

4

SCIENCE

Learner's Material

Quarter 1: Matter

This book was collaboratively developed and reviewed by educators from public and private schools, colleges, and/or universities. We encourage teachers and other education stakeholders to email their feedback, comments, and recommendations to the Department of Education at action@deped.gov.ph.

We value your feedback and recommendations.

Department of Education
Republic of the Philippines

**Science – Grade 4
Learner’s Material
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To Grade 4 Learners

Dear Boys and Girls,

We are happy to share with grade four pupils like you this learner's material.

As we embark on the K to 12 Basic Education Curriculum, we would like to inform you that the Science Basic Education Curriculum promotes the development of the 21st century skills among Filipino learners.

The lessons and activities provided in this learner's material were developed to help you become hands-on, minds-on learners. The activities that you are going to do can help you learn the essential science concepts and skills through learning by doing. The activities are fun, simple yet will allow you to think critically.

With the guidance of your science teachers, the activities in these materials will support you in the development of your own understanding of the different science concepts, skills and attitudes so you can better understand yourself and the world around you.

The knowledge you will gain as you do the activities presented in this material will enable you to practice and apply the process skills such as predicting, observing, classifying, hypothesizing, experimenting and communicating.

Enjoy this learner's material and together, let us appreciate, preserve, and protect the world around us while learning, appreciating, and applying science.

The Science Writing Team

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Quarter 1: Matter



The materials that we see around us exist in different forms: solids, liquids, or gases. Like other materials, solids have different characteristics/properties such as size, shape, color, odor, texture, and others. The solid materials could also undergo changes when exposed to certain conditions such as temperature or when mixed with other materials.

In the succeeding activities, you will do inquiry-based investigations to help you describe and understand changes that materials undergo when exposed to certain conditions. You will also do activities that will help you evaluate whether changes in materials are useful or harmful to one's environment.

The activities that you will do will help you develop the different science process skills such as investigating/experimenting, observing, describing, hypothesizing, tabulating/organizing data, analyzing, interpreting, explaining, generalizing, synthesizing, and communicating results.

Chapter 1: Properties of Matter

Lesson 1: Materials that Absorb Water

Activity 1: “Which Materials Absorb Water and Which Do Not?”



Objectives:

1. Describe materials based on the ability to absorb water.
2. Classify materials based on the ability to absorb water.



What you need:

- 3 pcs. Of: medium rubber balls, cotton balls, sponge, face towel, t-shirt, rug
- tissue paper, tap water, tray, clock or timer, dropper or dipper



What to do:

1. The whole group will listen to the instructions given by the teacher.
2. Form a group of four members each and choose among your group the person who will act as, timer, recorder, leader and presenter.
3. The leaders will get from the teacher the materials to be used for the activity and line them up on the table.
4. Put the materials one by one in a basin. Observe its characteristics and write them on the chart below.
5. Lift up the material and squeeze. Let the water drip down on the basin. Did the water come out? Did the material get wet? Is the material heavier when wet?

6. Record the observations in the chart.
7. Do the same for each material.
8. After observing all the materials, clean up the working table. Return all the materials in the proper place for future use.
9. Discuss your observation.
10. Present your data chart in class.

Name of objects	Characteristics of the Material		Put a (✓) if material absorbs water or (✗) if does not
	BEFORE adding water	AFTER adding water	
1. rubber balls			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			



Guide Questions:

1. What characteristics did you observe from each of the materials before placing them in water? When you squeeze each of the materials what comes out of them?
2. Did all the materials absorb water?
3. Which of the materials absorbed water? What are these materials made of?
4. Which of the materials did not absorb water? What are these materials made of?

5. Based on the experiment, classify the materials based on their ability to absorb water.



Remember these:

absorb - to take in (something, such as a liquid) in a natural or gradual way

porous - having small holes that allow air or liquid to pass through

non-porous - materials that do not allow air or liquid to pass through

- There are different materials in our environment that can be classified according to their properties. They can be classified based on their ability to absorb water. Some materials can absorb water more than others.
- Cotton is very porous, which makes it a natural absorber of water.
- Plastic as a non-porous material, does not allow water to pass through.
- Porous materials are materials having small holes that allow air or liquid to pass through.

Lesson 2: Materials That Float and Sink

Activity 1: “What materials float and what materials sink?”



Objectives:

1. Identify materials that float and sink.
2. Describe the kind of materials that float and sink.



What you need:

plastic bottle with cover, plastic saucers, pencils, erasers, metal spoon, large stones, plastic book cover, rubber balls, Styrofoam cups, toy boat made of wood, toy boat made of rubber, pail, toy doll made of plastic, water



What to do:

1. Form a group and choose among your group who will act as recorder, leader and presenter.
2. Get from your teacher the materials to be used for the activity.
3. Listen to the instructions to be given by your teacher.
4. The leader will get the plastic bottles with cover.
5. Ask the other members to describe the characteristics of the plastic bottles cover.
6. The recorder will record the description of the plastic bottles with cover. Place your descriptions in a chart below.
7. Pour water into the pail or basin.
9. Observe the plastic bottle with cap while in water. Did it float or sink?
10. Lift the plastic bottle with cover from the pail. Did the plastic bottle absorb water?
11. Record your observation.
12. Do the same procedures in steps 8-11 for the rest of the materials left.

13. After observing all the materials, clean up your mess.
Return all the materials in the proper place for future use.
14. Discuss your observation with your group mates.
15. Write your observation in the data chart.
16. Copy the data chart in your science notebook.
17. Present your data chart to the class.

