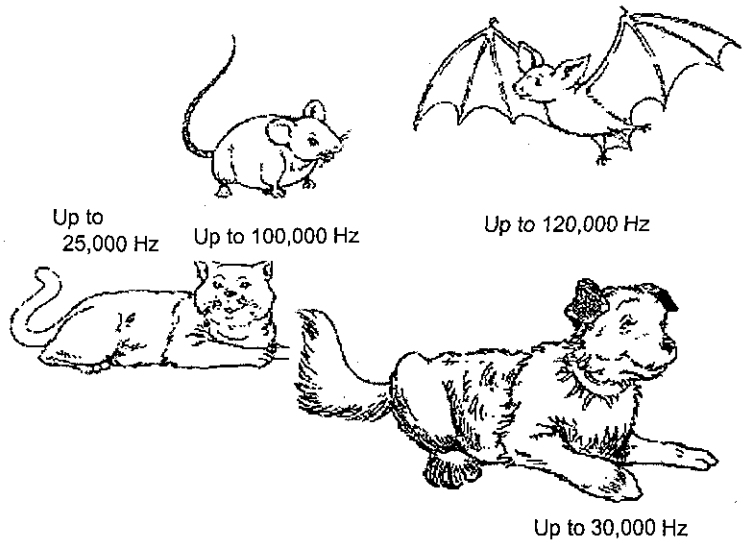
Topic 9: Sound

1. Key concept	Sound is associated with vibration, it can travel and can be heard by ear
2. Learning objective	
General Objectives	1) To be able to identify emerging of sounds by vibrations 2) To be able to demonstrate sound stops when vibration stops 3) To be able to describe that sound travels through various objects/materials
Specific Objectives	1) To be able to identify vibrations. 2) To be able to indicate various types of vibrations and their emerging sound. 3) To be able to tell the examples providing emerging sounds by vibrations. 4) To be able to identify that vibration being felt and seen and sound heard is associated. 5) To be able to tell more examples emerging sounds by vibrations. 6) To be able to apply their knowledge of sound and vibration to their every day lives. 7) To be able to conduct handicraft and experiment by themselves. 8) To be able to express own idea in group discussion. 9) To be able to express their findings from experiment. 10) To be able to describe sound can transmit through objects/materials.
3. Activities involved	Scientific Handicraft Experiment Discussion
4. Activity purpose	Children should carry our their activities by themselves Learning by doing and explore more learning Through scientific handicraft

Before Getting Started

Self-check list for Teachers	☐ Do I know sound is associated with vibration? ☐ Can I define vibration? ☐ Do I know sound can transmit through various objects/materials? ☐ Can sound travel through vacuum? ☐ Do I know how sound transmit? ☐ Do I know how sound is heard? ☐ Do I know characters of transmission of sound (dependence to objects/materials, diversity, etc.)
Background information for teachers	
Sound	Sound travels through air as a back and forth movement of air molecules. A vibrating surface makes sounds by alternately pushing and pulling at the layer of air surrounding it. This layer of air then pushes and pulls at the layer air next to it. This is how vibration travels through air. The wave regions of high and low pressure in the air radiate away. Sound travels at about 350 meter per second in air.

Our ears can detect the minute backward and forward movement (repeating changes) in the pressure around them. They are sensitive to the backward and forward movement that occurs between about 20 and 20,000 times per second – in other words, between 20 and 20,000 hertz (Hz). Energy that creates pressure the backward and forward movement between these frequencies is called sound. Sound travels in waves that can pass through any substance, although we usually listen to sound in air. Humans can hear sound up to 20,000 Hz but many animals can hear much higher frequencies.

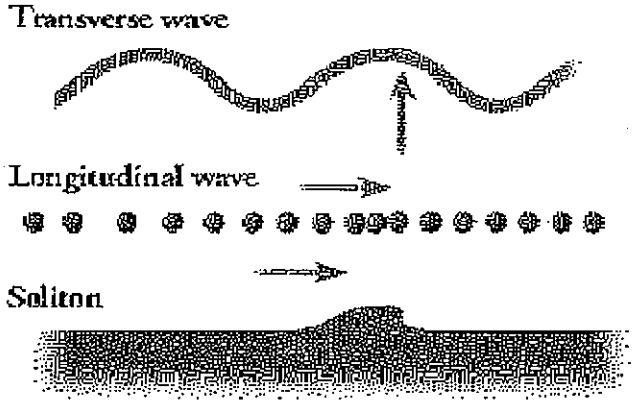


Vibration A regular back and forth movement of an object. The time the object takes to move back and forth once is known as its period. When the vibrations of an object affect the medium surrounding it, sound waves can be produced.

Wave A wave is a swinging motion that transmits energy as it moves through a medium (a wave-carrying substance or field). Airborne sound waves, for example, transmit sound energy as continuous variations in air pressure. Electromagnetic waves consist of electric and magnetic fields that vibrate. When a wave travels, the medium that it moves through is disturbed but does not travel with the wave.

Type of waves

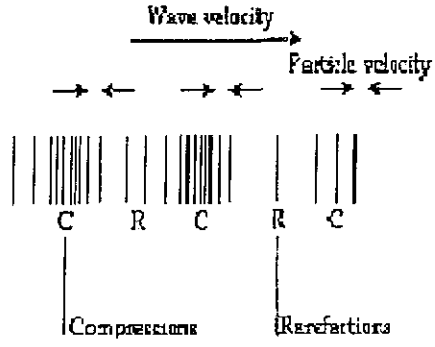
Physicists classify waves according to how they disturb the medium through which they move. In a transverse wave, such as a water wave, the medium is disturbed at right angles to the direction of travel. In a longitudinal wave, such as a sound wave, the medium vibrates in the direction of travel. A soliton is an isolated wave that does not lose energy as it travels. Solitons can occur in channels of water, such as canals.



Longitudinal wave

A longitudinal wave is one in which the vibrations occur in the same direction as the direction of travel of the wave. The most common example of a longitudinal wave is a sound wave.

A sound wave in air consists of alternate compressions (regions of high pressure) and rarefactions (regions of low pressure). All of the air molecules that make up the wave are vibrating backwards and forwards in the same direction as that in which the wave is traveling, but they have no net movement – they vibrate about one position and do not travel with the wave. All pressure waves are longitudinal. The speed at which a pressure wave travels depends on the medium in which it is traveling. Generally, the more rigid the medium, the faster the wave will travel.



Longitudinal Wave: Pattern of Compressions and Rarefactions

Transverse wave

A wave whose oscillations are in a direction at right angles to its direction of motion is called a transverse wave. Examples of transverse waves are waves on the surface of water, waves on a string, and electromagnetic waves. Transverse waves can be either progressive, where the wave travels forward, with each point having the same amplitude of swinging motion, or standing waves, where the wave is confined by some means to a particular space, and different points on the wave have different amplitudes of swinging motion. Water waves are progressive waves; waves on the string of a string instrument are standing waves.

Soliton

A soliton is an isolated (solitary) wave that can travel very long distances without changing its shape. When two solitons collide, they remain unchanged before and after the collision (this is not always true in particle physics, however). Solitons are now important in a number of areas of physics research, including optical fiber communications, the physics of fundamental particles, and the study of plasmas.

Frequency (Hz)

The number of repeating changes that take place or travel past a single point in one second. Repeating changes include mechanical movements, such as pendulum swings, and electromagnetic and sound waves. Frequency is given in units of cycles per second, called hertz (Hz).

Lesson Planner (Sound as vibration)

Suggested period (10)	**Period 1**	**Period 2**	**Period 3**
Lesson topic	Vibration 1 Swinging ruler	Vibration 2 Feel vibration	Vibration 3 Loud speaker
Sample lesson plan		*9-1*	
Specific objective	Be able to identify vibrations Be able to indicate various types of vibrations and their emerging sound.	Be able to tell the examples proving emerging sounds by vibrations. Be able to identify that vibration being felt and seen and sound heard are associated.	Be able to tell more examples emerging sounds by vibrations.
Introduction **(Motivation/Create interest/Active prior knowledge)**	Mention some familiar "sound" from daily life. *Remind the lessons in G2.*	Remind previous lessons. (Activities 1 and 2)	Remind previous lessons. (Activities 4 and 5)
Core/Development **(Active engagement with test/task)**	What is vibration? Swinging ruler (Activities 1 and 2) Rubber bands (Activity 3)	Experiment Vibration and Sound Pot-cover with pieces of paper (Activity 4) Feeling vibration (Activity 5) Dancing Sugar (Activity 6)	Experiment Rubber bands (Activity 3) Drum and paper (Activity 7) Plastic bottle (Activity 8) Experiment Loud speaker (Activity 9)
Assessment points	Observation of activities: Do they participate in learning process?; Do they get the meaning of experiments?; Do they discuss well?; Do they draw conclusion?; Do they positively discover anything extra from experiments?	Observation of activities: Do they participate in learning process?; Do they get the meaning of experiments?; Do they discuss well?; Do they draw conclusion?; Do they positively discover anything extra from experiments?	Observation of activities: Do they participate in learning process?; Do they get the meaning of experiments?; Do they discuss well?; Do they draw conclusion?; Do they positively discover anything extra from experiments?
Adaptation of curriculum	Activity 12 to utilize locally available material.		

Lesson Planner (Sound as vibration) (Sound Transmission)

Suggested four period	**Period 4**	**Period 7**	**Period 8**
Lesson topic	Vibration 4 Straw flute	Sound transmission1 String telephone	Sound transmission 2 Wood rod
Sample lesson plan		9-2	9-2
Specific objective	Be able to apply their knowledge of sound and vibration to their everyday lives.	To be able to study practically how sound can be heard by spreading out into various objects (thread)	To be able to study practically how sound can be heard by spreading out into various objects (wood rod)
Introduction **(Motivation/Create *interest/Active prior* knowledge)**	Remind previous lessons. (Activities 6 and 8)	Asking how to make objects to produce sound, how it is found and felt when the sound is *produced. The lesson* will begin by asking to do experiment and to discuss.	
Core/Development **(Active engagement with test/task)**	Experiment Rubber bands (Activity 3) Straw flute 1 (Activity 10) Experiment Straw flute 2 (Activity 11)	Experimenting with a string telephone (activity 13)	Experimenting with a wood rod (activity 14)
Assessment points	*Observation of activities: Do* they apply their idea?; Do they discuss well?; Do they draw conclusion?; Do they positively discover anything extra from experiments?	*Do they participate in the* learning processes? Do they discuss properly. Do they understand that the sound spreads out into the thread with the vibration of the thread? Do they understand that the string telephone can transmit the sound?	*Do they participate in the* learning processes? Do they discuss properly. Do they understand that the sound spreads out into the wood rod with the vibration of the wood rod? Do they understand that the sound from one end of the wood rod can be heard from another end Do they understand that the sound can spread out into the objects (traveling of sound inside the wood rod)? Can they experiment?
Adaptation of curriculum	Activity 12 to utilize locally *available material.*	To use similar objects that one likes or suitable objects in the activities	

Lesson Planner (Sound Transmission)

Suggested four period	**Period 9**	**Period 10**	**Period 5 6** Sound Vibration **Period 11 12** Sound Transmission
Lesson topic	Sound transmission 3 Water pipe	Sound transmission 4 Spoon and thread	
Sample lesson plan			
Specific objective	To be able to study practically how sound can be heard by spreading out into various objects (plastic water pipe)	To be able to study practically how sound can be heard by spreading out into various objects (thread, air)	**Assessment/Review**
Introduction **(Motivation/Create interest/Active prior knowledge)**	Making to remember again the previous lessons with Activity 13and 14.	Making to remember again the previous lessons with Activity 15	
Core/Development **(Active engagement with test/task)**	Experimenting with a plastic water pipe (Activity 15)	Experimenting with a steel spoon tied to a thread (Activity 16)	
Assessment points	Do they participate in the learning processes? Do they discuss properly. Do they understand that the sound spreads out into the water pipe with the vibration of the water pipe?	Do they participate in the learning processes? Do they discuss properly. Do they understand that the sound spreads out into the air? Do they understand that the sound spreads out into the thread? Do they understand that the sound heard from spreading out into the air and the sound heard from spreading into the thread are not the same. Do they find anything else next from the experiments?	
Adaptation of curriculum	To use similar objects that one likes or suitable objects in the activities		

Activity 1 Swing ruler (1)

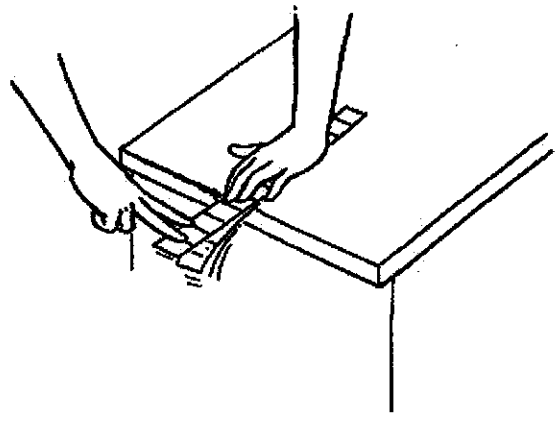
Teaching/learning material

Plastic rulers

Concept	Vibration causes sound but many children would not realize what a vibration is. In this experiment Let children see 'What a vibration is.'

A vibrating ruler

Place a ruler on a table, so that some of the ruler hangs out over the table's edge, press down hard on the ruler right at the edge, and "swang" the ruler so that it makes a sound.



Ask children to press down harder or softer and if possible try to count how long one "swing" takes

Activity 2 Swinging ruler (2)

Teaching/learning material

Plastic rulers

Concept	Vibration causes sound, but many children do not realize what vibration is. In this experiment, let children see "what a vibration is."

This experiment is a continuation of Activity 1.

Before experiment

Ask children if they make the vibrating part of the ruler longer, what will happen.

Let children guess and choose an answer from the followings.

a. The longer you make it, the slower it vibrates.

b. The longer you make it, the quicker it vibrates.

c. Something else

Ask children if they make the vibrating part of the ruler longer, what will happen.

Let them choose an answer from the following.

a. The longer you make it, the higher the pitch (tone).

b. The longer you make it, the lower pitch (tone).

c. Something else

Children can discuss their ideas.

After discussion, start the experiment to check it out.

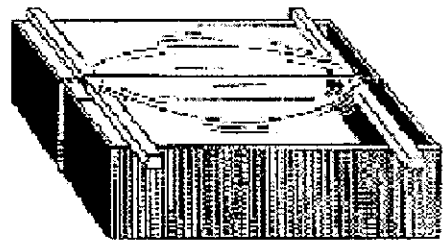
Activity 3 Rubber band and box

Teaching/learning material

Rubber band and string instruments

Concept	Vibration causes sound, but many children do not realize what vibration is. In this experiment, let children see "what a vibration is."

Tie a rubber band tightly around an empty box without a cover.



When you strum the rubber string, you see vibration and hear sound.

Ask children "how do you make a higher tone (pitch)?"

(Let children choose an answer from the following.)

a. Strum harder the string

b. Tie tighter

c. Others

Now let children try with string instruments.

When you strum the strings, you see vibration and hear sound.

Ask children, "how do you make higher tone (pitch)?"

(Let children choose an answer from the following.)

a. Strum harder the string

b. Tie tighter

c. Strum longer string

d. Others

Activity 4 Aluminum pot cover and sand

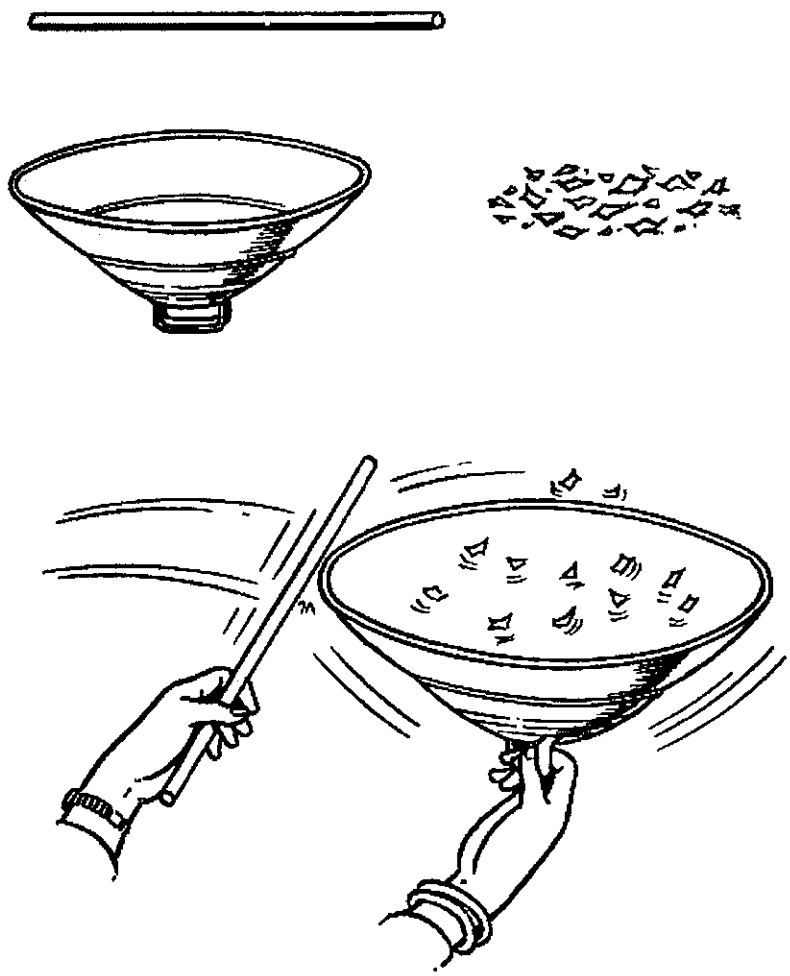
Teaching/learning material

Aluminum pot cover, sand, and a stick

Concept Let children "see" vibration when sound is heard.

Beat an aluminum pot cover which contains small pieces of paper with stick. What do you see when you hear the sound?

Ask children, "what do you see when you hear the sound?"



Activity 5 Feel the vibration

Teaching/learning material

Bell

Concept Let children feel vibrations when sound is heard.

Ask children, "when you ring the bell, what do you feel?"

(Let children choose an answer from the following.)

a. You don't feel anything.

b. It vibrates. So you feel a ticklish feeling.

c. It vibrates hard so that we can not touch it.

