

Gr. 4 – Understanding Matter & Energy

Light and Sound

Kaleidoscope

Specific Expectations:

2.2 Investigate the basic properties of light.

2.4 Use technological problem-solving skills to design, build and test a device that makes use of the properties of light or sound.

2.5 Use scientific inquiry/research skills to investigate applications of the properties of light or sound.

2.6 Use appropriate science and technology vocabulary, including *natural*, *artificial*, *beam of light*, *pitch*, *loudness*, and *vibration*, in oral and written communication.

3.1 Identify a variety of natural light sources and artificial light sources.

3.2 Distinguish between objects that emit their own light and those that reflect light from other sources.

3.3 Describe properties of light, including the following: light travels in a straight path, light can be absorbed, reflected, and refracted.

Big Idea (for lesson):

Students will explore the properties of light and light sources, and will build a kaleidoscope that allows them to make use of these properties.

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

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Intrapersonal

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 show a colour wheel demonstration to introduce the idea to students that white light consists of all colours, or can show the video. Ask students what it means when the wheel appears white? (<i>Answer: As mentioned, light is all the colours at once, producing white.</i>)</p> <p>Why can you distinguish between colours when the wheel slows down? (<i>Answer: When the wheel spins up to the right speed, the colors blend into a near-recreation of white light. This "white" wheel is created because your eyes cannot keep up with the rapid rate at which the individual colors are spinning.</i>)</p> <p>Tell students that the light consisting of colours is a property to remember. Another important property is that of reflection!</p>	<p>Kaleidoscope – Disappearing Colour Wheel – Sick Science! #186.mp4</p> <p>(Glue, ruler, pencil, scissors, strong, red, orange, yellow, green, blue, and purple sharpies, cardboard, plastic cup, Styrofoam plate)</p>
Action: 15 mins	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input checked="" type="checkbox"/>	<p>Have students build their own kaleidoscopes according to the instructions on the handout. Teacher can circulate and ask questions of the different groups:</p> <p>-Do you think the images you see would change if your mirrors were curved? How so? (<i>Answer: Depending on if the mirror is concave or convex, the image will be stretched or pinched when it gets to their eyes.</i>)</p> <p>-How do you think your images would change if the marble was not covering the end of the kaleidoscope? (<i>Answer: some objects visible in the room through the tube may be reflected in as well.</i>)</p> <p>-Why does a mirror reflect light? (<i>Answer:</i></p>	<p>Kaleidoscope Handout (Materials listed)</p>

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				<p><i>Mirrors are usually made of silver, which doesn't absorb any colours of light. Other objects, such as our clothes, absorb all the colours except the ones we see (ie: a purple sweater reflects purple light, but absorbs everything else). A mirror reflects the entire light spectrum.)</i></p>	
<p>Consolidate: 10 mins</p>	<p>W <input checked="" type="checkbox"/></p>	<p>S <input checked="" type="checkbox"/></p>	<p>I <input type="checkbox"/></p>	<p>Show students the "Flying With A Mirror" demo, and see if they can explain how it works based on what they've learned on reflection. A fun way to end the class! See the following website for in-depth instructions and explanations: https://www.stevespanglerscience.com/lab/experiments/flying-with-mirrors</p>	<p>Mirror</p>