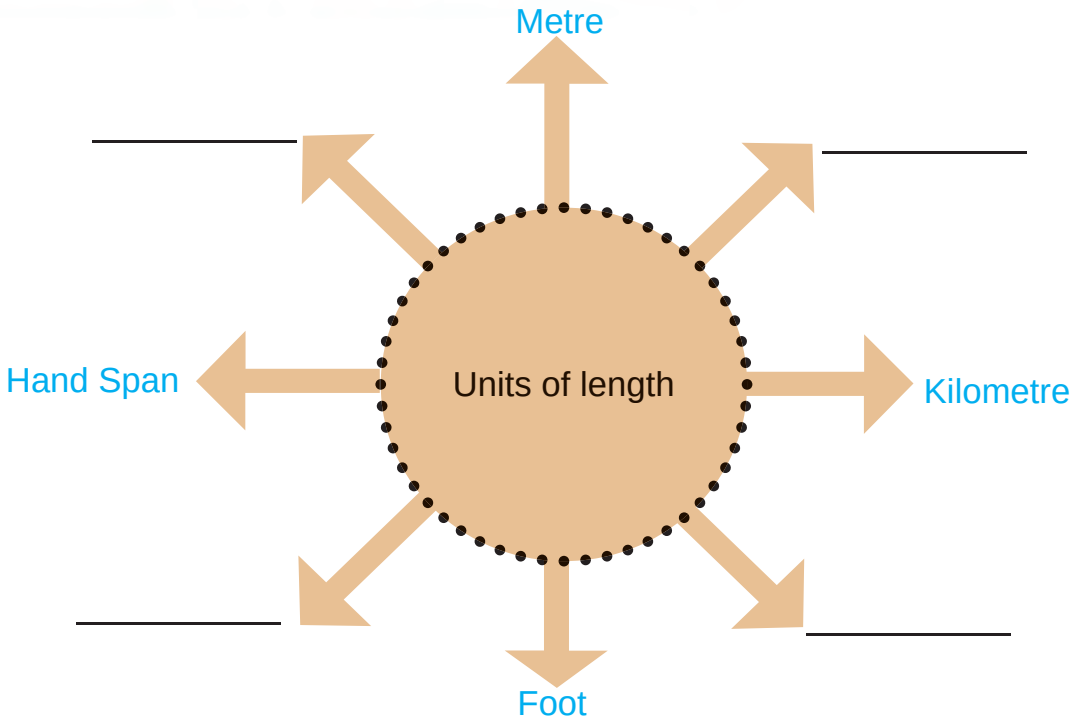


kilometre. This is called multiple of length. We express smaller lengths such as length of a pencil, pen nib etc. in centimetre and millimetre. These are called sub multiples.

Physical quantity	SI unit	Multiples	Sub multiples
Length	Metre	Kilometre	Millimetre, Centimetre

1 metre = 1000 millimetre

1 metre = 100 centimetre

1 kilometre = 1000 metre

Measurement of mass

Activity 5

Have you ever gone to a market? How do they measure rice, pulses, vegetables etc.? What instrument do they use to measure? Why do they not use the units millimetre and centi-metre in measuring rice, pulses, vegetables etc.? In what units do they measure? Discuss with your friends and find out the answer.

From the above activity we have learnt that all the quantities are not measured in the same unit. Different units are used for different quantities.

Activity 6

Among the three, a handful of rice, a handful of sand and handful of cotton, which one is heavier?

Sand is heavier because the amount of matter contained in sand is more than the amount of matter contained in rice and cotton.

The mass of a body is the amount of matter contained in it. The SI unit of mass is kilogram. We use beam balance, physical balance and electronic balance for measuring mass.

Multiples and sub multiples of mass

The mass of sugarcane, cotton etc. larger than 1 kilogram are measured in quintal and metric tonne. These are called multiples of mass. Similarly, the mass less than 1 kilogram is measured in gram and the mass less than 1 gram is measured in milligram. These are called sub multiples of mass.

Physical balance

Activity 7

Carefully observe the wrapper of the following items and write down masses mentioned on it.

Mass of toilet soap _____

Mass of washing soap _____

Mass of a biscuit packet _____

Know yourself

The quantity of rice purchased per month at home. The quantity of vegetables used at home per day.

Physical quantity	SI unit	Multiples	Sub multiples
Mass	Kilogram	quintal, metric tonne	gram, milligram

1 gram	=	1000 milligram
1 kilogram	=	1000 gram
1quintal	=	100kilogram
1 metric tonne	=	1000 kilogram

Measurement of time

We perform many activities in our day-to-day life. Many events take place, but duration of each event differs.

Activity 8

Look at the following activities. Discuss in small groups and tabulate the events/activities according to their duration.

