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Energy Use and Renewable Energy Activity Guide

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These four activities can be created as stations for a middle school class or summer camp. Children can be divided into 4 groups and cycle through the stations. Organized this way, it would take about 50-60minutes for a class to complete. Contact EOS to come to your class or camp today.

Solar Power

Materials: Model solar hot water heater, solar powered robots, lights, buzzer, fan, and cars, etc. Lamp with halogen bulb or access to sunlight.

What is solar power?

Solar power is energy from the sun. There are two kinds of solar power. The first is a solar cell, which turns sunlight directly into electricity. The light particles force electricity to start moving. Small solar cells are found on calculators and big ones can power houses! The second uses the sun's heat to warm the air or water. You can warm your home on a sunny day by letting the sun in. People also use solar panels to heat water. Solar energy is renewable because we aren't using it up. There's no pollution created when solar energy makes power or heat. Using solar power does not create greenhouse gasses, which are helping to warm our climate. Unfortunately, the sun is not available in the night, and very cloudy days limit the sun's powerful rays from reaching us. This means that it is not always available, but researchers are always improving batteries to store and keep the electricity generated from the sun. The price of solar panels is getting lower all the time.



Experiment with solar energy and record your answers below.

1. Place the water heater under the lamp or on a sunny windowsill. Record the starting temperature. Near the end of your turn, record the end temperature. How much did you increase the temperature by?

Start temperature: _____

End temperature: _____

Increase: _____

2. How can you make the solar gadgets move/spin/light up/buzz? What happens when you change the angle of the lamp (the sun)? Be gentle with the panel. Be sure to keep the lamp no more than 10cm from the panel!!

3. What do you think is good about solar energy? What could it be used for?

4. What might be some of its limitations to solar energy? Are there any downsides to using it? How could we make solar power even better?

Wind Power

Materials: Model wind turbine with voltmeter and gadgets to power such as buzzer and light, and access to wind or a fan to create wind indoors.



What is wind power?

Using the wind to create electricity has been around for a long time. When the wind turns the blades of a windmill they spin a magnet inside a coil of wire (called a generator), which makes tiny particles (called electrons) move and create a flow of electricity. A single windmill on a farm can make only a small amount of electricity, enough to power a few farm machines. To make enough electricity to power entire communities, power companies build "wind farms" with lots of wind turbines. Wind farms can be expensive and not everyone wants to live beside one. Wind energy is renewable (you can't use it up) and it doesn't create any pollution or greenhouse gasses, which are warming the planet and contributing to climate change. But the wind doesn't always blow.

Experiment with wind energy and record your answers below.

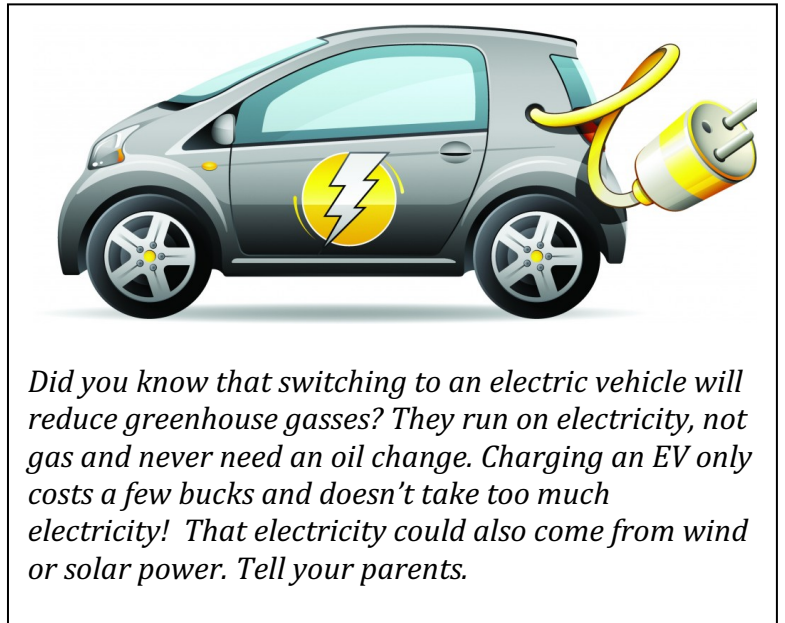
1. Can you make enough wind power to get the little fan, light and buzzer to work?
2. What happens when you add or take away blades? What happens when you change the angle of the blades? What is the best design for making the most power?
3. What was the highest amount of power your team was able to generate? (How many volts?)
_____ volts
4. What do you think is good about wind power?
5. What might be some of its limitations? Can you think of any downsides to wind power? How could wind power be designed differently to make it event better.

Saving Power at Home, School & in Your Community

Materials: Paper, markers, pencils and/or crayons.

What is electricity and why is it important to use less?

TVs, fridges and computers all use electricity. In order to make electricity you need a way to move a magnet inside a coil of wire. This is called a generator. The magnet forces tiny particles (called electrons) to move in the wire, creating a flow of electricity. One way to get a magnet moving and create electricity is with heat and steam. The heat from burning oil, natural gas or coal is a popular option. But this gives off dirty pollution and greenhouse gasses that are helping to warm the planet and change the climate. Most of the power made in New Brunswick is from coal, oil, diesel and nuclear powered stations. Only 28% comes from non-polluting renewable sources (wind, water and biomass). So it is important to try and use less energy at home.



Answer these questions together and think about how you can save energy at home.

1. What uses electricity in your homes? What gives off greenhouses gasses?
2. What can you do at home and school to use less power? (Look at some tips on the next pages.)

Now you can do one of these:

Make a Bookmark for Yourself

Design your own bookmark to help you remember how you will save energy at home.

Make a Poster for your School

Make a poster for your school to remind people to save energy.

Draw a picture of what you think our town will look like in 50 years!

Think about what your community will look like when you are much older. What kind of energy does it use? What kinds spaces are there? How big is it? What do the buildings look?

How much energy does it use?

Some communities are part of a national program called *Partners for Climate Protection* to save energy and reduce greenhouse gasses. Greenhouse gasses are created when fossil fuels (like gas, oil, coal and natural gas) are burned to create electricity or power a car. EOS Eco-Energy helps people save energy. First, it's good to know how much power certain things in our daily lives take.



Materials:

- Kilowatt meters (you can borrow some from your local library in New Brunswick!)
- A variety of small household appliances and gadgets such as lamps, radios, toaster, hair dryer, laptop, speakers, charging stations with phone, watches, etc.

What is a kilowatt meter?

A kilowatt meter measures how much power electricity appliances, gadgets, lights, etc use. The kilowatt meter shows us volts, amps and watts. Amperage (amps for short) is a measure of the AMOUNT of electricity used. Voltage (volts) measures the pressure, or FORCE, of electricity (in Canada it is always 120 volts). The amps multiplied by the volts gives you the wattage (watts), a measure of the WORK that electricity does per second. Set the kilowatt meter to watts to see how much power the devices on the table take to work.

Activity

1. What do you think takes the most power? State your hypothesis (a guess) to the group. Once you have your guesses, plug the kilowatt meter into the outlet and then plug an appliance into it. Be careful when plugging and unplugging appliances. Turn them off first.

2. What do you think takes the least amount of power? State your hypothesis to the group.

3. Were you right? What surprised you?