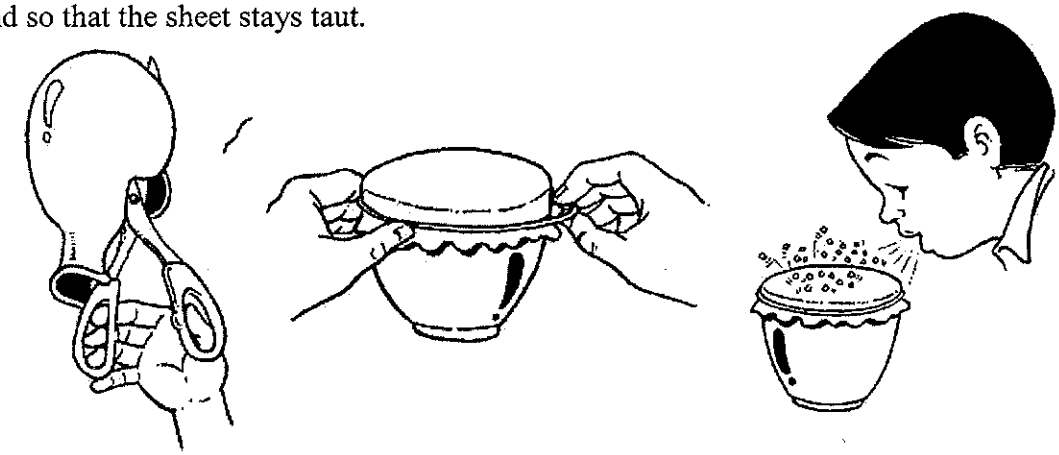
Activity 6 Dancing sugar

Teaching/learning material

Balloon, sugar, plastic cup, scissors, and rubber band

Concept Let children see vibration when sound is heard.

Cut the balloon and open it to form a sheet of rubber large enough to fit over the top of the cup. Stretch the rubber sheet over the top of the cup, and fix it to the cup using the rubber band so that the sheet stays taut.



Sprinkle a few sugar grains onto the rubber sheet.

Ask children before the experiment.
Now shout or make other loud noises close to the rubber sheet.

What happens to the sugar?
(Let them choose an answer from the following.)

a. Sugar grain dances up and down.
b. Sugar grain still stays.
c. Something else.

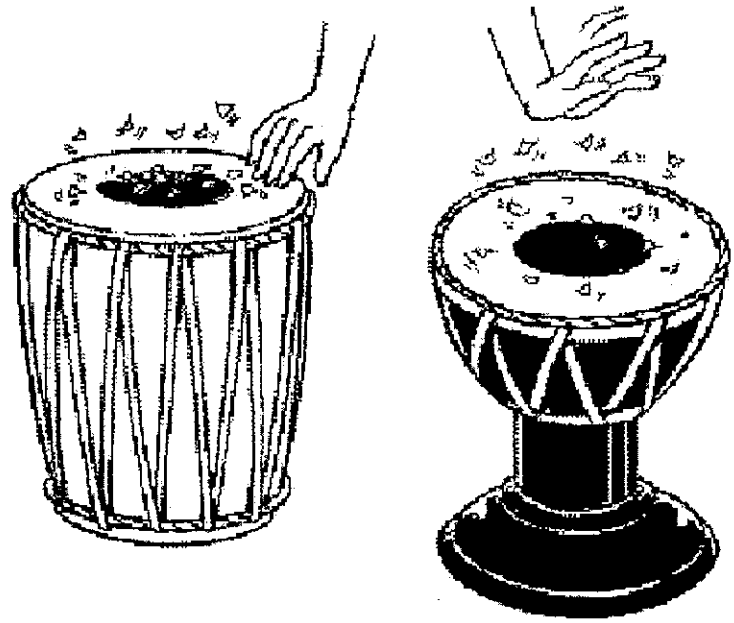
Activity 7 Drum and Paper

Teaching/learning material

Drum and small pieces of paper

Concept Let children see vibration when sound is heard.

Place small pieces of paper on a drum



Ask children, "when you beat the surface of the drum with small pieces of paper on it harder, what can you find?"

(Let them choose an answer from the following.)

a. Paper springs higher.

b. Paper springs less actively.

c. It does not make difference

Activity 8 Feel vibration

Teaching/learning material

Empty plastic bottle

Concept Let children feel vibration when sound is heard.

Ask children to touch gently both sides of your throat as you sing or shout. What do you feel? Your voice can also make a plastic bottle vibrate. Sing into an empty bottle, and feel the vibrations on the side of the bottle.

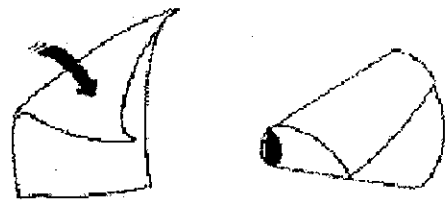
Activity 9 Loud speaker

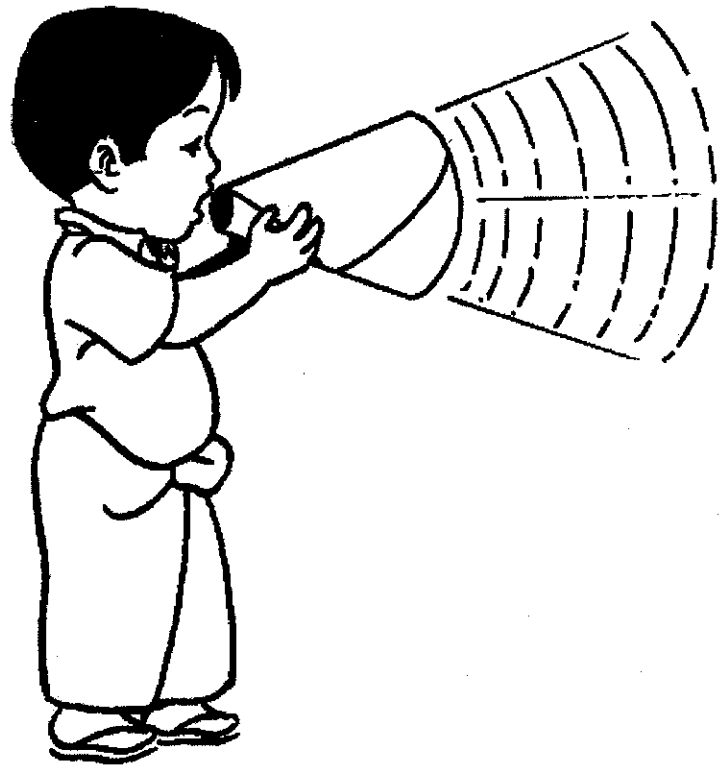
Teaching/learning material

A piece of paper

Concept Let children feel vibration when sound is heard.

Ask children to make cone shape with paper and speak through it. What do you find? When you speak, the paper vibrates.





Activity 10 Straw flute (1)

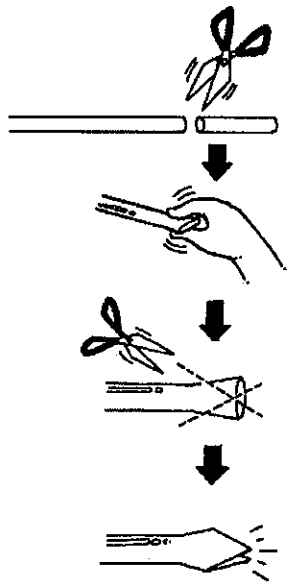
Teaching/learning material

Straw and scissors

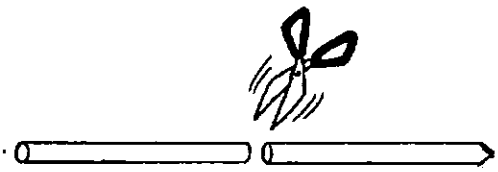
Concept Let children feel and see vibration when sound is heard.

Cut the straw about three quarter's size.

Cut one side as in the following figure. Flatten that side out. Now the straw flute is ready!



Before experiment, ask children, "now if you cut straw flute in half, what will happen?"
Let children choose an answer from the following.



a. Straw flute makes lower pitch (tone).

b. Straw flute makes higher pitch (tone).

c. It will not change the sound.

Activity 11 Straw flute (2)

Teaching/learning material

Straw and scissors

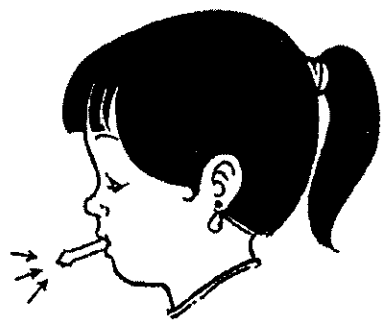
Concept Let children feel and see vibration when sound is heard.

You can use a straw flute made in Activity 10 or make them again.

Cut one side as figure. Flatten that side. Now straw flute is ready!

Now if you exhale through the flute from the other side, it won't make a noise.

But if you inhale through the straw, it will make a sound and you can see vibration at the edge.



Activity 12 Making instruments

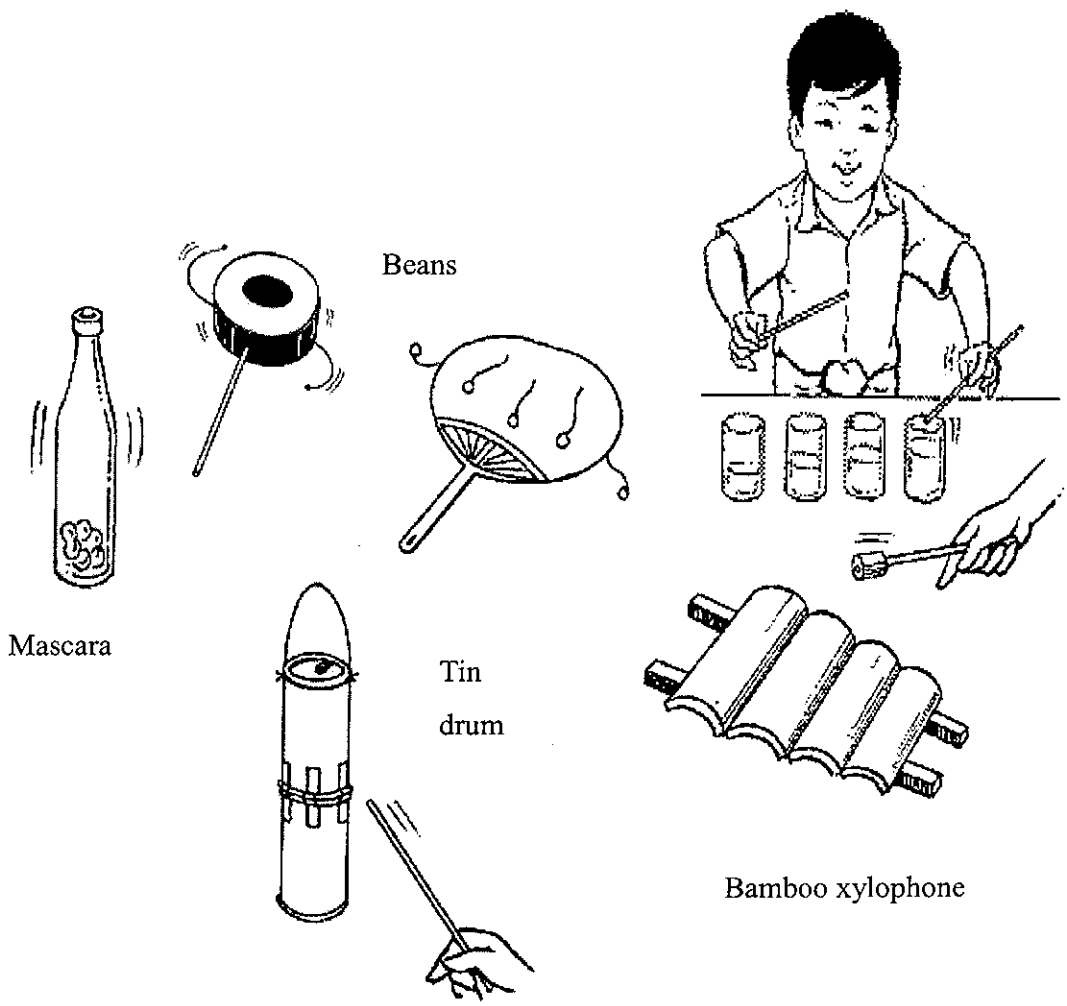
Teaching/learning material

1. Fan, beans, tape and string
2. Glass cups and water
3. Empty plastic bottle and beans
4. Bamboo
5. Empty tins and wooden sticks

Concept Let children enjoy music with hand-made instrument.

Children make various hand-made music instruments.

Children can use any locally available material and their ideas.



Activity 13 String Telephone

Teaching/learning material

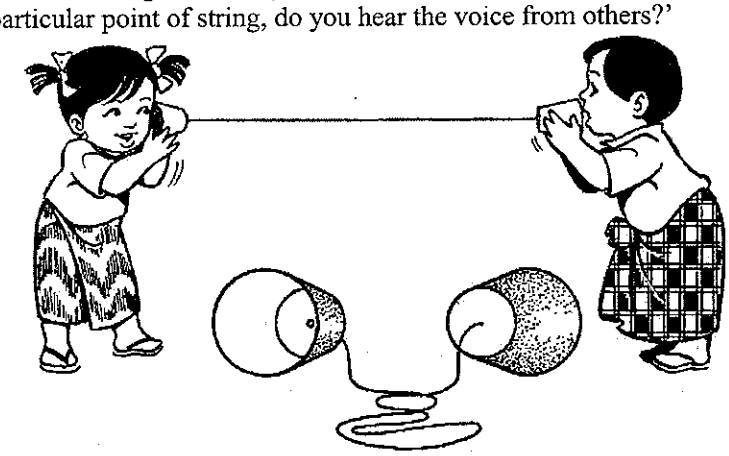
Paper Cups, String, Needle, Toothpick, Clips, Tape

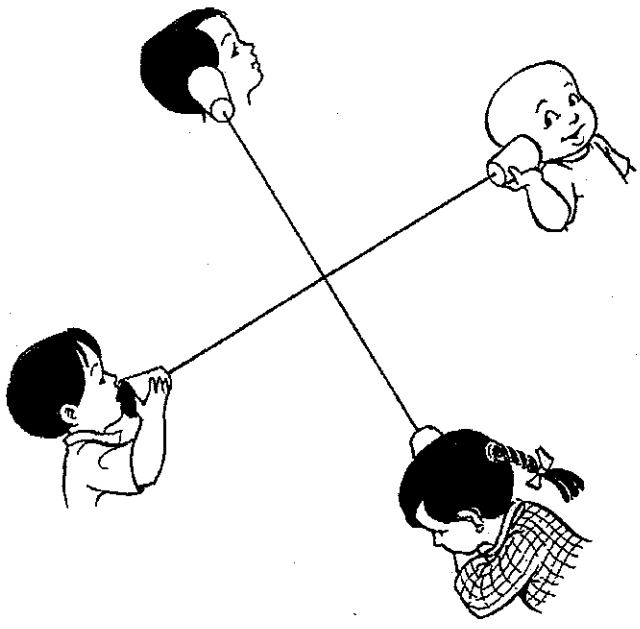
Concept Sound travels by vibration of string

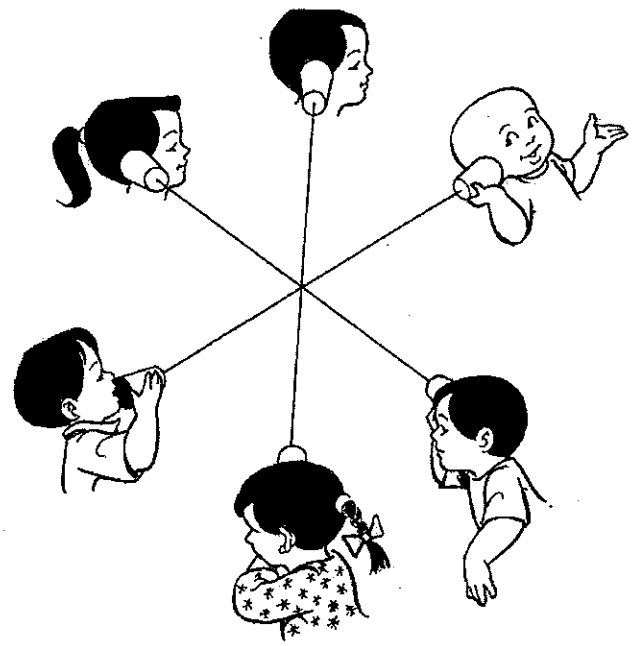
Teacher asks children to make a string telephone as following steps

1. Make a small hole at the end of the bottom of the cup with the needle.
2. Tight the string to toothpick through the hole and make a knot or fix it with tape.
3. Connect another cup with a long string.
4. Try to communicate with the other child by string telephone.
5. Connect many string telephone using clip as connection places (caution; only one can speak but many can hear so on the turn children should speak).

Teacher asks children,
'If you don't stretch the string well, can you hear the voice?'
'If you hold at particular point of string, do you hear the voice from others?'







Activity 14 Sound travels 1

Teaching/learning material

Wooden stick (diameter 2cm and 90cm length), stone (or something making sound), string, water hose

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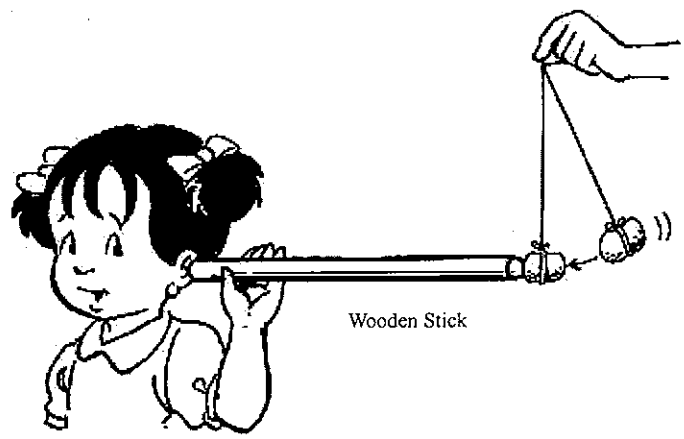
Concept Sound travels by vibration of wooden stick

Teacher asks children to do as following steps

1. Connect a stone with string.
2. Put ear at the end of stick and beat the other side with stone connected with string.



Teacher asks children,
'Can you hear sound through the wooden stick?'

