EXPERIMENT TIPS

How is a Pinwheel Like a Turbine?

This experiment appears in the section *Learn About Energy*.

Materials

Students will need the materials listed on their activity sheet:

- Plastic pinwheel on a stick
- Sink or running water
- Hot plate or stove top burner
- Teakettle
- Oven mitt
- A printed copy of this activity
- A pencil to write your answers

Objective

Students will observe various forms of energy transfer. When placing the blades of the pinwheel under a stream of running water, they will see the mechanical energy of water transferred to the mechanical energy of the pinwheel. When heating the teakettle on the burner, students will see the electrical energy from the burner change to heat (radiant energy) that is transferred to water. When students hold the pinwheel blades in the path of the steam and the blades turn, they will see that the mechanical energy of moving steam is transferred to the mechanical energy of the moving pinwheel blades.

Safety First

Students should be supervised by an adult while doing this experiment and should use an oven mitt.

Getting It Across

Have students read the information and follow the steps on the page. Explain that in this experiment, the energy source that was used to create the steam is whatever energy source is used to run the stove top burner: probably electricity or natural gas. In power plants, the steam that is used to run generator turbines can be created from a variety of energy sources, including coal, oil, natural gas, and nuclear power. Even geothermal energy and biomass can be used to provide steam.

Questions and Answers

1. Place the blades of a pinwheel under a stream of cold running water. What happens? (The blades turn.) What kind of energy transfer is taking place? (The mechanical energy of the water is transferred to the mechanical energy of the pinwheel.)

2. Fill the teakettle about half full of water and place it on the burner. Turn the burner on. What kind of energy transfer takes place as the water heats up? (Electrical energy from the hot plate changes to heat (radiant energy) that is transferred to water.)

3. What happens when you hold the pinwheel blades in the path of the steam when the kettle boils? (The blades turn.) What kind of energy transfer is taking place? (The mechanical energy of moving steam is transferred to the mechanical energy of moving pinwheel blades.) What kind of energy source did you use to create the steam? (Answers may include electricity, natural gas, or propane.) What kind of energy sources could be used to produce steam in a power plant? (Natural gas, coal, oil, geothermal energy, or biomass.)

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