

HOW CAN WE USE LESS ELECTRICITY IN OUR CLASSROOM?

Teacher-led Activity

In this activity, students have the opportunity to explore the concept that electrical appliances change electrical energy into other forms of energy (heat, light, sound and movement). Students will identify all the electrical appliances they use in the classroom and identify what sort of energy each provides. As a group, they will discuss ways to use less electrical energy in the classroom and design and implement an action plan to reduce the use of electricity. They will be encouraged to take regular actions to save power and be energy efficient.

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1. INTENDED LEARNING OUTCOMES

The students will be able to:

- Name the electrical appliances that operate in a classroom
- Describe actions that can be taken to make the classroom appliances work more efficiently
- Describe and carry out a number of actions to reduce the amount of electricity used in the classroom
- State the class electrical safety rules and explain why they are needed.

2. WHAT YOU NEED

- A demonstration electrical circuit comprised of a battery, wires, a light bulb and a switch (see Figure 1)
- A torch
- Equipment for the students to use in groups to create a simple circuit of a battery, wires and a light bulb (optional extension)
- Large paper and felt pens to create a wall display

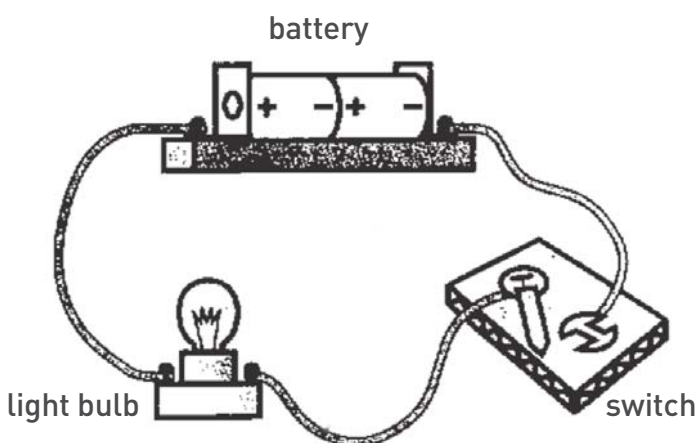


Figure 1: A simple circuit

3. FOCUS

Set up a demonstration electrical circuit. Use the circuit to clarify the understanding of electrical energy by asking the students questions like:

- What makes the light work?
- What happens to the battery's store of electrical energy?
- Will the light shine forever?
- Why might the light stop shining?
- Is there a way to make the light shine at night but not during the day?
- What do we use that has a battery and a light bulb?

4. MANAGING THE ACTIVITY

Part 1: Examining a Torch

Take apart a torch. Show the students the batteries, the bulb and the switch and explain that when the switch is turned on you have an electrical circuit.

- Ask the students what happens if you forget to switch off the torch.
- Explain that the battery is supplying electrical energy to this electrical appliance. This makes the torch give light. (The electrical energy is changed into light energy.) When all the stored chemical energy in the battery has been used, the bulb won't light up.
- Discuss the concept of an electrical appliance as something that uses electricity to provide heat, light, sound or movement.

HOW CAN WE USE LESS ELECTRICITY IN OUR CLASSROOM?

Part 2: Examining the Classroom

- (i) Set up a chart on paper that can later be displayed on the classroom wall. The chart should have four columns (see the example below):

| Classroom electrical appliance | What does it give us? (heat, light, sound, movement) | What is its source of power? | How can we save power? |
|--------------------------------|--|------------------------------|------------------------|
| | | | |
| | | | |
| | | | |

- (ii) Ask the students to name all the electrical appliances they can identify in the classroom and list them in the first column of the chart.
- (iii) Explain that the appliances might produce just one sort of energy but most produce more than one type of energy. The torch produces light and some heat. A heater produces heat, but it might also make a noise or glow red. A clock may have hands that move, and also make a ticking sound or glow in the dark.
- (iv) Work through the list of classroom electrical appliances with the students. Discuss what types of energy each appliance produces. List the responses on the second column of the chart.
- (v) Ask the students to name some different sources of electricity or things that provide electricity.