Teacher asks children to try hose.
1. Put a ear one side
2. Make sound the sound the other side.

Teacher asks children
'Do you hear the sound the other side through the hose?'
'If the hose is bended do you hear sound?'
(Children may answer Yes)

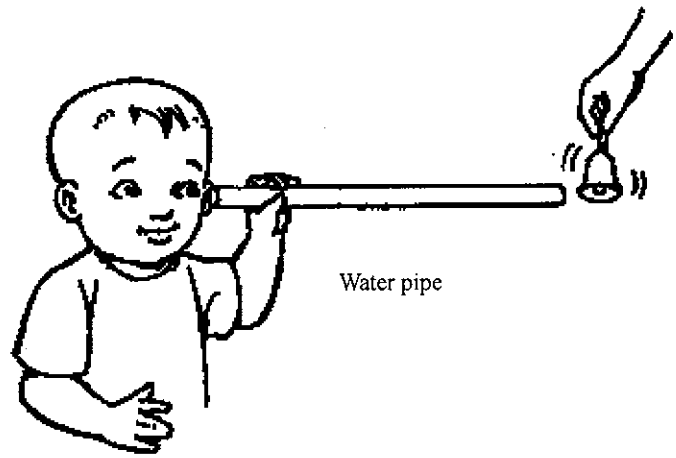
Activity 15 Sound travels 2

Teaching/learning material

Water pipe (diameter 2 cm and 90 cm long), iron bell, tuning fork.

Concept Let the children feel by listening to the sound that the sound travels with the vibration of the pipe.

Place one end of the pipe near the ear. Make a sound from the other end of the pipe and let them listen.
(For example, make a sound from the bell and let them listen.)



Teacher asks children the following questions.
1. Do you hear the sound that passed through it from the other side?
2. If the water pipe is bent, will you hear the sound?

Activity 16 Sound Travels 3

Teaching/learning material

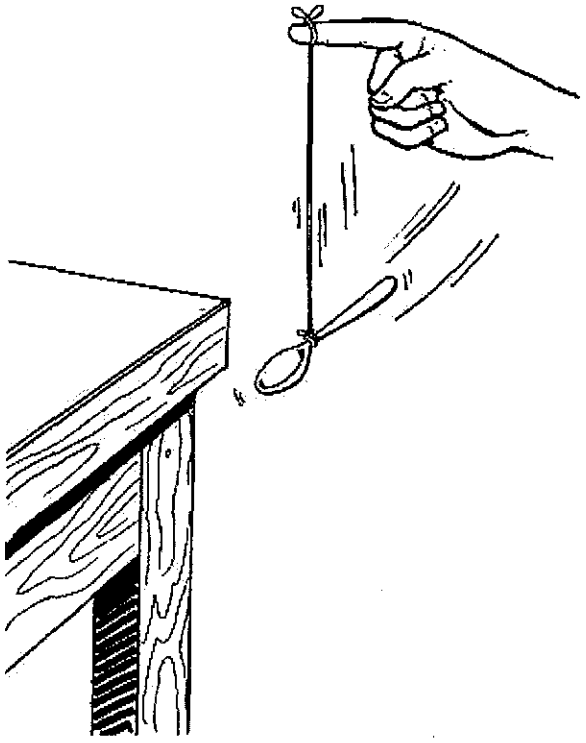
Steel spoon, thread (40 cm. long), table

Concept Let the children feel by listening to the sound that the sound travels with the vibration of various objects.

Tie the steel spoon with a thread at about its middle. Tie the other end of the thread to the index finger. Let them listen to the sound by striking the steel spoon tied to a thread, with a table.

Put the index finger tied to a thread inside the ear, strike the spoon with a table, and let them listen to the sound.

Teacher asks children.
Are the sounds heard as above the same? Which sound is heard more?
(Let the children choose from the following answers)
(1) The sound that heard after spreading into the air is louder.
(2) The sound that heard after spreading into the thread is louder.
(3) The two sounds heard are the same.



Lesson Plan 9-1

Lesson topic: Sound as vibration

Learning objectives: be able to identify emerging of sounds by vibrations and explain that sounds stops when vibration stops.

Teaching/learning materials: Aluminum, pot cover, pieces of paper, iron bell, paper cups, balloons, sugar

Teaching period: 35 min

Teaching/Learning procedure

Learning Activities	T	Teaching/Learning Materials	Points to be Noticed
Introduction Teachers carry out the following tasks. - Clapping. Ask, "What is this?" (Sound) - Ringing bell. What sound is it? Who knows the sounds, which you have learned in Grade (2)? (Individually)	3		Familiarizing to the topic.
Development/Core 1. Teacher tells the procedure of experiment Distribute Aluminum pot cover; small pieces of paper, iron bell and the iron stick to the groups of children.	2	Aluminum pot cover Small pieces of paper	
2. Let children do experiment pieces of paper and aluminum pot-cover experiment. Beating aluminum pot-cover and observe the movement of paper associated with sound. (Activity 4)	5		
3. After the experiment, ask them in-group and individually. - What do you find from this experiment? - Through the vibration of paper we can observe aluminum pot- cover is vibrating	3		Sound emerges due to vibration. Vibration produces sound. Sound stops when vibration stops.
4. Teacher tells the procedure of experiment. Distribute iron bell.		Iron bells	
5. Let children first predict (Activity 5)	3		
6. Write down children's predict on the board **Answer** | **No. Children** **1** | **2** | **3** |			Sound emerges due to Vibration
7. Children do experiment with iron bell What do you observe? What do you feel? - Sound can be heard. - The iron bell is vibrating.	6		Vibration produces sound. Sound stops when vibration stops.

<table>
<tr><th>Learning Activities</th><th>T</th><th>Teaching/Learning Materials</th><th>Points to be Noticed</th></tr>
<tr><td>8. Distribute empty paper cups and balloon to groups.
9. Let children first predict (Activity 6)
10. Write down children's predict on the board

<table><tr><td>Answer</td><td>No. Children</td></tr><tr><td>1</td><td></td></tr><tr><td>2</td><td></td></tr><tr><td>3</td><td></td></tr></table>
11. Children do experiment with Dancing Sugar
What do you observe?
What do you feel?
- Sound can be heard.

Children discuss in-group after the experiment.
What did you find from the experiment?
- Sound can be heard when things are vibrating

Conclusion/Summary/Evaluation
Teacher concludes this lesson with key concepts as follows

Sound emerges due to vibration.
Vibration produces sound.
Sound stops when vibration stops.

Let children to clear the tables.</td><td>1

3

6

3</td><td>Paper cup
Balloon
Sugar</td><td>Sound emerges due to vibration.
Vibration produces sound.
Sound stops when vibration stops.

Make children to aware the importance of maintenance of experiment material for future activities.</td></tr>
</table>

Lesson Plan 9-2

Lesson topic: The transmission of sound and hearing
Learning objectives: Be able to describe that sound spreads out into various objects from the place where it started to develop.
Teaching/learning materials: 1. Paper cups, threads, needle, toothpick, tape.
2. Thread, stone, wood rod (2cm in diameter and 90 cm long)
Teaching period: 70 minutes (2 periods)
Teaching/ learning procedure.

Learning activities	Time	Teaching/ learning materials	Points to be noticed
Introduction. 1. How can you do the objects to produce sound? (Give each child each object such as ruler, pencil, book, table, blackboard, iron bell, drum and let them do to produce sound) 2. When the sound is produced, what did you see (or) how did you feel? 3. How do the various sounds that you hear develop, children? 4. Why did you hear the sound? 5. Can the sound spread out into the air? Can it also spread out into various objects? Teacher lets the children discuss the above question and asks them to present to be recorded on the blackboard. Do not correct if they answer wrong. The right opinions will be known after the experiment.	10		The sound is produced when objects are beaten. (E.g. If you beat a drum it will produce sound) Vibration. The various sounds develop from the vibration of objects. The sound spreads out from where it develops and reaches to us so that we can hear. The sound can spread out into the air and into various objects.
Core development. **Activity A String Telephone (refer to Activity 13)** Teacher will distribute each group 5 paper cups, a thread (12 feet long) and three (6 feet long) threads, needle, toothpick and tape. Teacher will tell children to make a string telephone as the following order. - Make a hole on the center of the bottom of the two paper cups with a needle. - Let the thread pass through the different holes of the cups. - Each end of the thread that passes through the holes of different cups is tied to a toothpick broken into half and sticks it with the tape. After making string telephone by connecting two cups let each child talk with one cup and let other child listen with the remaining cup. Let them predict if the voice talked from the other side can be heard or not. - Then let the two children hold each cup by straightening out the thread and let them stand up at two places. - Let one child talk with one cup and let another child listen with the remaining cup by placing near his ear. (Let them do speaker and listener alternately and let them listen to the voice reciprocally)	25	Paper cups, threads, needle, toothpick, tape.	To record by taking tally. Answer | No. of children 1. Voice can be heard | 2. Voice cannot be heard | Let them study while doing experiment that the vibration of sound produced from one end of the thread spreads out to another end and causes to vibrate

<table>
<tr><th>Learning activities</th><th>Time</th><th>Teaching/ learning materials</th><th>Points to be noticed</th></tr>
<tr><td>- Then let them make another string telephones as shown in the figure.
- Let one child talk and let other children listen.
(Children will be asked to talk alternately)
Teacher will ask children the following questions.
(1) Do you hear the sound properly with a string telephone? The sound is properly heard since the string telephone can emit the sound.
(2) Can you hear the sound if you do not straighten out the thread.
(3) When you hold in the middle of the thread, can you hear the voice from the other side?
Children's answers will be recorded on the blackboard.</td><td>5</td><td></td><td>Let them notice that the sound with the vibration of the thread spreads out into the thread.
The sound is heard since it spreads out into the thread with the vibration of the thread.
It is difficult to emit the sound.
You cannot hear the voice.</td></tr>
<tr><td>Activity B Movement of sound (refer to Activity 14)
Teacher will ask children if the sound passed through the wood rod can be heard when one end of a wood rod is placed near the ear and strike the other end with a stone tied to a thread.
Let the children guess and tell.
Teacher will distribute materials to perform experiment to groups.
Then children will be told to carry out as the following order.- Tie the stone with a thread.
- Place one end of the wood rod near the ear.
- Strike the other end of the wood rod with a stone tied to a thread as shown in the figure.
- Let them listen to the striking sound of stone and wood rod.
Teacher will ask children if they can hear the sound that passed through the wood rod.
Let the children discuss in groups the facts found in relation with each experiment.
What did you find from the experiment?
The sound spreads out into the thread and wood rod with their vibration.
The sound is heard because the thread and wood rod transform and emit the sound.
The children's answers will be recorded on the blackboard.</td><td>15

10</td><td>Thread, stone, wood rod (2 cm. in diameter and 90 cm long)</td><td>To record by taking tally.
<table><tr><th>Answer</th><th>No. of children</th></tr><tr><td>1.The sound can be heard
2.The sound cannot be heard</td><td></td></tr></table>
Let them notice the movement of sound with the vibration of wood rod to one end.
The sound from one end of the wood rod can be heard from the other end since the sound spreads out into the wood rod with the vibration of the wood rod.
It should examine children if they find the fact that sound can spread into various objects.</td></tr>
<tr><td>Conclusion
Teacher will ask children to conclude the lesson as follows.

The sound can spread out into various objects.

Teacher will ask children to write down the above concept.</td><td>5</td><td></td><td></td></tr>
</table>

Assessment (Sound as Vibration)

Point of Assessment

Interest/Attitude/ Motivation	Scientific thinking	Technique	Knowledge and understanding
Is she/he interested in activities? Is she/he motivated to carry out activities? Does she/he enjoy activities?	Is she/he able to predict and find out the answer from activities? Is she/he able to relate vibration to sound from activities?	Is she/he able to carry out activities? Is she/he able to communicate (express prediction and listening to others) about this topic with teacher and peers? Is she/he able to make some instruments?	Is she/he able to identify the character of vibration? Is she/he able to understand we can always find vibration when sound occurs?

Oral Assessment/Group Discussion

1. When do you see vibration?

2. If you hear the sound, what can you see or feel?
3. How can you stop sound?

Written assessment

1. When you beat the surface of the drum with small pieces of paper harder, what can you find?

   a. Paper springs higher.
   b. Paper springs less actively.
   c. It does not make difference.

2. When you ring the bell,

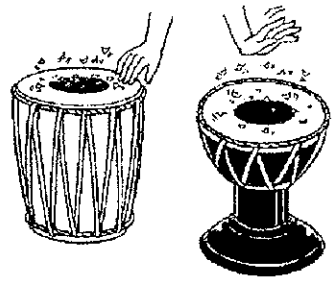
   a. You don't feel anything.
   b. It vibrates. So you feel a ticklish feeling.
   c. It vibrates so hard that we can not touch.

Message to Teachers

Check if children's idea about vibration.
Check if children can connect 'Sound and Vibration'.

1. Rulers swinging, drums making noise etc.
2. VibrationS
3. Stop vibration (children may answer "stop beating, stop ringing, stop playing" because when they stop those activities the vibration stops.)

1a



Let children understand vibration with real feeling.

2b

Assessment (Sound transmission)

Point of Assessment

Interest/Attitude/ Motivation	Scientific thinking	Technique	Knowledge and understanding
Does s/he take interest in the experiments? Is s/he motivated to carry out the activities? Does s/he like the experiments?	Does s/he able to guess and find out answers from the experiments Does s/he able to think that the sound from one end of an object (thread, wood rod, plastic pipe) is audible from another end due to the vibration of one end of the object and that this vibration spreads out into the object and causes the other end to vibrate to hear the sound?	Is s/he able to carry out the experiment? Does s/he able to communicate in relation with that topic to the teacher and friends? (the ability to present guessing and the ability to listen to what others say) Does s/he able to make a string telephone?	Is s/he able to distinguish the characteristic of vibration? Is s/he able to understand that the sound spreads out due to the vibration of objects?

Oral assessment/Group discussion.	Message to Teachers.
	Examining children if they can relate *the sound with vibration.* Examining children if they find out the sound spreads out from vibration of object
1. When you heard the sound, what did you see or what did you feel?	1. Vibration
2. Can you hear properly the voice spoken from one side of a string telephone?	2. I can hear the voice properly
3. If you place a wood rod near your ear and make a sound by striking the other end of the wood rod with a stone, can you hear that sound properly.	3. I can hear the sound properly
4. If you place a plastic pipe near your ear and listen, can you hear properly the sound from other side of the pipe	4. I can hear the sound properly
5. If you hear the above sounds, how sound travels to you to hear from the source of the sound?	5. We can hear the sound because the sound can travel through various objects.
Written assessment.	
1. What kind of object does sound travel through?	1. Air, thread, wood rod etc children may answer the material used in experiments.
2. How does a sound reach you from the *place where it develops*	2. The sound spreads out from vibration of object and reaches us.

Topic 10 : Magnetism

1. Key concept	A magnet has two poles which attract and repel each other. There is a magnetic field around a magnet
2. Learning objective	
General	1) Be able to understand how a compass functions and how to use it 2) Be able to understand that a magnet has a north and south pole, for example: two south poles together will repel each other and one south and one north will attract each other. 3) Be able to understand that the position of magnetic lines in the magnetic field, for example: the iron pieces will form the pattern around the poles. 4) Be able to know the properties of magnets and utilize them.
Specific	1) Be able to explain what the magnetic compass is and how it functions 2) Be able to explain that a magnet has north and south poles, and unlike poles of magnet attract each other and like poles repel each other. 3) Be able to explain that there is a magnetic field around a magnet and draw how it forms around a magnet. 4) Be able to create applications of magnets
3. Activities involved	Understanding a compass Making a compass with using a bar magnet 2 poles attract and repel Observing a magnetic field Making applications with magnets.
4. Activity purpose	To promote further understanding of the topic To attract interests of children To stimulate imagination and creativity of children

Before Getting Started

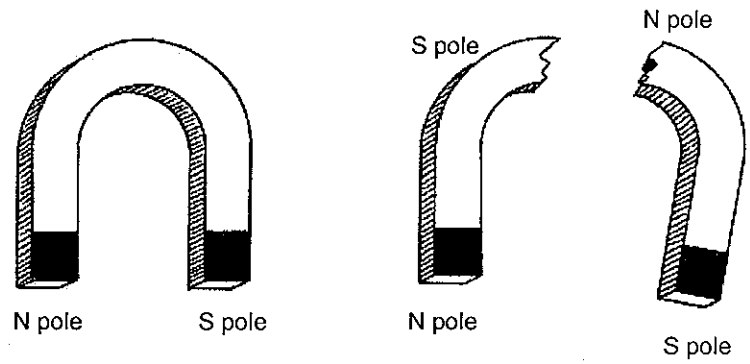
Self-check list for Teachers	☐ Do I know the properties of magnet well? ☐ Do I know that any magnet has two poles? ☐ Do I know how a compass functions and how to use it properly? ☐ Do I know how a magnetic field is formed around a bar magnet? ☐ Can I make the applications by using magnets?
Background information for teachers	
History of Magnet	The ancient Greeks used pieces of natural magnets, called lodestone at that time, which attracted piece of iron. In the twelfth century, the Chinese discovered that a magnet always stays in parallel to the line which connects north and south when it is hung with a thread. In the sixteen century, English sailor learnt how to magnetize a piece of iron with a magnet.

Magnetic force

Magnetism is a force. Iron and steel are the only common materials that are attracted to magnets. Nickel and Cobalt, which are less common, are attracted to magnets as well.

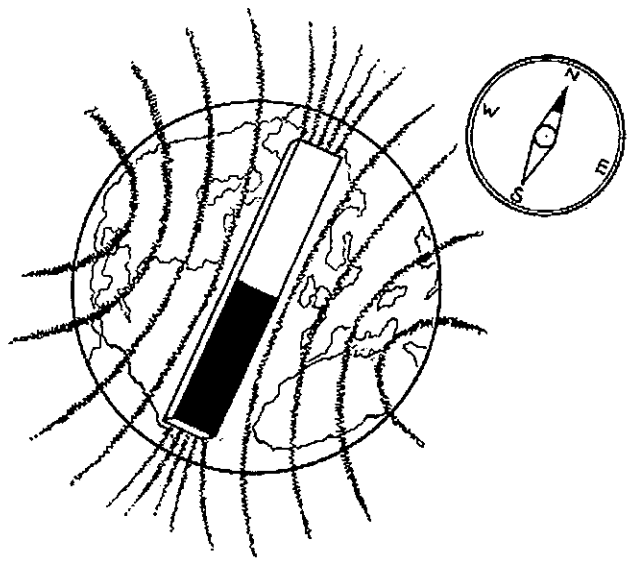
Poles of magnets

Magnetic force is concentrated at the ends or poles of magnets. We usually call them north pole and south pole. 2 poles exist in any magnet. When a magnet with 2 poles is broken into two pieces, each piece becomes a magnet with 2 poles.



