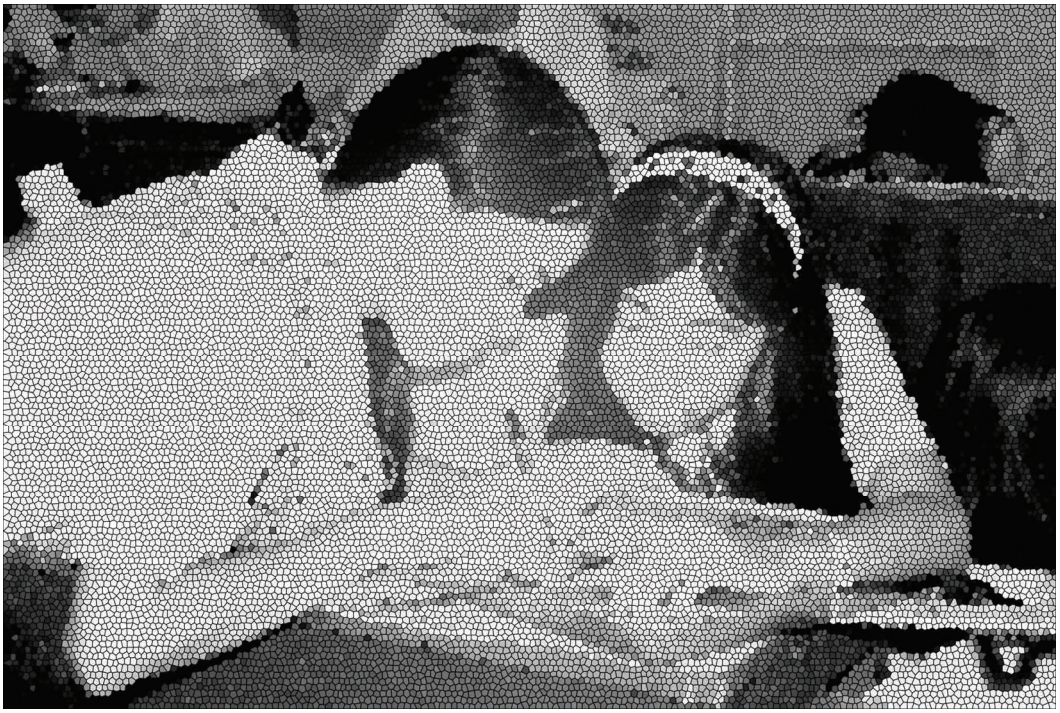
SCIENCE

4

Modified In-School Off-School Approach Modules (MISOSA)

Distance Education for Elementary Schools

SELF-INSTRUCTIONAL MATERIALS



CHANGES IN AN OBJECT BEFORE AND AFTER HEATING

Department of Education
BUREAU OF ELEMENTARY EDUCATION
2nd Floor Bonifacio Building
DepEd Complex, Meralco Avenue
Pasig City

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CHANGES IN AN OBJECT BEFORE AND AFTER HEATING

At the end of this lesson, you will be able to:

- *describe the change in an object before, during and after heating*
- *practice safe ways of handling hot objects and flammable materials (e.g. use of pot holder, not to play with firecrackers)*

Try to Recall

We have just finished topics on friction. Do you still remember what friction is? Try to answer the following questions. Write your answer in your notebook.

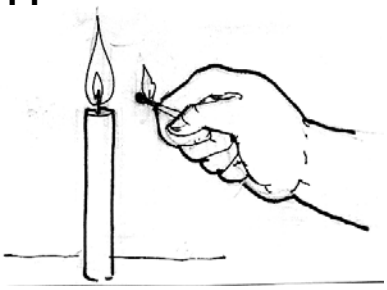
1. What is friction?
2. How does the object's surface affect its motion?
3. Explain why there is a need to increase or decrease friction when we do certain activities.

Exploration Time

Do you know that some objects change when they are heated? Try to discover these changes by doing the following activities.