1. Time taken for bathing
2. Duration of sleep
3. Working hours of your school
4. Time taken to blink your eyes
5. Time taken for ripening of fruits
6. Time taken for a plant to grow into a tree
7. Time taken for curdling of milk
8. Time taken to weave a saree
9. Time interval between a new moon and full moon
10. Duration of child to become a grandfather/grandmother
11. Time taken for a paddy to grow
12. Duration between quarterly and half-yearly examination
13. Time of fall of a coconut from a coconut tree

Events/ activities occurring in second	Events/ activities occurring in minute	Events/ activities occurring in hours	Events/ activities occurring in days / months	Events/ activities occurring in years

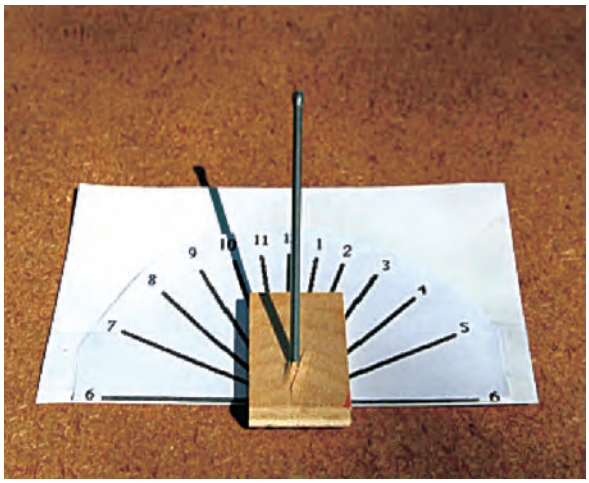
From the above events / activities, we have learnt that we use different units for measuring time.

Time is defined as the interval between two events. The SI unit of time is second.

For measuring time we use pendulum clock, wrist watch, wall clock, stop clock etc. In olden days people used sundial, sand clock, water clock etc. For measuring time accurately nowadays we use electronic clock and atomic clock.

Multiples and sub multiples of time

Time interval larger than 1 second is expressed in minute, hour, day, week, month, year etc. These are called multiples of time. Any time interval less than 1 second is expressed in millisecond, microsecond etc. These are called sub multiples of time.



Physical quantity	SI unit	multiples	sub multiples
Time	second	minute, hour, day, week, month, year	millisecond, microsecond

1 minute= 60 second

1 hour= 60 minute

1 day= 24 hour

1 year= 365 1/4 days

1 second= 1000 millisecond

1 second= 1000000 microsecond

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I. Choose the correct answer.

1. SI unit of length is

   a) Centimetre b) millimetre c) metre d)kilometre

2. SI unit of mass is

   a) gram b) kilogram c) milligram d) centigram

3. 1 metric tonne is equal to

   a) 1000 kilogram b) 100 kilogram c) 1 kilogram d) 10 kilogram

4. SI unit of time is

   a) second b) minute c) week d) day

5. 1 hour = _____ seconds.

   a) 60 b) 3600 c) 24 d) 1000

II.Fill in the blanks.

1. One metre = _____ centimetre
2. One kilometre = _____ metre
3. One quintal = _____ kilogram
4. One minute = _____ second

III. Match the following with the correct units

1. Thickness of a five rupee coin - kilometre
2. Breadth of a classroom - centimetre
3. Distance between two places - millimetre
4. Height of your friend - metre

IV. Fill in the blanks with the correct answer.

1. The mass of gold is measured in the units _____ (gram/metre)
2. Rice, sugar etc are measured in the units _____ (milligram/kilogram)
3. Generally sugarcane is weighed in the units_____(tonne/gram)
4. The mass of the chemicals present in a tablet are expressed in the units_____ (milligram/kilogram)

V. Arrange the following units in ascending order.

Year, second, month, micro seconds, hour, minute, week, millisecond.

VI.Find the answer

1) Ravi took 90 minutes to draw a picture. Kumar took 1 hour to draw the same picture. Who took more time to draw? How much more time did he take ?

2) Thread and metre scale are provided to you, using that try to measure the length of the given curved line AB.

VII.Answer the following questions

1. Define measurement and unit.
2. What is the significance of standard units?
3. What are fundamental quantities? Why are they called so?
4. What are the SI units of length, mass, and time? Mention their symbols.
5. Expand the following

(i) FPS (ii) CGS (iii) MKS (iv) SI

Project

1. Measure the length and breadth of your class room and write them in foot, hand span, centimetre and metre.
2. Make a model of a sand clock.

a) Using the model of a sand clock you have made, find the time taken for the sand to completely come down from the upper part to the lower part.
b) Find your heart beat and pulse rate for the same time taken for the sand to completely come down from the upper part to the lower part.

Let us know

- The length of the largest sea animal, blue whale measures 30metres approximately.
- Mass of the sun = 1.99×10^{30} kilogram
- Mass of the earth = 5.98×10^{24} kilogram

(mass of the sun is 3,20,000 times heavier than the earth)

SCIENCE

Motion

We look at different objects in our daily life .Of them, many move from one place to another place. Some of them remain stationary. With our experience, shall we do the following activity?

Activity 1

On your way to school, observe your surroundings and classify the objects under moving and stationary objects

Objects in motion	Objects at rest
_____	_____
_____	_____

From the above activity we have learnt that some objects move and some remain stationary.

Can we find out whether an object is at rest or in motion only by observing them directly?