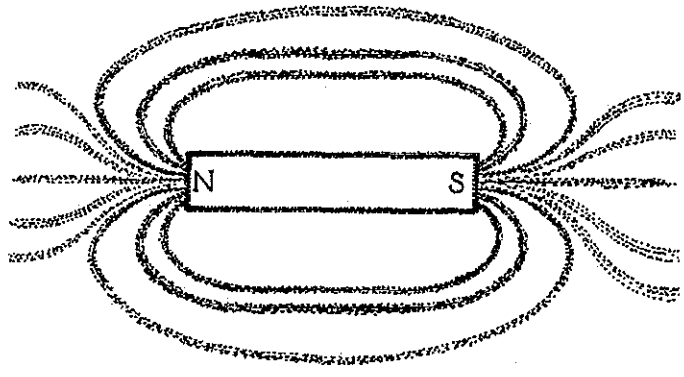
Earth is a magnet

Earth can work like a magnet. This is why magnetic compass can direct to north. The earth's geographic North pole is actually a magnetic south pole. The north pole of a compass is called 'north' because it points towards the earth's geographic North pole. However, like pole repel, so what attract the north pole of a compass must, magnetically speaking, be a south pole.



Magnetic field

A magnetic field is the region around a magnet in which other magnetic objects can be affected by its magnetism. The stronger the magnet, the larger its magnetic field. For example, the magnetic field around a bar magnet is formed as below.



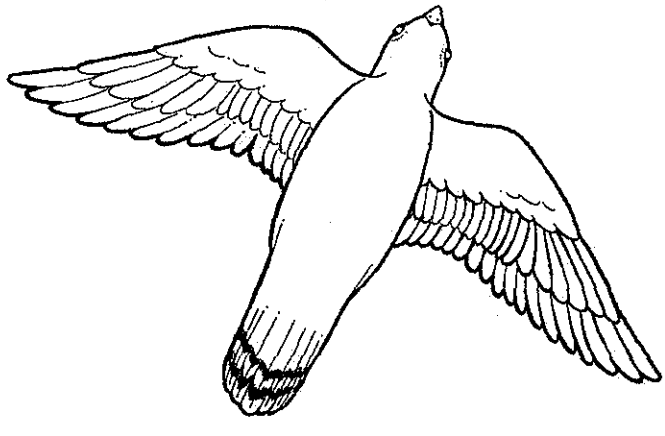
Earth has its own magnetic field, which is the strongest at its magnetic north and south poles.

Magnetization

Any piece of iron or steel can be turned into a magnet by stroking it several times in one direction with one end of a permanent bar magnet. When the magnetized iron or steel is burned or strongly shocked, the magnetized iron loses its magnetic power.

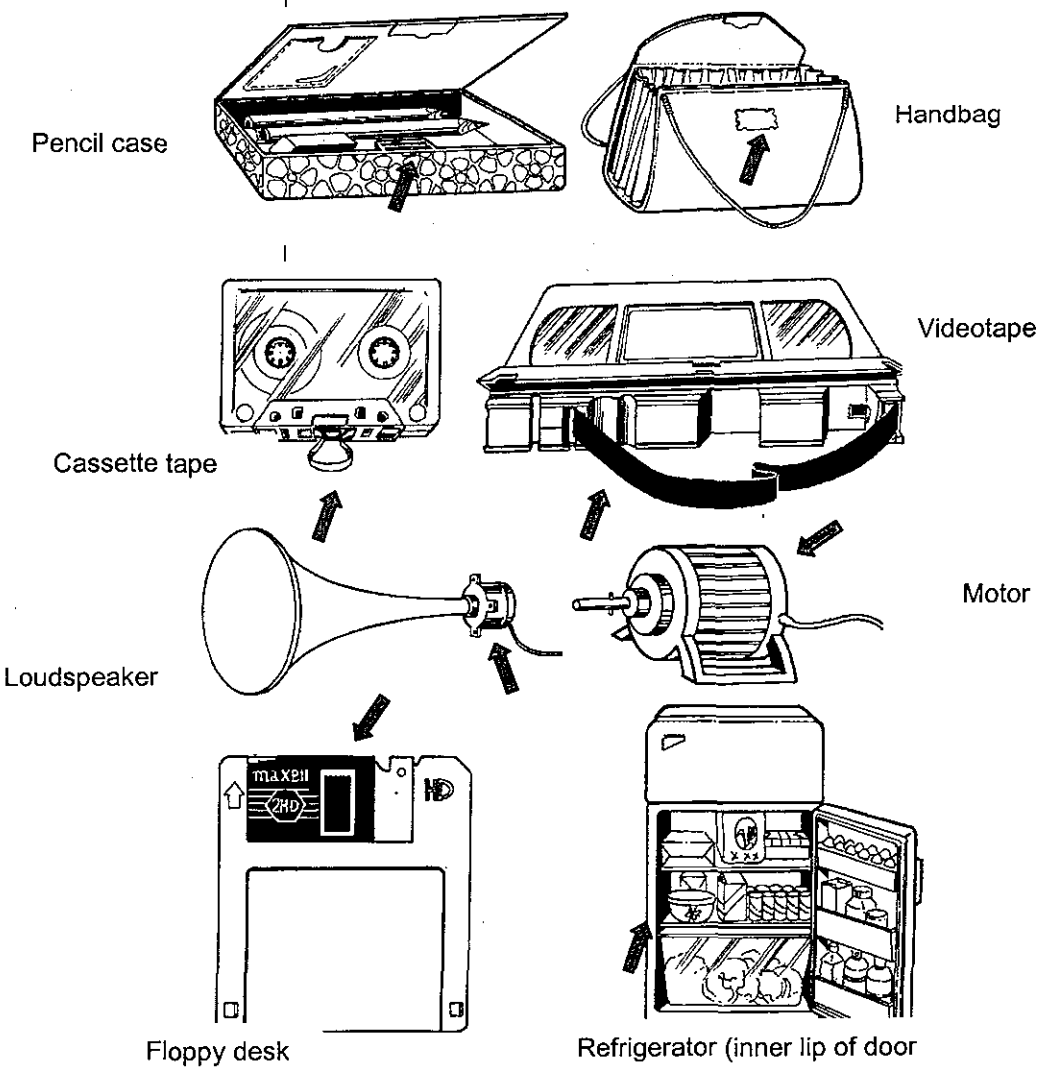
Birds have senses for magnetic field.

Homing pigeons can know their locations to use their sense for magnetic field. Migrating birds, such as terns, use magnetic field to find their ways accurately over thousands of kilometers.



Magnets are used in various ways

Although magnets seems unrelated to our lives, magnets are actually helping our lives greatly. We can find a lot of magnets in our devises and equipments. In any electric motor and speaker, we can find magnets. Video tape and music tape are coated with a thin layer of magnetic material. In fact, magnets are very important to generate electricity.



Lesson Planner

Suggested periods (12)	**Period 1 and 2**	**Period 3**	**Period 4**
Lesson Title	Compass	Two poles	Magnetic field
Sample lesson plan	10-1	10-2	10-3
Specific objective	Be able to explain what the magnetic compass is and how it functions	Be able to explain that a magnet has north and south poles, and unlike poles of magnet attract each other and like poles repel each other.	Be able to explain that there is a magnetic field around a magnet and draw how it forms around a magnet.
Introduction **(Motivation/Create interest/Active prior knowledge)**	Observe compass and its functions	Reminding the properties of magnets which students learned in Grade 2	Try to think what exists around a magnet.
Core/Development **(Active engagement with test/task)**	Think why it can point one direction wherever it is located. Make a compass with using a bar magnet, water, styrene foam (thick paper) and a bowl. **Activity 1 and 2**	Check how like poles act and how unlike poles act each other. **Activity 3**	Using the iron dust, observe the magnet field around a bar magnet. **Activity 4**
Assessment points	Interested in the topic? Thinking scientifically? Having skills for activities? Understanding ?	Interested in the topic? Thinking scientifically? Having skills for activities? Understanding?	Interested in the topic? Thinking scientifically? Having skills for activities? Understanding?

Lesson Planner

Suggested periods	**Period 5 and 6**	**Period 7 8 9 10**	**Period 11 12**
Lesson Title	Applications of magnets	Extra activities	**Assessment/Review**
Sample lesson plan	10-4		
Specific objective	Be able to create applications of magnets	Be able to create applications of magnets	
Introduction **(Motivation/Create interest/Active prior knowledge)**	Show some samples teacher already made with magnets.		
Core/Development **(Active engagement with test/task)**	Using magnets, students make any applications. **Activity 5**	**Activity 6** **Activity 7** **Activity 8** **Activity 9**	
Assessment points	Interested in the topic? Thinking scientifically? Having skills for activities? **Understanding?**		

Activity 1 Observing a compass

Teaching/learning material

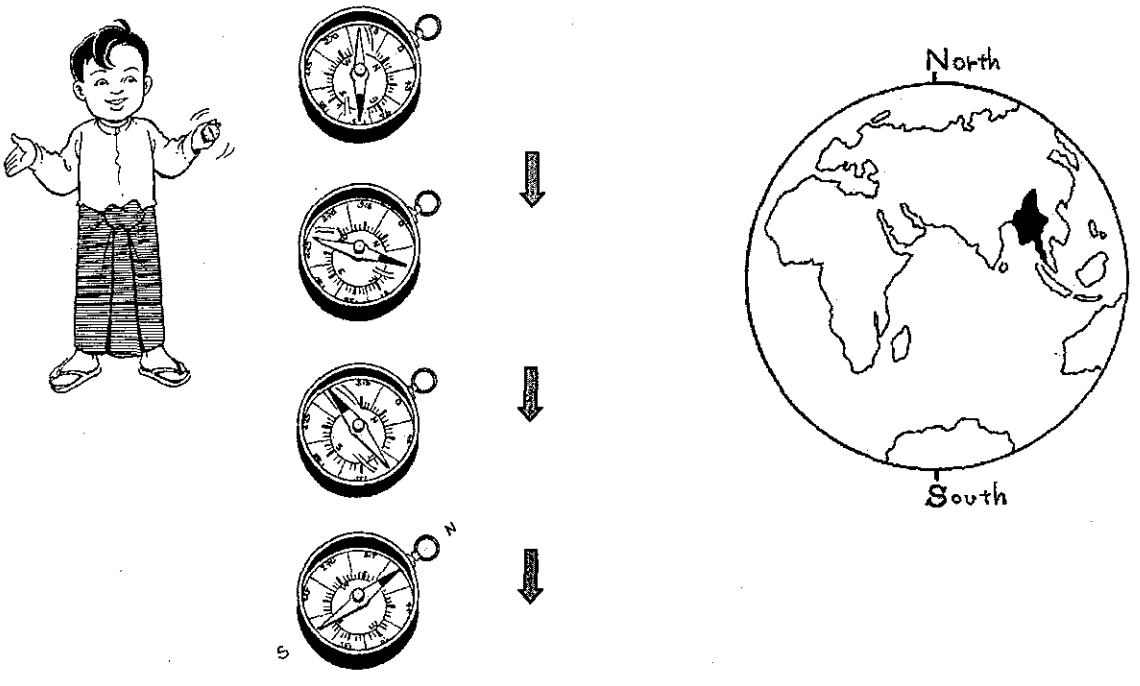
Compass

Concept The needle in the compass is the magnet which informs us directions

Compass is such a useful tool for our life since it tells us which direction is north or south. But it is very interesting to think why the compass can direct certain direction wherever it is placed.

In this activity, teacher and children think together why the compass can function like that.
Steps to do this activity could be the followings.

1. Show the compass to all children. (If you have enough, distribute it to children in groups)
2. Give children time to observe it
3. Encourage children to speak out their findings on the compass.
4. Suppose that a child mentions that the needle(arrow) is directing to one direction. If not, teacher facilitates them to find it.
5. Let us think why this is happening.
6. When no child could say any idea, teacher may say that the needle(arrow) is a magnet.
7. Let us remind the properties of magnets which children already learnt in grade 2.
8. "Iron and steel are attracted by the magnet" children possibly say. Then, look at the direction which the compass is directing and ask children if they can see any iron or steel.
9. The question for children is that "What is attracting the magnet (needle)?"
10. Teacher can give the answer that earth is a big magnet and the magnet in the compass is attracted by the magnetic force of the earth.
11. Teacher draws the earth on the blackboard and tries to stimulate children's imagination.



Activity 2 Making the compass with a bar magnet

Teaching/learning material

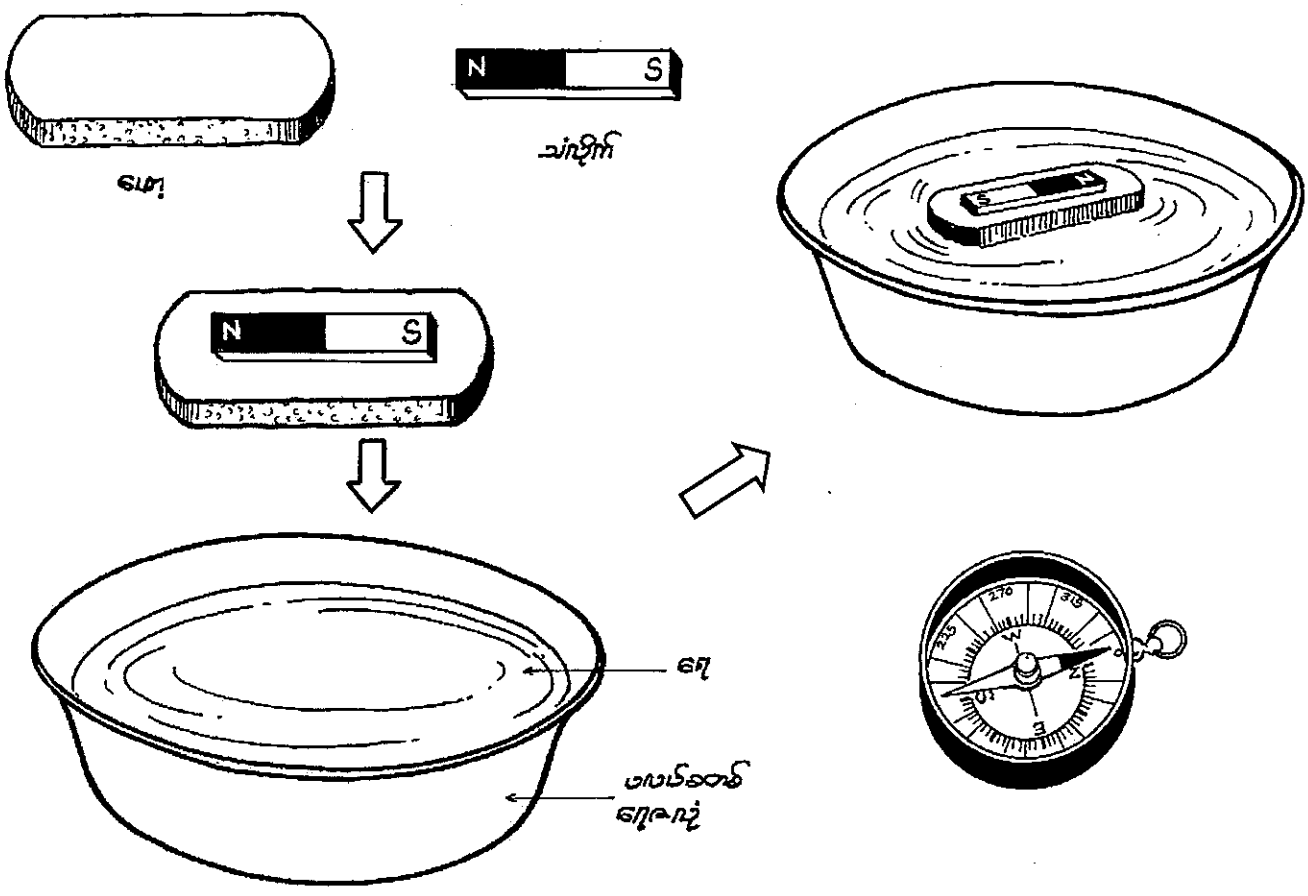
Bar magnet, water, polystyrene foam(or thick paper), bowl

Concept A compass can be made with a bar magnet.

Once knowing the needle of the compass is the magnet, let us make our compass with using a bar magnet.

1. Let us cut the polystyrene foam(or thick paper) to the size on which a bar magnet can be placed.
2. Put enough water in the bowl.
3. Put the bar magnet on the cut foam and softly put them on the water.
4. Observe what happens. When the bar magnet on the water becomes still, move it with your finger softly. Then, see what happens again.
5. Locate the compass 1 meter away from the bowl and check the direction it indicates. Compare the direction of the bar magnet on the water and the direction of the compass.

