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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Science

Quarter 1
Week
5

Lesson Exemplar for Science Grade 5
Quarter 1: Week 5
SY 2023-2024

Development Team

Writers: Kathleen Mallorca Morales
Validator: Diana Lou E. Sipalay
Illustrator:
Layout Artist:

Management Team
Juan Dela Cruz, Juan Dela Cruz, and Juan Dela Cruz

LESSON EXEMPLAR TEMPLATE

SCIENCE/QUARTER 1/ GRADE 5 (Week 5)

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	The learners learn that… 1) Scientists identify three states of matter based on shape and volume. 2) Temperature can cause state changes. 3) Planned simple scientific investigations require several steps and processes. 4) An understanding of matter can be applied to solve real-world problems.
B. Performance Standards	*By the end of the quarter*, learners describe three states of matter based on properties of shape and volume and identify heat as being involved in changes of state. They plan a simple scientific investigation following appropriate steps and using units such as milliliters, liters, grams, kilograms, and degrees Celsius for measuring.
C. Learning Competencies and Objectives	**Learning Competency:** The learners describe how changes in temperature cause matter to change in state, such as solid to liquid to gas *Lesson Objectives:* Learners will be able to: 1. define heat and how it travels; and 2. Determine the effects of heat on states of matter.
D. Content	Temperature and its effect on the state of matter.
E. Integration	• Collaboration • Development of survival skills • Measuring Skill (Science Process Skill Focus) • Value of Precision

II. LEARNING RESOURCES

Britannica Kids (n.d.). Types of Energy. https://kids.britannica.com/kids/article/energy/353100#

JICA National Science Textbook for Grade 5. (2020). Department of Education Papua New Guinea. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwi5hNGBv4mFAxVfxjgGHUf6B1wQFnoECBsQAQ&url=https%3A%2F%2Fwww.jica.go.jp%2FResource%2Fproject%2Fpng%2F004%2Fmaterials%2Fku57pq00003t6ut6-att%2Fg5_science_text_01.pdf&usg=AOvVaw2EdHbiSyO2ZoD9_DGqVNys&opi=89978449 .

Khan Academy (n.d.). What is Thermal Energy? https://www.khanacademy.org/science/physics/work-and-energy/work-and-energy-tutorial/a/what-is-thermal-energy#:~:text=Thermal%20energy%20refers%20to%20the,the%201%CB%A2%E1%B5%97%20law%20of%20thermodynamics)

OpenAI. (2024). *ChatGPT* (3.5) [Large language model]. https://chat.openai.com

Soni, A. (2021). Learn Bright | Effects of Heat on Matter [Video]. YouTube. URL https://youtu.be/DUUt9gH9yX8

Smile and Learn – English (2019). State of Matter and Changes of State – Science for Kids [Video]. YouTube. URL https://youtu.be/vNvElea-124?t=60

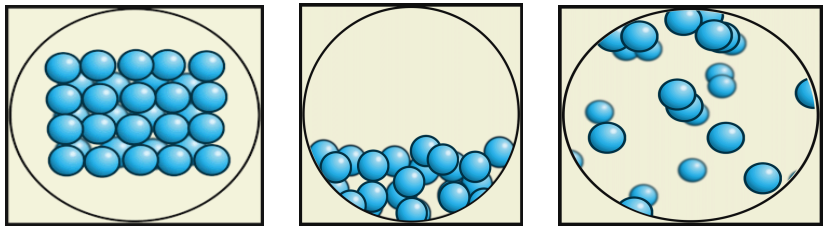
Tutoring Hour (2024). States of Matter Quiz | Is it a solid, liquid, or gas? [Video]. YouTube. URL https://youtu.be/oXFTdBLC-xg?t=36

