

# Gr. 1 - Understanding Matter & Energy

## *Energy in Our Lives*

### Windmill

**Specific Expectations:**

- 2.1 Follow established safety procedures during science and technology investigations.
- 2.2 Investigate how the sun affects the air, land, and/or water, using a variety of methods and resources.
- 2.3 Design and construct a device that uses energy to perform a task.
- 3.1 Demonstrate an understanding that energy is what makes the things they do or see happen.
- 3.2 Demonstrate an understanding that the sun, as the earth's principal source of energy, warms the air, land, and water; is a source of light for the earth; and makes it possible to grow food.
- 3.4 Identify everyday uses of various sources of energy.

**Big Idea (for lesson):**

Students investigate wind power as a source of energy, and connect it to the sun and everyday uses of that energy. Students design and test different models to see which catches the wind best to produce movement.

**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

**Delivering The Lesson:**

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Portion & Timing	Grouping:			Introduction:	Materials
<b>Minds On:</b> <b>10 mins</b>	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	<p>Teacher can do a demonstration to introduce how movement of water can do work by changing one type of energy to another. Follow the instructions here to build an easy water wheel:  <a href="http://howto.wired.com/wiki/Build_a_Plastic_Cup_Waterwheel">http://howto.wired.com/wiki/Build_a_Plastic_Cup_Waterwheel</a></p> <p>Ask students where the energy that lifts the pulley comes from? (<i>Answer: The force of the water turning the wheel.</i>)</p> <p>Ask students if they can think of any other sources of energy that are captured by turning wheels? (<i>Answer: Windmills!</i>).</p>	4 Styrofoam plates Pencil Stiff straw 9 small plastic cups Masking tape String Water container/ hose
<b>Action:</b> <b>15 mins</b>	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input checked="" type="checkbox"/>	<p>Have students build their own windmills according to the instructions on the handout. Teacher can circulate and ask questions of the different groups:</p> <ul style="list-style-type: none"> <li>-Besides wind and water, can you think of other places that energy comes from? (<i>Answers listed on handout.</i>)</li> <li>-What type of things do we use energy to do?</li> <li>-Is the energy from our windmill doing any real work? (<i>Answer: No, but we can make it do work with some adjustments.</i>)</li> </ul>	Windmill Handout (Materials listed)
<b>Consolidate:</b> <b>15 mins</b>	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	<p>With a little bit of preparation, you can have an electrical set-up that can be connected to the windmill. The instructions are found at the following website:  <a href="http://www.hometrainingtools.com/a/wind-energy-science-newsletter">http://www.hometrainingtools.com/a/wind-energy-science-newsletter</a></p> <p>-Explain to students that the addition of the motor makes it into a generator. Show students that electricity flows through and lights the bulb. Ask students what type of energy the spinning mechanical energy changes into? (<i>Answer: electrical energy, then light.</i>)</p> <p>-How is this set-up similar to real windmills? (<i>Answer: they have large-scale generators that also convert mechanical energy into electrical, and potentially light!</i>)</p>	Pinwheel windmill (from handout) Small electric motor Alligator clip leads 1.5 V bulb Strong fan