(This activity can be also carried out by suspending a bar magnet with a cotton string)



Activity 3 Two poles of magnet

Teaching/learning material

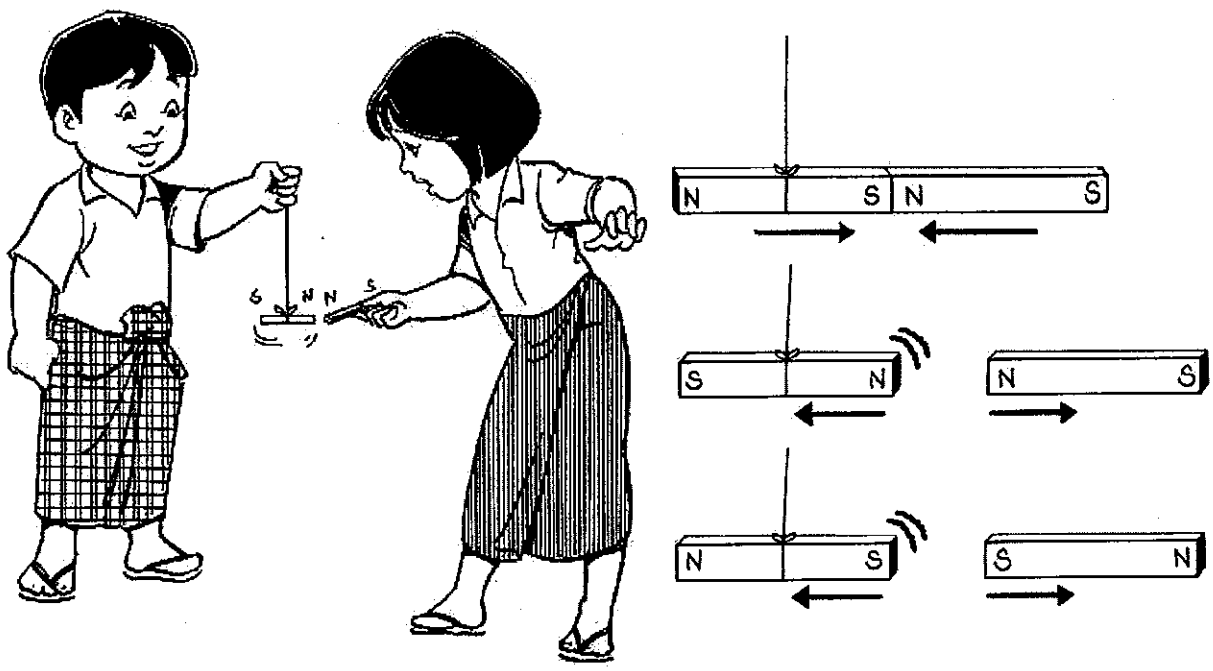
Bar magnet, round magnet, "U" shaped magnet, etc

Concept A magnet has two poles.

This activity is to see the properties of magnet. If we have two magnets (any kind is fine), we can check the properties of magnet.

1. Suspend a magnet with a string. If available, a bar magnet or u-shaped magnet is better. Let us call this magnet as magnet A
2. Make sure that magnet A can move and rotate.
3. Hold another magnet (let us call this as magnet B). Approach one side of magnet B closer to one side of magnet A.
4. See what happens. If it is not clear, move magnet B closer and further repeatedly.
5. Next, move magnet B closer to the other side of magnet A.
6. See what happens.
7. Hold another side of magnet B and do 3 -6.
8. Encourage children to write their observation on their notebook and to summarize the results.

Teacher can facilitate children to understand 2 magnets attract or repel each other. Teacher needs to add that any magnet has 2 different poles, called N-pole and S-pole. When N-pole and S-pole meet, they attract. When N-pole and N-pole meet or S-pole and S-pole meet, they repel each other. And also, do not forget to mention that **any shaped magnet** has N-pole and S-pole.



Activity 4 Observing magnetic field around magnet

Teaching/learning material

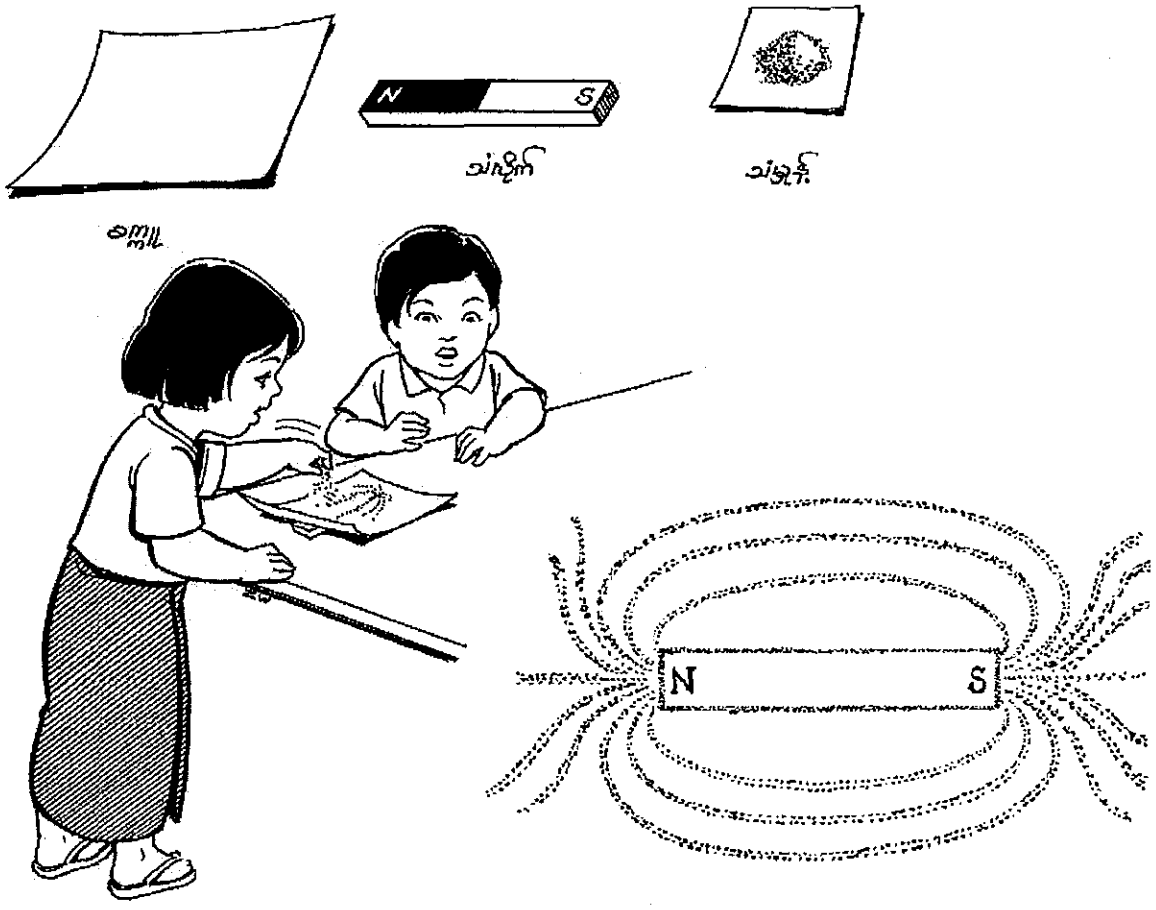
A bar magnet, iron dust, paper

Concept Magnetic field is formed around a magnet.

This activity is to observe how a magnetic field is formed around a bar magnet.

1. Let us put a bar magnet on the desk
2. Cover the magnet with a paper
3. Take iron dust with two fingers (thumb and first finger)
4. Sprinkle iron dust on the paper (around the magnet) little by little
5. Observe what kind of pattern is formed with the iron dust

If the pattern is not clear enough, hit the side of paper softly with a finger or start from the beginning.



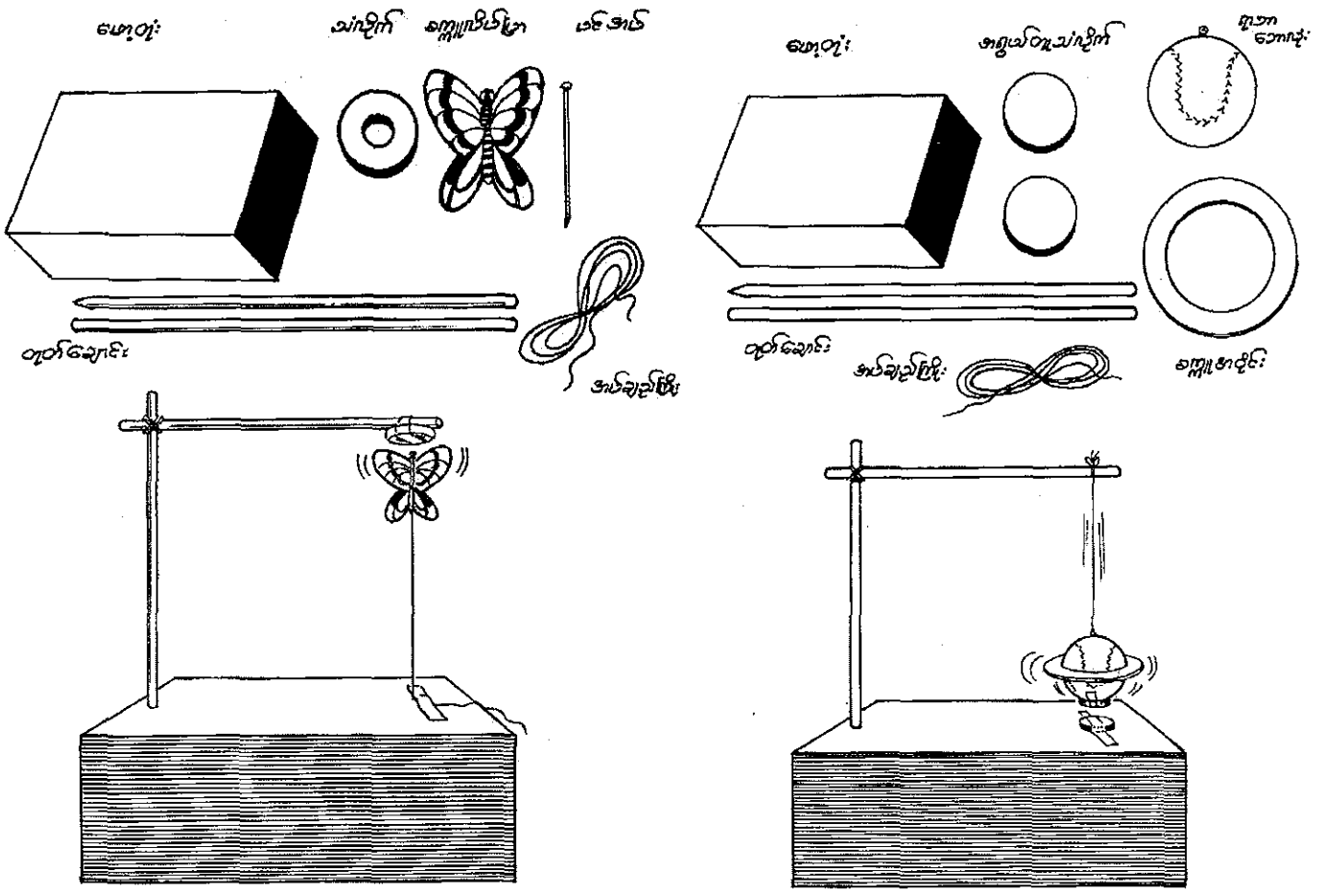
Activity 5 Applications of magnets

Teaching/learning material

Any kinds of magnet, paper, cotton, cello tape, glue, color pencils, etc.

Concept Let's make applications of magnet.

Let us play by using the properties of magnet. The samples below are the applications of magnets. Encourage children to create their own applications. More examples are shown after "Lesson plans 10-4"



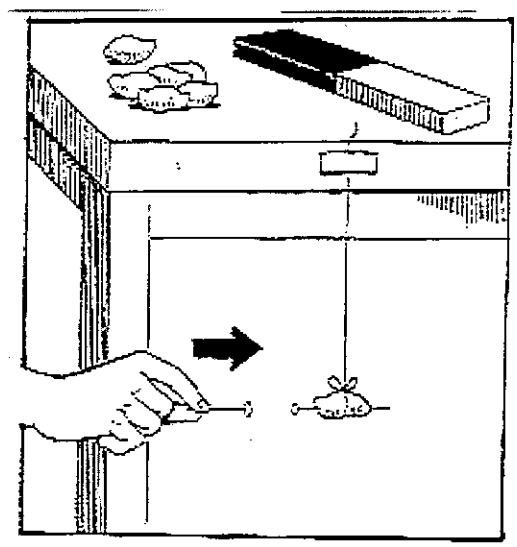
Activity 6 Polar Journey (Extra Activity Games playing with magnet)

Teaching/learning material

a one-foot length string, two clothes pins, plastic foam peanuts and a bar magnet

Concept . Through games find out nature of Magnets

(1) Magnetize a clothes pin by rubbing with a bar magnet from the head to the tail repeatedly.
(2) Similarly, magnetize another clothes pin like above. (Both of the clothes pins have to be rubbed with only one pole of the bar magnet)
(3) Insert a magnetized clothes pin into the plastic foam peanuts.
(4) Tie around the plastic foam with a one-foot length string and stick the other end of the string at the edge of desk as shown in the figure.
(5) Bring the head of second magnetized clothes pin close to the head of clothes pin hung with the string. (What will happen? Why?)
(6) Bring the tail of 2nd magnetized clothes pin close to the tail of clothes pin hung with the string. (What will happen? Why?)
(7) Bring the tail of 2nd magnetized clothes pin close to the head of clothes pin hung with the string. (What will happen? Why?)



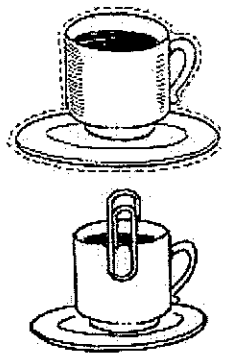
Activity7 Flying saucer with cup (Extra Activity Games playing with magnet)

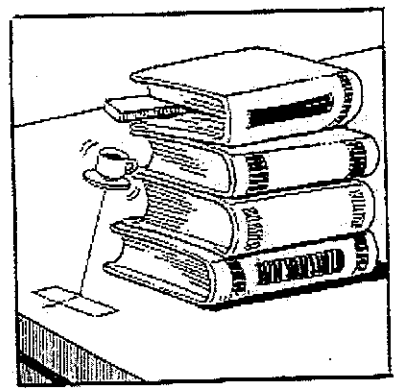
Teaching/learning material

paper, markers, metal paper clip, 10- inch- long string, tape, strong and flat magnet, stack of books and scissors

Concept Through games find out nature of Magnets

(1) Draw the figure of saucer with cup on the paper and cut out the figure with scissors.
(2) Stick the paper clip on the back of the figure with tape.
(3) Tie one end of the 10- inch- long string at the paper clip and stick the other end on the table with tape.
(4) As shown in the figure, place the magnet in between sheets of a book and place this book on the top of the stack of books. (Stack the books enable the magnet to attract the saucer.)
(5) As shown in the figure, raise the saucer with cup up. (Will the saucer with cup be in the air or fall down? Why it happens so?)





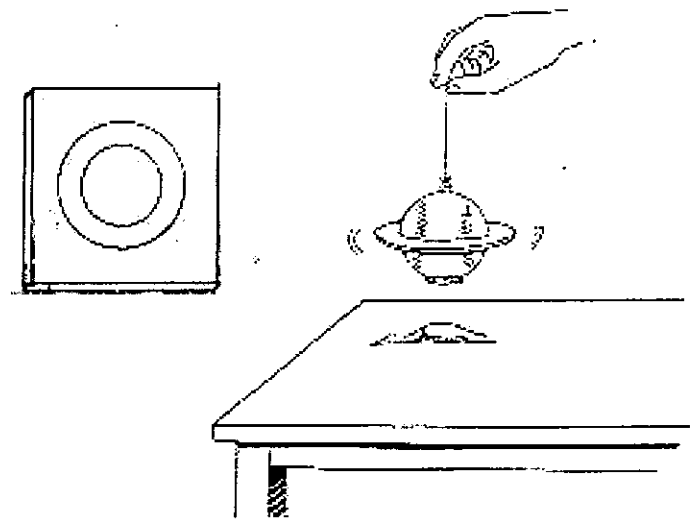
Activity 8 Ball spinning around (Extra Activity Games playing with magnet)

Teaching/learning material

Prepare two disk magnets, ball (styrene foam ball, Ping-Pong ball), card paper, 10- inch long string, scissors, knife and tape

Concept Through games find out nature of Magnets

(1) Stick the disk magnet on one side of the ball with tape. Stick the10- inch- long string on the other side of the ball with tape. (Tie the string at the ring in case the ball has a ring at the top)
(2) Cut out the card paper in circular shape and put on the ball. (As shown in the figure)
(3) Stick the other disk on the table with tape.
(4) Bring the ball tied with the string close to the disk stuck on the table with tape. Observe what will happen to the ball. (What will happen to the ball? Why?)
(5) Observe by putting the ball tied with the string at the different place near the magnet on the table. (What will happen to the ball when it reaches close to the magnet? What will happen to the ball in case of getting farther from the magnet? What is the difference in the spinning of the ball when nearer to the magnet and farther from the magnet? Why?



Activity 9 Auto-motion (Extra Activity Games playing with magnet)

Teaching/learning material

Foam core board, markers, a pair of chop sticks, two magnets, stiff paper, a bunch of metal paper clips, tape and four books of the same width

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Concept Through games find out nature of Magnets

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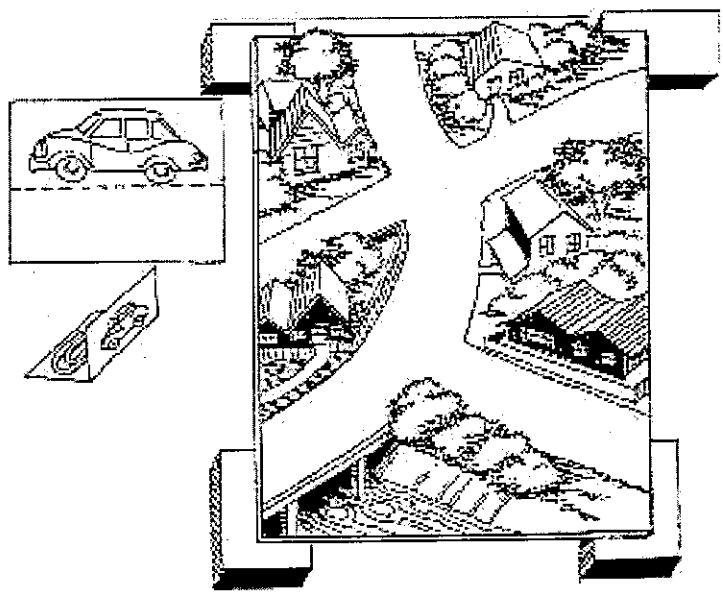
(1) Draw an outline of a road seen from above on the foam core board as shown in the figure. There has to be side ways and junctions in this outline of road. House, factory, river and garage beside the road have to be included. After drawing the outline, place four books at the four corners of the foam core board and raise the foam core board.
(2) Draw the figure of a car shown below on the card paper. (The figures of other motor vehicles can also be drawn) After drawing, fold the card paper along the dotted line. Stick the paper clip on the folded card paper with tape and put the figure of car on the road.
(3) Stick the magnet at the edge of chop stick with tape. Touch the edge of chop stick with magnet is stuck underneath the foam core board around the place of car.
(4) Move the chop stick in the various places.