- This should be a simple discussion about batteries, mains electricity, solar power, generators and wind turbines. The discussion may include hydro electricity or thermal electricity generation
 - If your school does not use solar power, a simple way to introduce solar power in the classroom is to demonstrate a solar-powered calculator
 - Batteries are likely to be used in appliances in the classroom like watches, digital cameras etc.
- (vi) Discuss the source of classroom electricity. Find out if students are aware that the school gets the electricity from the power company and that the school pays for the electricity it gets.

HOW CAN WE USE LESS ELECTRICITY IN OUR CLASSROOM?

(vii) Check that all students understand that the power coming into the classroom's power points is 240 volts. This is strong enough to kill people.

(viii) Review your safety rules about the use of electricity in the classroom. You could make a wall display of the electrical safety rules.

Part 3: Conserving Power

(i) Ask the students why it is important to save power or reduce the use of electricity. List the answers on the bottom of the wall chart.

(ii) Go through the list of electrical appliances. Ask the students to decide when it is necessary to use each appliance. List on the fourth column of the chart what could be done to save power.

(iii) Ask the students to identify any appliances that must always be connected to a source of electrical energy. This list would include clocks, essential safety devices (smoke alarm, fire alarm system or emergency bell), or heater for a fish tank.

(iv) Ask the students to discuss other ways to reduce energy use. Some ideas could be:

- Turning off all appliances when they are not in use
- Not leaving appliances like video players on standby
- Using energy-efficient light bulbs

- Turning off the lights when you leave the room or when they are not needed
- Turning off the radio if you leave the room
- Turning off the computer at the end of the day or when it is not in use
- Reducing winter heater use by:
 - Wearing warm clothing in winter
 - Keeping heat in the room by insulating with curtains, carpet, bats and insulation in the ceiling, walls and floors
 - Keeping heat inside by closing doors and windows.

- (V) Develop and implement as a class a simple action plan to make sure that:
- Power is saved because the electrical appliances are used only when they are needed
 - The students use all electrical appliances safely.

5. REFLECTION

- Work as a class to review energy saving actions in the classroom, first daily and then at longer intervals.
- Discuss how effective the class was in using less electricity in the classroom – has there been a reduction in the power bill for the school that can be attributed to the student's efforts?
- Discuss what energy saving actions can be transferred to a home setting.

HOW CAN WE USE LESS ELECTRICITY IN OUR CLASSROOM?

6. EXTENSION

- Have the students work in groups to set up a simple electrical circuit involving a battery and a light bulb. (For guidance with this activity, see Ministry of Education, *Science Focus: Electricity in Making Better Sense of the Physical World (Levels 1 to 4)*, Learning Media, Wellington 1999.)
- Ask able students to use in-class and online resources to investigate other ways to save power or use less electrical energy in the classroom.
- Ask the students to work in groups to produce a brochure or a series of pictures that illustrate how to save power in a classroom. Present the illustrations and information to another class and encourage them to develop and implement an action plan to save power in the classroom.
- Ask the students to decide what they are going to do at home to reduce the use of electrical appliances and save money on the family's power bills.

7. SAFETY GUIDE

- Discuss the danger of electrocution.
- Establish or reinforce classroom procedures to ensure the students are safe when they are using electrical appliances in the classroom.

8. RESOURCES

- Teachers can find out more about how to conserve electricity from the Genesis Energy and Schoolgen websites: <http://www.schoolgen.co.nz/ee/> <http://www.genesisenergy.co.nz>
- For information about energy saving strategies, such as insulation, go to the Energywise website: <http://www.energywise.org.nz>
- Te Kete Ipurangi – The Online Learning Centre is the Ministry of Education's portal for Environmental Education – Education for Sustainability (EfS) resources: http://www.tki.org.nz/r/enviro_ed/
- The Landcare Research site CarboNZero provides tips for energy efficiency action plans: <http://www.carbonzero.co.nz>
- The Kiwi Conservation Club webpage is a useful resource for students: <http://www.kcc.org.nz/howcanihelp/electricity.asp>
- Ollie's World website provides useful energy efficiency resources for independent students: <http://olliesworld.com/>
- For guidance for setting up a simple electrical circuit involving a battery and a light bulb, see Ministry of Education, *Science Focus: Electricity in Making Better Sense of the Physical World (Levels 1 to 4)*, Learning Media, Wellington 1999.