

Gr. 7 - Understanding Earth & Space Systems

Heat in the Environment

Solar Cooking

Specific Expectations:

1.2 Assess the environmental and economic impacts of using conventional and alternative forms of energy.

2.1 Follow established safety procedures for using heating appliances and handling hot materials.

2.3 Use technological problem-solving skills to identify ways to minimize heat loss.

2.4 Use scientific inquiry/experimentation skills to investigate heat transfer through conduction, convection, and radiation.

2.5 Use appropriate science and technology vocabulary, including *heat*, *temperature*, *conduction*, *convection*, and *radiation*, in oral and written communication.

3.6 Explain how heat is transmitted through radiation, and describe the effects of radiation from the sun on different kinds of surfaces.

Big Idea (for lesson):

Students investigate an example of energy change by developing their own “solar cooker”, and look into evidence of chemical changes and their general effects on the environment.

Accommodations:

- Increase time
- Visual Aids
- Manipulatives
- Chunking
- Step-by-Step
- Scaffolding
- Copy of Notes
- Student Grouping

Differentiated Instruction:

- Content: Use demo to show the content as you offer verbal descriptions.
- Process: Have students work in pairs and support each other if physical impediments exist.
- Product: Students may show their final product in pairs, and communicate their findings either verbally, visually, or through written means.
- Other: _____

Bloom's Taxonomy:

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

Multiple Intelligence:

- Verbal/Linguistic
- Logical/Mathematical
- Visual/Spatial
- Bodily/Kinesthetic
- Naturalist
- Musical/Rhythmic
- Interpersonal
- Intrapersonal

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Delivering The Lesson:

Portion & Timing	Grouping:			Introduction:	Materials
Minds On: 10 mins	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	<p>Teacher can demonstrate the conduction of heat in water through a balloon demo. Ask students how they can explain this demonstration. (<i>Answer: The thin balloon lets the heat pass through very quickly and warms the water.</i>)</p> <p>-Would the entire amount of water heat up, or just the water near the bottom? (<i>Answer: The water disperses the heat by convection currents in the water.</i>)</p> <p>-Can you think of other situations where water is used to regulate heat? (<i>Answer: sweat to regular body temperature.</i>)</p>	Solar Cooker – Fire Water Balloon – Coolest Conductor of Heat.mp4
Action: 20 mins	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input checked="" type="checkbox"/>	<p>Have students build their Solar Cooker according to the instructions on the handout.</p> <p>Teacher can circulate and ask questions of the different groups:</p> <p>-What properties of air allow for a dehydrator to work? (<i>Answer: When air is heated, it rises.</i>)</p> <p>-What properties of the sun’s energy allow a dehydrator to work? (<i>Answer: Light energy passes through the glass pane and is absorbed by the dark surface, warming the chamber.</i>)</p> <p>-What properties of water allow a dehydrator to work? (<i>Answer: foods contain some amount of water, and when heated to a temperature nearing 100 degrees Celsius, this water will evaporate and prevent bacterial spoilage.</i>)</p>	Solar Cooker Handout (Materials listed)
Consolidate: 10 mins	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	<p>Teachers can end the class with a quick discussion of alternate sources of energy besides solar energy, and list the pro’s/con’s of these sources on chart paper (ie: biofuel, fossil fuels, wind, hydroelectric, nuclear, etc.)</p>	Chart paper Markers