Activity 2

Do the earth, air etc. move ? If they move, how do we know? We may get more information through a small group discussion

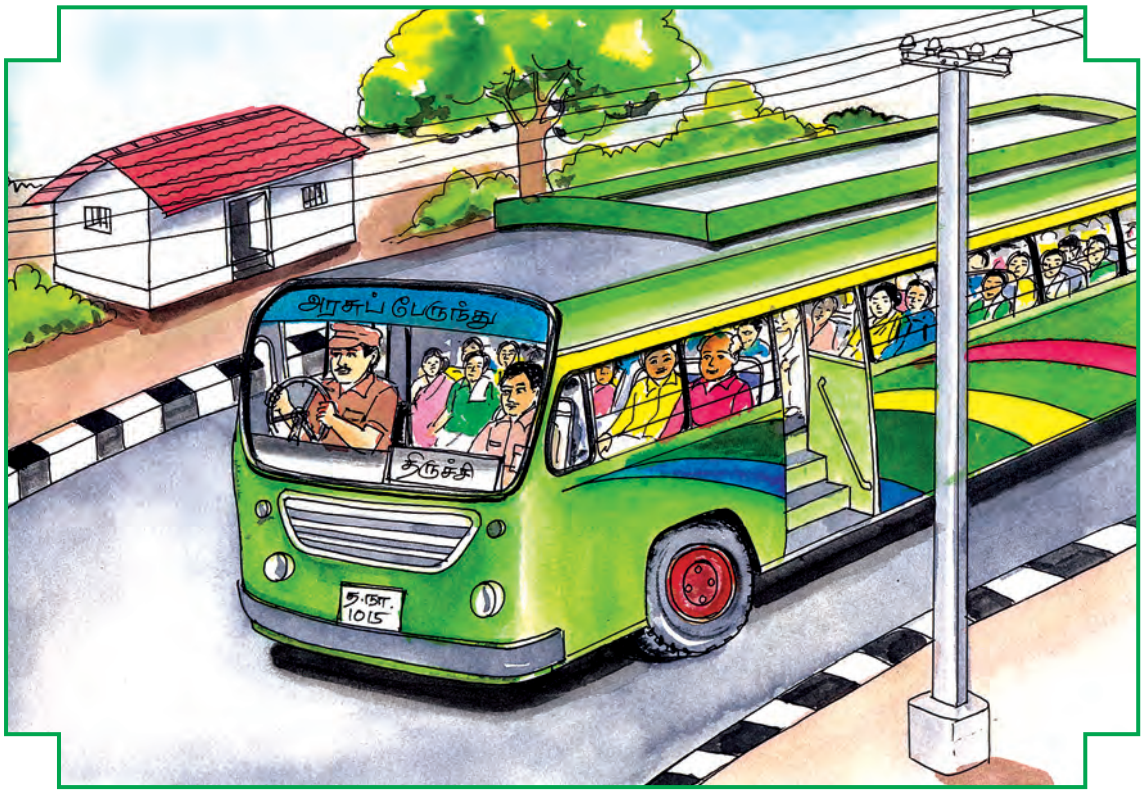
From the above discussion, we see that some objects change their position with time. Even though in some cases. We do not see the objects changing their position directly we come to know their motion from other effects.

If an object does not change its position with respect to time, it is said to be stationary.

If the object changes its position with respect to time then it is said to be in motion.

Have you travelled in a bus? When

How do we differentiate rest and motion?



you look out from a moving bus, do the trees, houses, lamp post appear to be stationary or in motion? Share your experience in small groups.

Akilan had two friends, Mugilan and Selvam. Akilan invited his friends to his town for a circus show. The three friends went to the circus and enjoyed the funny dance of the clown. Akilan returned home and his friends reached the bus terminus and got into a bus. The bus passed by Akilan's house. As Akilan was in the sit-out, he waved hands to his friends.

Next day when Akilan met his friends in school, he shared his experience with his friends. Akilan said, "When I was in the sit-out, I saw you in the moving bus and I waved hands".

Mukilan and Selvam said, "When you waved your hands we were in the moving bus. You and your house appeared to move backwards".

What do we learn from this?