(What happens to the car when the chop stick is moved? Why?)



Lesson Plan 10-1

Lesson topic: Magnetic Compass
Learning objectives: Be able to explain what the magnetic compass is and how it functions
Teaching/learning materials: Magnetic compass, bar magnet, styrene foam, bowl, water
Teaching period: 70 minutes

Teaching/Learning procedure

Learning activity	Time	Teaching /learning Materials:	Points to be noticed
Introduction Today's lesson is very useful for your life. - Can you point out the direction of your home? - Do you know which direction it is? North, South, West or East? - If you know north, south, west and east, which direction is your house located from where you are.	5		Teacher asks questions Encourage students to mention place they have been.
Core/Development **Observe the compass (refer to Activity 1)** There is a big help for understanding directions. Have you seen this (Compass)? Teacher encourages students to carefully look at it and tell teacher about it Findings would be: - An arrow inside - An arrow spins - Some words inside - An arrow looks floating. - Metal outside - An arrow is green. - An arrow directs the same direction.	10	Compass	Distribute compasses to each group. Any finding from students is highly appreciated by teacher. Just encourage them to say anything about compass. Record them on the white board.
Why can the compass direct the same direction? Make sure that compass directs the same direction wherever it is located. Then, encourage students to think why this is happening? If a student says because the arrow is a magnet, praise him/her a lot. Then, encourage all students to remind the properties of magnets. If no student can say because it is a magnet, teacher can ask students "Give up?" Then, teacher can say that the secret of compass is that the arrow inside is a magnet. Teacher reminds students of its properties.	15		Give them enough time to think and say reasons they can think of. As properties of magnets, students will say a magnet is attracted by iron or other magnet.

Learning activity	Time	Teaching /learning Materials:	Points to be noticed
Earth is a huge magnet. The arrow is attracted by iron or magnet. Let's see the direction the arrow directs and ask students if they can see a huge mass of iron or magnet in the direction. (of course there is no such things) Let us think what is attracting the arrow. Encourage students to think and think. If a student says that earth is a magnet, teacher praises him/her and starts to draw the earth (circle) and Myanmar on the white board. If no student says that the earth is a magnet, teacher says "Give up? "And "secret is that the earth is also magnet" Then start to draw the earth as well. Teacher can mention that the arrow is directing to North. (This means if you walk with compass to North, you can reach Mandalay, China, Russia, and finally North pole of the earth, would like to do it?	20		Say it takes to Mandalay,
Let us make a compass by using a bar magnet (refer to Activity 2) Once we know the arrow in compass is a magnet, it should be easy for us to make it. Let us try to do it. Teacher can explain how to make it with using a magnet, foam, water and a bowl. Then, keep the compass a bit away from the hand-made compass and compare both compasses. Encourage students to speak out any findings.	15	Bowl, styrene foam, bar magnet magnetic compass Water	Keep the compass away from a hand made compass in the bowl.
Conclusion With this lesson, student will know that compass is made with a magnet and it can show the same direction wherever it is located.	5		In addition to knowing about the compass, student will know how to properly use it.

Lesson Plan 10-2

Lesson topic:	Any magnet has two poles (North and South)
Learning objectives:	Be able to explain that a magnet has north and south poles, and unlike poles of magnet attract each other and like poles repel each other.
Teaching/learning materials:	Bar magnet, thread
Teaching period:	35 minutes (1 periods)

Teaching/Learning procedure

Learning activities	Time	Teaching/ learning materials	Points to be noticed
Introduction Teacher starts the lesson by asking a question like "Do you know a magnet? Tell me anything about the magnet" Teacher may also remind children of the previous lesson "Magnetic compass". Teacher may say that we will learn more about magnet today.	5		Appreciate and record what the children say.
Core/Development Ask, 'what will happen if a magnet is hung by tying in its middle with a string'. Encourage children to speak their ideas. Then, children do it by themselves. After the experiment, teacher asks children to express the finding.	5	Thread, bar magnet.	Make sure children recognize from the experiment that a magnet always directed towards north and south.
Teacher asks children "to which direction does a magnet direct?" Teacher may explain that the end of the magnet which directs to north is called "North pole (N)" and the other end is called "South pole (S)". In fact, any magnet has 2 poles, north and south.	5		Make sure children recognize that a magnet has north pole and south pole. Make children sure which is north pole and south pole in the magnet they have.
Activity A (refer to Activity 3) Teacher says "We have 2 bar magnets and look into the relation between them today".			
Teacher shows 2 bar magnets and their north poles and south poles. Then teacher asks children questions below. **1. What happens if north pole and north pole come closer?** **2. What happens if north pole and south pole come closer?** **3. What happens if south pole and south pole come closer?** Encourage children to speak their ideas. If they answer "attract" or "repel", let us count how many think they attract/repel for each question by drawing the table. After hearing their ideas, let us do the experiment with children.	15		Record by taking tally.

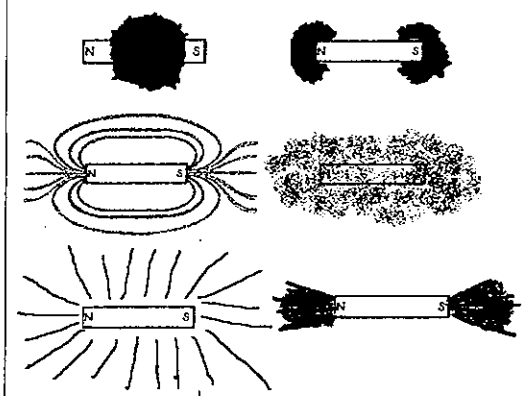
	Attract	Repel
North and North		
South and North		
South and South		

Learning activities	Time	Teaching/ learning materials	Points to be noticed
Experiment is done with the following steps. 1. Keep a magnet with a string. (string is tied at the middle) 2. Approach north pole of another magnet to the north pole of the suspended magnet. 3. Observe what happens. 4. Approach south pole of the magnet to the north. pole of the suspended magnet. 5. Observe what happens. 6. Approach south pole of the magnet to the south. pole of the suspended magnet. 7. Observe what happens. Ask children to record the results and observation of their experiments. After all groups go through the steps, teacher again asks children 3 same questions given before the experiment. **Conclusion** By this lesson, children will know that magnet has north and south poles and that unlike poles of magnet (S and N) attract each other and like poles (N and N, S and S) repel each other.	5		

Lesson Plan 10-3

Lesson topic:	Magnetic field
Learning objectives:	Be able to explain that there is a magnetic field around a magnet and draw how it forms around a magnet.
Teaching/learning materials:	Bar magnet, iron dust, paper (if available, thick paper is better)
Teaching period:	35 minutes (1 period)

Teaching/Learning procedure

Learning activity	Time	Teaching /learning Materials	Points to be noticed
Introduction Encourage children to tell as much as they remember the properties of magnet. Today, we will learn more about magnet today.	5		The children tell by discussing among themselves.
Core/Development Teacher by holding the iron dusts and bar magnet asks the children, 'What are these materials?' Teacher shows that the materials are sticking to the magnets. Children will realize that the materials are dusts of iron. If not, teacher can facilitate them to realize. Then, teacher say "we use iron dusts to know about magnets today"	5	Iron dust, bar magnet.	It will be shown to each child. Children's saying will be recorded on the blackboard.
I want you to use your imagination today. Imagine that we put a paper on a bar magnet and we sprinkle iron dusts on the paper, especially around magnet. Do you think how the dusts stick and what kind of pattern is made?	10	Iron dust, bar magnet, paper	Teacher explains this by showing a paper, magnet and dusts. Teacher encourage them to imagine how it looks like and also show some samples like,
All children draw the picture of a bar magnet and their imagination on how dusts stick around the magnet on their notebooks. When they finish drawing their imagination, start the activity.			
Activity (refer to Activity 4) This activity is to be done with the following steps. 1) Put the bar magnet on the desk and paper on the magnet. 2) If paper is bent, try to keep it horizontal with fingers. 3) Make sure the position of the magnet under paper. 4) Sprinkle dusts of iron little by little on the paper, around the magnet. 5) Observe what kind of pattern is made and draw the pattern on the notebooks.	10		
If the pattern of iron dusts is not clear, hit softly the paper with fingers several times, or do it again from 2).			It is also good to count how many children support each example.

Learning activity	Time	Teaching /learning Materials	Points to be noticed
After doing the activity, Teacher draws 3 pictures of magnets on the blackboard and encourages children to draw the pattern of iron dust formed by the magnet. **Conclusion** Teacher also draws the pattern of iron dust around the bar magnet. (Refer to the picture in Activity 4) Then, teacher starts to explain that there is a magnetic field around any magnet and the magnetic field is formed just like the pattern we draw. Lines in the pattern are called magnetic lines. In fact, the magnetic field can not be seen, but we can observe it if we use iron dusts. Then, teacher can conclude this lesson by saying and writing, **There is a magnetic field formed around any magnet.**	5		.Teacher appreciates children's drawing. If the drawings are clear enough, let us use them as the proper answer. But if there are not clear, teacher better draws proper one.

Lesson Plan 10-4

Lesson topic:	Applications of magnets
Learning objectives:	Be able to create applications of magnets
Teaching/learning materials:	Cottons, sheets of paper, pins, clips, nails, pins, bar magnets, disk magnets, scissors, knife, glue, tape, markers, etc.,
Teaching period:	70 minutes (2 periods)

Teaching/Learning procedure

Learning activity	Time	Teaching /learning Materials	Points to be noticed
Introduction Teacher makes the children think and discuss the following questions regarding magnet and present the outcomes to the class again. (1) Which things can be attracted by a magnet? (2) How many poles does a magnet have? Which direction do these poles point toward? (3) What will happen if two similar poles of bar magnets are made closed by each other? What will happen in case of two different poles? (4) What is the magnetic field? (5) How do the iron materials (e.g. needle, pin) have to be made to become magnets? Are these magnets natural magnets or man made ones? The children's answers have to be recorded on the blackboard.	5	Blackboard, Chalk	If the children cannot give answers, teacher has to give guidelines and supplement the answers if necessary.
Development/Core (refer to Activity 5) Teacher tells the children will have to play with magnets in this lesson taking as basis on the known facts concerned with magnet. Teacher demonstrates three or four items out of the games attached after the preparation. Whenever the teacher completes the demonstration of one item, ask the given questions in the game relating to magnet. Have the children think and discuss by group and presentation of each group will be recorded on the blackboard. After the teacher's demonstration of model games, encourage children to create new items of games with magnet.	20 35	Cottons, sheets of paper, leaves, pins, clips, nails, tapes, scissors. knife, glue, pins, tape, etc.	

Learning activity	Time	Teaching /learning Materials:	Points to be noticed
Conclusion Children present which property of magnet is used in the game they made by group to the class. Children express what makes them surprised while playing with magnet. *Teacher tells the children the utensils made by using magnet.* Conclude the lesson by asking the children to tell how the magnet contains in these materials is useful.	10		If the children make the same as the model the teacher has shown, let them do so. The utensils made by using magnet are; Pencil box with magnet, purse with magnet, refrigerator (magnet is set in the inner lip of door in order to make the refrigerator closed tightly), compass, telephone, electric bell etc.

Assessment

Point of Assessment

Interest/Attitude/ Motivation	Scientific thinking	Technique	Knowledge and understanding
Is s/he interested in compass? Is s/he interested in magnets? Is s/he interested in doing activities? Is /she motivated to check properties of magnets? Is s/he motivated to create something with magnets?	Is s/he able to predict and find out answers from the activities? Can s/he think the arrow (magnet) in the compass is attracted by the earth? Can s/he connect the compass with the bar magnet on the water? Does s/he think there are forces between magnets? Can s/he think/imagine magnet field is formed around a magnet? Can s/he think about magnetic field around u-shaped magnet?	Can s/he conduct activities as explained? Can s/he observe repelling and attracting of magnets? Can s/he record what s/he has seen or done? Can s/he draw the diagram of activities properly? Can s/he create applications of magnets on her/his own? Can s/he communicate with the teacher and friends?	Does s/he understand why the compass can indicate north? Does s/he understand that any magnet has 2 poles, like poles repel and unlike poles attract? Does s/he understand that magnetic field is formed around a magnet?

Oral Assessment/Group discussion.

1) What is inside the magnetic compass?
2) Explain why the compass can indicate directions.
3) What will happen to the pointer inside a compass if a bar magnet is brought near it?
4) Describe the properties of a magnet.
5) Explain when magnets attract and repel each other.
6) Which places of magnet do the iron particles attach most?
7) Describe how the magnetic field forms around a bar magnet.
8) Guess how the magnetic field forms around U-shaped magnet.
9) Can magnets attract iron or steel without contacting?

Written Assessment

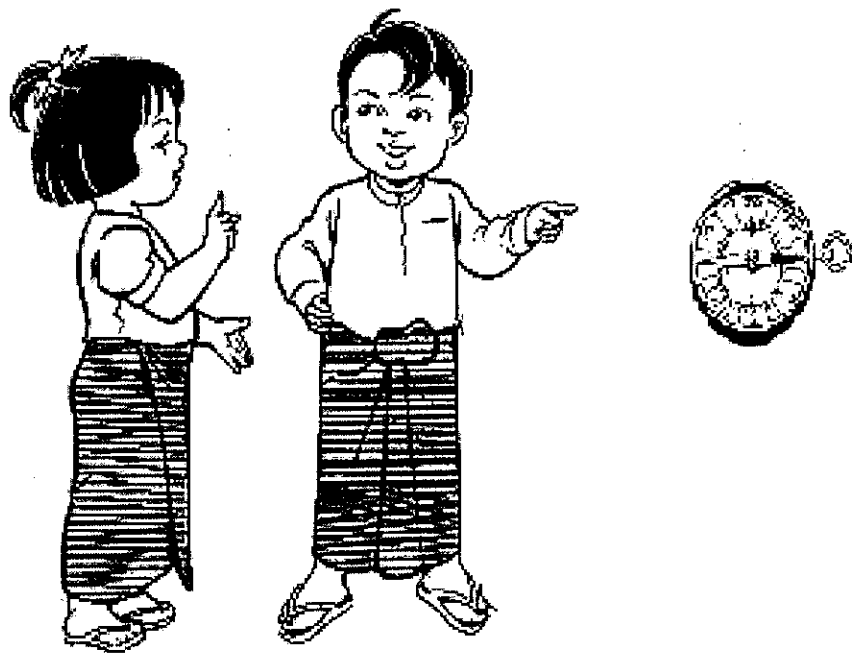
1) How do you make a compass with a bar magnet?
2) Write down the properties of a magnet.
3) Draw the magnetic field around a bar magnet.
4) White down objects which are attracted or repelled by a magnet.
5) Where can we find magnets in our lives?

Message to Teachers

Give questions with which children need to think and reflect to answer.

Grade 3

Chapter 4 The earth and space

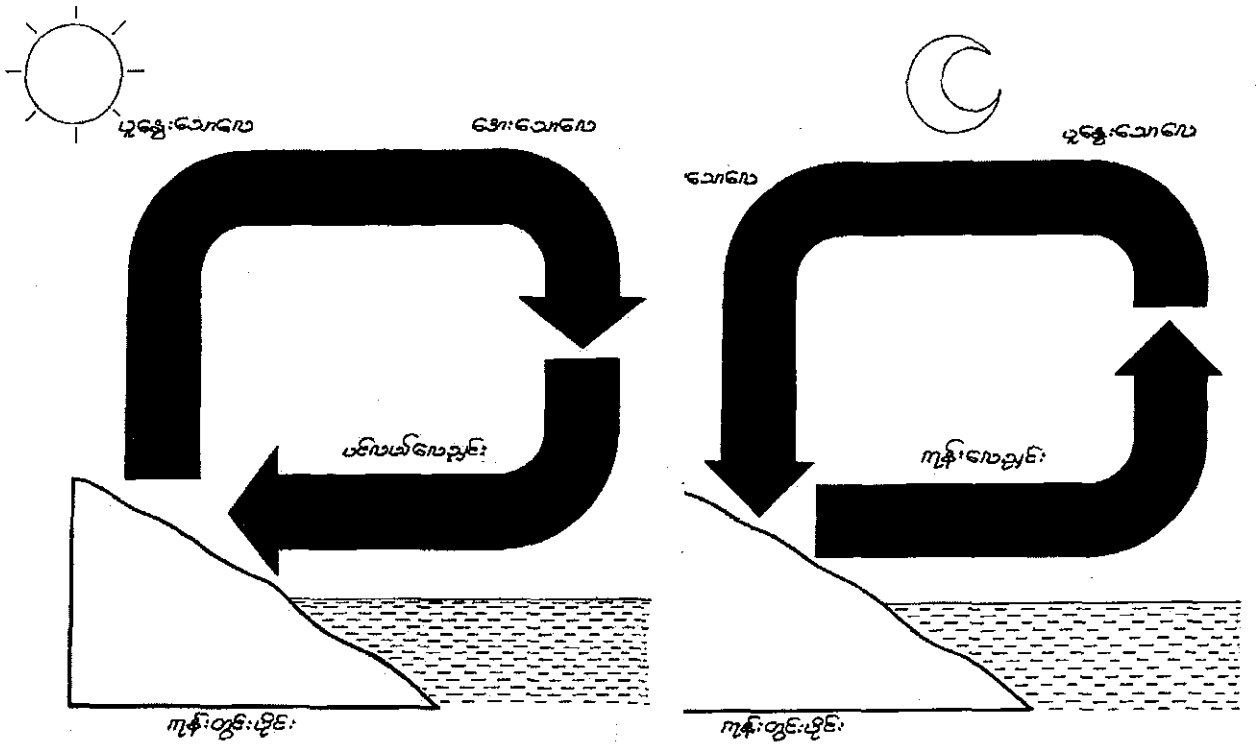


Topic 11 : Weather

1. Key concept	There are various winds and clouds
2. Learning objective	
General	1) Be able to understand wind blows from different directions 2) Be able to understand there are different wind speeds which can be observed 3) Be able to understand that there are different types of clouds formations
Specific	1) Be able to explain wind blows from different direction 2) Be able to make a wind vane and use it to measure the direction of wind 3) Be able to describe there are various speeds of wind and understand effects from wind by knowing the wind speed 4) Be able to explain how cloud forms 5) Be able to describe that there are various kinds of clouds. 6) Be able to explain different symbols represent different weather condition and to record daily weather with the symbols
3. Activities involved	Understanding the wind direction Making a wind vane Listening to the weather forecast Imaging the wind speeds with illustration Observing clouds for a week
4. Activity purpose	To promote further understating of the topic To attract interests of children To stimulate imagination and creativity of children

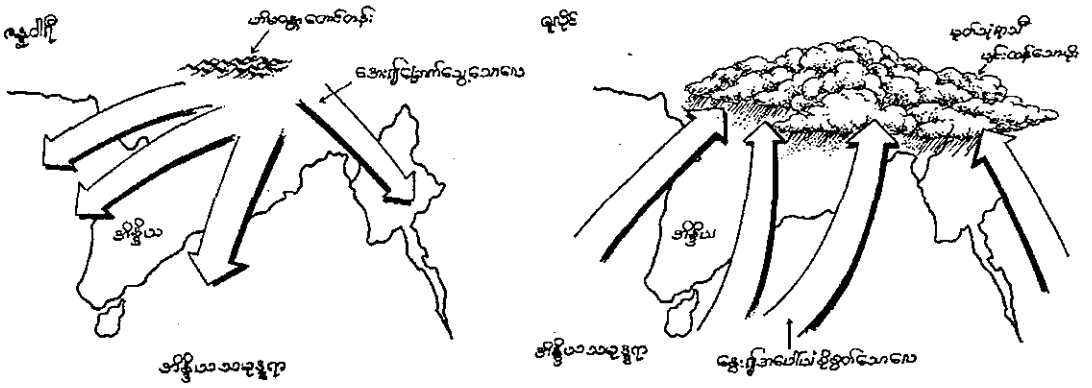
Before Getting Started

Self-check list for Teachers	☐ Can I make a wind vane?
Background information for teachers	
Why wind blows (day and night)	Heat from sunlight is the main cause why wind blows. The air warmed by sun directly or indirectly goes up. The air cooled down at higher position goes down. As a result, the air circulated as the diagram below shows. In the day time, the land is warmer than the sea. The air on the land goes up and the air above the sea comes down. As a result, wind blows from the sea to the land. On the other hand, in the night time the sea is warmer than the land because the sea can keep heat than the land. The air on the sea goes up and the air above the land comes down. As a result, the wind blows from the land to sea.



