CANADIAN LEARNING COMPANY'S

Discussion Guide for

HEAT AND CHANGING STATES OF MATTER

OBJECTIVES

After viewing this program, students will be able to:

- Distinguish between heat and temperature.
- Analyze what happens to the potential energy in coal as it is burned.
- Account for the reason we cannot capture 100% of the energy released by burning coal.
- State the First and Second Laws of Thermodynamics in your own words.
- Give examples of the ways energy changes forms in our environment.
- Construct a mind map showing how molecular arrangement differs in solids, liquids, and gases.
- Compare heat of fusion and heat of vaporization.
- Explain why materials contract and expand as they change temperatures.

This program is part of the AIMS Interactive Science Essentials Series. This twenty-four part series covers four subject areas- Earth Science, Biology, Physics, and Chemistry. There are six programs in each subject area. The individual programs are divided into randomly accessible sections.

A glossary provides written definitions of terms used in the program, and in most cases will run a section of the video where the word is used in context.

A script of the narration is accessible, as well as a bulletin board containing a general introduction to the subject. A quiz allows the student to test their knowledge and the results are recorded for you. In the teacher's section you can view each student's test responses and edit or create your own quiz and test questions.

OVERVIEW

Heat and the Changing States of Matter is part three of the Physics Essentials series which examines modern day physics. The program explains how thermal energy causes matter to change states, expand and contract, and how thermal energy is transferred by convection, conduction, and radiation. It also looks at how different materials vary in their specific heat capacity and thermal conductance. These important concepts are illustrated by footage of steel mills, solar and geothermal power plants, wind farms, the flight of hot air balloons, and the latest 3-D animation.

TEACHER'S PREPARATION

- Before the student uses the program set up the computer so that they can easily reach the mouse and the keyboard.
- Load the CD-ROM into the computer so that it is ready for the student to begin using.
- While students are able to work at their own pace, some students may benefit from using the program more than once.

SUGGESTED DISCUSSION QUESTIONS

1. Distinguish between heat and temperature.

2. Analyze what happens to the potential energy in coal as it is burned.

3. Account for the reason we cannot capture 100% of the energy released by burning coal.

4. In your own words state the First and Second Laws of Thermodynamics.

5. Give examples of the ways energy changes forms in our environment.

6. Construct a mind map showing how molecular arrangement differs in solids, liquids, and gases.

7. Compare heat of fusion and heat of vaporization.

8. Explain why materials contract and expand as they change temperatures.

9. Discuss why the heat capacity of water makes it an excellent solar collector.

10. List and discuss the three ways heat energy can be transferred.

11. Compare conductors and insulators.

12. Evaluate the advantage of developing fusion type nuclear power plants instead of the current fission type.

13. Design a chart showing the advantages and disadvantages of alternate energy sources such as solar energy, geothermal energy, and burning city trash.

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HEAT AND CHANGING STATES OF MATTER

VOCABULARY LENGTH

Boiling	Calories
Conduction	Convection
Energy	Expansion
Friction	Gas heat capacity
Heat of fusion	Heat of vaporization
Insulator	Joules
Kinetic energy	Nuclear
Nuclear radiation	Resistance
Steam	Thermal

ADDITIONAL BENEFITS

Students will be able to: kinetic energy resistance

- Discuss why the heat capacity of water makes it an excellent solar collector.
- List and discuss the three ways heat energy can be transferred.
- Compare conductors and insulators.
- Evaluate the advantage of developing fusion type nuclear power plants instead of the current fission type.
- Design a chart showing the advantages and disadvantages of alternate energy sources such as solar energy, geothermal energy, and burning city trash.

PROGRAMS DETAILS

LENGTH:
25 minutes

SUBJECT AREAS:
Physics

AUDIENCE LEVELS:
Junior-Senior High

ORDER NUMBER:
1-9095SG

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