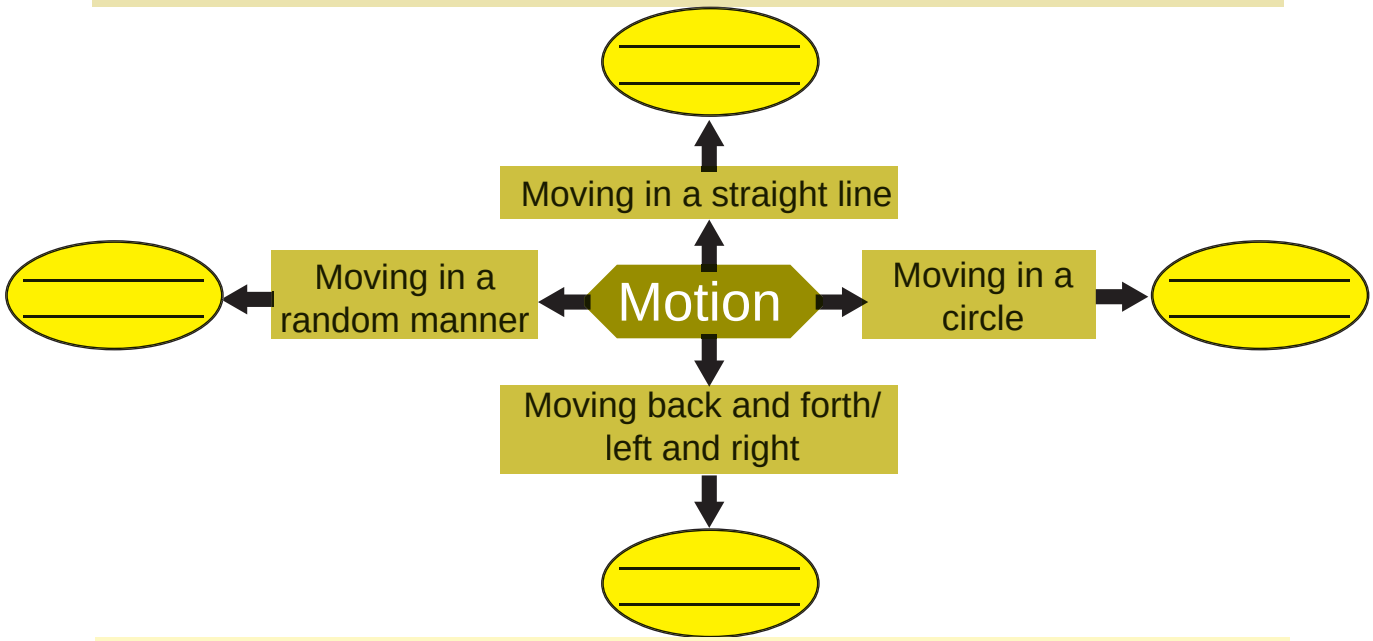
An object may appear to be stationary for one observer and appear to be moving for another. An object is at rest in relation to a certain set of objects and moving in relation to another set of objects. This implies that rest and motion are relative terms.

Motion is defined as the change of position of an object with respect to time.

Are the following motions same or different type? Discuss in small groups and classify.

Activity 3

1. Motion of a sprinter running a 100 m race
2. Motion of a coconut falling from a tree
3. Marching of soldiers
4. Motion of the tip of hands of clock
5. Movement of your hand when you write on a notebook
6. Motion of the moon around the earth
7. Motion of a ball in a foot ball match
8. Motion of the earth revolving around the sun
9. Motion of children playing on a sliding board
10. Motion of the wagging tail of a dog
11. Motion of children playing in a playground
12. Motion of flies and mosquitoes
13. Motion of children playing in a swing
14. Motion of flapping of elephant's ears
15. Motion of people in a bazaar
16. Motion of people on a carnival day
17. Motion of a spinning top
18. Motion of opening and closing of a draw



From the above activity, we have come to know that there are different types of motion.

Types of motion.

Linear motion

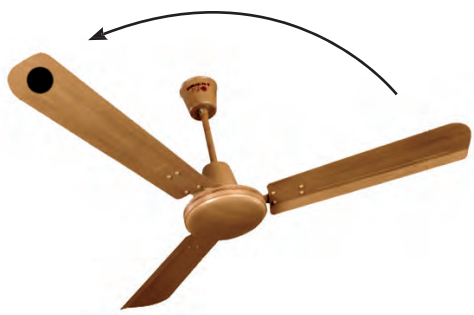
Did you observe the vehicle moving along a straight road and a coconut falling from a tree? What type of path did they take during their motion. Like wise, When an object moves along a straight line, it is said to be in linear

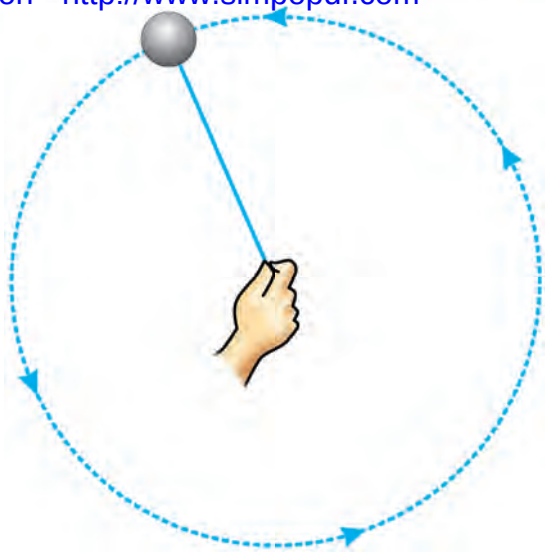
motion. Motion of a body dropped from the top of a building and motion of a lift are examples for linear motion.

Circular motion

Take a stone, tie a thread to it and whirl it with your hand and observe the motion of the stone. Is the stone moving along a circular path? In this motion we can see, in any point in the circular path the distance of the stone from the centre of the circle (hand) remains the same.

Similarly we can see the motion of the child in the merry go round. Here also the distance between the child and the centre of the merry go round remains same in each and every point of the circular path.





From this, it is clear that if an object moves along a circular path,it is said to be in circular motion. Motion of the tip of hands of a clock and a point marked on the blade of the fan are some more examples for circular motion.

Rotational Motion

If a body revolves about an axis, it is said to be in rotational motion.

Eg.Spinning top
Motion of a fan
Motion of a merry go round

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Periodic motion

If an object repeats same type of motion at regular intervals of time it is said to be in periodic motion.