Name of material	Characteristics of the material BEFORE placing it in water	Observation as to whether the materials float or sink
1. Plastic bottle with water		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		



Guide Questions:

What are the characteristics of the materials before they were placed in the water? Describe them.



Remember these:

- Sink means to fall to the bottom of water, float means to stay on top.
- Some things float on top of water, some things stay submerged partway down, and some things sink.
- Some things sink very fast and some things sink very slowly.
- An object's shape can affect its ability to float, but some materials float no matter what their shape - such as styrofoam and balsa wood.
- Some things float at first, but then sink as they absorb water or take water on through holes.

Lesson 3 - Materials that Undergo Decay

Activity 1: "What Will I Turn Into?"



Objectives:

1. Identify the materials that undergo decay.
2. Describe the materials that undergo decay.
3. Classify the materials whether they decay or do not decay.



What you need:

- 3 pcs. of: transparent plastic cups, slices of bread, aluminium foil, wax paper, plastic bottle caps (without a cork or carton) kangkong leaves, or camote leaves
- water, 2 slices of banana, leftover food



What to do:

1. Form a group and choose who will act as leader, recorder and presenter.
2. Put out the materials that each group was assigned to bring.
3. Listen to the instructions of your teacher.
4. Prepare the materials for your activity today.
5. Describe the characteristics of each of the materials one at a time. Note color, texture, size, smell and others. Record your observation in your science notebook.
6. Cut each of the materials into smaller pieces.
7. Place each of the cut materials in separate transparent cup. Label cups according to materials.
8. Moisten each set up with $\frac{1}{2}$ spoonful of water.
9. Cover every set up with small black plastic.
10. Tighten the plastic sheet with a rubber band or thread to prevent ants and other insects to get to the food.
11. Bring your set up outside where it gets both sunlight and partial shade during the day.
12. Visit your set up every day for seven days. On the second day, remove the cover of every set up and turn the contents with a stick. Put back the plastic cover.
13. Observe each of the materials in every cup. Describe the texture, odor, size, and color of the materials.
14. Record your observations in your science notebook.
15. Return the cover of every set up and leave it in the same area where you placed them before.
16. On the third day, turn the contents of every set up with a stick.
17. Observe again what happens to the materials in every set up. Continue this until the seventh day.
18. Record your findings in your science notebook.
19. Copy your observations in the data chart.
20. Present your data chart in class.

Name of the materials	Characteristics of the materials		
	Before placing them in the set-up	On the 3 rd day	On the 7 th day
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			



Guide Questions:

1. What are the characteristics of the material before cutting it?
2. What are the materials made of?
3. What materials did you add to every set up before covering it with a plastic sheet?
4. Where did you place the set up after preparing it?
5. Why did you choose that area for your set up?
6. When you visited and observed your set up after three days, what changes happened to the materials?
7. When you visited and observed the set up again on the seventh day, what further changes did you observe?
8. Can you still identify the original materials that you used? What can you still recognize and identify?
9. What happened to the materials that you cannot identify?
10. Classify the materials whether they decay or not.
11. How do you dispose material that decay?
12. What did you learn in this activity?

Remember these:



decay – to be slowly destroyed into bits in the presence of water, air and soil

- Not all plants and animals decay at the same time.
- Some were compressed under water and thick layers of soil over millions of years. They were converted into fossil fuels such as coal, oil or natural gas. These fuels are used by power stations, factories, motor vehicles and others.
- The organic matter in soil is derived from plants and animal. It becomes organic fertilizer.
- Organic fertilizer from compost pit does not harm but enrich the soil.
- Some factors that contribute to the decaying process of the materials are: sunlight, water, soil and action of microorganisms
- Left over foods are kept in refrigerators to avoid or delay spoilage since microorganisms that break down food do not grow fast in cold temperature.

Lesson 4 - Diseases/ Sickness Resulting from Exposure to Decaying Materials

Activity 1: “What Diseases/Sickness Will I Get from Being Exposed to Decaying Materials?”



Objectives:

1. Identify the diseases/sickness that may result from exposure to decaying materials.
2. Describe the diseases/sickness that may result from exposure to decaying materials.



What you need:

- picture of an old man sick with tuberculosis, boy sick of asthma, woman sick of diarrhea, informal settlers in dumpsite or in esteros



What to do:

1. Visit the gallery prepared by your teacher inside your classroom.
2. Examine the five pictures displayed in the gallery.
3. Describe what you see in each picture.
4. Record it on your science notebook.
5. As soon as you are done observing, go back to your group and discuss your findings with them.
6. Organize your findings in the data chart below:

Place where the family lives	Waste materials seen in the surroundings	Pests breeding in the surroundings	Possible illness resulting from exposure to decaying materials
dumpsite	empty plastic bottles	flies	allergy



Guide Questions:

1. What are the waste materials seen in the surroundings?
2. How are the waste materials disposed?
3. What are the pests dwelling in the place?
4. Why do you think those pests like to breed in dirty place?
5. What illnesses could the people living near the dumpsite and squatters' area acquire?
6. What could be the possible causes of the illnesses acquired by the family living there?
7. What did you learn in this activity?



