

UNIT OF WORK - ENERGY

OVERVIEW

Introduction

The Units of Work created to support the Ollie Saves the Planet Program supplement learning from the CD ROM and provide a curriculum structure for teachers to plan classes based on these Units of Work.

These units are integrated with the activities found on the Ollie Saves the Planet CD ROM and Website and include the following:

- Unit 1 Sustainability
- Unit 2 Waste (1)
- Unit 3 Waste (2)
- Unit 4 Water
- Unit 5 Energy
- Unit 6 Air
- Unit 7 Biodiversity

This Unit of Work has been created specifically for this website. For a complete set of the Units of Work and some further information on the value of environmental education refer to the Ollie Saves the Planet CD ROM.

To order your copy of the CD ROM go to Ollie's Website Shop at www.olliesworld.com/html/shop.htm.

Process of Learning

"The development of thinking and problem solving skills is an important objective of education for a sustainable future, especially given the urgency of problems facing the world today. These skills can be taught and enhanced through enquiry learning". (UNESCO, Teaching and Learning for a Sustainable Future, 2002)

This Ollie Saves the Planet Unit of Work is designed on the enquiry learning process and incorporates a range of forms - including analysis, problem solving, discovery and creative activities - both in the classroom and in the community. Within this Unit of Work, students are presented with relevant background data to enable them to explore a local issue. The investigation of a local issue encourages students to process the data they are working with in order to reach their own conclusions.

Problem solving provides students with an opportunity to practice the skills needed to find solutions to the local issues that concern them. This helps to develop the important citizenship objectives of learning for a sustainable

future and integrates skills - for both students and teachers - of using experiential and enquiry-based strategies. It also integrates skills in the planning of values clarification and values analysis with the possible solutions, so students can take action to help work towards a sustainable future.

This Unit of Work covers the issue of Energy and has been written to fit into a number of teaching styles, enabling teachers with access to only 2 or 3 computers to have all the students working on the unit simultaneously (See below for further details on classroom set-ups). This unit lends itself to student directed learning. The role of the teacher in this unit is to facilitate the learning process.

How to Use the Units of Work

This Unit of Work is structured in the following way:

Section A: Background Information

This section will provide background information for the Unit of Work. The information will allow teachers to plan and organise learning opportunities for their class and provide suggested ways to present the information in the Unit of Work. The Background Information is comprised of:

- Part 1: Goals & Objectives
- Part 2: Links to Curriculum
- Part 3: Preparation Checklist
- Part 4: Assessment
- Part 5: Locating information from the Ollie Saves the Planet Program
- Part 6: Resources and Links

Section B: Unit of Work

This Unit of Work is designed to promote enquiry-based learning and encourage students to change behaviour to reduce their impact upon that particular issue. This Unit of Work is designed so that:

1. Teachers lead *Part 1: Introduction* and *Part 2: Scene Setters* to provide students with the skills and knowledge to explore a local issue.
2. Having completed the Introduction teachers are encouraged to facilitate the learner centred process provided from *Part 3: Identifying a Local Issue* through to *Part 8: Reflection*.

This Unit of Work is comprised of:

- Part 1: Introduction
- Part 2: Scene Setters
- Part 3: Identifying a Local Issue
- Part 4: Investigate
- Part 5: Vision
- Part 6: What Can We Do?
- Part 7: Lets Do It?
- Part 8: Reflection
- Part 9: Additional Activities
- Part 10: Appendix - Integrated Unit Planner

Alternative Classroom Set-ups

The Educator is also provided with a range of alternative ways to use the Ollie Saves the Planet Program, depending on how their school's computer resources are made available to students. If students can only access a small number of computers in another room away from the classroom - e.g. in a library - use a similar setup to that suggested for the classroom in Alternative Three.

Alternative One – Most work completed within a computer room

One way to use *Ollie Saves the Planet Program* is to have the students complete only the activities on the CD. The CD contains activities and projects for students to complete in each section. There are many info screens to assist in research and some suggested websites to refer to. Teachers should consider completing the prior learning activities in *Part 1: Introduction* and *Part 2: Scene Setters* with the students before beginning a topic on the CD. Student's learning experiences can be brought together at the end by doing the concluding activities in *Part 8: Reflection*.

Alternative Two – Alternating between a computer room and classroom

Each unit of work provides many additional classroom activities that support the activities on the CD. Book your students into the computer room to complete the CD activities. Use the additional activities in one of the following ways:

1. Select activities and have all students work together through these activities.
2. Set up activity stations with different activities around the classroom and have students progressively work through each activity.
3. Allow students to select a number of activities offered in each unit of work and assist them to set up and complete the activities.

