All About the Uses Of Energy

Investigation Data Sheet

Energy for Children

Build A Model Steam Generator

Electricity is produced with special machines called generators. Generators spin and change mechanical energy into electricity. A common way to spin an electrical generator is with heat energy from steam. Water is heated up until it turns to steam, and then steam turns the generator. The result is electricity.

Objective

Build a miniature steam generator to explore how heat energy can be put to work to turn a steam-powered paddle wheel.

Materials

__ a plastic drinking straw
__ a tack
__ a piece of poster board or lightweight cardboard
__ 2 toothpicks
__ a long wooden dowel
__ a ruler
__ tape
__ scissors
__ a teakettle filled with water on a stove
__ an adult helper

Safety Notice: All applicable laboratory safety rules must be followed. Students should not perform any experimental activity without the teacher's supervision and express permission. Students must follow safety guidelines and wear appropriate protective gear.

Procedure

1. Use the tack to pierce two sets of holes completely through the straw about 3 cm from the top. Push two toothpicks through the holes of the straw so that they cross each other.
2. Cut out four squares of cardboard that measure about 5 cm in length and width. These squares will be the paddles for the paddlewheel of the model steam generator. Complete the paddlewheel by taping a cardboard paddle to each of the toothpicks that are inserted to the straw.
3. With the help of an adult, fill the teakettle with water and place it on the stove to boil.
4. Slip the straw of your paddlewheel over the end of a wooden dowel. The dowel will help you stay a safe distance from the teakettle when the water comes to a boil. Put your paddlewheel to work when you see steam escaping from the kettle. From a safe distance, hold the paddlewheel in the steam and watch what happens. Sketch and record your observations in the space below.

Conclusions

- What part of the mini-steam generator is an example of mechanical energy? Explain.

- How does this generator use heat energy and mechanical energy to work?

- What other forms of mechanical energy can be used to operate generators that produce electrical energy?