

Gr. 5 - Understanding Earth & Space Systems

Properties of and Changes in Matter

Solar Cooking

Specific Expectations:

- 1.1 Evaluate the environmental impacts of processes that change one product into another through physical or chemical changes.
- 2.1 Follow established safety procedures for working with heating appliances and hot materials.
- 2.2 Measure temperature and mass, using appropriate instruments.
- 2.5 Use appropriate science and technology vocabulary, including *mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible change*, in oral and written communication.
- 3.3 Describe chemical changes in matter as changes that are irreversible.
- 3.7 Identify indicators of a chemical change.
- 3.8 Distinguish between a physical change and a chemical change.

Big Idea (for lesson):

Students investigate an example of a chemical 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: 15 mins	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	<p>Student introduced a specific scenario where we see a change of state of a slime substance. Let the students play with the mixture for a few minutes, asking them how it's like a solid and how it's like a liquid.</p> <p>Ask students to define viscosity. (<i>Answer: the measureable thickness or resistance to flow in a fluid.</i>)</p> <p>Have students slap the cornstarch mixture, and explain what happens. (<i>Answer: the impact forces the water between the starch chains to form a semi-rigid structure, since water cannot be compressed. When pressure is released, the mixture flows again.</i>)</p> <p>Ask students how this mixture is similar to quicksand? (<i>Answer: quicksand is a mixture of sand grains and water, similar to cornstarch and water.</i>)</p> <p>Based on how the cornstarch behaves, what is the best way to escape from quicksand? (<i>Answer: don't thrash about! Your weight causes you to sink, and you would only force yourself further down. Instead, move slowly to bring yourself to the surface, lie on your back, and try to slowly paddle.</i>)</p>	Solar Cooker – Cornstarch Goo – Cool Science Experiment.mp4 -Box of cornstarch -Large mixing bowl -Cookie sheet -Pitch of water -Spoon -Large Ziploc™ bag -Newspaper -Water -Foodcolouring
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> <ul style="list-style-type: none"> -What properties of air allow for a dehydrator to work? (<i>Answer: When air is heated, it rises.</i>) -What properties of the sun's energy allow a dehydrator to work? (<i>Answer: Light energy passes through the glass</i> 	Solar Cooker Handout (Materials listed)

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				<p><i>pane and is absorbed by the dark surface, warming the chamber.)</i></p> <p><i>-What properties of water allow a dehydrator to work? (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>	
<p>Consolidate: 5 mins</p>	<p>W <input checked="" type="checkbox"/></p>	<p>S <input type="checkbox"/></p>	<p>I <input type="checkbox"/></p>	<p>Have students discuss the benefits of different types of changes in matter, and how these changes are only possible due to the different properties of matter. (Ie: freezing foods to prevent bacterial development, etc.)</p>	