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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Science

Quarter 3
Lesson
8

Lesson Exemplar for Science Grade 7
Quarter 3: Lesson 8 (Weeks 8)
SY 2024-2025

Development Team

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SCIENCE (PHYSICS) /QUARTER 3/ GRADE 7

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	1. Scientists and engineers analyze heat transfer to predict their effects on different materials. 2. Scientists and engineers investigate the different ways for heat to transfer in the context of conservation of energy. 3. Illustrating the flow of heat between a body and its environment leads to accurate dictions about heat transfer. 4. The unique characteristic of conduction, convection and radiation. 5. Scientists and engineers conduct innovative research on to find solutions to the current global energy crisis by creating new designs in housing insulations for a more efficient energy usage.
B. Performance Standards	*By the end of the Quarter, the learners should be able to:* 1. employ scientific techniques, concepts, and models to predict the presence and direction of heat flow in a system. Identify the method/s of heat transfer occurring in a given system; 2. represent their understanding on methods of heat transfer using scientific language, logical reasoning and illustrations; 3. use their curiosity, knowledge and understanding, and skills to propose solutions to problems related to heat transfer; and 4. explore how modern technologies might be used to overcome current global energy concerns about heat transfer.
C. Learning Competencies and Objectives	***Learning Competency*** 1. Describe the three methods of heat *Lesson Objective 1:* Explain how conduction occurs. *Lesson Objective 2:* Explain how convection occurs. *Lesson Objective 3:* Explain how radiation occurs. 2. Cite examples of the three methods of heat transfer *Lesson Objective 1:* Give advantageous practical examples of conduction, convection and radiation. *Lesson Objective 2:* Give advantageous environmental examples of conduction, convection and radiation *Lesson Objective 3:* Give disadvantageous practical examples of conduction, convection and radiation.

	Lesson Objective 4: Give disadvantageous environmental examples of conduction, convection and radiation. 3. Apply learnings in heat transfer to energy conservation *Lesson Objective 1:* Use principles of heat transfer to reduce heat loss and increase heat gains in homes and buildings. *Lesson Objective 2:* Apply heat transfer concepts to save energy in the real world.
D. Content	***Heat Transfer:*** 1. Insulators and conductors 2. Methods of heat transfer *3.* Energy conservation
E. Integration	N/A

II. LEARNING RESOURCES
● Ateneo de Naga University Junior High School Physics Module ● Cutnell & Jonhson Physics 9th ed (2012). ● Hewitt, P. Conceptual Physics 12 ed (2015) ● Pabellon, J. and Tubal, G. (2000). Science and technology for a better life. Makati City: Diwa Scholastica Press Inc. ● Wilson, Buffa & Lou (2010). College Physics 7th ed. https://www.youtube.com/watch?v=zpVOoKH2AzI https://www.youtube.com/watch?v=UYlVmgn6iDk

III. LEARNING RESOURCES		**NOTES TO TEACHER**
A. Activating Prior Knowledge	**1. SHORT REVIEW** Let students refresh their ideas on thermal conductors and insulators by doing this science magic trick. Activity 1. **Sorting Hat: Thermal Conductor or Insulator** *Use the worksheet for this activity (see page 1).*	

	2. FEEDBACK 1. Facilitate a class discussion with the results of the activity. 2. Differentiate conductors and insulators (The teacher can also present the grouping of conductor and insulator and let the students realize the difference using the result of their activity.	After the activity, let the students give other examples of conductors and insulators. Let them explain the importance of identifying if materials are conductors or insulators.
B. Establishing Lesson Purpose	**1. Lesson Purpose** You may say this to the class: In today's lesson, we will explore the major sources of heat energy as well as the three fundamental methods of heat transfer: conduction, convection, and radiation. Our goal is to understand how heat energy moves through different materials and environments, and to recognize real-world examples of each method. Through various activities, you will be able to define and differentiate between these three types of heat transfer, explain the principles behind them, and apply this knowledge to analyze everyday situations, such as how a pot heats up on a stove or how the sun warms the earth. This understanding will not only enhance your comprehension of physical science concepts but also provide practical insights into energy efficiency and thermal management in various contexts.	
C. Developing and Deepening Understanding	**SUBTOPIC 1: Methods of Heat Transfer (Conduction)** **1. Explicitation** Activity 2: **To Burst or Not? A Magic Trick** *Use the worksheet for this activity (see page 3).* **2. Worked Example** • Discuss the concept of conduction • Focus on the following areas:	

	a. Definition b. How heat travels c. Sample illustrations d. Application on everyday lives **3. Lesson Activity** Activity 3: **First Come, First Serve (Conduction of Heat)** *Use the worksheet for this activity (see page 4).*	**KEY to Activity 3** 1. The paper clip falls from the spoon as one end of the spoon was heated. 2. No. 3. The first paper clip to fall is the one nearest to the flame. The last paper clip to fall is the one farthest from the flame. As the free end of the spoon was heated by the candle, heat began to travel from the free end of the spoon to the other side spoon as evidenced by the melting of the wax that led to the fall of the paper clips. 4. The flame heats up the atoms of the spoon causing them to vibrate faster and a stronger collision to each other thus raising the thermal energy of the spoon. The increase in kinetic energy of the atoms raised the temperature of the spoon, thus melting the wax and the paper clips fall.