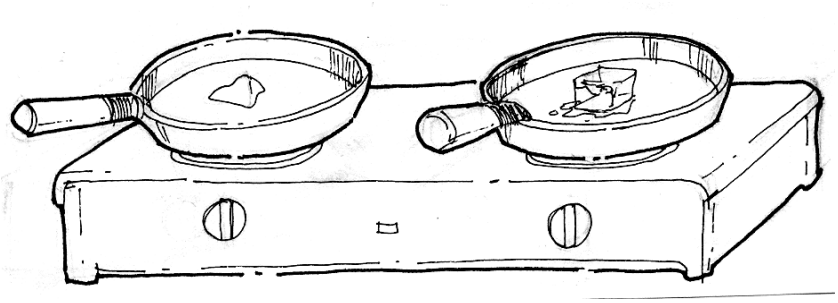
ACTIVITY 1

- **Light a candle.**
- **Observe what happens after one minute.**



ACTIVITY 2

- **Get 2 pans.**
- **Put a small piece of wax (floor wax or candle wax) in a pan and an ice cube in the other pan. Heat both pans over a slow fire (maybe from alcohol, kerosene or stove). Observe what happens.**

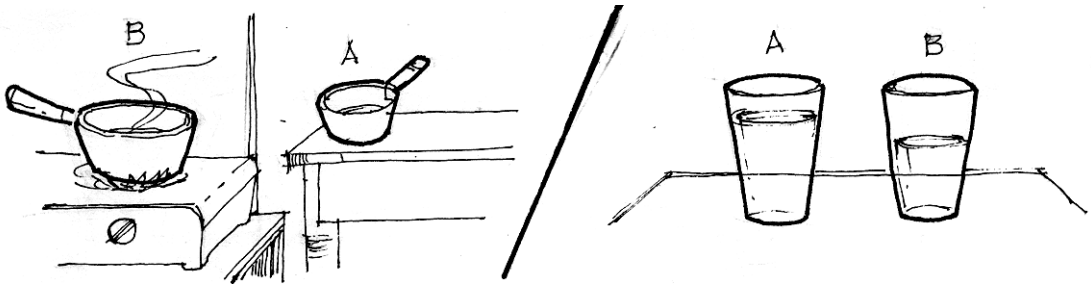


- **What changes happened to the piece of wax and the ice cube?**
- **What caused them to change in their phase?**
- **What will happen to water when it is heated? Why?**
- **The small piece of wax and ice cube became smaller after being heated. Why do you think?**

ACTIVITY 3

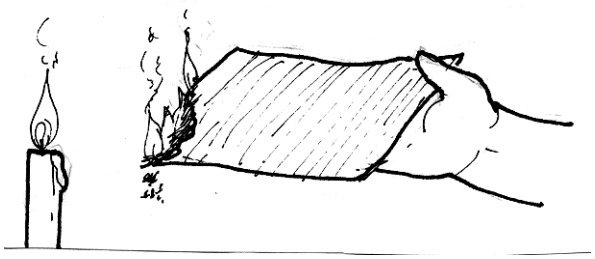
- **We feel the heat of the sun especially during summer. Our skin could be wet with perspiration. However, even without being wiped, our skin becomes dry after sometime. Where do you think does our perspiration go?**

ACTIVITY 4



- **Prepare 2 glasses of water.**
- **Pour 1 glass of water in each of the two pans. Place one pan on the table and boil the other pan. Then let it cool.**
- **Pour the water back into the glass.**
- **Which glass has less water?**
- **Why did the water become less after boiling?**
- **Where did the water go?**

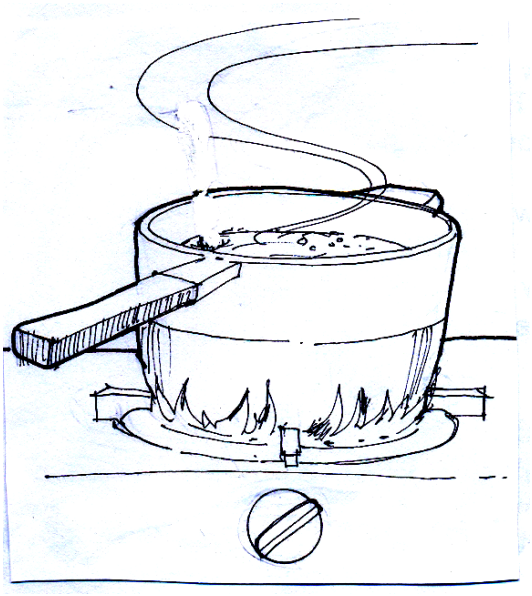
ACTIVITY 5



- **Burn a piece of paper. Observe what takes place as the paper burns. But be careful not to touch the fire.**
- **What remains after the paper has burned up? Can the ashes be changed back to a paper again? Why?**

ACTIVITY 6

- **Boil some water in a pan. Get the temperature of the boiling water using a thermometer. As it boils, observe the steam coming out. The steam consists of water particles escaping from the pan. What did you observe from the boiling water? Is it hot? Is it safe to touch the boiling water with our bare hands? Why?**



- **Read and learn more:**

When a candle is heated, it melts and drops off. When cooled it becomes solid again. A heated candle changes from solid to liquid. When cooled it changes from liquid to solid. Some materials solidify when cooled and some materials liquefy when heated just like the candle, wax and ice cube in your experiment.

