

SAVING ELECTRICITY ...

CROSS CURRICULA ACTIVITIES ON AN ENERGY EFFICIENCY THEME FROM:

Curriculum Links

Social Sciences:

Using Energy as a context to understand how we can make wise decisions about our access to and use of the resources we have.

Science:

Identifying and describing everyday uses and examples of electrical energy and identifying the ways that we can make the most efficient use of this form of energy.

English:

Using energy efficiency as a practical context for developing skills in listening, reading, viewing, speaking, writing and presenting.

Links to Mathematics, Technology, and The Arts

Best suited to Curriculum Levels 2-4+



A HOME SURVEY

- For a fun and different type of homework assignment, have students conduct a room-by-room count of electrical appliances they have at home.
- Transfer results to a class master sheet including totals. What statements can they make by looking at the survey results, **eg** *the most common appliance is a refrigerator, and the least common is an electric chainsaw.*

ENERGY MATHEMATICS

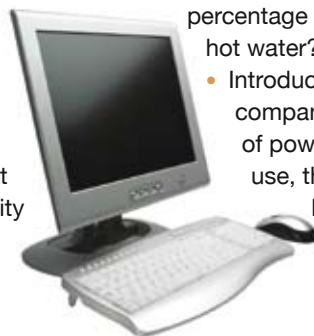
- A WATT (W) is how we measure the flow of electricity.
- A KILOWATT (kW) is 1000 Watts.
- A MEGAWATT (MW) is 1,000,000 Watts or 1000 kW.
- A KILOWATT-HOUR is a quantity of energy. If one kilowatt of electricity is used in an hour we call this one kilowatt-hour of electricity.
- Use 20 cents per kilowatt hour as a hypothetical power charge for student calculations.

DO WE TAKE IT FOR GRANTED? – TUNING IN

- Agree to use the word *appliance* as an easy generic name to describe any machine or implement that 'does work' or provides a service (lighting) around home and school.
- Have students look around the classroom. How many appliances and teaching aids (including computers and lights) can they see that are powered by electricity? How many of them are being used at present? How many are switched on but are not in use? List results.
- Divide students into groups and assign each group and area of the school (**eg** classrooms/office/caretakers shed staffroom...). The group task is to find out how many appliances/machines in each area are powered by electricity.
- Record and display the following information in an appropriate form such as tables, graphs, lists, or databases.
 - *total number of electrical appliances in each room*
 - *total number of electrical appliances in the school*
 - *most common electrical appliance/s used at school*
 - *average hours per day or per week used.*
- Have each student contribute to a wall chart master list outlining the uses we have for each appliance. Discuss how useful each appliance is and give it a 'usefulness' rating on a 1-5 scale. How essential do they think each appliance is? Is there a non-electrical substitute they could easily use instead?
- In groups have students speculate on how dramatically their everyday lives would change if there was no electricity.

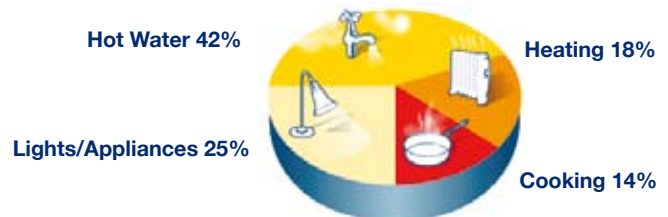
eg

- *what would they have to do without?*
- *how would their lifestyle change?*
- Debate the idea that we take our electricity supported lifestyle for granted.



HOW MUCH DO WE USE AND WHAT DOES IT COST?

- Put the energy maths to use by having students count the number of light bulbs they have at home. Assume they are 100W bulbs – that is it uses 100W every hour or 10 hours to use one kilowatt of power. Have students calculate the amount of power used per hour if all of the lights were left on at the same time.
- Tell students that it is convenient to list four categories to show where the power goes in a typical household – hot water; heating; lights/appliances; cooking. Have them guesstimate what percentage of power is used in each category. Share the percentages below with students.



- Were they surprised at the percentage of power we use for hot water?
 - Introduce the idea that power companies charge us per kilowatt hour of power we use and that means the more we use, the more it will cost our household. How could students make use of this information to save power and to save money? Discuss.



... IT JUST MAKES SENSE!

INTRODUCING ENERGY EFFICIENCY

- Thinking of their own household or classroom as an example, what 'off the top-of-our-head' actions taken will immediately cut down on the amount of power being used but not affect their lifestyle or classroom environment greatly – if at all? Why do they think that cutting down on power usage is a sensible idea?
 - *it costs us less*
 - *we don't have to generate as much.*
- How aware are the students of the recent publicity about reducing our power consumption across the country? What problems do we have? What is the main cause and what could be the consequences? **eg**
 - *low lake levels means we can't generate as much hydro electricity as we normally do.*
- Introduce the concept of energy efficiency as 'making the best use of and making a saving on all the energy we use at present in our homes and at school.
- Introduce the following idea for discussion and comment:
 - *the simplest way to reduce and save energy around the home is to turn off anything that doesn't have to be switched on or is not being used.*
- Share and have students react to the following fact: *In the USA, it has been calculated that the equivalent of 7 nuclear power stations are in constant use just to power computers which are switched on but not being used.*

POWER SAVING WEB RESEARCH PROJECT

www.mercury.co.nz/savepower

- Divide the class into research groups – Heating, Cooking, Lighting and Appliances, and Hot Water. The group task is to conduct online research using the *Where does the power go?* section of the Mercury Energy website. Have groups pay particular attention to the no cost energy saving hints. Were they surprised at how easy it is to save power? Groups report their findings back to the class and complete a written summary for a class display.
- Have groups work through the *Room by room* tips for a more detailed savings advice. Add to the list.
- Develop the idea that if we know how much per hour an appliance uses or how much it costs to run it per hour, we would be able to take actions that could cut down on our power usage. Have groups work through this section of the website. List appliances and/or normal everyday activities from most to least expensive.



- From this information, challenge students to make a preliminary list of simple steps they could take at home that would make savings on the power we use. What immediate steps can they take in the classroom and school to make power savings?

LET'S TAKE POSITIVE ACTION

- Print out sufficient Savings Checklists for each student. Have them work through the list and identify any areas or actions that they and other family members could take to make immediate savings.
- As a homework assignment, have students use the checklist and website ideas to conduct an energy audit at home. Report back on what they found, **eg**
 - *are there appliances that are not switched off at the wall when not in use?*
 - *do families know that by switching off pilot lights on TVs and DVD players, they can make power savings?*
- Have students work through the checklist and website with family members and report back on actions their family is taking to become more energy efficient.
- Introduce the idea that changing people's long term behaviour can take time. Suggest that a 'one room at a time' could be a good way to start at home to get the energy efficiency message across.
- Tell students that a good campaign always has an on-going evaluation. Brainstorm ways they could track how effective their campaign is being, **eg**
 - *long term monitoring of power accounts for savings*
- To get the message out to other students at school, have students design a series of posters that highlight simple power saving actions that they can take. What other methods could be effective? **eg**
 - *slogans*
 - *mini-dramas*
 - *shoot a DVD*
 - *family fridge reminders*
 - *awards at assembly*
 - *community flyer*
 - *saving tips for the class website ...*

FURTHER DIRECTIONS

- Visit: www.energyeducation.co.nz for:
 - *Science Lesson Plans*
 - *History of Electricity*
 - *Energy Information Projects*
 - *Projects and Experiments*
 - *Electrical Safety*
 - *Games*
 - *Energy information in Te Reo*



Source: Mercury Energy www.mercury.co.nz