Remember these:

diseases – an illness that affects a person, animal, or plant
: a condition that prevents the body or mind from working normally

- Decaying materials are wastes that may cause harm to one's health.
- There are common ailments that may result from being exposed to decaying materials. Some of these are allergy, cholera, malaria, typhoid, dysentery and some skin disease such as ring worm and scabies.
- Malaria and dengue are diseases spread by specific type of mosquitoes. These become epidemic in places where these type of mosquito breed.
- Typhoid – is a waterborne disease. People who drink polluted water can become infected with typhoid. The garbage in this area is a good breeding place for flies. The flies can carry the disease and infect more people.
- Dysentery is a disease that can cause severe diarrhea. If not treated properly someone can die from it. This is a waterborne disease that is transmitted to a person when they drink polluted water.
- Proper disposal of waste should be observed in areas near dumpsites, esteros or canals to prevent them from too much exposure to garbage that will result to danger.
- Good hygiene practices such as washing of hands, boiling of water, avoidance [if possible] or exposure to air.

Lesson 5 – Effects of Decaying Materials to One’s Health and Safety

Activity 1: “What are the effects of decaying materials on one’s health and safety?”



Objectives:

1. Identify the effects of decaying materials on one’s health and safety.
2. Describe the physical state of people exposed in decaying materials



What you need:

- survey form, parents permit, manila paper, marker, plastic cup, rotten fruit, slice of bread and other materials that decay fast



What to do:

1. Get the survey form from your teacher. Discuss the contents with your groupmates.
2. Listen attentively to the instructions of your teacher.
3. Submit your parental permit to your teacher.
4. Make a courtesy call with your teacher to the Punong Barangay.
5. Request for the assistance of the barangay officials in going to the identified communities for study.
6. As soon as you reach the community assigned to your group, observe the surroundings. Describe the surroundings.
7. Write your observation on your science notebook.
8. Interview the members of at least three households in the community based on the survey form.

9. After the community visit, Go back to your classroom and consolidate the results of your interview in the data chart.
10. Discuss your findings with the group.

Survey Form

1. Name (Head of the family)_____2.Age____3.Sex_____
4. Address _____
5. Occupation _____
6. How many members are there in the family? _____
How many are children? _____
7. with toilet? Yes____ No____ How many? _____
8. What kind of trash is found in the household? _____
9. Where is their trash located? _____
10. What illnesses/diseases have members of the family suffered for the past years? _____

11. What were done to treat the illness/disease? _____

12. What are being done to prevent the spread of the disease? _____

Data Chart

Household _____

Specific area in the community _____

Non decaying materials seen in the area	Decaying materials seen in the area	Ways of disposing decaying materials	Possible effects on the health of the family members



Guide Questions:

1. How many households did you survey?
2. Where did each of the households throw their decaying garbage?
3. Where did they throw their non-decaying garbage?
4. What could be the effects of their practice of disposing garbage to their health?
5. What illness/disease have members of the family living in the area suffered?
6. What did you learn from this activity?



Remember these:

Pollution - action or process of making land, water, air dirty and not safe to use.

Compost - waste materials that are recycled as fertilizer

- Decaying materials when not disposed properly causes pollution.
- Pollution is harmful to one's health. Pollution is one thing that can seriously interfere with the proper functioning of our body.
- Exposure to decaying materials will make people sick.
- Making compost is one way of disposing garbage properly. Waste materials that are made into compost are not harmful to one's health and safety.

Lesson 6: Importance of Reading Product Labels

Activity 1: "What is the importance of reading product labels?"



Objectives:

1. Read product labels.
2. Explain the importance of reading product labels.



What you need:

- empty packages or containers of different products: milk, cereals, sardines, meat loaf
- empty bottles and boxes of over-the-counter medicine/ drugs (those that can be bought without a doctor's prescription: cough syrup, pain reliever, ointment, toothache drops)
- wrappers of detergents/soaps, empty containers with copies of labels of disinfectants and pesticides



What to do:

1. Get the materials from your teacher.
2. Group the materials based on products.
(food products, medicine/drugs, housekeeping products)
3. Get food products first.
4. Look for the product label in each of the materials.
5. List any information you can get from the product label in the data chart below:

Food Products	Use	Manufacturing date	Expiry date	Precaution (if any)

6. Get the empty boxes of over-the-counter medicines/drugs. Read the labels.
7. Look for the information you get from the product labels.

8. Record it in the data chart below:

Medicine and Household Chemicals/ Brand	Uses	Date Manufactured	Expiry Date	Warning Signs/ Symbols

10. Do the same with housekeeping products.
11. After you are done performing the activity, return all the materials to your teacher.
12. Always clean the activity area before leaving.



Guide Questions:

1. What information are given by the labels of the products?
2. What are the manufacturing dates and expiry dates of each of the products?
3. Do all the labels provide enough information about the food products?
4. If you will compare the labels of the food products to the labels of drugs/medicines and housekeeping products, what similarities will you find?
5. Which information found in the product labels do you think is the most important? Why?
6. What is the importance of knowing how to read product labels?



Remember these:

- Household materials are classified according to their use. They are classified as food products, medicine, personal care, cleaning products, and pesticides.
- People protect oneself and the other members of the family from the household materials by reading product label.
- Product labels are intended to ensure the safety of the user.
- They give the product ingredients (to which someone might be allergic). They describe the safe way of using the product, including the dose (in the case of medicine)
- They warn possible dangers.
- They describe the proper way of storing the product.

Lesson 7 - Ways of Disposing Materials According to Their Properties

Activity 1 – “How will I sort/separate materials?”