Alternative Three – Complete work in a classroom that has several permanent computers

Set up activity stations with different activities around the classroom and have students progressively work through each activity. The three or four computers become one of the activity stations. If more computer time is required to complete the projects, consider sending students to the library computers or completing the projects without using a computer. For some units of work you may like students to choose which activities they do?

Links to Curriculum

The Ollie Saves the Planet Units of Work have been developed for teachers at Level 3, 4 and 5 in Australia. Although they are based on the Australian school curriculum they are still suitable for educators in community groups or parents to use to facilitate learning in the area of the environment.

“Teaching about sustainability emphasises critical and creative thinking, problem solving, decision making, analysis, co-operative learning, leadership, and communication skills. As a result, it is a very good way of achieving educational objectives without adding to the problem of curriculum overload”.
(UNESCO, Teaching and Learning for a Sustainable Future, 2002)

The Units of Work have been designed so they can be *integrated* into the existing curriculum rather than creating a new subject area. The Units of Work should be viewed and used as *interdisciplinary* in nature and therefore meet the needs of the following subject areas:

- Science
- English
- Maths
- Geography
- Social Science
- Information Technology
- Art
- Personal Development: group work and critical thinking.

Each Unit of Work will have a large language component and will set the scene for using the Ollie Saves the Planet CD, working on the units, exploring the internet and designing web pages.

A range of Additional Activities will be included at the end of each Unit of Work. This section is a useful resource for teachers keen to explore the particular issue further or provide additional learning opportunities for the students.

Preparation Checklist

Use this checklist as a guide to ensure that the students' involvement in actions to help the environment meet local regulations and all health and safety guidelines.

- Does the Principal or School Council need to be informed prior to the activity?
- What information may they require?
- Do local authorities, landowners, neighbours, etc need to be informed or to be part of the process?
- Is permission from parents required?
- Have all health and safety issues been addressed?
- Are the relevant health and safety issues fully understood by all students?
- Do students understand and comply with the school's code of conduct?
- Do you need further advice in setting up the projects?
- Do you need to discuss any issues with a second educator?

Assessment

Each Unit of Work contains examples of where teachers can assess the students' understanding and interpretation of the material being explored. A Blooms Taxonomy and Multiple Intelligence Activity Grid has been provided for each Unit of Work as a guide to the types of learning that aim to take place during each activity. This could be used as a guide to assessing the learning achieved by students throughout the Unit of Work.

"...assessment (is) an integral part of students' day-to-day schooling rather than a series of end-of-course tests. This goal is especially important in education for a sustainable future because of the wide range of objectives concerned with knowledge, skills, values/attitudes, and action".
(UNESCO, Teaching and Learning for a Sustainable Future, 2002)

Each Unit of Work provides suggested assessment pieces that take place throughout the learning process rather than at the end of the Unit in the form a written test. Use these as an ongoing guide to gauge the students' level of understanding and knowledge of the Unit of Work.

ENERGY – UNIT OF WORK

1. GOALS & OBJECTIVES

Aim:

- Students will understand the importance of energy and how it is part of their lives

Objectives:

- To highlight some of the issues in relation to energy production and energy use.
- To investigate a local energy issue to understand the implications of these energy issues on their lives.
- To develop strategies to reduce the classes impact upon on a particular local issue.
- To develop a personal commitment to reducing individual impacts on environmental energy issues.

2. LINKS TO CURRICULUM

This Unit of Work is designed to be integrated within the curriculum and can be infused into other areas of the curriculum rather than creating a whole new subject.

The Energy Unit specifically relates to the following areas of the curriculum:

Energy Unit Section	Subject Area
Introduction	English, Information Technology, Social Science
Scene Setters	English, Social Science, Geography
Issue	Science, Social Science, Geography, English
Investigation	English, Geography
Vision	Art, English, Social Science
What Can We Do	English, Science, Geography, Information Technology
Lets Do It	

Energy Unit Section	Subject Area
Reflection	English
Additional Activities	English, Information Technology, Science, Geography, Social Science

3. PREPARATION CHECKLIST

Remember to check the general Preparation Checklist in the Unit of Work Overview, prior to any activities. Specifically for the Energy Unit you will need to prepare the following:

Energy Unit Section	Preparation	Materials Required
Introduction	1. Read through the Energy info-screens and become familiarised with the Energy Activities and Projects. 2. Organise computer access	1. Computers 2. Learning journal 3. Whiteboard 4. Marker pens 5. Writing materials
Scene Setters		1. Colour pencils 2. Poster paper 3. Whiteboard 4. Watch/stopwatch, measuring tape or trundle wheel (Activity 1) 5. Tape measure, calculator (Activity 3)
Issue	1. Identify in the local area a relevant energy issue (you may like to ask your local council for assistance or recommendation of a local issue).	
Investigation	1. Book the local library or school library 2. Organise a guest speaker 3. Organise a field trip to local council or environment centre	
Vision	1. Organise access to Art materials or Art room.	1. Poster paper 2. Paint 3. Art desks 4. Textas 5. Crayons
What Can We Do		
Lets Do It		
	1. Organise exercise books to be used	

