Learning Experiences

Integration key — E = English, M = Maths, S = Science, H = History, G = Geography, A = Arts

Lower primary		Middle/Upper primary	
Environmental		**Environmental**	
• Investigate heat and light energy from the sun by standing for five minutes in the sun (ensuring sun safe routines are observed), recording the sensation of heat on the body then standing in the shade.	E, M, S	• Explore how various forms of energy, from the simple to the complex are essentially sourced from nature either in the present (wind) or from the past (oil)	H, S, G
• Identify and explore sources of energy used in our lives.	S, M	• Explore how chemical energy is supplied naturally by the environment and how we utilise it for our daily needs.	S, G
• Conduct experiments that show how plants need and respond to light, including photosynthesis.	G, S	• Construct a systems diagram showing how fossil fuels were formed and how their release of CO2 relates to global warming and possible climate change.	S, G, E, M
• Explore examples of chemical energy outside in a natural area (for example, saltwater corroding iron, limestone cave formation, the smell of mangroves and other examples in the playground or neighbouring environment).	S, E		
Economic		**Economic**	
• Investigate ways of saving or reducing energy use in the immediate environment (for example, turning off lights when leaving a room, turning off lights in a room that is well lit by sunshine).	G, E	• Examine energy alternatives of geothermal, tidal, solar, wind and biofuel.	G, E, S
• Explore various forms of energy used in the home and school and how they meet specific needs (for example, heat energy from the stove cooks our food).	E, S	• Use graphic organisers to understand energy production on a large scale. Draw on a variety of information sources including excursions to power stations, hydro-electric dams, wind farms and the like to observe and experience energy production in the real world and in context.	S, A, E, M
• Track the energy inputs that are required for making everyday items (for example, bread, milk, tea, a shoe, T-shirt and so on). Display energy use charts.	A, E, S, G	• Undertake design activities and introduce tasks to utilise a renewable energy source.	G, M
• Explore how people have kept themselves warm from early times up to the present.	G, S, H, E	• Identify and mark on a map the developed and developing nations. Record their energy fuel sources as a percentage breakdown.	G, A, E, S
– *Which ones have cost money?*		• Compare statistics in the form of graphs, tables and charts. Include looking at pictures from space of the world at night.	M, S, G
– *Which ones are the most economical?*			
Social		**Social**	
• Identify sources of energy used in our lives.	S, E, G	• Design and produce storyboards, videos, stop animation films, books, posters and billboards that illustrate the history of energy technology from its rudimentary beginnings to the large scale power plants in operation today.	E, G, S, A
• Find examples of where and how human beings have altered the environment to meet their energy needs (for example, air conditioners to cool a room, fridges to preserve food, damming rivers for hydro-electricity).	H, S, G	• Imagine and record visions of a future world with no fossil fuels.	G, E
• Pose 'what if' scenarios and record ideas, solutions, thoughts and feelings about adapting to a required change (for example, imagining there was no more electricity).	E, S, G		

Energy Audit and Action Process

The energy audit process outlined below is best undertaken by middle and upper level primary students. However, with greater teacher support and guidance some aspects of the audit process could be carried out by lower primary students.

Conducting an on-site energy audit

You could conduct an energy audit of your school by looking at your school's monthly energy bills over the course of the year alone, but this would not provide a means for identifying which locations and buildings have the highest and lowest energy use, or which rooms contain the highest energy consuming items. This method would not deliver a detailed energy profile of the school and determining the areas of need would be more difficult. A more comprehensive energy audit, as outlined below, will tell you how much, why and where energy is used in the school. Some schools elect to have an outside auditing team come into the school to carry out the energy audit, but this excludes the students from the entire process and denies them the opportunity to develop deep understandings and ownership of the sustainability action process.

Start by discussing the possibility of conducting an energy audit day at a staff meeting. Explain the process (see below) and gain the support of all stakeholders to secure an appropriate day and time for carrying out the audit. To conduct the audit, students will need to interview teachers, students and other school workers about how long and how frequently electrical items are in use in every room of the school.

The energy audit is best done all in one day as some members of staff may find it a bit disruptive. It is important that the whole school knows the day on which the audit is to take place, its purpose and how the information will be used by the students. It is crucial that all ancillary staff, including the canteen helpers, have been informed and know what has been planned. Failing to keep everyone informed about what is involved could cause problems for the audit and disrupt people unnecessarily.

TIP*: If possible, take digital photographs and video all through the audit process of students carrying out various steps as this will prove to be an excellent resource when compiling the audit presentation, as well as providing a visual diary of the process.*

Energy bill tracking

1 Collect a year's worth of your school's energy bills. Have students examine the bills and discuss their features.

2 Using the information from the bills, construct a table that records the month, kilowatts consumed, greenhouse gas emissions and cost.
For example:

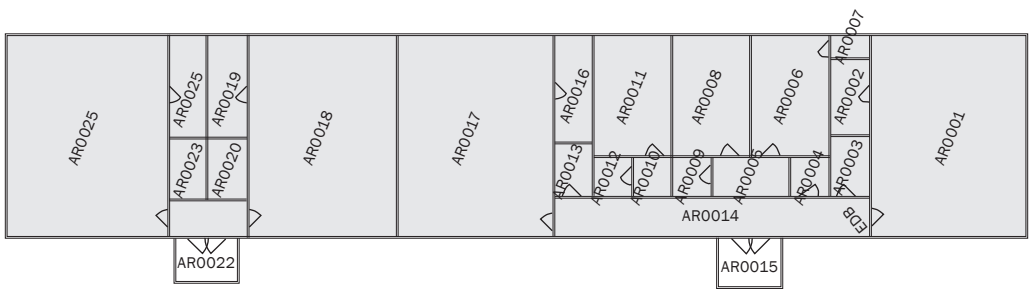
School Energy Bill Profile: 20_ _												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
kW												
CO2 kg												
Cost $												

Once completed, the energy bill tracking table can be used to compare periods of highest and lowest use. It can also be used to make comparisons later, when energy reducing and efficiency actions have been implemented.

School capture maps or blueprints

3 Obtain copies of the school capture maps or blueprints. Capture maps are scale floor plans of all buildings in the school with a coding system for every room, storeroom and amenity that builders, plumbers and other workers refer to when carrying out building works. Usually the principal or office staff will have such maps on file. If other school maps or blueprints are used, have students create a code for each room of the school.

4 As a class or in small groups have students mark on the map which rooms are occupied by specific classes and teachers. Continue to label each room according to its function or who uses the room, for example, general assistant's shed, canteen, sick bay, principal and so on. Colour-code each building block to make recording audit data easier.



Sample of part of a school capture map, including codes for each room.

CHAPTER 5 Waste

Waste by definition is:
Anything left over or superfluous, as excess material or by-products. Waste occurs in different forms and can be known as rubbish, trash, refuse, garbage or junk. It consists of human unwanted or useless materials.

Systems

Some components of waste have economic value – they can be recycled, re-used or reduced. These are the three Rs of waste, but some people say there is one more R to consider – refused. This means, for example, deliberately choosing not to buy products that have unnecessary packaging, thus lessening the volume entering the waste stream. In other words 'avoid' it. The waste cycle can be presented as a hierarchical system with avoid or refuse at the top, then descending in order of priority to reduce, re-use, recycle to finally, the least desirable, deposited waste in landfill.