Objectives:

1. Observe ways of disposing waste materials by sorting them according to its properties.
2. Identify ways of disposing waste materials according to its properties.



What you need:

- meal leftovers, banana peelings, kangkong stem, camote leaves, twigs, weeds, tetrapack of juices, glass bottles, cartons/papers, pieces of cloth



What to do:

1. Get the materials that you need from your teacher.
2. Place all the materials on your table.
3. Sort the materials according to their properties.
4. Observe and describe the characteristics and properties of each of the materials. Record your description in chart 1.
5. After describing each of the materials based on their characteristics and properties, identify each of the materials whether they are kitchen waste, garden waste, or factory returnable.
6. List the identified materials in chart 2 under its corresponding column.

Chart 1

Name of Materials	Description (odor, color, etc.)	Properties (decaying, non-decaying)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Chart 2

Kitchen Waste	Garden Waste	Factory returnable



Guide Questions:

1. What materials did you use in the activity?
2. What can you say about the materials you gathered?
3. Are they still usable?
4. Which of the materials are still usable? waste materials?
5. How did you classify the materials?
6. Which of the materials are kitchen wastes? garden wastes?
7. Which of the materials are factory returnable or can be recycled?
8. How are you going to dispose the waste materials?
9. What did you learn in this activity?



Remember these:

pollution - the action or process of making land, water, air, dirty and not safe or suitable to use

biodegradable - capable of being slowly destroyed and broken down into very small parts by natural processes

- To dispose of the materials properly is to use a technique or procedure we call the Total Recycling Scheme, which utilizes wastes into factory returnables, fertilizers, feeds, fermentables, fuel, fine crafts and filling materials. These are what we identify as then multi-F's Recycling Scheme.
- Recycling is collecting, processing and manufacturing materials instead of throwing them away. Recycling lessen the amount of garbage we have to dispose.

Lesson 8 – Proper Waste Disposal According to the Properties of Each Material

Activity 1: “How Will I Dispose Waste Materials?”



Objective:

1. Demonstrate proper disposal of waste according to its properties.



What you need:

- worn out rubber slippers, used t-shirts, balloons, plastic bags, aluminium foil, disposable diapers, soft drinks cans, broken pieces of glass, empty boxes, peelings of vegetables, leaves, juice/candy wrappers, old toys made of wood/plastic



What to do:

Caution: Be careful in handling the materials especially the broken pieces of glass, diapers, etc.

1. Go to your assigned station.
2. Identify the kind of materials in your station.
3. List the materials in your science notebook.
4. Group the waste materials according to the following properties: biodegradable, non-biodegradable, recyclable, and/or combustible
5. Use the sacks in your station to place the waste materials.
6. In your science notebook, list the steps to be followed in disposing the waste materials in your assigned station.
7. Prepare a group presentation on proper waste segregation to be performed in class.



Guide Questions:

1. What waste materials are found in your station?
2. What are the properties of each of the waste materials?
3. Were all the materials disposable?
4. How did you dispose the waste materials?
5. Where did you place the materials that undergo decay?
6. What did you do with the materials that undergo decay?
7. What did you do with the non-decaying materials?
8. Are there waste materials that can be reused?
9. What are the materials that can be recycled?
10. What did you learn in this activity?



Remember these:

- Proper disposal of human waste is important to avoid pollution of water sources.
- Disposal must be done in to avoid harming the environment mentor causing harm to human health.
- Waste should never be disposed down sinks, drains, lavatories, ditches, near wildlife habitats or ponds.
- Products for disposal should not be mixed together and containers should be clearly labelled.
- Separate materials into bio-degradable and non-biodegradable
- Recycle some of the non-biodegradable materials

Lesson 9 - Safety Precautions in Disposing Waste Materials

Activity 1: “What are the safety precautions in disposing waste materials?”



Objectives:

1. Classify materials/wastes according to properties.
2. Enumerate safety precautions in disposing waste materials according to its properties.



What you need:

worn out rubber slippers, empty bottles of dextrose and tubing, used t-shirts, plastic bags, old toys made of wood/ plastic, disposable syringe, aluminum foil, plastic bottle of water, balloons, broken pieces of glass, empty boxes of medicines, vegetable/fruit peelings, leaves, juice wrappers and candy wrappers



What to do:

Caution: Be careful in handling the materials especially the broken pieces of glass, tubings, disposable syringe, etc. Do not play with these materials.

1. Go to the working station assigned to you.
2. Listen for the instructions given by the teacher.
3. When necessary, use hand gloves in handling materials in your station
4. Sort the waste materials.
5. Classify the waste materials by properties.
6. There are containers provided in your station.
7. Place the waste materials in every container after classifying.
8. Label the containers according to the properties of materials
9. Record in your data chart all the waste materials placed in every labelled container.
10. Present your output in class.

Station _____		
Container 1 (Waste materials that decay)	Recyclable Materials	Container 2 (Materials that do not decay)



Guide Questions:

1. What are the materials found in your station?
2. What are the materials that undergo decay?
3. What are the materials in your station that do not undergo decay?
4. How did you sort the materials?
5. How did you classify them?
6. Are the waste materials in your station harmful to your health?
7. Why do you say so?
8. What safety precautions are you going to observe in disposing waste materials?
9. What insights did you gain in this activity?



Remember these:

1. Waste materials should be properly disposed of.
2. There are many waste materials found in the home, classrooms, and laboratories.