Energy Unit Section	Preparation	Materials Required
Reflection	as Learning Journal	
Additional Activities	1. Organise computer access (Activity 1 only)	1. Computers (Activity 1) 2. Learning journal 3. Whiteboard 4. Marker pens 5. Writing materials

4. **ASSESSMENT**

Assessment for Energy focuses on relating learning with the measurement and reporting of what students have achieved. This relationship helps make assessment an integral part of students' day-to-day schooling rather than a series of end-of-course tests (*UNESCO 2002, Teaching and Learning for a Sustainable Future: A Multi-media Professional Development Programme*).

The Energy Unit of Work consists of the following possible assessment pieces:

Energy Unit Section	Assessment Piece
Introduction	
Scene Setters	
Issue	1. Presentation of Issue
Investigation	1. Issues Report
Vision	1. Art Poster
What Can We Do	1. Action List
Lets Do It	
Reflection	
Additional Activities	

5. ENERGY CONTENT FROM OLLIE SAVES THE PLANET CD ROM

- **Activity –Reduce Energy Activity (Multiple choice questions)**
- **Activity –Energy Unscramble Activity (Unscramble word game)**
- Activity – Waste to Energy Activity (Rollover information diagram)
- Supplementary activities –
 - Arcade Energy Game (turning off lights game)**
 - Arcade Word Puzzles**
 - Arcade Quiz
 - Rita's Challenge (Resource Use Activity)
- **Project - Energy (Wise Energy Use, Turn it Off Song)**
- **Project - Energy Audit (Energy Audit for the Home, Wise Energy Strategy)**
- **Info-screens – Energy,**
 - and waste**
 - conserving energy**
 - energy use in Australia**
 - facts and figures**
 - hydroelectricity**
 - making energy from fossil fuels**
 - nuclear**
 - other renewable energy sources**
 - saving energy at home**
 - solar**
 - turning waste into energy**
 - what is it?**
 - wind**
 - Fossil fuels,**
 - burning fossil fuels**
 - facts and figures**
 - fossil fuels – renewable or non-renewable resource?**
 - in Australia**
 - mining for fossil fuels**
 - what are fossil fuels?**
- The Ollie Saves the Planet website has a regularly updated list of Energy Resources and Links.

Note: The **bolded** activities and info-screens currently appear on this website. For access to the full range of activities refer to the Ollie Saves the Planet CD ROM. To order your copy of the CD ROM go to Ollie's Website Shop at www.olliesworld.com/html/shop.htm.

UNIT OF WORK - ENERGY

1. INTRODUCTION

Teachers Instruction:

1. Go to the *Energy Info-screens* and read the information provided in the 11 info-screens.
2. Students can then complete some or all of the following activities:

Activity 1: Reduce Energy CD ROM/Website Activity

- Ask students to complete activity, which is a series of multiple choice questions based on the info-screen content.

Activity 2: Energy Unscramble CD ROM/Website Activity

- Ask students to complete activity, which is a word unscramble based on energy words and definitions from info-screens.

Activity 3: Strike Me Lucky!

- Materials: blackboard or white board and student writing materials
- Set the scene by saying “Imagine that all workers who help to produce energy have gone on strike. To keep the classroom safe, all electricity and gas has been turned off for 24 hours.”
- Discuss as a class, or divide students into groups to discuss one of the questions and then report back.
- Make lists of the following:
 - How would the classroom be affected at this very moment?
 - What other changes would occur in the school without any energy?
 - How would getting up and getting ready for school this morning have been affected?
 - Would there be any problems getting to school or going home?
 - What will be affected when you get home in the afternoon or evening?

Once lists have been made, discuss how we rely on the use of energy.

Activity 4: Energy Glossary

- Student instructions: As a class, make a glossary of energy-related words that students are not familiar with. Display this in a prominent position.

2. **SCENE SETTERS**

The following activities reinforce the learning that has taken place in the Introduction. Scene setters consists of a series of activities that the teacher leads and aims to generate discussion about a particular energy issue.

Teacher Instructions:

The following activities have been provided for you to use with your students. The aim is to generate discussion about a particular energy issue.

There are more scene setting activities contained within the Ollie Saves the Planet CD ROM.