Eg :Motion of a child in a swing Motion of pendulum in a wall clock

- Motion of the string of veena while plucking
- Motion of the moon revolving around the earth
- Motion of the earth revolving around the sun

Random Motion

When an object moves at different speeds and in different

direction, it is said to be in random motion.

Eg. A fish swimming in a tank

The movement of a foot ball during a game

Multiple Motion

Can a body perform more than one type of motion at a time? We ride a bicycle. What type of motion does the wheel perform? What type of motion does the cycle perform?

The motion of the wheels of a bicycle is rotational, whereas the motion of the bicycle is linear. The wheels of a bicycle perform rotational as well as linear motion simultaneously. Similarly, a rolling ball and a drilling machine perform more than one type of motion simultaneously.

Can you think of any other object performing more than one type of motion simultaneously? Explain.

Science Today

Robot

Issac Asimov is called as the Father of Robot. It is he who named the machine as Robot (derived from Philippines language). Robot is a human machine. We programme the machine (Robot) to do the work we want it to do.

The machinery parts of Robot follow and implement the commands already programmed. Robots are run by heavy batteries. Robot's brain is nothing but an electronic chip. The movements of Robot are controlled by electronic chip or computer. Nowadays well designed Robots are used for complicated and minute clinical surgeries. Very soon we may have Robots in our homes to do house hold work.

Robot

How nice would it be to have a Robot to do our home work?

Imagine and draw the various activities, a Robot can do in your school.

Evaluation

I. Choose the correct answer.

1.Movement of a branch of a tree in an is an example for

a) Linear Motion b) Circular Motion

c) Periodic Motion d) Rotational Motion

2.The motion of a rolling ball is _____ motion

a) Circular b) Linear

c) Rotational d) Multiple

3. Who is the father of Robot?

a) Sir Issac Newton b) Galileo

c) Issac Asimov d) Thomas Alva Edison

II. Look at the picture and answer the following .

1. From the given picture, identify objects which are,

In Motion

1._____ 2._____ 3._____

At Rest

1._____ 2._____ 3._____

2. Classify the following pictures based on the kind of motion. Among them identify the pictures which work on more than one kind of motion.

III. Fill in the blanks .

1. The movement of the needle in a sewing machine is _____ (linear motion, random motion)
2. The rotation of an object about an axis is _____ (linear, rotational motion)
3. Motion is defined as the change of _____ of an object with respect to time. (position, mass)

IV. Give reasons for the following.

1. Name the organ in your body which works in periodic motion.

2. Is there any difference between a child who plays on a merry-go-round and a child who takes part in a 50m race?
3. Name the types of motion possessed by children playing in a playground. Give reasons.
4. What is the name of the instrument in the given picture? Specify its uses. What type of motion does it perform while in operation?

V. Answer the following.

1. When do you say that an object is in motion?
2. Distinguish between linear motion and circular motion.
3. What is rotational motion? Give example.
4. What is periodic motion? Give example.

Do it yourself

Spread a large sheet of white paper on the ground and keep a little sugar on it. Ants are likely to be attracted to the sugar and you will find many ants crawling on the sheet of paper soon. For any one ant, try and make a small mark with a pencil near its position when it has just crawled on to the sheet of paper. Keep marking its position often a few seconds as it moves along on the sheet of paper. After some time, shake the paper free of the sugar and the ants, and connect the different points you have marked with arrows to show the direction in which the ant was moving. Each point you have marked shows where the ant moved to, in intervals of a few seconds.

Motion seems to be some kind of a change in the position of an object with time, isn't it?

FURTHER REFERENCE

Websites:

http://www.tutorvista.com/content/science/science-i/motion/types-motion.php

http://en.wikipedia.org/wiki/measurement

www.arvindguptatoys.com

Magnetism 5

You might have seen magnets. Have you ever enjoyed playing with them?

Why do the pins stick to the pin holder placed on headmaster's / headmistress's table?

Why does the door of a refrigerator close by itself after opening?

Because the magnets are attached to the pin-holder and the refrigerator.

Already we know that magnet attracts pins, iron pieces and iron particles in sand. Cranes are used to lift heavy iron loads. Powerful magnets

Powerful electromagnets are used to operate electromagnetic trains, lifts and escalators.

Discovery of magnets

How magnets were discovered? It is an interesting story.

It is said that, there was a shepherd named Magnes, who lived in Magnesia in Asia minor.

He used to take his herd of sheep and goats to the nearby mountains for grazing. He would take a stick with

him to control his herd. The stick had a small piece of iron attached to one end.

One day he was surprised to find that he had to pull hard to free his stick from a rock on the mountain side.

It seemed as though the stick was being attracted by the rock.

He thought that the rock was God. The rock was a natural magnet and it attracted the iron tip of the shepherd's stick.

It is said that this is how natural magnets were discovered.

People have discovered that certain rocks have the property of attracting pieces of iron.

In early days Chinese navigators used magnets to find the direction.

The magnetites are the natural magnets. They are called as magnetic stones.

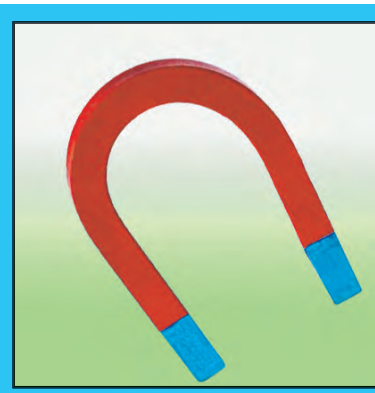
Natural magnets do not have definite shape.

