waste for a sustainable future P–10 overview

Big Understandings

1. **Waste is a resource. It comes in many forms. Most waste can be avoided, reduced, reused and recycled.**

2. **Products and materials have a life cycle.**

3. **Waste impacts on our environment and society.**

4. **Effective waste management supports a healthy environment.**

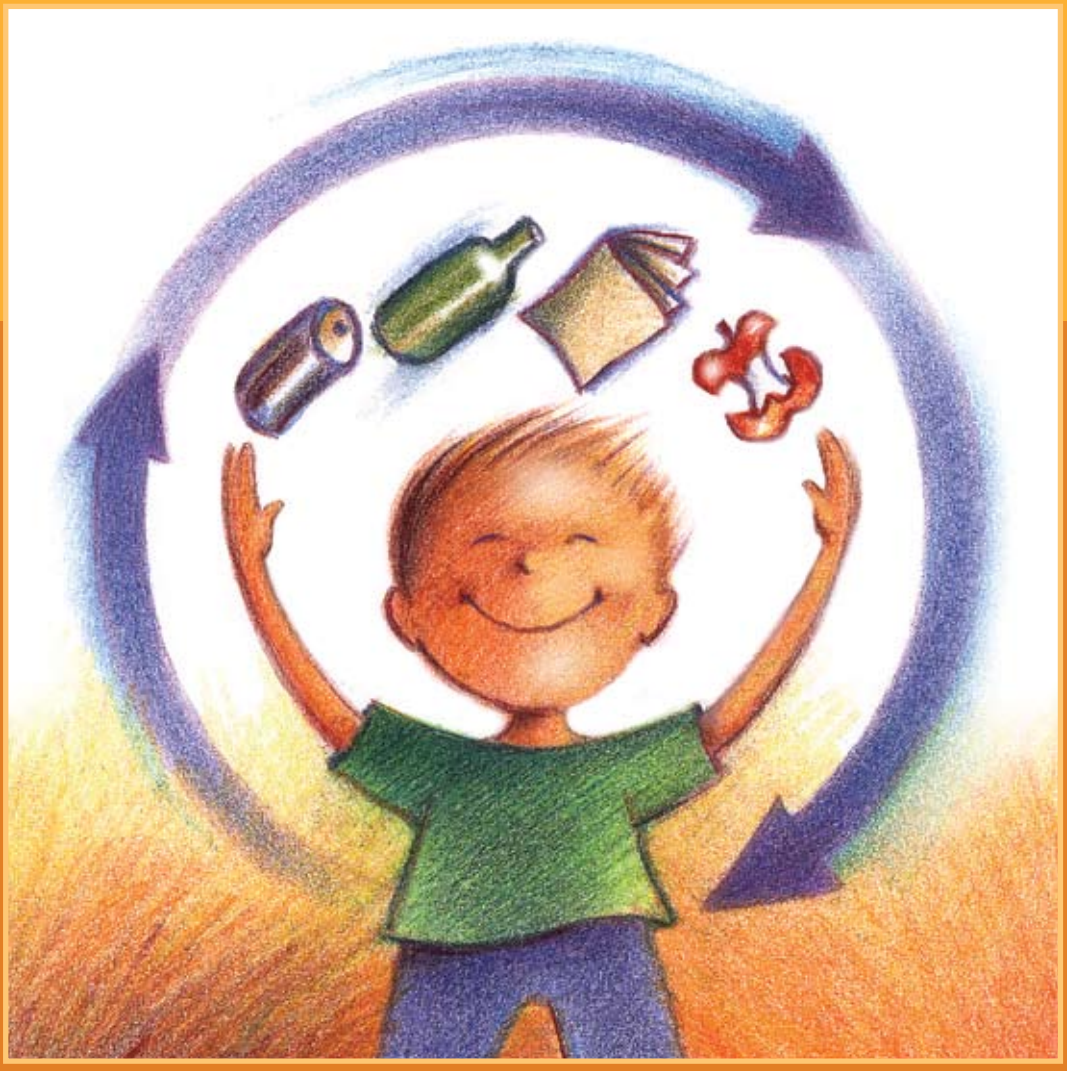
5. **In the ACT sustainable waste management practices address where waste comes from, how we use it, where it goes and how we can make a difference.**