III. TEACHING AND LEARNING PROCEDURE	**NOTES TO TEACHERS**

A. Activating Prior Knowledge	**1. Short Review** **(Week 5 – Day 1)** Learners will watch the video (see below) and they will answer a 15-item quiz with a partner. Instruct the learners to prepare a piece of paper to answer the 15 questions given by the video. They are to work with a partner. Video Link: https://youtu.be/oXFTdBLC-xg?t=36 Classify the following materials into the three states of matter. 1. water 2. rubber duck 3. steam from boiling kettle 4. ink 5. air from hair dryer 6. statue 7. smoke from chimney 8. orange juice 9. marble 10. maple syrup 11. air inside the balloon 12. Rubik's cube 13. vinegar 14. pen 15. air inside a raft	Prepare the video for the quiz. The video is designed so that after each question, there is an answer given and an explanation. For this activity, instruct the learners to prepare a piece of paper while they work with a partner for the review. *Answer to the activity:* Classify the following materials into the three states of matter. 1. Water - liquid 2. rubber duck - solid 3. steam from boiling kettle - gas 4. ink - liquid 5. air from hair dryer - gas 6. statue - solid 7. smoke from chimney - gas 8. orange juice - liquid 9. marble - solid 10. maple syrup - liquid 11. air inside the balloon - gas 12. Rubik's cube - solid 13. Vinegar - liquid 14. Pen - solid 15. air inside a raft - gas

B. Establishing Lesson Purpose	**1. Lesson Purpose (2 minutes)** You already know the different states of matter. Do these states change? What do you think causes the change? Learners may share their answers. In this lesson, we will answer the following questions: a. what is heat and how does it travel? b. what is its effect on the different states of matter?	Say to the learners, "Have you ever thought of how water from being something that can be seen, after heating, becomes invisible?" What do you think happened to water as you boil it?" The teacher can state more examples depending on the time allotment schedule set. This leads to the questions in the lesson purpose.
	2. Unlocking Content Area Vocabulary (10 minutes) As preparation for the game, you will be asked to work with a partner to search for the meaning of the given words. Game: The following words are written on the board. The teacher reads the descriptions and learners then need to choose which words have been described. thermal energy heat evaporation condensation sublimation melting freezing point	Ask the learners to prepare for a game. Context clues can be beneficial in this lesson. Once the game is done, the learners can now search through Google for the correct meaning of the following words by pair: thermal energy, heat, evaporation, condensation, sublimation, melting freezing point, fusion Here are the meaning of the words: **Thermal energy** refers to the energy contained within a system that is responsible for its temperature.

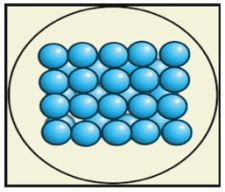
		Heat is a form of energy . Heat flows from hot objects to cold objects. **Evaporation** is when heat turns a liquid into gas (vapor) **Condensation** is the process where a gas becomes liquid. It is the reverse action of evaporation, where a liquid becomes gas. **Sublimation** is conversion of a substance from the solid to the gaseous state without it becoming liquid **Melting** is change of a solid into a liquid when heat is applied. **Freezing point** is the temperature at which a liquid becomes a solid.

C. Developing and Deepening Understanding	**SUB-TOPIC 1:** **(Week 5 – Day 2)** **1. Explicitation (5 Minutes)** The particles/molecules in the different states of matter may be represented by any of the following illustrations. Which state of matter is shown in the picture? A B C  Say, *"It is important for us to remember the arrangement of the molecules in the different states so that it would be easy to understand the effect of heat on the different states of matter"* What do you think? When you think of the word heat, what comes to your mind? List at least three words and write on the board/share your answer.	The teacher shall ask the students to identify the state of the picture. S/he can use a slide deck for this to show the movements or just print and paste the pictures on the board. *Answer Key:* *A. Solid* *B. Liquid* *C. Gas* The teacher may re-order the picture for the class. If the teacher has access to Mentimeter, s/he may consider having them answer this question for the word cloud. However, you may randomly ask the learners their answers and write the words on the board as they share their answers.

