

Review Open-Notes Quiz and Steam Engines

Topic: Heat and Temperature

Date: 13 April 2010

Subject: Physical Science

Grade level: 8

NSES Standards:

Teaching Standard B: Teachers of science guide and facilitate learning. In doing this, teachers:

- Focus and support inquiries while interacting with students;
- Challenge students to accept and share responsibility for their own learning;
- Encourage and model the skills of scientific inquiry, as well as the curiosity, openness to new ideas and data, and skepticism that characterize science.

Teaching Standard D: Teachers of science design and manage learning environments that provide students with the time, space, and resources needed for learning science. In doing this, teachers:

- Structure the time available so that students are able to engage in extended investigations;
- Create a setting for student work that is flexible and supportive of science inquiry;
- Ensure a safe working environment.

Assessment Standard A: Assessments must be consistent with the decisions they are designed to inform:

- Assessments are deliberately designed;
- Assessments have explicitly stated purposes;

Assessment Standard D: Assessment practices must be fair:

- Assessment tasks must be appropriately modified to accommodate the needs of students with physical disabilities, learning disabilities, or limited English proficiency;
- Assessment tasks must be set in a variety of contexts, be engaging to students with different interests and experiences, and must not assume the perspective or experience of a particular gender, racial, or ethnic group.

Grades 5-8 Content Standard A: As a result of activities in grades 5-8, all students should develop:

- Abilities necessary to do scientific inquiry;
- Understandings about scientific inquiry.

Grades 5-8 Content Standard B: As a result of their activities in grades 5-8, all students should develop an understanding of:

- Transfer of energy.

SOL: The student will investigate and understand temperature scales, heat, and heat transfer. Key concepts include:
d) applications of heat transfer (heat engines, thermostats, refrigeration, and heat pumps).

Topic: Quiz and Conductors/Insulators

Intended Learning Outcomes:

- SW compare data taken yesterday with data taken today.
- SW investigate differences in materials by melting ice.

Daily Question: How can the most heat be transferred from the hot water cup to the cold water cup?

Procedures for Learning Experience	Guiding Questions	Materials Needed	Evaluation (Assessment)	Approximate Time
E ngagement/ E xploration: Students will complete WYW, which is 20 matching questions (broken into 4, 5 question sections) on the vocabulary for the unit.	What are you still having difficulty understanding?	Worksheet	Student participation	15 minutes
E xplanation: I have drawn two pictures on the board, one of a conductor and the other of an insulator. We will discuss the differences of these with the drawings, as another way of showing the students how heat is transferred more easily through a conductor than an insulator.	Why is a conductor better at moving heat than an insulator?	Drawings	Student participation	10 minutes
E xplanation: I will use a presentation to introduce practical applications of heat transfer, which include steam engines, heat pumps, and refrigerators. The explanation is not too in-depth, but enough to show where the heat is going in each scenario.	What are some practical applications of heat transfer?	Presentation software	Student notes	15 minutes
E xtension: Students will view a video from Safari Montage on steam engines. After completion, we will discuss how a steam engine works and why it is used.	Why is a steam engine used? How does a steam engine work?	Video	Student participation	15 minutes

Extension: Students will complete a study guide by Thursday and be homework for the next two nights.	What are you still having difficulty understanding?	Study guide	Student participation	Homework
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Notes:

Vocabulary: heat, temperature, molecules, kinetic energy, Kelvin, Celsius, Fahrenheit, absolute zero, phase change, bi-metallic strip, melting point, boiling point, conduction, convection, radiation, vaporization, condensation, thermostat, refrigeration, heat engine

Safety:

- None.

Differentiation:

- Multiple modalities: drawing, notes, video.
- Students with IEPs will have time with Mr. Prentiss tomorrow to complete study guide.

Technology:

- Presentation software.
- Video from Safari Montage.