When water is heated, some of it changes to water vapor. Water vapor is water in the form of gas. Water vapor contains the materials present in water. The change from water to gas is called a **physical change**. Just like the wax in the experiment, it melts when heated but it turns to wax again when cooled. In a physical change, the material can be brought back to its original form.

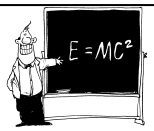
The piece of paper becomes black when it is burned. Then it turns into ashes. Ashes cannot be changed into paper again. The materials of which ashes are made are not the same as the materials in the paper. A new material is formed when a piece of paper is burned. This is called a **chemical change**.

Heat can make a material change into other materials. Physical and chemical changes of matter happens everyday. There are things that need to be changed physically so that we can use them. Chemical change is needed to happen to some objects so that they can be made. Can you name some materials that undergo changes physically or chemically?

Water expands when heated. Continuous heating will make the water level go higher until it reaches its boiling point. The boiling point of water is 100°C. We must be careful in handling boiling water. Try to do the following:

- Always use safety holder in transporting hot water.
- Don't touch boiling water with bare hands.
- As much as possible, stay away from boiling water.
- Treat scald properly. A scald is a burn caused by contact with hot liquid.

We must be careful with heated air, too. Air expands. When heated in a balloon, it stretches the balloon and makes it larger. Balloons and tires should not be overheated. They will explode when they reach their elastic limit. Other materials and fuels like gasoline, kerosene, charcoal, liquefied gas, thinner, etc. should be kept in safe place because these are highly combustible materials.



I learned that:

- Some materials solidify when cooled and some materials liquefy when heated.
- The heat during boiling changed the liquid water into gaseous water vapor and turns back to liquid water when it is cooled. This is called a physical change. The candle wax in the experiment also undergone physical change. It melts when heated but it turns to wax again when cooled.
- The piece of paper change in texture, color appearance and composition when it is burned. This shows that the substances in the paper changed. This process is called a chemical change.

Apply It

Answer the following questions:

1. When you boil some water, don't leave it boiling for a very long time. Why?
2. Suppose you want to cook or fry some eggs but you see that the cooking oil in the bottle has solidified. What should you do so that the oil can flow from the bottle to the frying pan? Explain your answer.
3. You wash some clothes and you want them to dry quickly. Where should you hang them? Why?
4. Your mother want you to buy floorwax but it is not available in the stores. The store manager suggested that you buy candles and kerosene instead of floorwax. What will you do with the candles and kerosene to produce floor wax?

Test Yourself

Answer the following questions:

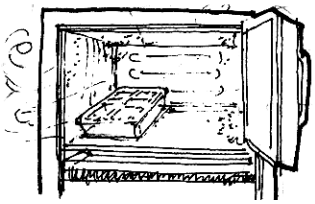
1. Under what condition will a candle melt?
   a. when it is cooled
   b. when it is inside a bottle
   c. when it is heated

2. Which object is not a source of heat energy?
   a. sun
   b. lighted candle
   c. water

3. What is produced when two surfaces rub each other?
   a. air
   b. vapor
   c. friction

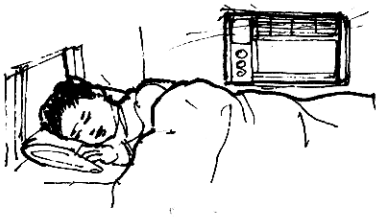
4. Which of these will happen to the object that is placed under the sunlight?
   a. Its temperature will disappear.
   b. Its temperature will not change.
   c. Its temperature will increase.

5. Which of the following shows the effect of heat?



a.

b.



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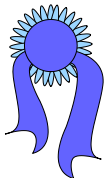

Congratulations for trying your best in accomplishing this module, try to share the things you have learned with your classmates and friends.