Unit Description

Early Childhood P-2	Later Childhood 3-5	Early Adolescence 6-8	Later Adolescence 9-10
This unit of work is designed to raise awareness in students about: • what waste is • how waste is generated • where waste goes Students will learn about the following key components: • refusing, reducing, reusing and recycling • impact on the school and home environment • how an individual and groups make a difference	This unit of work is designed to raise awareness in students about: • how waste can be transformed • peer pressure, power of consumerism and media influence on choice • how waste has a significant impact in their life and their future Students will learn about the following key components: • life-cycle of waste • make considered decisions to promote a sustainable future • effective waste management practices	This unit of work is designed to raise awareness in students about: • assessing and evaluating attitudes about waste practices • consumerism and choices we make • waste management locally, nationally and internationally Students will learn about the following key components: • science of materials • life-cycle of waste • the effect waste has on the environment and social justice issues • sustainable waste management practices	This unit of work is designed to raise awareness in students about: • environmental values and attitudes held by individuals and groups in society • ethics of marketing, packaging and possessing Students will learn about the following key components: • extraction, processing, manufacturing, distribution, marketing, purchasing • local, national and international policy, programmes, regulations and practices

waste for a sustainable future P–10 overview

waste
for a sustainable future



early childhood
years P–2

Australian Sustainable Schools Initiative - ACT

waste for a sustainable future

Class: Preschool to Year Two

Band of Development: Early childhood

Duration: Suggested 2-3 hours per week over 10 weeks

Teacher:

School:

The format for this unit of work is based on the **Kath Murdoch** model for integrated inquiry. The Essential Learning Achievements and Essential Content have been selected from the ACT Department of Education and Training, Curriculum Framework, *Every Chance to Learn*.

Unit Description:

This unit of work is designed to raise awareness in early childhood students about:

- what waste is
- how waste is generated
- where waste goes

Students will learn about the following key components:

- refusing, reducing, reusing and recycling
- impact on the school and home environment
- how an individual and groups make a difference

Big Understandings

1. Waste is a resource. It comes in many forms. Most waste can be avoided, reduced, reused and recycled.
2. Products and materials have a life-cycle.
3. Waste impacts on our environment and society.
4. Effective waste management supports a healthy environment.
5. In the ACT sustainable waste management practices address where waste comes from, how we use it, where it goes and how we can make a difference.

Values and Attitudes

In early childhood, students have opportunities to develop values and attitudes about:

- appreciation of the intrinsic value of the natural world and the need to preserve the diversity of ecosystems for future generations
- respecting and caring for life in all its diversity
- responsibility as consumers and citizens to conserve and manage environmental resources and natural heritage in ways that are fair to both present and future generations
- optimism for the future through participating in informed, positive action to address local, national and global issues relating to environmental sustainability

Essential Learning Achievements covered in this unit are ELA 2, 3, 19 and 20. Essential Content has been selected from the early childhood band of development.

ELA 2 the student understands and applies the inquiry process

Essential Content

In early childhood, students have opportunities to understand and learn about:

- explore inquiry as a useful process for creating knowledge and understanding the world around them

In early childhood, students have opportunities to learn to:

- ask questions and identify possible sources of information to seek answers
- make predictions or conjectures related to their everyday experience and think through ways to test them
- make observations about what is happening around them using all their senses
- follow suggestions to collect and record data or information from a small range of sources
- learn how to use appropriate tools and equipment safely to make measurements and record information
- follow suggestions to order and present data or information
- attempt to convince themselves and others about whether their findings are true
- share and communicate observations, results, ideas and understandings

ELA 3 the student makes considered decisions

Essential Content

In early childhood, students have opportunities to:

- be aware when they have a choice
- ask for advice when making a decision or a plan
- delay a decision until they have thought about it
- identify a criterion for making a good decision ('I'll know that I've made the right choice if ...')
- notice if someone else has been affected by their decision
- set a small number of goals
- make decisions and put them into effect in authentic situations as part of activities or themes in the school's curriculum

ELA 19 the student understands and applies scientific knowledge

Essential Content

In early childhood, students have opportunities to understand and learn about:

- scientific aspects of their everyday activities and applications of science in their own lives (e.g. uses of energy in the home, ball games, pet care, decisions influenced by weather) and the place of science in the work of people in the community

Matter

- observable properties of common materials In a variety of everyday objects
- how changing familiar materials may change their properties (e.g. heating, cooling, mixing)

Earth and space

- some of the ways in which living things depend on the Earth and are affected by its changes

ELA 20 the student acts for an environmentally sustainable future

Essential Content

In early childhood, students have opportunities to understand and learn about:

- elements of the natural environment that humans, animals and plants need for survival
- different living things in their local environment and some observable relationships between living things and their environment
- how people cooperate to care for and respect places in a community
- why it is important to conserve resources, protect the environment and participate in positive environmental action

In early childhood, students have opportunities to learn to:

- observe and record changes evident in their own local environment, both natural and those caused by human action
- share responsibility for the quality of their immediate environments and for resource conservation
- use their imagination to generate preferred future scenarios in relation to particular aspects of their local environment

Worthwhile Learning

Schools may choose to include other worthwhile learning linked to the ELA 20 and 22. For example:

Related topics or themes:

- global waste issues and making connections
- waste comes in different forms (Solid, Liquid, Gas)
- making “sustainable” good decisions/ choices - needs versus wants
- generating a scientific language e.g. organic, renewable, non-renewable
- convenience purchasing

Tuning In

Outcomes

What understandings will my students have at the end of the Tuning In stage?

What they know about waste.

Waste is a resource.

People generate waste at school and at home.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- ask questions and identify possible sources of information to seek answers
- make observations about what is happening around them using all their senses
- share and communicate observations, results, ideas and understandings

ELA 19 understands and applies scientific knowledge:

- observable properties of common materials In a variety of everyday objects

ELA 20 acts for an environmentally sustainable future:

- different living things in their local environment and some observable relationships between living things and their environment

Assessment

What evidence will there be that they have learnt?

Completed Topic Wheel with pictorial and text responses.

Select an item of waste and share how to transform it into another resource. For example, a yogurt container can be used as a pencil holder.

Design and create a Trash Monster using 'treasures' collected from waste materials.

Mind map that illustrates who and what makes waste.

Strategy

What is/are the most effective strategy or strategies to teach this?

Brainstorm.

Think, Pair, Share.

Making lists.

Formulate questions.

Design and make.

Representing ideas visually, pictorially and through sculpture.

Sharing ideas and working cooperatively with others.

Read and select interesting facts.

Activity

What is the best vehicle to deliver the learning?

Use bin contents to demonstrate and introduce waste. Tip bin onto tarpaulin and visually explore contents.

Whole class brainstorm and discussion.

What is waste?

Who makes the waste?

Is there any 'treasure' in this waste?

Guided questioning to clarify a shared definition of waste.

Back to Back/Face to face to encourage discussion about focus questions.

Use Topic Wheels to record prior knowledge and questions:

Things I feel about waste...

Things I know about waste...

Things I want to find out about...

Ways I could find out ...

Read texts such as *The Lorax* by Dr Zeus, *World-Wise Waste* by Caren Trafford.

Finding Out

Outcomes

What understandings will my students have at the end of the Finding Out stage?

Waste resources need to be classified and sorted.

The Materials Recovery Facility (MRF) is where recycling occurs.

Landfill occurs when we cannot recycle waste resources or we choose not to.