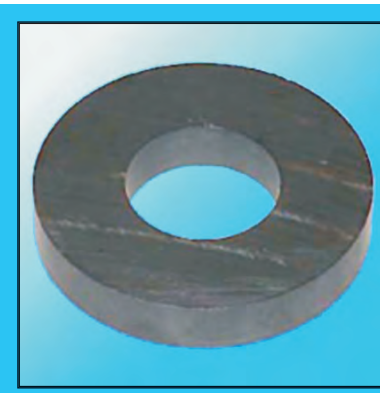
When a magnet is freely suspended, it always comes to rest in north- south direction. That is why they are called as leading stones or load stones.

After the method of magnetization of iron plate came into practice, we started making different types of magnets and using them.

Such man made magnets are called Artificial magnets. Here some of the shapes of artificial magnets used in our day –today- life are listed below.


Bar magnet


Horse shoe magnet


Ring magnet

What type of Substances are attracted by magnets?

Shall we find out whether pen cap, plain pins, pencil, blade, nail, chalk piece, iron ball, plastic scale, wooden scale and coin are attracted by magnet or not? Shall we discuss in small groups and list them?

Substances attracted by magnets	Substances not attracted by magnets

Let us know?

Magnets attract not only articles made up of Iron but it also attracts Nickel and Cobalt.

We understand that, magnet attracts certain substances whereas some other substances do not get attracted.

The substances that are attracted by a magnet are called magnetic substances.

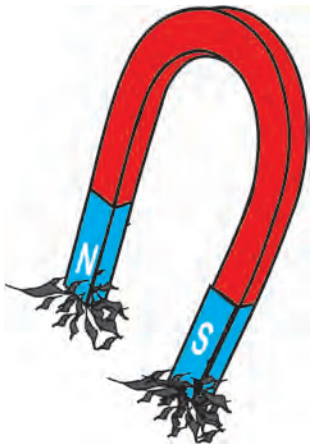
The substances that do not get attracted by a magnet are called non-magnetic substances.

Does magnet have poles?

Is it not an interesting question? It is better to find out by ourselves. To perform a simple experiment, it is sufficient to have iron filings and a magnet. Spread some iron filings on a sheet of paper. Now place a bar magnet on the iron filings. What do you observe? The iron filings stick all over the magnet, but more iron filings stick to the ends. Even in a horseshoe magnet more iron filings stick to the two ends.

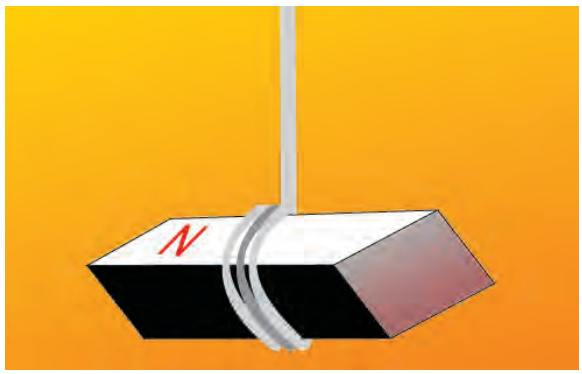
The ends of a magnet has the strongest magnetic force. So most

of the iron fillings cling near both the ends of the magnet. They are called poles of the magnet.



Which is north pole? Which is south pole?

The poles of a magnet are easily found by freely suspending the magnet as shown in the diagram.



A freely suspended magnet always comes to rest in north-south direction after being disturbed.

North seeking pole is called north pole. South seeking pole is called south pole.

This property of a magnet to find out directions is used in a magnetic compass.

Magnetic compass

Magnetic compass is a circular disc on which a small needle is pivoted at its centre. This needle can rotate freely and always points in the north-south direction.

Different directions (North, South, East, and west) are marked on the compass. The magnetic needle always rests in north-south direction. By using this magnetic compass we can find out different directions

Make your own magnet

There are several methods of making artificial magnets.Let us learn the simplest one.

Take a nail /a piece of Iron. place it on a table.

Now take a bar magnet and place one of its poles near one edge of the a nail/a piece of Iron and rub from one end to another end without changing the direction of the pole of the magnet.

Repeat the process for 30 to 40 times.