Below are examples of the waste materials:

Home	Offices	Classrooms	Laboratories
tubes/ bottles of shampoo and conditioner leftover food (fish, meat, rice) plastic containers soft drinks bottles	packing materials empty cartridge empty boxes blades cutter	empty boxes cardboard broken pieces of glass old news paper	disposable syringe razor gloves needles

3. Proper segregation of materials should be observed. Do not mix decaying materials with non-decaying materials.
4. The sharp objects should be placed in a cardboard box and close or tape the box and mark it as trash.
5. Never touch waste materials with your bare hands. Use appropriate equipment in sorting waste materials to avoid puncture from sharp objects or use gloves.
6. Recycle non-decaying waste materials such as plastics bottles. They can be made into decorations and pots.
7. Generate income by selling old newspapers, cardboard, cartolinas, manila papers, and bond papers and other waste materials that are not recyclables.
8. Re-use plastic bags.

Chapter 2: Changes that Materials Undergo

Lesson 10: Changes in Solid Materials

Activity 1: “How Can I Change It?”



Objectives:

1. Define what is solid.
2. Identify some ways of changing solid materials in terms of size, shape, texture, etc
3. Describe the change/s that happen/s in solid materials.



What You Need: (by group)

- 1 pc. of: candle, aluminum foil, ice cube, wooden stick, crepe paper, plastic cup, chocolate bar
- match (matchstick)/ lighter



What to Do:

1. With the given solid materials, show ways by which you could change the state of the materials' size, shape texture, etc.
2. In your science notebook, copy the table below. Fill in column 2 to identify way/s of changing the material.
3. Fill in column 3 to describe the change/s that occurred in the material.

(1) Material	(2) What can I do to change the material?	(3) What change happened in the material?
candle		
crepe paper		
aluminum foil		
plastic cup		
drinking straw		
ice cube		
chocolate bar		
wooden stick		
rubber band		



Guide Questions:

1. What are some ways of changing solid materials?
2. What changes may happen to solid materials when change in temperature and/or surrounding pressure is applied?
3. How do these changes occur?



Remember these:

- A solid has definite shape and volume. You can hold solids.
- Solid materials have different characteristics/properties such as size, shape, color, texture, weight, etc.
- Solid materials can be changed through many ways: by cutting, tearing, folding, twisting, bending, stretching, pressing, coloring, crumpling, melting, and others. Such action/s may change the material's size, shape, texture, color, and other characteristics/properties

Activity 2: “What Happens to the Solid Materials when Bent?”



Objectives:

1. Identify the characteristics of solid.
2. Describe what happens to the solid materials when they are bent.



What You Need: (by group)

- 2 pcs. of: soft plastic ruler, electric wire (12 inches long), paper clip, metal spoon (used for eating)
- 1 pair of rubber slippers



What to Do:

1. Bend each of the given solid materials. Observe and describe what happens to each material.
2. Copy the table below in your science notebook. Record your observations.

Material	What happened to the material when bent?
plastic ruler	
electric wire	
paper clip	
metal spoon	
rubber slippers	



Guide Questions:

1. What happened to the solid materials when they are bent?
2. Was a new material formed when solid material was bent?
3. What characteristics of solid were evident in this experiment?



Remember these:

- Solid materials can be bent. When bent, these materials may change their size and shape. No new material is formed. Only the physical appearance of the materials is changed.
- Bending of solid materials is applied in situations like: bending of steel bars/iron in industry, etc.

Activity 3: “What Happens to the Solid Materials when Pressed?”



Objectives:

1. Demonstrate how to press solid materials properly.
2. Describe what happens to the solid materials when they are pressed.



What You Need: (by group)

- 1 pc. of banana, pandesal, clean plastic sheet, small wood, empty glass/bottle, large stone
- $\frac{1}{4}$ kilo dough (do this ahead of time)



What to Do:

1. Using the piece of wood or empty glass bottle or large stone, press each of the given materials. Observe what happens to each of the material.
2. Record your observations in your science notebook using the table below.

Material	Observation
modelling clay	
paper cup	
banana	
pandesal	
dough	



Guide Questions:

1. What happened to the solid materials when they were pressed?
2. Was a new material formed when solid material was pressed?
3. What characteristics of solid were evident in this experiment?



Remember this:

- Solid materials can be pressed. When pressed, these materials may change their size and shape. Other solid materials may also change their texture when pressed. However, no new material is formed because only the physical appearance of the material is changed.

Activity 4: “What Happens to the Solid Materials when Hammered?”



Objective:

Describe what happens to the solid materials when they are hammered.



What You Need: (by group)

- 1 pc. of: block of wood, empty tin can (*lata*), hollow block, small sheet of galvanized iron, hammer



What to Do:

Caution: Be careful in handling the materials. Do not play with the materials.

1. Hammer each of the given materials. Observe what happens.
2. Record your observations in your science notebook using the table below:

Material	Observation
block of wood	
empty tin can (<i>lata</i>)	
piece of hollow block	
sheet of galvanized iron	



Guide Questions:

1. What happened to the solid materials when they were hammered?

2. Was a new material formed when solid material was hammered?
3. Explain the phases each material underwent as hammering was applied.



Remember this:

- A hammer is a hand tool usually consists of a solid head held on the end of a handle. It is used for beating/ striking or pounding materials/objects.
- Solid materials can be hammered. When hammered, these materials may change their size and shape, and even the texture. However, no new material is formed because only the physical appearance of the material is changed.