	REMEMBER! Heat is not matter but is a form of energy. It is a type of energy known as thermal energy. It is measured using a thermometer. Energy can be transferred to and from molecules through heat. A rise in temperature causes atoms and molecules to move faster and farther apart because they gain thermal energy.	Paste on the board or show on a slide deck the REMEMBER part and allow the pupils to read.
	Guide Questions: 1. What do you think will happen to the molecules of the different states of matter whenever heat is applied? 2. What happens to the state of matter when heat is applied to the object?	Ask the pupils their answers to the two prompt questions.
	2. Worked Example (30 minutes) **LAS 1: Heating and Cooling a Candle** *Preliminary Questions:* What happens to a candle when heat is applied to it? What about if heat is removed from it?	For this activity, learners will refer to the LAS 1 "Heating and Cooling a Candle"
	Safety Precautions: The learners will be given reminders on the safety precautions in conducting experiments. Since there is a need for them to use the burner/fire extra caution is to be observed.	Give reminders to the learners when handling fire/flame/heat. Guide the learners as they experiment by group. Facilitate and go around the room to prevent any accident.

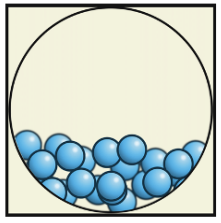
Discussion Questions:

1. What was the state of the candle before and after heating?
   Before – Solid ; After – Liquid
2. How did the state of the candle change after placing it in the bowl?
   When heated, the candle goes from solid to liquid. After placing it in the bowl, the liquefied candle begins to solidify as it cools down.
3. What was the temperature of the candle when it completely melted and hardened?
   Answers may vary. As guide, the temperature when it was melted must be higher than the temperature when it hardened.
4. How does the candle change its state from a solid to a liquid and from a liquid to a solid?
   When heat is applied, it goes from solid to liquid. When heat is no longer applied, it cools down and goes back to being solid.
5. Imagine seeing the molecules of the candle. Could you draw how they look like before heating??



State: Solid

6. How about after it was heated?

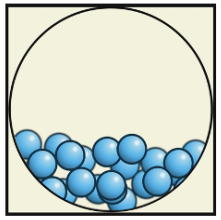


State: Liquid

Monitor and facilitate the answering of the guide questions after the experiment. Sample answers are given but can be modified and expounded depending on the flow of discussion.

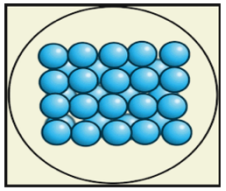
7. What do you think caused the molecules to change their arrangement?
Heat

8. When the melted candle was poured into the can, what do you think the molecules look like? Draw it in the box.



State: Liquid

9. How about when the temperature reading was at its lowest? How do you think the molecules looked then? Draw it in the box.



State: Solid

For the Synthesis part,

What happened to the candle when you heat and cool it? What do you think is the effect of heat on solid and liquid materials?

Most solids become liquid at a certain temperature when heated just like the candle when melted. When we removed the heat from it, it became solid again. Heat affects the states of matter.

After answering and discussing the guide questions and synthesis, leave this as a closing note for next meeting:

Do other states of matter also change when heat is applied to it? Let's find out next meeting.

	(Week 5 – Day 3) **LAS 2: Water Wonder (35 minutes)** *Preliminary Questions:* What happens to ice when heat is applied to it? What happens if we continue to apply heat to it? *Safety Precautions:* The learners will be given reminders on the safety precautions in conducting experiments. Since there is a need for them to use the burner/fire extra caution is to be observed. Note: As boiling can take more time than 14 minutes, the teacher can decide to add rows on the record table so as to achieve this change. ***Discussion Questions:*** 1. What happened to the ice cubes when the temperature increased? *They melted.* 2. What happened to water when heat was continuously applied? *After melting, gas/vapor was produced after longer exposure to heat.* 3. What happened to the volume of water before and after applying more heat? *The volume of the water decreased after applying continuous heat.* 4. Where do you think the water goes? *It was changed to gas/ water vapor.*	Say, "Looking at the Vocabulary list, which terms did we explore at the last meeting? Today we will explore the rest of the terms in the list. What do you think will happen if we bring water to a boil? Let's find out!" For this activity, learners will refer to the LAS 2 "Water Wonder" Give reminders to the learners when handling fire/flame/heat. Guide the learners as they experiment by group. Facilitate and go around the room to prevent any accident. Monitor and facilitate the answering of the guide questions after the experiment. Sample answers are given but can be modified and expounded depending on the flow of discussion.