Bring a pin or some iron fillings

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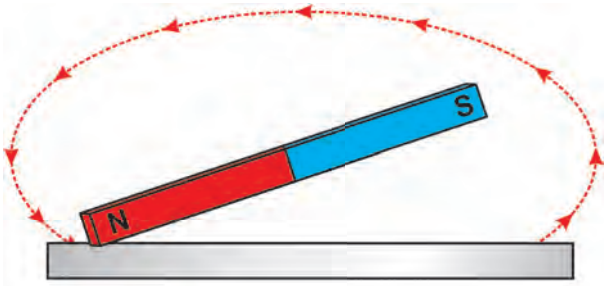
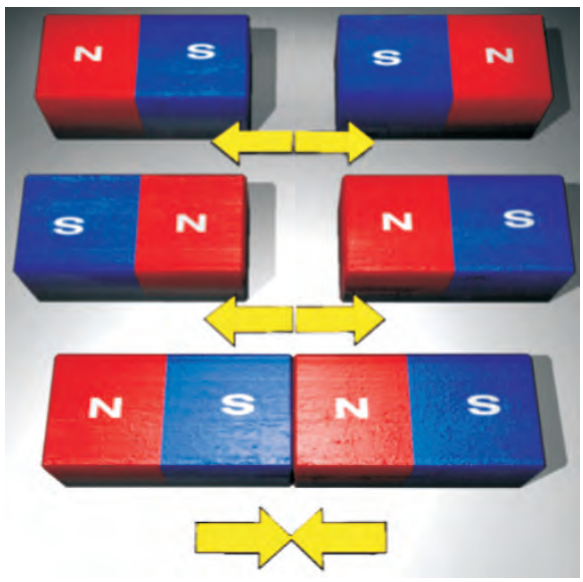


near a nail /a piece of Iron to check whether it has become a magnet. If not, continue the process for some more time.

Shall we find out what happens when two bar magnets are brought closer?

Attraction? or repulsion ?

When we bring two north poles of two bar magnets closer as shown in the figure they move away from each other. Similarly when two south poles of two bar magnets are brought closer they too move away from each other.



When a north pole and a south pole are brought closer, they pull towards each other.

Like poles repel each other.

Unlike poles attract each other.

Do the magnets lose thier properties ? When?

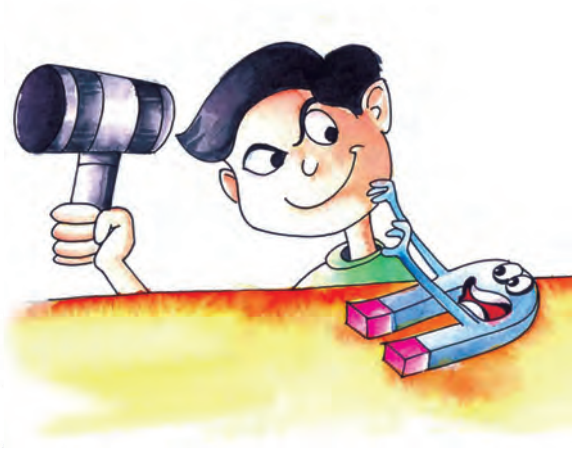
Magnets lose their properties if they are,

- heated
- dropped from a height
- hit with hammer

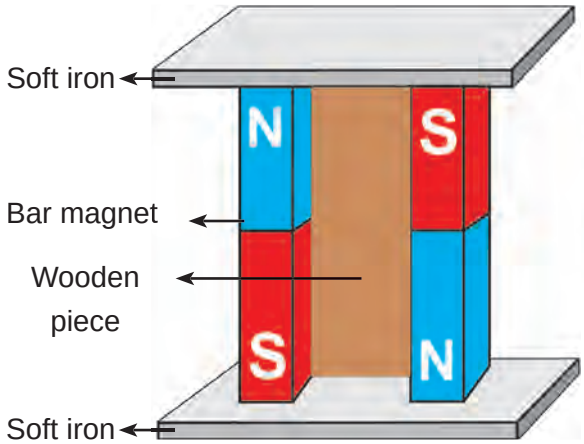
When heated

When dropped

When hammered



Bar magnet

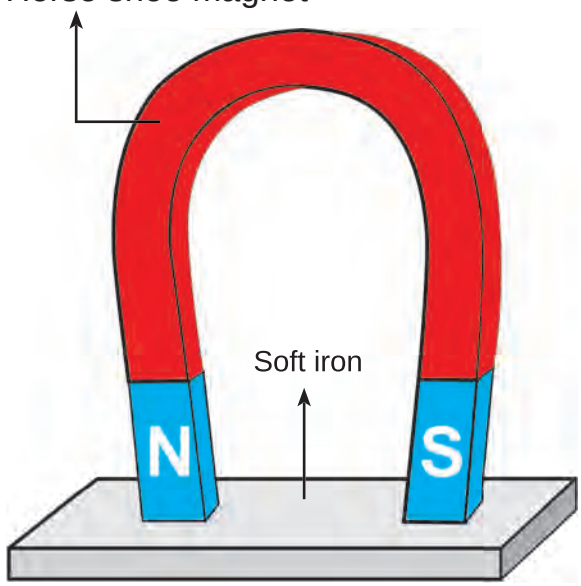


Storage of magnets

Improper storage can also cause magnets to lose their properties. To keep them safe, bar magnets should be kept in pairs with their unlike poles on the same side. they must be separated by a piece of wood while two pieces of soft iron should be placed across their ends.

For horse-shoe magnet one should keep a piece of iron across the poles.

Horse shoe magnet



Let us know

Magnets lose their properties if we keep it near the cassettes, mobiles, televisions, compact disks and the computer.

Some facts . . .

1.Electromagnets are used in giant wheels.

2.In 1600, English scientist William Gilbert proposed that earth behaves like a giant magnet.

Science today

Shall we learn about electromagnetic train?

Electromagnetic train is also called as suspension train. In France it is called as flying train. It does not require diesel, petrol or any other fuel.

The technology in which the property of magnetic attraction and repulsion used gave birth to super fast electromagnetic trains.