	SUBTOPIC 2: Methods of Heat Transfer (Convection) **1. Explicitation** 1. Ask the students how they keep being cool during hot season. 2. Let the students share some of the cooling appliances they have at home (fan, aircon, etc.). 3. Ask them what they observe on the placement of these appliances inside their rooms. 4. Let them share why they think these cooling appliances are placed on high areas. **2. Worked Example** • Discuss the concept of convection. • Focus on the following areas: a. Definition b. How heat travels c. Sample illustrations d. Application on everyday lives **3. Lesson Activity** Activity 4: **Round and Round We Go** *Use the worksheet for this activity (see page 5).*	Sample answers of the students: 1. Use cooling appliances. 2. Electric fan, air cooler, air conditioning unit. 3. These appliances are usually placed on higher places. Leave the question 4 hanging. Tell the class that you will answer this at the end of the activity. **KEY to Activity 4** 1. In set up 1, the red liquid moves up while the blue liquid goes down until both jars have the same color already. 2. In set up 2, the red and blue liquid are stationary. 3. The food color made the rising and sinking of water visible. 4. When hot and cold liquids are mixed, the hot liquid goes up while the cold liquid goes down. 5. Hot water is less dense than cold water, hence it goes up

		while the denser cold water goes down.
	Discuss the answer to question #4 in the Explicitation.	
	SUBTOPIC 3: Methods of Heat Transfer (Radiation) **1. Explicitation** 1. Ask the students what they are wearing during hot season, cool season. 2. Hang the question, "How does color affect the transfer of heat?"	Sample answers of the students: 1. Students may answer light colored clothes during hot season and dark colored clothes during cold season. 2. Leave the question hanging. Tell the class that you will answer this at the end of the activity.
	2. Worked Example • Discuss the concept of radiation • Focus on the following areas: a. Definition b. How heat travels c. Sample illustrations d. Application on everyday lives	
	3. Lesson Activity Activity 5: **Pass the Heat** *Use the worksheet for this activity (see page 6).*	**KEY to Activity 5** 1. The can that is painted black is expected to have a lower temperature after 5 and 10 minutes. 2. The black can cool first. 3. The black can 4. The black can 5. The black can is a good absorber or emitter of heat.

D. Making Generalization	**1. Learner's Takeaways** Activity 6: **Which is Which? Looking Thru My Lens** *Use the worksheet for this activity (see page 7).* **2. Reflections on Learning** Activity 6: **Energy Audit (Tara Na!)** *Use the worksheet for this activity (see page 8).*	**KEY to Activity 6** 1. Convection 2. Conduction 3. Conduction 4. Radiation 5. Convection 6. Radiation 7. Conduction

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		**NOTES TO TEACHERS**
A. Evaluating Learning	**Formative Assessment** **Write the letter of the correct answer in your answer sheet.** 1. Which method of heat transfer involves direct contact between materials? A. Convection B. Radiation C. Conduction D. Insulation 2. What is the primary method of heat transfer in fluids (liquids and gases)? A. Conduction B. Convection C. Radiation D. Reflection 3. Which method of heat transfer can occur in a vacuum? A. Conduction B. Convection C. Insulation D. Radiation	**Answer Key:** 1. C 2. B 3. D 4. C 5. C 6. B 7. C 8. B 9. B 10. A 11. D 12. B 13. C 14. B 15. D

4. What is the main form of heat transfer from the Sun to the Earth?
   A. Conduction
   B. Convection
   C. Radiation
   D. Advection

5. In which process does warm air rise and cool air sink, creating a circulation pattern?
   A. Conduction
   B. Radiation
   C. Convection
   D. Evaporation

6. What type of surface is best at emitting and absorbing thermal radiation?
   A. Light, shiny surface
   B. Dark, matte surface
   C. Transparent surface
   D. Reflective surface

7. When you feel the warmth from a fire without touching it, what type of heat transfer is occurring?
   A. Conduction
   B. Convection
   C. Radiation
   D. Insulation

8. Why do metal handles of pots often have plastic or wooden coverings?
   A. To increase heat transfer
   B. To reduce heat transfer
   C. For aesthetic purposes
   D. To increase weight

9. Which method of heat transfer primarily occurs when boiling water on a stove?
   A. Conduction
   B. Convection

C. Radiation
D. Evaporation

10. Which method of heat transfer primarily occurs in solid materials?
A. Conduction
B. Convection
C. Radiation
D. Sublimation

11. What type of heat transfer is reduced by using double-glazed windows?
A. Conduction
B. Convection
C. Radiation
D. All of the above

12. In which heat transfer method do particles themselves move from one place to another?
A. Conduction
B. Convection
C. Radiation
D. Conduction and Convection

13. Which type of heat transfer is most significant in the heating of the Earth's atmosphere by the Sun?
A. Conduction
B. Convection
C. Radiation
D. Advection

14. Which of the following statements about radiation is true?
A. It requires a medium to transfer heat.
B. It can occur in a vacuum.
C. It only occurs in solids.
D. It is slower than conduction.

<table>
<tr><td></td><td colspan="3">15. Which of the following is best used when cooking to avoid burns?
A. Piece of carton
B. Rubber gloves
C. Mittens
D. None of the above

2. Homework (Optional)</td><td></td></tr>
<tr><td>B. Teacher's Remarks</td><td>Note observations on any of the following areas:</td><td>Effective Practices</td><td>Problems Encountered</td><td rowspan="4"></td></tr>
<tr><td></td><td>strategies explored</td><td></td><td></td></tr>
<tr><td></td><td>materials used</td><td></td><td></td></tr>
<tr><td></td><td>learner engagement/ interaction</td><td></td><td></td></tr>
<tr><td></td><td>others</td><td></td><td></td></tr>
<tr><td>C. Teacher's Reflection</td><td colspan="3">Reflection guide or prompt can be on:
▪ <u>principles behind the teaching</u>
What principles and beliefs informed my lesson?
Why did I teach the lesson the way I did?

▪ <u>students</u>
What roles did my students play in my lesson?
What did my students learn? How did they learn?

▪ <u>ways forward</u>
What could I have done differently?
What can I explore in the next lesson?</td><td>Teacher's reflection in every lesson conducted/ facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC sessions.</td></tr>
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