5. What observable characteristic of water surfaced?

Water can undergo change of state from solid to liquid to gas by applying heat on it.

6. What changes in the states of matter did you observe during this activity?

Solid to liquid to gas

After discussion, please give a summary of the findings and the discussion.

(Week 5 – Day 4)

VIDEO SUMMARY: (30 minutes)

Video File: https://youtu.be/vNvElea-124?t=60

Learners will watch the video entitled States of Matter and Changes in State

Say, *"Take note of concepts you clearly understood and those you need more explanation. Make notes while you watch the video."*

My Notes on Matter

State of Matter	Definition	Arrangement of Particles	Examples	Characteristics
Solid				
Liquid				
Gas				

Ask them to complete the table guided by the summary of the lesson given by the video. Make sure to process the table to ensure mastery of the concepts.

Changes in Matter

States of Matter	State when heated	Term Used
Solid	Liquid	Melting
Liquid	Gas	Evaporation
Gas		

States of Matter	State when cooled	Term Used
Solid		
Liquid	Solid	Freezing/Solidifying
Gas	Liquid	Condensation

After completing the table and summarizing the concepts, present these tables for easier comprehension of changes in matter involving heat. Make sure to put emphasis on the terms for rote memory.

Ask the learners which of the listed vocabulary words became clear to them.

D. Making Generalizations

1. Learners' Takeaways: Word Mapping

Say, *"This activity will help you organize your learning on the Changes in Matter. Make a Word Map for the following terms."*

Solid Liquid Gas

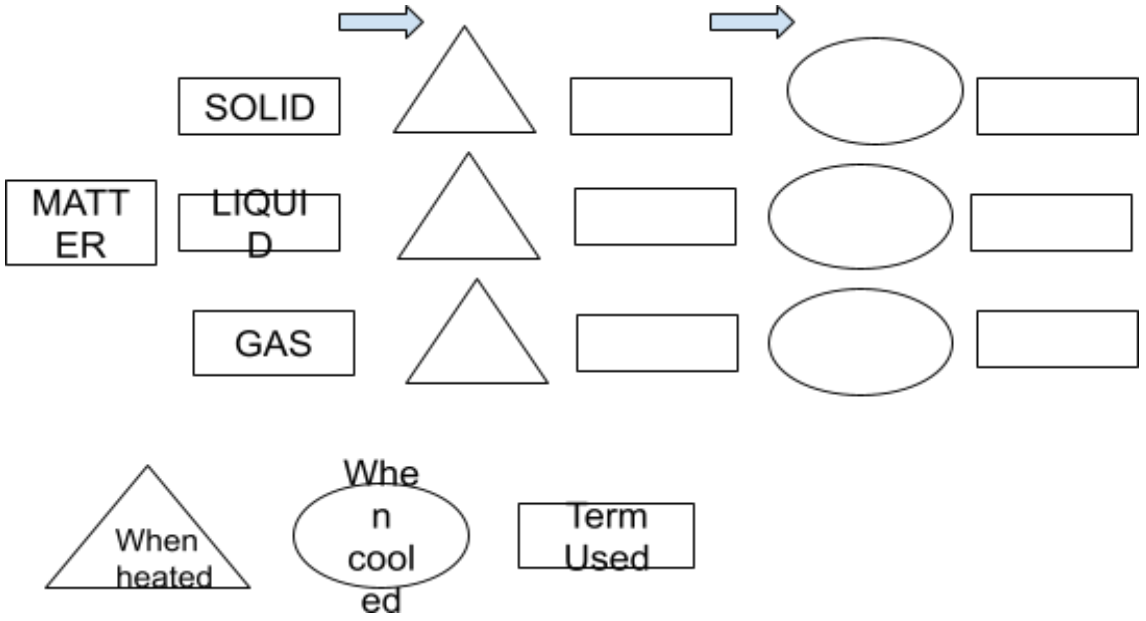
Melting Freezing Evaporation Condensation Sublimation

Instructions:

1. For the triangle shape, write what happens to the state of matter when heat is applied.
2. For the oblong shape, write what becomes of matter when it is cooled.
3. For the rectangle shape, write the terms used to describe it.