Why wind blows (winter and summer)

The wind differently blows according to the season as well. In winter, the sea is warmer than the land the air over the sea goes up and the cool and dry air comes from Himalayas. In summer, the air on the land is warmer. The air goes up and the warm and moist air comes from the ocean. In fact, this warm and moist air brings heavy rain to Myanmar in Summer.



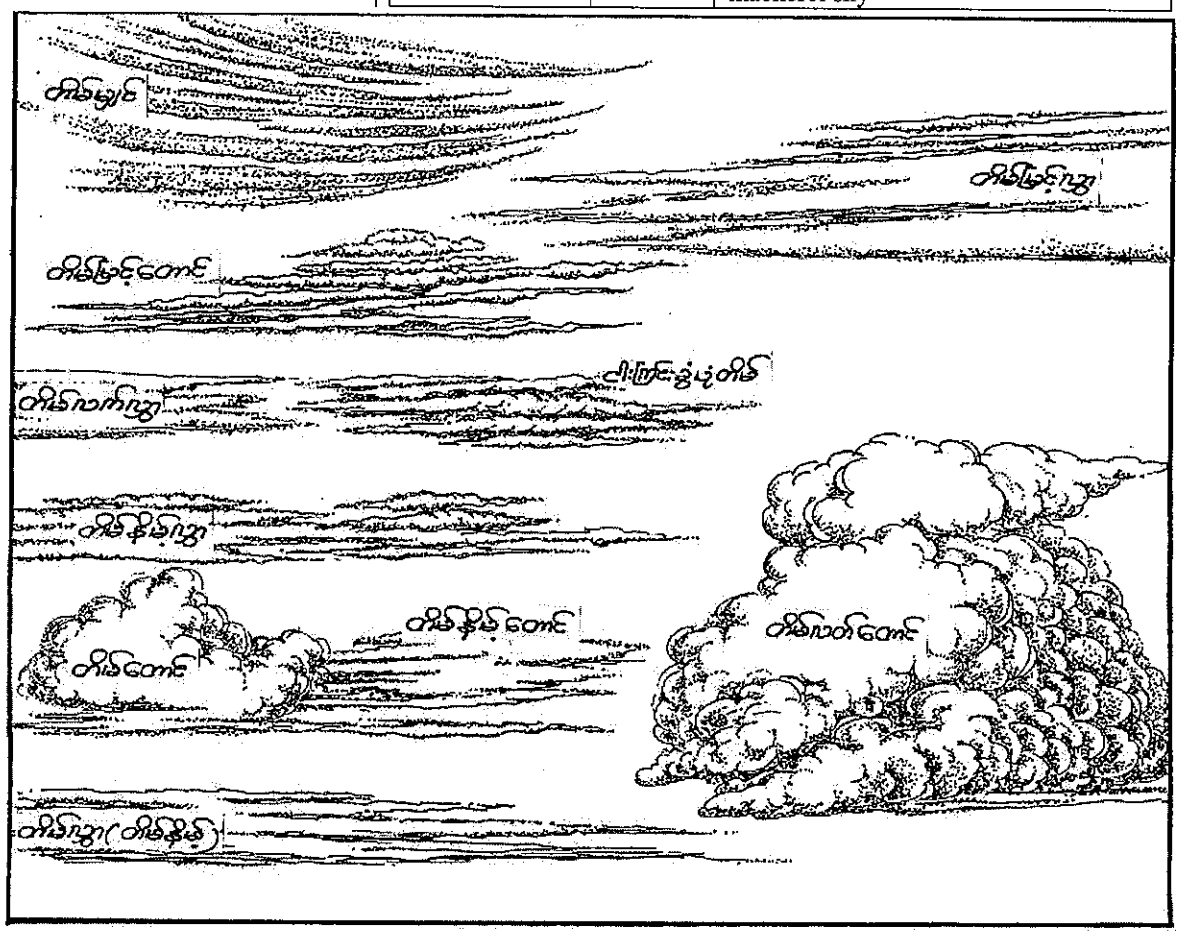
How cloud is formed

When warm air rises into cooler air, the vapor begins to condense and form cloud. Inside of the cloud is still warm and continues to rise forming tall, fluffy clouds.

Various kinds of cloud

Clouds are usually classified by their appearance and height. The height of a cloud is measured to the cloud's base, but some types of clouds can tower many thousands of meters above their bases. Low level clouds have bases at the height of less than 2,000 meters. Medium level clouds have bases at 2,000 – 5,000 meters and high level clouds have bases around 5,000 – 14,000 meters.

Name	Height	Characteristics
Stratus	Low	Like unbroken sheets or layers
Cumulus	Low	Fluffy, cumulus, resembling balls of cotton wool
Cumulonimbus	Low	Reaching 13,000m, anvil shaped, bringing heavy showers and thunderstorms
Nimbostratus	Medium	Bringing persistent rain and snow, thicker and gray
Altostratus	Medium	Thin layer
Altocumulus	Medium	Spectacular bands, like ripple marks on a seashore
Cirrus	High	Wispy appearance, contain water as minute crystals of ice
Cirrostratus	High	Forming veils
Cirrocumulus	High	Making a regular ripped pattern called mackerel sky



How rain falls

Raindrops from in clouds when air currents cause tiny droplets of water to bump into each other. These droplets join together to form larger drops, which fall as rain. The air must be humid for rain to reach the ground without evaporating.

Most of rain starts as crystals of ice that form high in the atmosphere in clouds where the temperature is low. In warmer conditions, the crystals turn to rain before getting to the ground. In cold condition, the crystals reach the ground without melting, which is called snow.

Lesson Planner

Suggested periods (10)	Period 1,2, 3	Period 4	Period 5 6
Lesson title	Wind direction	Wind speed	Cloud formation
Sample lesson plan	11-1	11-2	11-3
Specific objective	Be able to explain wind blows from different direction Be able to make a wind vane and use it to measure the direction of wind	Be able to describe there are various speeds of wind and understand effects from wind by knowing the wind speed	Be able to explain how cloud forms Be able to describe that there are various kinds of clouds.
Introduction **(Motivation/Create interest/Active prior knowledge)**	Having to recite the poem related with the direction of wind	Remind the facts of weather news that children hear daily	Having children to tell the clouds they have ever seen
Core/Development **(Active engagement with test/task)**	Activity 1, 2, 3	Activity 4,5	Activity 6, 7
Assessment points	Observation of activities: Do they participate in the learning process? Do they participate in the practical activities? Do they discuss well?	Observation of activities: Do they participate in the learning process properly? Do they discuss well? Do they draw conclusion?	Observation of activities: Do they participate in the learning process properly? Do they participate in the activities? Do they discuss well?
Adaptation of curriculum	It is to try and search the picture charts, photos and information related with the lesson and the materials necessary for experiment to carry out. The weather news announcement for the lesson of wind speed can be described by using radio, cassette recorder or television. However, if these materials are not available, according to the condition of region, teacher can tell.		

Lesson Planner

Suggested periods	**Period 7 8**	**Period 9 10**
Lesson title	Weather record	**Assessment/Review**
Sample lesson plan		
Specific objective	Be able to explain different symbols represent different weather condition and to record daily weather with the symbols	
Introduction **(Motivation/Create interest/Active prior knowledge)**	Remind previous lesson	
Core/Development **(Active engagement with test/task)**	Activity 8	
Assessment points	Observation of activities: Do they participate in the learning process properly? Can they forecast the weather conditions? Do they draw conclusion?	
Adaptation of curriculum	It is to try and search the picture charts, photos and information related with the lesson and the materials necessary for experiment to carry out. The weather news announcement for the lesson of wind speed can be described by using radio, cassette recorder or television. However, if these materials are not available, according to the condition of region, teacher can tell.	

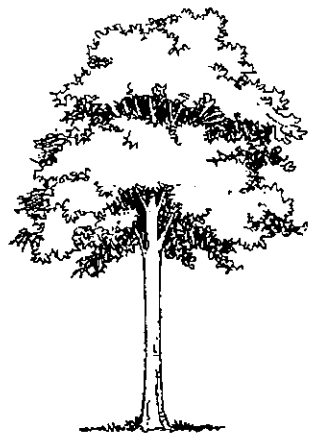
Activity 1 Singing a song (wind direction)

Teaching/learning material

Concept Understand that wind can blow any direction.

When wind is still, a tree is still as well.

What happen when there is stormy wind ?



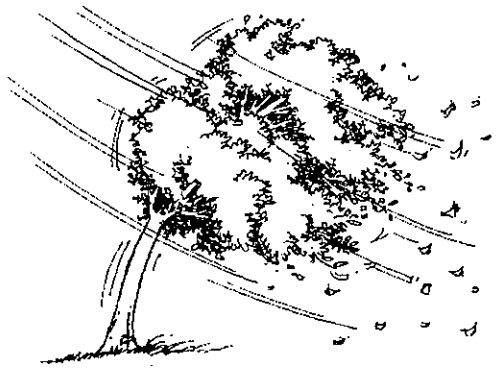
လေငြိမ်ငြိမ် သစ်ပင်ငြိမ်ကငြိမ်

This is what happens. This is what happens.

When blowing from the east, Sway, Sway to the west.

When blowing from the west, Sway, Sway to the east.

Still wind, the tree is still, still, still.



လေပြင်းတိုက်တော့ ဘယ်ညာခတယ်

Encourage children to think about their experiences about wind direction. Ask them if the wind comes from the same direction.

Activity 2 Getting information from media (weather forecast)

Teaching/learning material

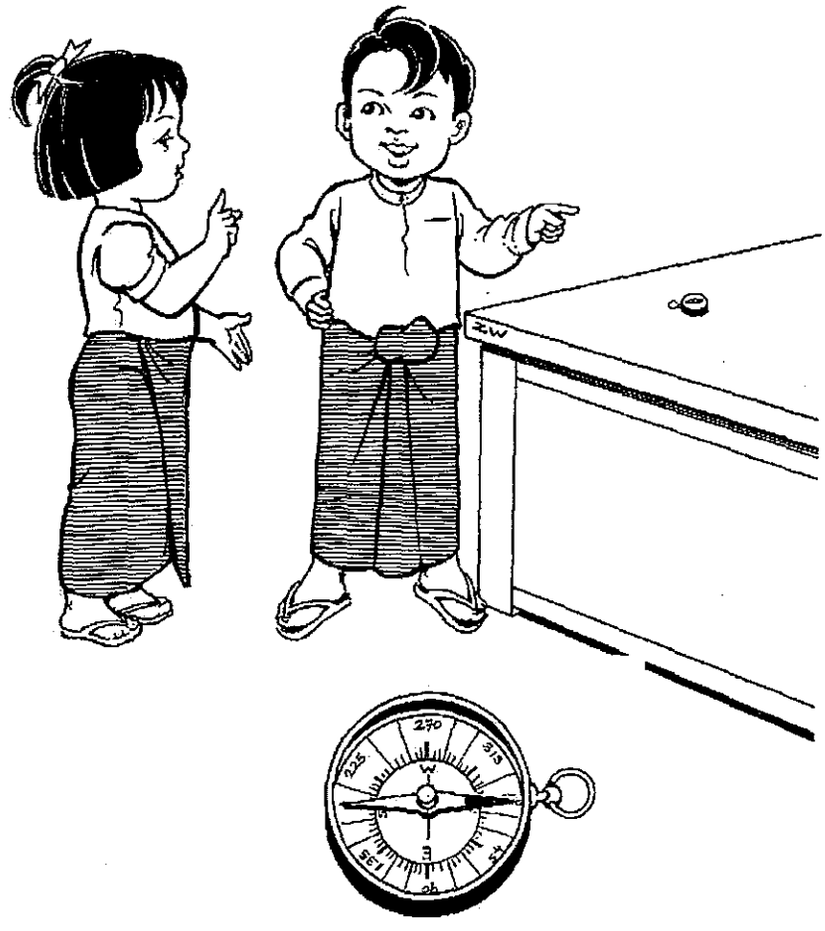
Newspaper/Radio, compass

Concept Wind blows different directions

Let us listen to the weather forecast from radio and catch the information about wind direction at your place (State, division or city).

If it is difficult to listen to radio in classroom time, teacher can tape the radio forecast and play it in the classroom. Teacher can listen to the radio and take note, then state it in the class room.

Children are encouraged to catch the information about the wind direction and try to understand the meaning of the information. For example, when the weather forecast says, wind blows from north west, let us indicate the direction of wind with a finger.



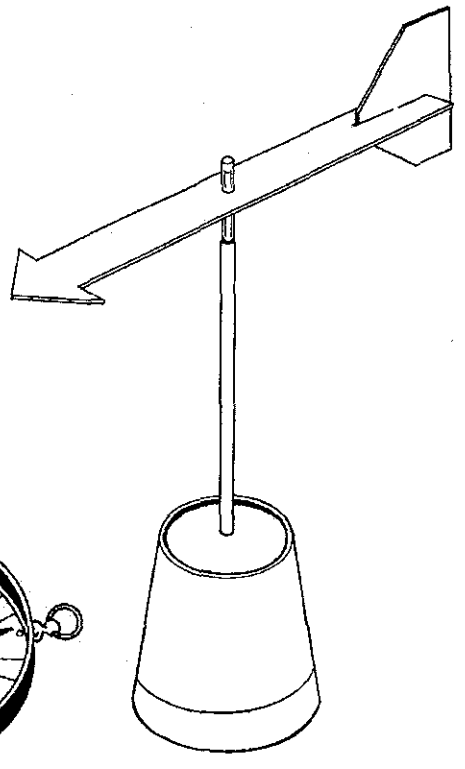
Activity 3 Making a wind vane

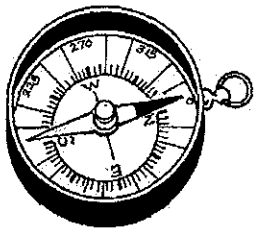
Teaching/learning material

Paper cup, straw, bamboo chopstick, thick paper

Concept Making a wind vane to measure the wind direction

1) Let us make a wind vane with materials which are locally available.
2) Cut a straw 3 cm long
3) Taper the bamboo stick thinner than the straw, pass 3 cm straw through the stick and make sure that the straw can move without much friction.
4) Insert one side (not tapered side) to the bottom of the paper cup
5) Cut thick paper into the shape of an arrow, about 18 cm long and 3 cm wide.
6) Cut thick paper into the shape of a triangle whose side is 6 cm.
7) Make a hole of straw's diameter size at the center of the arrow shaped paper and fix 3 cm long straw.
8) Cut the end of the arrow shaped paper and fix the triangle shaped paper as the diagram shows.
9) Pass the bamboo stick to the straw which is attached to the arrow shaped paper.
10) Wind vane completed. Let us go outside and see how it works fine.
11) Check the direction with compass and find which direction wind blows.
12) Let us record the direction of wind for 5 days (use the table below)





No.	Day	Wind Direction
1.		
2.		
3.		
4.		
5.		

Activity 4 Experiences with wind and Listening to the Radio

Teaching/learning material

Concept There are various wind speeds we can observe in our life.

Encourage children to speak about their experiences related to wind. Ask children if they have experienced strong /fast wind and what happened at that time.

Let us listen to the radio to get weather information. Teacher turns on the radio to tune in the weather forecast. When the time for weather forecast is out of school class time, let us tape the forecast and play it in the class room. It is also good that teacher takes note of the weather forecast and read it in the class room several times. After reading the news, ask children what kind of information they caught. Teacher can write the information children mention on the blackboard.

When a child mentions about the wind speed in the forecast, let us think about the meaning of wind speed. If no child mentions about the wind speed, teacher can ask children if they could hear anything about speed.

