# ACTIVITIES

**Student Activities *continued***

9 harnessed for electricity to plan new ways to use anything that spins to generate power. For example, what everyday items could be potential generators? (Bicycles, egg beaters, fans, …) They can look on the Internet at sites like “www.instructables.com” to help them plan a new generator.

10 Groups should present their ideas, which should include a visual (sketch of the idea), a summary of their readings online, and citations. Advanced groups should calculate the amount of electricity they think their invention would create.



# TEACHERS GUIDE

## HAND HELD GENERATOR

**ITEM # 4225-00**

## ENERGY - ELECTRICITY

- How does a spinning object create electricity?
- What tasks can be made easier if one uses that spinning object and the electricity it creates?

Students can generate electricity for themselves with this hand-held generator made for DC power, up to 5 volts. They can convert their own mechanical energy into electrical energy, and apply these concepts to answer the questions above and more. Cranking wheel on the generator will light the small bulb. Students view the closed motor and set of four wheels inside clear, easy to hold plastic body. Additional lead wire attachment with crocodile clips included. Spare leads and gears available separately.

# Materials

- 4 hand-held generators with lead and bulb
- Internet access

# Goals & Objectives

**Students will:**

- create electricity by using the generator
- explain that energy always exists, but must be harnessed to use
- apply knowledge of kilowatts to calculate the approximate kilowatt hours this generator could provide

# Assessment

Use group participation, calculations, and presentations.

**Answers to calculations:**

**a** Equation is 5 Watts x 8 hours = 40 Watts, x 7 = 280 Watts, or .28 KWhs.

**b** Answers will vary depending on number of rooms. Assuming 3BR, 1B, LR, and K, the equations would be 6 rooms x 60 Watts = 360, x 6 hours =2160, x 7days = 15120, or 15.12 KWhs.

**c** Answers will vary, and must follow the above formula.

(You might want to point out that most bulbs these days are at least 100W, though some are using new technology to reduce energy consumption.)



 

# Activities

**1** Split students into 4 groups.

**2** Tell students that energy always exists, from several sources. Electricity can be converted from these sources, making electricity a secondary source of power.

**3** One way to harness energy and convert it to electricity is to use a generator.

**4** Ask volunteers to define what a generator is. (It converts mechanical energy into electricity using magnets to force electrons to jump atoms, creating current through coiled wire.)

**5** Write these steps on the board, and have students look to see what parts of this apparatus they can see through the clear plastic of the generator.

**6** Turn off the lights in the classroom. Let each group's members take turns cranking the generator's handle to light the bulb. Students can note that the faster they crank, the brighter the bulb lights.

**7** Tell students that the bulb is a 5-watt bulb. (They may still need to know that electricity is measured in units called watts.) If a household is using electricity, it is billed for the number of kilowatt hours. A kilowatt hour is 1000 watts used within one hour.

**8** Ask students to answer the following questions:
(You may want to discuss how to set up the equations if this is new or advanced for them.)

**a** If the bulb burned for eight hours a day for a week, how many kilowatt hours (KWhs) would it use?

**b** Assume you have one bulb in each room of your house that is a 60-watt bulb. If they remain on for 6 hours daily for one week, how many KWhs have you used?

**c** Guess how many bulbs you have in your house lit each day for approximately 6 hours. How many KWhs have you used?

**Note**

It is always best to DO an experiment ahead of time to be able to best present it to the class.

**9** Groups can use their knowledge that mechanical power can be

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