Activity 5: “What Happens to the Solid Materials when Cut?”



Objective:

Describe what happens to the solid materials when they are cut.



What You Need: (by group)

- 1 pc. of: used paper (any kind of paper), small cardboard (any *karton*), used cloth (any kind), pair of scissors
- 2 pcs. of: candy wrapper, leaves



What to Do:

1. Using the pair of scissors, cut each of the given materials. Observe what happens to the material.
2. Record your observations in your science notebook using the table below.

Material	What happened to the material when cut?
piece of paper	
piece of cardboard (<i>karton</i>)	
candy wrapper	
leaves	
piece of cloth	



Guide Questions:

1. Describe what happens to solid materials when they are cut.
2. Was there a new material formed when the solid material was cut?



Remember these:

- Solid materials can be cut. When cut, these materials may change their size and shape, but no new material is formed. Hence, only the physical appearance of the solid material is changed when cut.
- Not all solid materials can be cut using simple scissors. Some solid materials, like iron, steel, etc., can be cut using sophisticated cutters (i.e. metal cutters/machine cutters).

Lesson 11: Changes in the Properties of the Materials when Exposed to Different Temperatures

Activity 1: “What happens to the Materials when Heated and when Cooled?”



Objectives:

1. Define heating.
2. Define cooling.
3. Describe what happens to the materials when heated and cooled.



What You Need: (by group)

- 1 pc. of : clean discarded tin can (*malinis na lata*), stick/ any small stick, candle/alcohol lamp (*gasera*), box of matches, small wood, tripod or metal stand
- 1 pc. of tong/ gloves (made of thick cloth)/any thick cloth to handle hot material
- 2 pcs. of crayon (for group 1 only)
- 2 pcs. of chocolate bar/cube (for group 2 only)
- 2 spoonfuls of butter/ margarine (for group 3 only)



What to Do:

Caution: Be careful in handling the alcohol lamp.

1. Describe the physical state of the materials (crayon/ chocolate bar/butter or margarine) assigned to your group.
2. For group 1, put pieces of crayon in the tin can.
For group 2, put pieces of chocolate in the tin can.
For group 3, put 2 spoonful of butter/margarine in the tin can.
3. Using the matchstick, light the candle and let it stand on a small piece of wood. (Lighted alcohol lamp or *gasera* may also be used.)
4. Using a pair of tong (or gloves made of thick cloth), hold

- the tin can (with ice cubes/chocolate bar/ butter or margarine) over the flame.
- Heat the tin can for 2-3 minutes. Observe what happens. (Take note of your observations when the material is heated.) Use a tripod or metal stand
 - After 2-3 minutes, remove the tin can from the flame.
 - Wait for a few minutes until the material cools off. Observe what happens. (Take note of your observations when the material cools off.)

Caution: The tin can will become hot. Handle it with care.



Guide Questions:

- What happens to each material (crayon/chocolate bar/ butter or margarine) when heated? Why?
- Is there a change in the appearance of the material? What change took place?
- How would you describe the change/s that happened to the material when heated?
- What happens to the material when cooled? Why?
- Is there a change in the appearance of the material?

- How would you describe the change/s that happened to the material when cooled?
- Describe the change in the properties of the material when they are heated and cooled.



Remember these:

- When the materials are heated, they changed their size, shape, and texture. They also changed their forms. When heated, the solid materials are changed to liquid. When cooled, the liquid materials are changed to solid.
- The materials (crayon/chocolate/butter or margarine) changed its form from solid to liquid when heated. It also changed its size, shape, and texture.
- The materials (crayon/ chocolate/butter or margarine) changed back to its form from solid to liquid when cooled. It also changed its size, shape, and texture.)

Lesson 12: Changes in the Properties of the Materials when Mixed with other Materials

Activity 1: “What happens to the Solid Materials when Mixed with Other Solid Materials?”



Objectives:

1. Describe what happens to the solid material when mixed with other solid materials.
2. Identify the changes in the properties of solid materials when mixed with other solid materials.
3. Classify solid materials based on their characteristics and properties.



What You Need: (by group)

- 1 pc. spoon
- 2 pcs. of mixing bowl/any small plastic container
- 1 tablespoon of each of the following pairs of materials:
 - sand and pebbles, rice grains and corn grits, instant coffee and creamer, rock salt and pepper, white sugar and iodized salt, corn starch and creamer, paper clips and staple wires, iodized salt and vetsin, powdered detergent and rock salt, flour and baby powder



What to Do:

1. Prepare one tablespoon of each of the materials listed in the table.
2. Using the spoon, mix/combine the pairs of solid materials (listed in the table) in the mixing bowl or any plastic container.
3. After mixing/combining the materials, observe what happens. You may also touch/feel the resulting mixture. Record your observations on the table below by checking the proper column.

Solid Materials	Can you still identify/distinguish each solid material in the mixture?		Did the resulting mixture look the same throughout?		Is there a change in the property of each solid material in the mixture?	
	Yes	No	Yes	No	Yes	No
sand and pebbles						
rice grains and corn grits						
instant coffee and creamer						
rock salt and pepper						
white sugar and iodized salt						
corn starch and creamer						
paper clips and staple wires						
iodized salt and vet-sin						
powdered detergent and rock salt						
flour and baby powder						



Guide Questions:

1. Which pair of materials can still be distinguished from their original state after mixing/combining them?
2. Which pair of materials cannot be distinguished from their original state after mixing/combining them?