Activity 5 Various speeds of winds

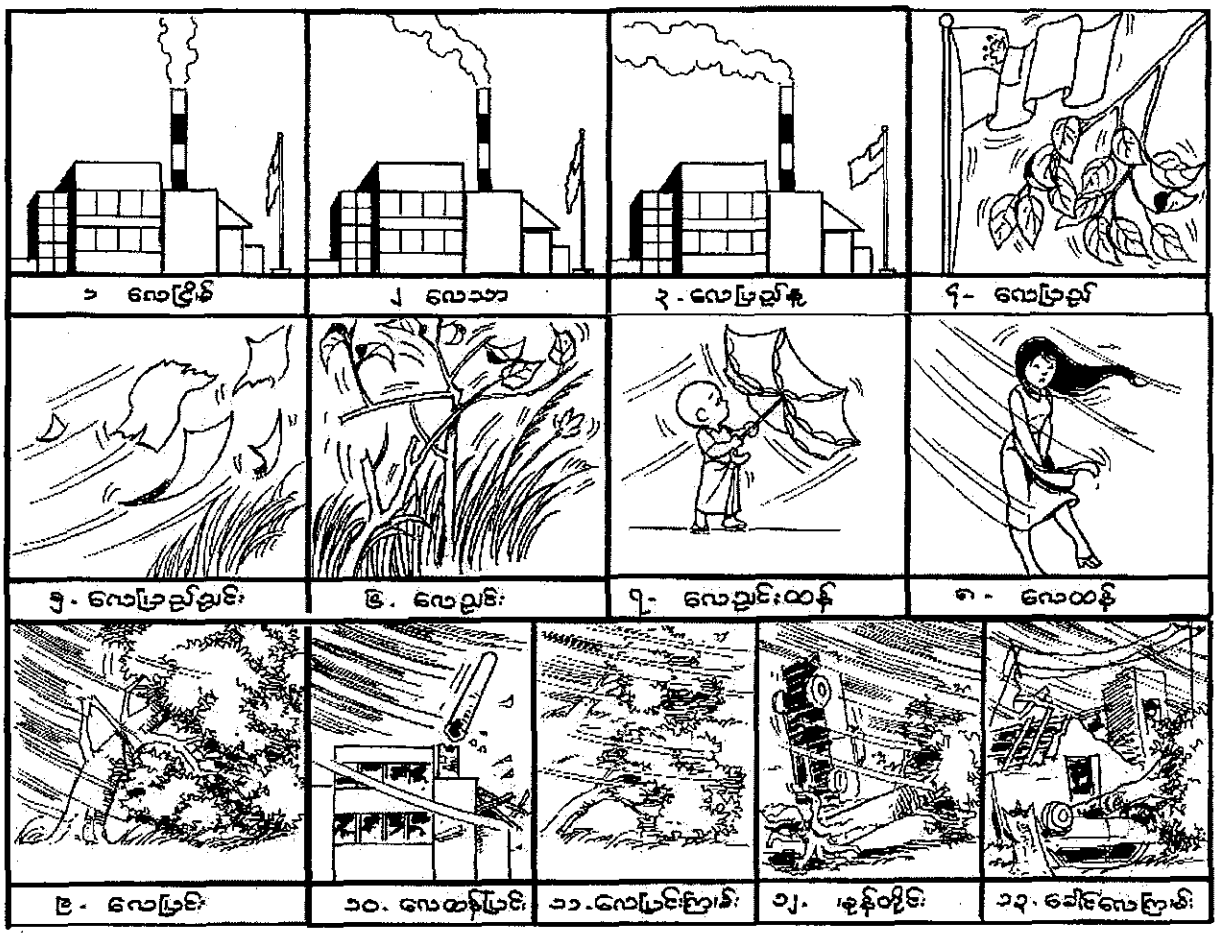
Teaching/learning material

Illustrations, empty table to show wind speed and its influence

Concept There are various speeds of wind we can observe.

The list below shows the wind speed and possible influence of it. Show the illustrations to children and support them to get sense of wind speed and effects.

Speed (km/h)	Effects	Picture
Less than 1	Calm, Smoke rises vertically	1
1-5	Light air, smoke drifts, but flag not to move	2
6-11	Light breeze, smoke shows the direction of the wind	3
12-19	Gentle breeze, flag move gently. leaves rustle	4
20-29	Moderate breeze, loose paper blows around	5
30-39	Fresh breeze, small trees sway	6
40-50	Strong breeze, umbrellas blown inside out	7
51-61	Moderate gale, resistance felt when walking into wind	8
62-74	Fresh gale, twigs and branches break	9
75-87	Strong gale, chimneys topple, roofs damaged	10
88-102	Whole gale, trees blown over but not moved	11
103-120	Storm, trees uprooted and moved, vehicles blown over	12
More than 120	Hurricane, buildings destroyed, widespread devastation	13



Activity 6 Observing clouds for a week

Teaching/learning material

Concept There are different types of cloud.

Let us observe cloud and record it for a week

Children draw the table below and try to fill in according to the cloud they see.

Day	Time	Color	Low/high	Weather	Illustration/others
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					

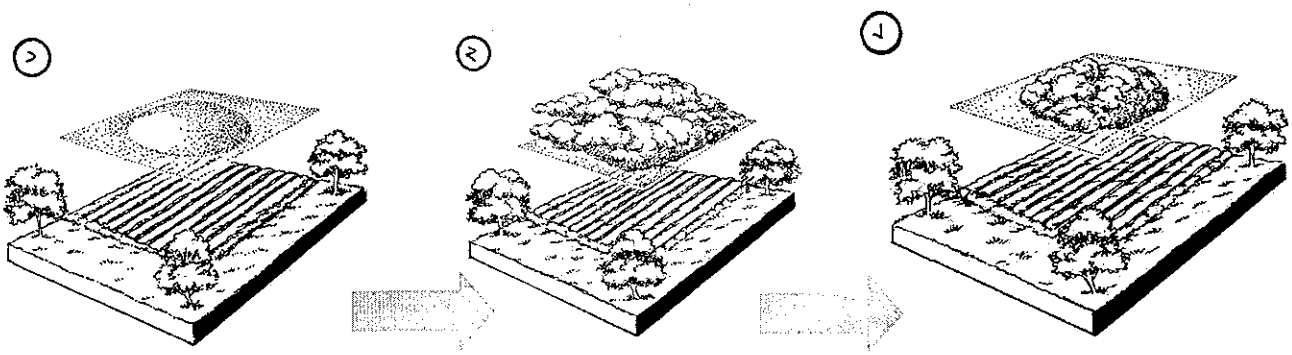
In the next week, children present their records. Teacher explains different types of clouds which is shown on the text book (refer to "Before getting started" as well). Then, try to identify the cloud they observed for a week and categorize them into various types teacher introduced.

Activity 7 How is cloud formed?

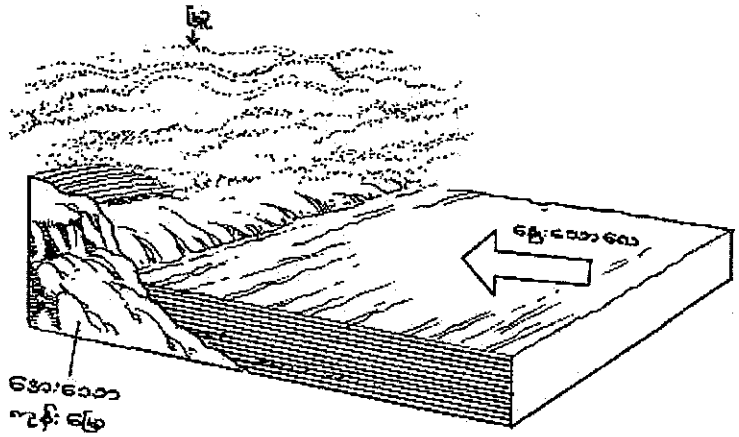
Teaching/learning material

Concept Children understand how the cloud is formed

In sunny weather, warm and moisture air rises. When this rises into cooler air at the higher places, the vapor in the air begins to condense and form cloud. But inside of the cloud is still warm and continues to rise, forming tall, fluffy clouds.



When cloud forms at the ground level, it is called fog. Fog can be often seen around ocean, lake and river. Fog is often dangerous in particularly for car drivers and mountaineers since it greatly limits visibility.

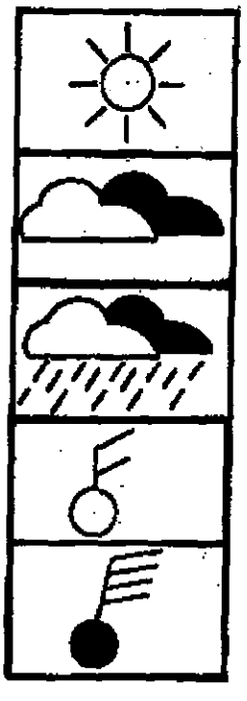


Activity 8 Keep the weather records with symbols

Teaching/learning material

Concept	Children understand the meaning of weather symbols and records the weather for a week

Teacher introduces the weather symbols with their meaning. Let us check today's weather, even yesterday and think which weather symbol is proper to describe the weather for each day.
Children can be assigned to record the weather for a week with using the weather symbols.
In the next week, some children present their record and explanations.



နေသာသည်

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Lesson Plan 11-1

Lesson topic: Wind direction
Learning objectives: Be able to explain wind blows from different direction
Be able to make a wind vane and use it to measure the direction of wind
Teaching/learning materials: Sand, empty bottle, bamboo chopstick, card paper, cello tape, and compass
Teaching period: 105 minutes (3 periods)
Teaching/Learning procedure

Learning Activities	Time	Teaching/ learning materials	Points to be noticed.
Introduction Ask the children if they know the direction of the sunset according to the lesson learnt in Grade One. Ask them to face the direction of the sunrise and stretch out the hands to the sides. Have them remember the four directions (East, West, South and North). Then, let them think an essential thing for living things. By giving clues that it cannot be seen, recall their knowledge on air is an essential thing for living things.	5		
Core/development **1. Sing the following rhyme with gesture (refer to Activity 1)** Air is still still, the big tree is still What happens when the gentle breeze blows It happens like this, It happens like this When the wind blows from the east direction, (it sways) ^{2} to the west When the wind blows from the west direction, (it sways) ^{2} to the east Still still, The big tree is still. After singing the rhyme, teacher discusses the following questions with the children. - What happens to a tree when air is still? - What happens to a tree when wind blows? - To which direction do the tree sway when wind blows from the east? - To which direction do the tree sway when wind blows from the west? -	5		
2. Let children discuss freely how the wind blows that is used to them in the environment. If necessary, teacher gives in advance the children the following points that should be discussed. - What usually happens when wind blows? - What usually happens when wind blows slowly ? - What usually happens when wind blows strongly? - Wind blows from which direction to which direction ? - Does wind blow from only one direction?	20		

After discussing one's experience on how wind blows, the result of the discussion has to be presented by each from each group. **3. Why wind blows (refer to "Before getting started")** Then, teacher explains why wind blows as follows: At daytime, the land becomes warm more quickly than the sea so that hot air on the land rises up and cool air moves towards the land. At night, the land becomes cool more quickly than the sea and the sea is warmer than the land. When hot air on the sea goes rising up, cool air on the land takes place on the sea. In the morning and in the evening, when the wind direction changes from the sea to land or from the land to sea, air is still. (refer to "Before getting started")	5		In fact, the direction of wind is subject to many factors. It changes day and night and summer and winder as well. Also mountains and geographical factors influence its direction as well.

Second Period (Making a wind vane, refer to Activity 3)

Learning Activities	Time	Teaching/ learning materials	Points to be noticed.
4. Making a wind vane (refer to Activity 3) *Teacher asks the children to take an example of wind vane s/he made and lets them make it practically.* **5. Recording the wind direction for 5 days** After making wind vanes, ask the children to observe the wind direction through using wind vane and compass in the field in front of school during leisure time or when going back from school. **6. Filling in the table** Have the children fill the findings from the daily observation in the following table.	35		

No.	Day	Wind Direction
1.		
2.		
3.		
4.		
5.		

Third Period (Presentation of wind direction for a week)

Learning Activities	Time	Teaching/ learning materials	Points to be noticed.
7.Group discussion about the results *Children observe the tables they have noted down within the group and discuss how wind blows daily. Then, select a representative to present the results from the group discussion.*	10		
8. Presentation by the groups	15		
9. Teacher and students review the presented points together.	5		
Conclusion Wind blows from different directions. Those directions can be measured with a wind vane.	5		

Lesson Plan 11-2

Lesson topic: Wind speed
Learning objectives: Be able to describe there are various speeds of wind and understand effects from wind by knowing the wind speed
Teaching/learning materials: Illustration
Teaching period: 35 minutes (1 period)
Teaching/Learning procedure

Learning Activities	Time	Teaching/ learning materials	Points to be noticed.
Introduction			
Teacher reads a weather report. (**refer to Activity 4**) According to the report from the **Meteorological department, monsoon become stronger in the middle of the bay of Bengal; the monsoon from southern west passes over the Rakkhine costal region with the wind speed of 60 miles per hour it is moving towards Bangladesh.** It will be contained that wind can blow with how many miles per hour in the weather news.	5		To turn on the radio or cassette. If not possible, teacher can read out the weather report.
Development			
Teacher asks children the meaning of wind speed. Ask the children to discuss within group.	10		
Let three children or groups give answer. Children give the different meaning of wind speed.	5		Without telling whether the answers of the children are right or wrong, teacher writes their answers on the blackboard.
Before giving explanation, teacher gives examples and let the children answer the questions.	5		
E.g. If it takes one hour to walk from your home to school, how many miles of distance will there be between your home and school? Teacher explains that the speed of walking is three miles per hour if the distance between your home to school is three miles. Children, if you travel by car, how many miles will you reach after one-hour drive? Teacher explains that if they will reach twenty miles distance after one hour, the car is being driven with twenty miles per hour. Teacher explains that if the wind travels at a distance of forty miles within an hour, it can be said that the wind speed is forty miles per hour.			Teacher notes down the answers of the children and pick up the answer, which is nearest to be correct and explain. Children's answers are written down on the blackboard.
A table of wind speed is shown to the children (refer to **Activity 5**)	7		

Learning Activities	Time	Teaching/ learning materials	Points to be noticed.

No.	Speed (m/hr)	Situation	Effects	Fast/slow
1		Calm		slow
2		light breeze		
3		gentle breeze		
4		fresh breeze		
5		fresh gale		
6		storm		fast

Teacher asks the children to observe carefully the illustrations indicating the various movements of the things due to wind.	7		
For each illustration, let us ask children if they have similar effects.			Encourage children to speak their experiences.
Conclusion There are various speeds of wind which can be measured. We can understand the powerfulness of wind by looking at the wind speed.	1		

Lesson Plan 11-3

Lesson topic: Different cloud and cloud formation
Learning objectives: Be able to explain how cloud forms
Be able to describe that there are various kinds of clouds
Teaching/learning materials: Color pencils
Teaching period: 70 minutes 2 period
Teaching/Learning procedure

Learning Activities	Time	Teaching/ learning materials	Points to be noticed.
Introduction Teacher asks the questions to the children. Have you ever gazed at the sky? What is seen in the sky at night? What is seen in the sky at daytime? What colors of clouds have you ever seen? What shapes of cloud have you ever seen?	5		Teacher records the answers of children on the blackboard. Do not tell whether the answers of the children are right or wrong.
Development **Activity A (refer to Activity 7)** Ask children think and discuss by group how the clouds are formed. Ask children present the outcomes from their discussing points by group. If the children cannot answer precisely the formation of cloud, teacher explains again by asking questions based on the lesson on evaporation and condensation. - *Into what condition is the water transformed due to the* sun heat? - Where does the vapor go? - When the moist air containing vapor rises up, does it get warmed or cooled down? - When it is cooled down, what does the vapor become? Teacher explains that it becomes condensed and collects as minute water droplets and forms clouds.	10		
Activity B (Refer to Activity 6) Teacher asks the children to observe the clouds in the sky within one week and to make a table of observation. Then, teacher has to draw a table on the blackboard. To show how to observe and record properly, teacher and children go out and observe the cloud of the day and teacher shows how to fill in the table. Although the table starts from Monday, it can be started from any day.	20	Color pencil	Children observe individually.

Day	Time	Color	Height Low/high	Weather	Illustration/others
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					

Time to observe clouds has to be the same.

2nd period (Presentation of the observation results and various kinds of cloud)

Learning Activities	Time	Teaching/ learning materials	Points to be noticed.
Have the children come out in front of the class and present their observations within a week. Teacher and all students review the findings from their observation and teacher explains about the three kinds of cloud.	25		Teacher needs to draw many blank tables for children to fill in and present.
The cloud at the high position from the ground level (high cloud) is **cirrus** (mare's tail); the cloud at the medium position (medium cloud) is **altostratus**; the cloud at the low position (low cloud) is **nimbostratus** (nimbus). Teacher can mention which cloud is likely to bring the rain as well. After teacher explains 3 kinds of clouds, let us come back to the result of cloud observations and encourage children to identify what kind of cloud children observed for 5 days.	10		It is very important for children to understand what kind of cloud they observed.
Conclusion Through observation of cloud by children and explanation by teacher, children understand how the cloud is formed and there are various kinds of clouds.	5		

Assessment

Point of Assessment

Interest/Attitude/ Motivation	Scientific thinking	Technique	Knowledge and understanding
Is s/he interested in weather and cloud? Is s/he interested in reflecting their experiences with winds? Is s/he interested in doing activities? Is s/he motivated to observe and record about the clouds and weather?	Can s/he think that wind blows due to heat from sun? Can s/he think how a wind vane works? Can s/he think of the meaning of speed? Can s/he relate wind speeds to their effects? Can s/he think how cloud forms? Can s/he categorize clouds?	Can s/he make a wind vane? Can s/he use the wind vane with a compass to check the direction of wind? Can s/he observe and record the clouds and weather for a week? Is s/he able to communicate about this topic with teacher and peers? (presentation of prediction)	Does s/he understand that wind blows from various directions? Does s/he understand that the wind speed influences the daily life of man? Does s/he understand there are various types of clouds? Does s/he understand how cloud forms?

Oral Assessment/Group Discussion.

1) To which direction will the leaves move if the wind blows from the east?
2) What is 'wind speed'?
3) How do you feel when the gentle breeze and fresh breeze blow?
4) What bad consequences can develop from the blowing of gale?
5) Explain how cloud forms?
6) From which clouds can we forecast that it will rain?
7) Mention what kind of cloud we can see today?

Written assessment.

1) How can you know the direction of wind?
2) Guess the wind speed by seeing the movement of objects in your environment.
3) Describe the weather conditions according to the observations within a week.
4) Forecast the weather condition by seeing the height of clouds.
5) What kind of clouds can be seen on a sunny day?
6) What kind of clouds can be seen on a rainy day?

Message to Teachers

Give questions with which children need to think and reflect lesson they learn in order to answer.

Encourage children to explain or answer the questions with drawing diagrams.