Activity 1: Run, Run, Run

- Materials: Watch/clock or stopwatch, measuring tape or trundle wheel.
- Preparation: A safe area outside where students can run; measure 100 metres and place a marker at either end.
- Student instructions: We use a lot of energy to heat our buildings. However, our bodies are able to heat themselves. When people feel cold, they can turn on the heating, put on a jumper or choose to do something active. You can use this activity to find out how long it takes to feel warmer by being active and how long body warmth lasts.
- Teacher instructions: Ask each student to run back and forth (at their own speed) between the 100 metre markers. Record the time each student starts their run and then use the stopwatch to record how long it takes for them to feel warm. Once they are warm ask them to stop. Record the distance they ran and describe how fast they ran. When they start to cool down, calculate how long they were warm.
- Discussion: Do you think that going for a quick run is a good alternative to turning up the heater?

Activity 2: Design a Sign

- Student instructions: People can reduce their energy use by switching off appliances, lights and other things when they are not being used. However, people often forget to do this. To remind people to turn things off, you can make a small 'reminder' sign. Choose an appliance that is often left on e.g. a light, TV or computer. Make a small sign that can be stuck near the power switch. Make sure that signs aren't placed on heaters - because of fire risk.

Note: There are more scene setting activities contained within the Ollie Saves the Planet CD ROM.

3. IDENTIFYING A LOCAL ENERGY ISSUE

Teacher Instruction:

Identify in your local area a relevant energy issue that would be suitable for the students to explore. You may like to ask your local council for assistance or recommendation of a local energy issue. Alternatively, the first task would ask the students in groups of 5 to select a local energy issue. Some examples of these could be:

- Local environmental effects of hydro-electricity dams, wind farms, coal-burning power stations or other local energy production methods.
- Energy usage within the school.
- Energy usage at a local shopping centre, sports ground or business.

Student Activity:

In groups of five you need to identify a local energy issue. As a group you need to present to class your energy issue and describe why you have chosen that issue.

4. INVESTIGATION

Teacher Instruction:

In groups of 5 the students are to spend time researching their particular issue. You may like to visit the school library, local library etc... You may ask the local council or environment centre people to visit the class to provide information to the students.

Student Activity:

In groups of five the students must investigate the energy issue and present a one page report on the following:

1. Title of energy issue
2. What is the environmental energy issue
3. Why is it an environmental issue

5. VISION

Teacher Instruction:

- The aim of this activity is for the students to develop a vision for the environmental energy issue they have investigated.
- Ask the students to paint or draw a picture or plan of what they would like the place they are investigating to look like in 50 or 100 years time. Encourage the students to use lots of colour and imagination – there are no right or wrong answers.

- The completed posters would be useful to spread the message around the school. The students could present the poster at school assembly and posters could be hung around the school corridors.

Student Instruction:

1. Imagine it is a hundred years into the future. Picture what the local energy issue looks like.
2. Draw or paint on large poster paper what it looks like on one half of the paper.
3. On the other half of the poster draw or paint what you would like it to look like.
4. Present to the class your poster and describe what you have drawn and why.
5. Hang these posters up within the classroom.

6. WHAT CAN WE DO?**Teachers Instructions:**

- The aim of this activity is for the students to develop an action plan of what they could do to achieve the sustainable vision they have created for their energy issue
- Ask the students to develop a list of at least 3 and no more than 5 things they could do to help reduce their impact on their particular issue
- Develop a class list of actions and this can become the students' *code of action*.

Student Instruction:

1. Look at your vision and think of how you could help to reach your vision.
2. Develop a list of the things you do that contribute to the current state of the environmental energy issue
3. Develop a list of no more than 5 things that you can directly do to help to reach your vision
4. Hand into your teacher to compile the class list.

7. LET'S DO IT**Teachers Instruction:**

- The aim of this activity is to encourage the students to implement the list of actions they developed in the last activity.
- Provide the students with the class *code of action*.
- Discuss as a class code of action and work how people are going to implement these actions.

- Provide regular class time to discuss the class *code of action* and assist where possible the students efforts to implement there actions.

8. **REFLECTION**

Teachers Instruction:

- The aim if this activity is to provide students with the opportunity to reflect on their investigation and their action plan.
- Ask students to create a Learning Journal. This could be a plan exercise book that students could decorate with energy and environmental pictures. The Learning Journal becomes the place where any work done within this unit goes – posters, list, reflections
- Write on the board 3 questions:
 1. What did we want to change?
 2. Did it change?
 3. What would we do differently next time?
- Ask students to reflect on this Unit of Work and write answers down to these questions in their Learning Journal. There are no right or wrong answers

9. **ADDITIONAL ACTIVITIES**

There are additional activities provided for you to use with your students on the Ollie Saves the Planet CD ROM. The aim of these activities is to generate discussion about a particular energy issue.

10. **BLOOMS TAXONOMY**

The Ollie Saves the Planet CD ROM also contains an Integrated Unit Planner based on the Blooms Taxonomy Multiple Intelligence Activity Grid. This identifies six levels of cognitive complexity that can be used to make sure that instruction stimulates and develops students' higher-order thinking skills.