For this activity, allow the students to work individually or in pairs. Consider time restraint if needed.

Put the shapes on the board in this manner to guide the students while telling them the instructions on how to do the activity.

	2. Reflection on Learning 1. In what way will your knowledge of the changes in matter help you in your day-to-day life?	The teacher can always insert reflection in every lesson or activity if s/he deems necessary not just at the end of the lessons.

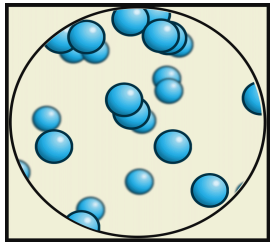
IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION	**NOTES TO TEACHERS**

A. Evaluating Learning	**1. Formative Assessment** **Take a 10 item Multiple Choice Quiz** 1. What term describes when matter changes from solid to gas? a. freezing b. melting c. evaporation d. sublimation 2. When matter goes from solid to liquid, the process is called____ a. freezing b. melting c. evaporation d. sublimation 3. When matter goes from gas to liquid, the process is called _____ a. freezing b. condensation c. evaporation d. sublimation 4. If you heat a solid, what will happen to it? It will __ a. melt b. disappear c. freeze 5. When matter changes state, its weight will ____ a. change b. not change c. get heavier 6. What state of matter has its own shape? a. solid b. liquid c. gas	The teachers can employ the assessments and can give additional guide questions if s/he deems necessary. Have learners take this as a quiz. Answer Key: 1. D 2. B 3. B 4. A 5. B 6. A 7. B 8. A 9. C 10. B

7. Which of the following contributes to the changes in the states of matter?
   a. time
   b. heat
   c. water

8. What happens to the molecules of matter when heated?
   a. it moves
   b. it freezes
   c. it disappears

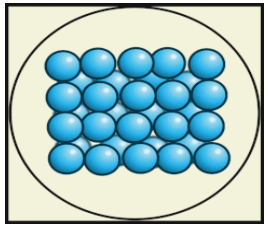
9. What state of matter is shown in the figure below?



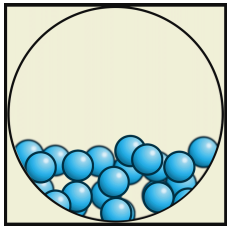
a. solid
b. liquid
c. gas

10. Which diagram represents a liquid state of matter?

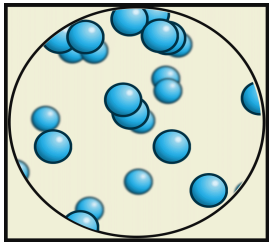
A



B



C



2. Homework

The teacher may opt to give homework if s/he thinks the competency is not yet mastered.

A. Teacher's Remarks	*Note observations on any of the following areas:*	**Effective Practices**	**Problems Encountered**	
	Strategies explored			
	Materials used			
	Learner engagement/ interaction			
	Others			
B. Teacher's Reflection	*Reflection guide or prompt can be on:* ▪ *Principles behind the teaching* *What principles and beliefs informed my lesson?* *Why did I teach the lesson the way I did?* ▪ *Students* *What roles did my students play in my lesson?* *What did my students learn? How did they learn?* ▪ *Ways forward* *What could I have done differently?* *What can I explore in the next lesson?*			

Prepared by: Kathleen Mallorca Morales	***Validated by: Diana Lou E. Sipalay***
Institution: Xavier University	***Institution: SDO – Caloocan City***