How does the electro magnetic train work?

Electromagnetic trains do not have wheels.Powerful electromagnets are attached to the bottom of the train as well as on the track. The north pole of the electromagnet on the track faces upwards and the north pole of the electromagnet on the train, faces downwards. The north pole in the track repels the north pole on the train and levitates the train. The electric current that changes constantly allows a change in polarity of electromagnets. This change in polarity pushes and pulls the train.

Electromagnetic train runs faster than ordinary train. Another significance of electromagnetic train is that it does not make noise. We can see electromagnetic train in Japan, China, France, Germany and America.

Electromagnetic train

Write any 5 differences between a train and an electromagnetic train. (First difference is given)

1. Electro magnetic trains do not have wheels whereas ordinary trains have.
2. _____
3. _____
4. _____
5. _____

Evaluation

I. Choose the correct answer

1. It is a natural magnet
   a) Bar magnet b) Magnetite
   c) Ring magnet d) Horse-shoe magnet
2. An object that is attracted by magnet.
   a) wooden piece b) plain pins
   c) eraser d) a piece of cloth
3. Mariner's compass was first used by
   a) Indian b) European
   c) Chinese d) Egyptian
4. A freely suspended magnet always comes to rest approximately in the _____ direction
   a) North - east b) South - west
   c) East - west d) North - south
5. Magnets lose their properties when it is
   a) used b)stored
   c) hit with hammer d)cleaned
6. Mariner's compass is used to find the
   a) speed b) displacement
   c) direction d)motion

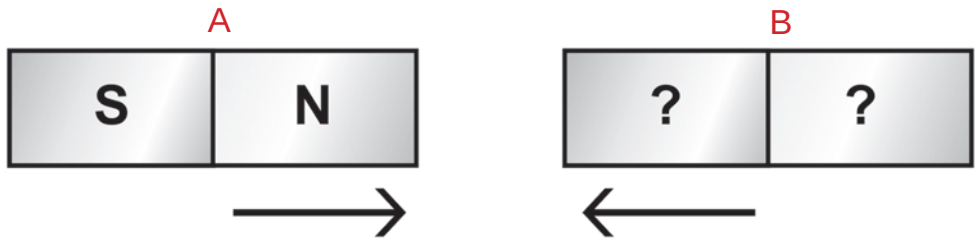
II. Circle the odd ones and give reasons .

1. Bar magnet, magnetite, ring magnet , horse- shoe magnet
2. Iron nail, pins, rubber tube , needle
3. Lift, escalator, electro magnetic train, electric bulb
4. Attraction, repulsion, pointing direction, illumination

III. Think and answer

1. You are provided with a bar magnet without labelling the poles of the magnet and iron fillings. Using this.
   a) How will you identify the poles of the magnet?
   b) Which point of the bar magnet attracts more iron fillings? Why?
2. You are provided with an iron needle. How will you magnetize it ?

3. Two bar magnets are given in the figure A and B. By the property of attraction, identify the North pole and the South pole in the bar magnet (B)

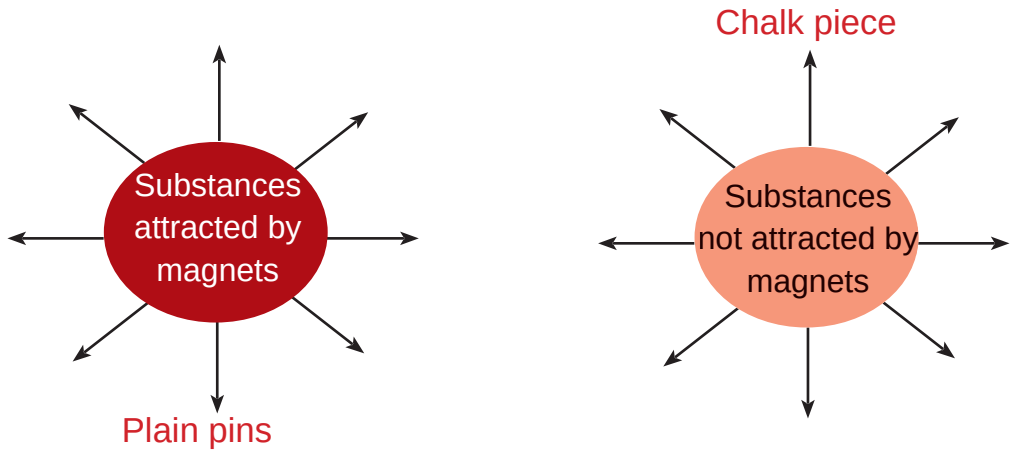


4. Take a glass of water with a few paper clips inside. How will you take out the paper clips without putting your hands.

IV. Answer the following

1. What are artificial magnets? Draw some artificial magnets and label the poles .
2. Explain the attraction and repulsion between magnetic poles.
3. Write the properties of magnets.
4. When does a magnet lose its magnetic property?

V. Write down names of substances.



Let us muse upon

With the help of your teacher find the direction in which the flag pole, Principal's room, laboratory and play ground are located in your school.

FURTHER REFERENCE

Websites:

http://www.school-for-champions.com/science/magnetism.htm

http://en.wikipedia.org/wiki/magnetite