Landfill impacts on our environment.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- explore inquiry as a useful process for creating knowledge and understanding the world around them
- follow suggestions to collect and record data or information from a small range of sources
- share and communicate observations, results, ideas and understandings

ELA 3 makes considered decisions:

- be aware when they have a choice
- ask for advice when making a decision or a plan

ELA 19 understands and applies scientific knowledge:

- how changing familiar materials may change their properties (e.g. heating, cooling, mixing)

ELA 20 acts for an environmentally sustainable future:

- observe and record changes evident in their own local environment, both natural and those caused by human action
- why it is important to conserve resources, protect the environment and participate in positive environmental action

Assessment

What evidence will there be that they have learnt?

Pre-Excursion orientation: share and compare ideas and expectations of exploring the MRF.

Make a collage of the four categories using junk mail advertising pictures.

Excursion reflection or PMI on the excursion.

Represent pictorially or orally their understandings of the journey of waste resources.

Strategy

What is/are the most effective strategy or strategies to teach this?

Questioning and inferring.

Locating and selecting.

Working cooperatively.

Explaining.

Representing ideas in a range of different ways.

Identifying and making choices.

Reading and viewing.

Reflecting.

Activity

What is the best vehicle to deliver the learning?

Sort and classify waste from classroom bin into four categories: paper, mixed recyclables, organic and landfill. Use the posters from the Sustainable Schools Website to help students classify items.

As a class, follow a piece of waste resource from each category in our school. Plot the journey so far of the waste resource. (Complete this pre-excursion to the MRF.)

As a class design a simple graph to gather the information. Model using information gathered from classroom bins.

Students classify and sort waste resources found in their home.

In small groups, share data collected from home and draw conclusions.

Excursion to MRF Education Centre.

Continue to plot the journey of the waste resource (post excursion).

Ollie Saves the Planet DVD.
Individual or whole class inquiry.

Use interactive whiteboard to access information and engage in interactive tasks.

Guest Speaker from Waste Wise.

Sorting Out

Outcomes

What understandings will my students have at the end of the Sorting Out stage?

Personal and collective choices about waste as a resource.

Disposal of waste.

The impact waste has on the environment.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- explore inquiry as a useful process for creating knowledge and understanding the world around them
- contribute to planning and conducting simple investigations by asking questions and seeking answers through observing, experimenting, engaging with information in texts, discussing ideas with others and using ICT
- learn how to use appropriate tools and equipment safely to make measurements and record information
- share and communicate observations, results, ideas and understandings

ELA 3 makes considered decisions:

- set a small number of goals

ELA 20 acts for an environmentally sustainable future:

- why it is important to conserve resources, protect the environment and participate in positive environmental action recycling
- how their local environment changes over time

Assessment

What evidence will there be that they have learnt?

List findings and make conclusions to determine how much of their waste resource went to landfill at school and at home.

Place captions on the photos to explain best practice.

Make useful oral contributions to discussion about waste resource disposal.

Discuss personal choices made to depict the impact of positive and effective waste management.

Strategy

What is/are the most effective strategy or strategies to teach this?

Working cooperatively.

Presenting.

Identifying and making choices.

Developing analytical skills.

Apply information gathered.

Explore feelings, values and attitudes.

Review and revisit understandings.

Activity

What is the best vehicle to deliver the learning?

Compile a class graph with data collected about the types of waste resources found. Discuss alternative uses for waste resources.

Introduce the concept of 'Refusing'.

Role play making good choices with waste resources.

Taking photos of people modelling positive choices with waste resource and place photos around the school.

Collage, dioramas or model of an area in the environment, which has not been affected by waste pollution, e.g. pond, playground or beach.

Play the consequence game. Use scenarios about waste and where they are going to put their waste. Analyse and argue about what waste management is.

Write a rap or chant about managing waste resources effectively. Listen to the 'Ollie rap' on Ollie Saves the Planet to scaffold by providing a model.

Information report about the data collected.

Going Further

Outcomes

What understandings will my students have at the end of the Going Further stage?

Waste resources should be reused or recycled where possible to reduce impact on the environment.

