

Make it at Home – Pinwheel

The pinwheel we will be making is going to be a model of a wind turbine. Wind turbines help convert wind energy into electricity. As the rotor of the turbine spins, the movement of the blades drives a generator, which creates energy. The motion of the wind turbine blades is kinetic energy. Kinetic energy is the motion of waves, electrons, atoms, molecules, substances, and objects. It is what we end up converting into electricity that we use.



* WARNING: make sure to ask parents for help if you do not know how to use a push pin. It is sharp, so please be careful.

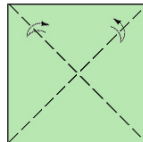
To create your pinwheel, first you will need to gather all your materials. Once you have all the materials in front of you, you are ready to begin.

MATERIALS

You will need to have:

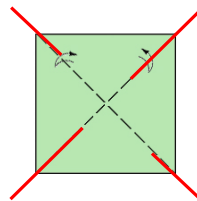
- 1.) 2-3 sheets of paper
- color paper preferred
- 2.) 1 wooden pencil
- Ex: a yellow number 2 pencil
- 3.) 1 round wooden skewer or a push pin
- 4.) 1 pair of scissors
- 5.) A hair dryer

- 1.) Cut a sheet of paper into a square. 8.5 inches by 8.5 inches is a recommended size.
- 2.) Fold the square diagonally, then unfold it. Fold it again along the other diagonal. The paper should now be a square with an 'X' crease. It should look like this:



(the dotted lines show where the creases should be)

- 3.) Cut the corners of the 'X', about 2 inches out from the center.



(cut where the red lines are)

- 4.) Carefully make a hole in each right side of the triangular cut slits (near the square's corners); you should have made 4 holes.
- 5.) Pick up each of the holes from each corner with the push pin from the back, so that they are all on top of one another. Stick the push pin onto the wooden pencil (the eraser part is an easy place to push it in).
- 6.) Blow wind onto the pinwheel with different levels of force to see how much it spins or doesn't spin.
- 7.) "For a differentiated activity, try using a hair dryer on the highest setting to spin the pinwheel. Is there any difference between blowing at the pinwheel lightly and the highest setting on a hair dryer?"

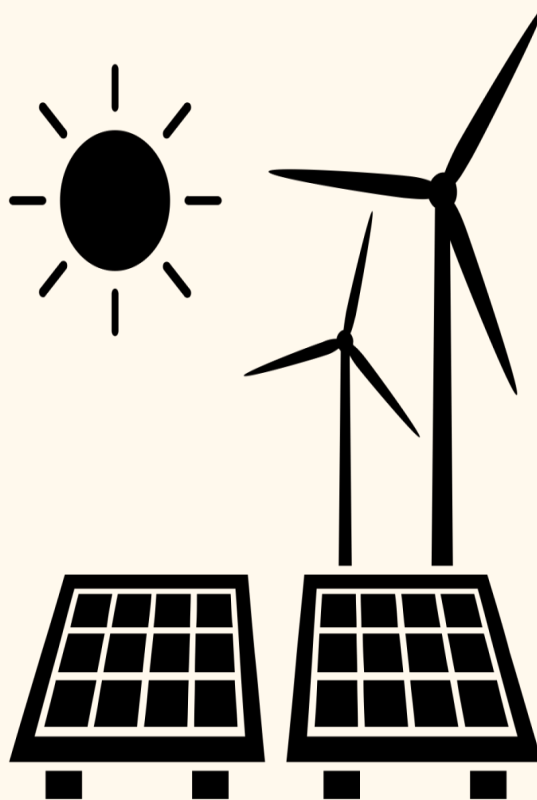
Energy In the Real World

Scavenger Hunt

Name: _____

INSTRUCTIONS

Print this sheet out and try to find an example of each type of energy in your surroundings. When you find an example, circle the energy name and draw or write what you found inside the box. You can also fill in the BONUS box with any type of energy that you want. You may complete this scavenger hunt inside your house, in your backyard, in the park, on the beach, or wherever you want! Please make sure that if you do go outside, you have an adult to supervise you. If you forget the meaning of one of these words, you can always refer back to Sections 1 and 2, or you can ask your guardian for help. Most importantly, make sure you have fun and stay safe!



Chemical Energy

Mechanical Energy

Light Energy

Electrical Energy

BONUS: Your Choice!

Sound Energy

Elastic Energy

**Solar or Wind Power
Energy**

Thermal (Heat) Energy

Energy

the ability to do work

Kinetic energy

the motion of waves, electrons, atoms, molecules, substances, and objects

Potential energy

stored energy and the energy of position

Mechanical energy

the energy which is possessed by an object due to its motion or its stored energy of position. It can be either kinetic or potential energy.

Gravitational energy

is energy that is stored because of an object's position or height above Earth's surface.

Elastic energy

is stored when materials stretch or compress. Examples include rubber bands and sling shots.

Heat energy

is the energy an object has because of the movement of its molecules, and heat can be transferred from one object to another object. It is also called thermal energy.

Friction

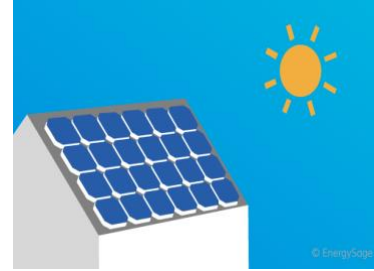
is the resistance of motion when one object rubs against another. Anytime two objects rub against each other.

Chemical energy

it is energy that is stored in the bonds between atoms and molecules.



Energy Lesson Plan: Post Test



1. Which activity was your favorite from the lesson plan?

Mark only one oval.

- Scavenger Hunt (Section 3)
- Painting Pendulum (Section 4)
- Academic Lesson (Section 5)
- Collision (Section 6)
- Pinwheel (Section 7)
- Rollercoaster (Section 7)

2. On a scale of 1-10 (1 being too easy and 10 being too difficult), how would you rank the academic lesson (section 5)?

Mark only one oval.

| | | | | | | | | | | | |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Too Easy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Too Difficult |

3. On a scale of 1-10 (1 being too boring and 10 being very fun), how would you rank the entire lesson plan?

Mark only one oval.

| | | | | | | | | | | | |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Boring | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Fun! |

4. Can you list 3 different vocabulary words that you learned through this lesson plan?

5. Please click the box next to the words and concepts that you are comfortable with.

Check all that apply.

- Energy
- Mechanical Energy
- Kinetic Energy
- Potential Energy
- Law of Conservation of Energy
- Isolated System

6. In your own words, what is energy?

7. What is the "Law of Conservation of Energy?"

8. What are the two types of energy that are included in mechanical energy?

Check all that apply.

- Kinetic Energy
- Solar Energy
- Electrical Energy
- Potential Energy

9. What other fun activities or lessons do you want to see?

10. Did this lesson plan help you grow more interested in physics?

Mark only one oval.

- Yes
- No
- Maybe

11. Would you consider studying physics in the future?

Mark only one oval.

- Yes
- No
- Maybe

12. How can we improve this lesson plan for future students? For example, you can say "Add more building activities."