3. Which mixture looked the same throughout?
4. Which mixture did not look the same throughout?
5. Is there a change in the property of each solid material in the mixture?
6. What happens to the solid materials when mixed with other solid materials?
7. Compare and contrast the physical state of each solid material before and after each was mixed with other materials.



Remember these:

- When two or more materials are combined, a mixture is formed. Solid materials can be mixed/combined with other solid materials. Mixed materials can be classified depending on the appearance of the resulting mixture.
- When the solid material is mixed with other solid material, each of the combined/mixed materials can be easily identified/distinguished from one another. Such mixture is called heterogeneous mixture.
- Some solids materials, when mixed with other solids, cannot be distinguished from each other. If the resulting mixture looked the same throughout, such mixture is called homogeneous mixture.
- The properties of each solid material in the mixture do not change. The size, shape, color of each solid material remain the same even after mixing.

Activity 2: “What Happens to the Solid Materials when Mixed with the Liquid Materials?”



Objectives:

1. Define what is liquid.
2. Describe what happens to the solid materials when mixed with the liquid materials.
3. Describe the changes in the properties of solid materials when mixed with the liquid materials.



What You Need: (by group)

- 1 pc. teaspoon, ginger,
- 4 pcs. clear drinking glass
- tap water, vinegar, cooking oil, rubbing alcohol,
- 1 teaspoon of: sand, flour
- 1 pinch of : salt, pepper, vetsin, dye coloring (*jobos*)
- *malunggay* leaves



What to Do:

1. Get a clean drinking glass.
2. Using the spoon, mix/combine solid materials with the liquid materials listed in the table.
3. After mixing the materials, observe what happens.
4. In your notebook, copy the table below. Record your observations on the table by checking the proper column. Write down also the changes you observed when solid and liquid materials are mixed or combined.

Solid Material mixed with the Liquid Material	Did the solid material completely dissolve in the liquid material?		Changes Observed when solid and liquid materials are mixed
	Yes	No	
sand and water			
salt and vinegar			
flour and cooking oil			
pepper and vinegar			
vetsin and vinegar			
ginger and rubbing alcohol			
powder dye(<i>jobos</i>) and water			
<i>malungay</i> leaves and water			



Guide Questions:

1. What are the solid materials that can be completely dissolved in the liquid materials?
2. Why do these materials completely dissolve in liquid?
3. What are the solid materials that cannot be completely dissolved in the liquid materials?
4. Why do these materials cannot completely dissolve in liquid?
5. What are the different changes you observed when solid and liquid materials are mixed?
6. What happens to the solid materials when mixed with the liquid materials?



Remember these:

- Solid materials can be mixed/combined with liquid materials. Some solid materials completely dissolved in the liquid materials, but others do not.
- Some solid materials settled at the bottom of the container, while others stayed within the liquid.
- Some solid materials spread out evenly in the liquid materials, but some do not. When mixed with the liquid, some solid materials changed their size, shape, and color, but some do not.

Activity 3: “What Happens to the Liquid Materials when Mixed with Other Liquid Materials?”



Objectives:

1. Describe what happens to the liquid materials when mixed with other liquid materials.
2. Describe the changes in the properties of liquid materials when mixed with other liquid materials.



What You Need: (by group)

- 1 pc. teaspoon
- 4 pcs. clear drinking glass
- 5 spoonful of each of the following pairs of materials:
 - soy sauce and vinegar,

- cooking oil and water
- alcohol and water
- fish sauce (*patis*) and vinegar
- soy sauce and cooking oil
- soda/softdrinks and water
- coconut milk and water



What to Do:

1. Get a clear drinking glass of water.
2. Using the spoon, mix/combine two liquid materials identified/ listed in the table.
3. After mixing the liquid materials, observe what happens.
4. Record your observations in the table by checking the proper column. Write down also the changes you observed when the two liquid materials are mixed.

Two (2) Liquid Materials Mixed	Did the two (2) liquid materials completely mix?		Changes observed when two (2) liquid materials are mixed
	Yes	No	
soy sauce and vinegar			
cooking oil and water			
alcohol and water			
fish sauce (<i>patis</i>) and vinegar			
soy sauce and cooking oil			
soda/softdrinks and water			
coconut milk and water			



Guide Questions:

1. What liquid materials mixed completely? What made this happen?
2. What liquid materials did not mix completely? What made this happen?
3. What changes did you observe when two liquid materials mixed?
4. What happens to the liquid materials when mixed with the other liquid materials?



Remember these:

- Liquid materials can be mixed with other liquid materials.
- While some liquid materials completely mix with the other liquids, some do not.
- Two liquids that do not mix form two layers like what you see with oil and water.

Lesson 13: Changes in Materials that are Useful or Harmful to One's Environment

Activity 1: "What are the Changes in the Materials that are Useful or Harmful to the Environment?"



Objectives:

1. Recall changes which took place in the materials used in the previous experiment.
2. Identify changes in materials that are useful or harmful to the environment.



What You Need: (by group)

- 1 pc. manila paper
- 1 pc. marking pen



What to Do:

1. Brainstorm ideas about the different changes in the materials that you have used and observed in the surrounding environment.
2. Discuss the effects of these changes to our surroundings.
3. Prepare a table similar to the table shown on the manila paper. List in column 1 as many changes in the materials that you can think of.
4. Identify whether such changes in the materials are useful or harmful to the environment by putting a check mark (✓) on the proper column.

Changes in the materials	Effect of the changes in the materials to the environment	
	Useful	Harmful

6. Discuss how each of these changes affect the environment.
7. Present your output to the class.



Guide Questions:

1. What are the changes in the materials that are useful to the environment? What made them useful to the environment?
2. What are the changes in the materials that are harmful to the environment? What made them harmful to the environment?



Remember these:

- Some changes in the materials are useful to the environment, while others are harmful.
 - a) Useful: cutting of piece of cloth to be made into handkerchief, cutting of fabric to be made into clothes, cutting and shaping pieces of wood/lumber into chair, changing wood into charcoal for cooking;
 - b) Harmful: burning of old tires and other plastic materials/ trash, throwing of kerosene and detergents into the sewage, etc...)
- When the material (soil/land) is dumped with garbage of any kind such as empty bottles, plastics, toxic wastes, chemicals from factories, and others, the soil/land becomes polluted. Polluted land serves as breeding places for flies, cockroaches and rats. These pests carry germs that cause diseases, hence hazardous to one's health. Growing plants is not also possible in polluted land.
- When the material (i.e. water in the river) is dumped with garbage of any kind such as empty bottles, plastics, waste materials from houses, and other industrial and chemical wastes from factories, the river becomes polluted. If we drink water contaminated with germs, we are likely to get sick/diseases. Polluted water also kills living organisms, i.e. fish, water plants, etc.

- When the surrounding air is blanketed with smoke from factories and motorized vehicles, ashes and other dust particles, the air becomes polluted. Polluted air causes skin itchiness, lung infections, cancer and other respiratory diseases.
- Some changes in the materials are harmful to the environment. It may pollute land, water and air. To keep our surroundings clean and to prevent or minimize pollution in our environment, people are encouraged to do the 5R's (Reduce, Re-use, and Recycle, Repair, Rot).
- Burning of garbage such as plastic materials, rubber, and other wastes is harmful also to the environment. Many items in household garbage when burned release dangerous toxic chemicals. These pose health risks for people particularly those with asthma and other heart and lung ailments. Because the smoke is close to the ground, it can also settle on fruits, vegetables and other vegetation that becomes dangerous to eat for humans and wildlife. The smoke and toxins that enter the air also contribute to the greenhouse effect and global warming. To prevent/ minimize the effect of burning of garbage/ wastes, waste segregation should be done, and the 5 R's should be practiced.
- Cutting down trees is also harmful to the environment. It affects the quality of air that we breathe. It causes a rapid change in temperature (the temperature rises to a sometimes uncomfortable level). In addition, when trees are cut down, rain levels are severely affected (since moisture in the air could not be retained by the trees). This, in turn, changes weather patterns, which leads to other environmental concerns. Cutting down of trees also causes soil erosion. Many animals native to forests also lose their habitats. Cutting down tree is prohibited. To solve the problem on deforestation, planting of trees (reforestation) should be done.

Activity 2: “What are the Harmful Effects of the Changes in the Materials to the Environment?”



Objectives:

1. Identify the harmful effects of the changes in the materials to the environment,
2. Describe the harmful effects of the changes in the materials to the environment.
3. Suggest some ways of preventing/minimizing the harmful effects of the changes in the materials to the environment.



What You Need: (by group)

- 1 pc. manila paper
- 1 pc. marker



What to Do:

1. Study the pictures on the table shown on the next page.
2. Describe what is shown in each of the given pictures. Write your answers on column 2.
3. Describe also its harmful effect to the environment by filling up column 3.
4. Enumerate some ways of preventing/minimizing its effect to the environment by filling up column 4.
5. Present your output to the class.



Remember these:

5R's of Responsible Waste Management.

Reduce

- Buy items in refillable containers
- Use cloth bag/eco bag/ paper bag/ native baskets instead of plastic bag, when you buy groceries,.
- Avoid buying disposable items or single use products such as batteries, razors, utensils, plates, cups, etc.

Reuse

- Donate or sell re-usable items
- Use both sides of paper when printing and re-use as scratch paper, gift wrapper, etc.
- Consider the potential life span or durability when buying new products.
- Buy durable food/ storage containers and reuse them instead of using foil, plastic bags/ wrap.

Recycle




- Do not throw away used newspaper or used writing pads. Sell them or bring them to paper mills which can turn them into usable paper again.
- Used bottles, tin cans, rubber tires can be recycled into useful materials.



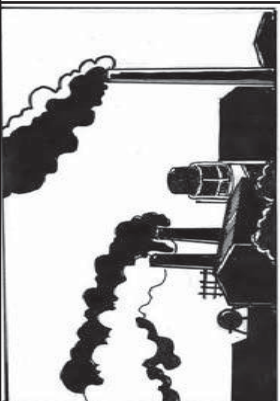
Repair

- Have appliances, office equipment, lighting fixtures, and automotive parts repaired instead of buying new ones.
- Have an old furniture reupholstered or refurbished instead of buying new ones.

Rot

- Set up a compost pile to compost yard trimmings.
- Make a compost pit/ bin in the yard for your biodegradable materials such as fruits, vegetables, coffee grinds etc.

Picture showing changes in the material	What does the picture show?	What is its effect to the environment?	What can people do to prevent/minimize its harmful effect to the environment?
			
			
			

<p>Picture showing changes in the material</p>			
<p>What does the picture show?</p>			
<p>What is its effect to the environment?</p>			
<p>What can people do to prevent/ minimize its harmful effect to the environment?</p>			