Ways that waste resources are reduced, reused and recycled.

Use information to identify issues and continue to make considered and positive decisions.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- contribute to planning and conducting simple investigations by asking questions and seeking answers through observing, experimenting, engaging with information in texts, discussing ideas with others and using ICT
- share and communicate observations, results, ideas and understandings

ELA 20 acts for an environmentally sustainable future:

- why it is important to conserve resources, protect the environment and participate in positive environmental action
- share responsibility for the quality of their immediate environments and for resource conservation

Assessment

What evidence will there be that they have learnt?

List or draw understandings and questions on Topic Wheels.

Articulate and reflect on their allocated project topic.

Comment on visual representations and presentations of peer projects.

Transform waste resources into another useful product. E.g. plaiting or weaving plastic bags to make a mat.

Strategy

What is/are the most effective strategy or strategies to teach this?

Discussion.

Construction.

Cooperative learning.

Inferring and classifying information.

Reflecting and making positive choices.

Reporting.

Reading and writing.

Visual aids.

Individual/Group/Class projects.

Negotiating with others.

Comparing and contrasting personal data collected.

Activity

What is the best vehicle to deliver the learning?

Revisit Topic Wheels and add any new information, ideas or questions using a different coloured pencil.

Use questions to brainstorm possible topics for further research and individual projects.

Show that you understand recycling. I now know that ...

What might be produced as a result of this learning? I can ...

Allocate topics to individuals, pairs or small groups. Jointly construct clear criteria that explicitly describe the quality of work expected for the task. Projects to be completed and presented to class.

Whole class model for establishing and maintaining waste station in class or other agreed site.

Group/pair projects could include establishing and maintaining, worm farms, compost bins, making waste information posters and displaying around school.

Making Connections

Outcomes

What understandings will my students have at the end of the Making Connections stage?

We need to manage waste resources appropriately.

Recognise the benefits of refusing, reducing, reusing and recycling waste resources.

Ways one person can make a difference.

The need for a communal effort to manage waste resources effectively.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- explore inquiry as a useful process for creating knowledge and understanding the world around them
- make predictions or conjectures related to their everyday experience and think through ways to test them
- share and communicate observations, results, ideas and understandings

ELA 3 makes considered decisions:

- ask for advice when making a decision or a plan

ELA 19 understands and applies scientific knowledge:

- scientific aspects of their everyday activities and applications of science in their own lives (e.g. uses of energy in the home, ball games, pet care, decisions influenced by weather) and the place of science in the work of people in the community

ELA 20 acts for an environmentally sustainable future:

- why it is important to conserve resources, protect the environment and participate in positive environmental action

Assessment

What evidence will there be that they have learnt?

Students make a Bloom's Box. Use sentence starters of keywords that directly link with framework provided in activity column.

Share their Bloom's Box with peers.

Reflection of Laying It on the Line:

Why do we think about things so differently?

How do our beliefs and values influence our decisions and actions?

How and why do our actions change?

How and why do our values change?

Strategy

What is/are the most effective strategy or strategies to teach this?

Multiple Intelligences activities.

Making connections.

Accepting and responding to feedback.

Linking cause and effect.

Making inference and generalising.

Summarising and reflecting information.

Providing feedback.

Restating view.

Higher order thinking skills.

Activity

What is the best vehicle to deliver the learning?

Revisit Topic Wheel and add new information in different colour.

Bloom's Box

Make a large dice using card and write the following questions.

Knowledge: What have I learned about waste resources?

Comprehension: How do you reduce or recycle waste resources?

Application: What can be recycled?

Analysis: What would happen if we didn't manage waste resources properly?

Synthesis: How can we make a difference?

Evaluation: How have my ideas changed about waste resources?

Why have my ideas changed?

Where do I go from here?

Roll the dice and encourage a range of responses.

Laying it on the line

Students state and justify opinions. Prepare four signs reading: Strongly disagree, Disagree, Agree, Strongly agree. Place along a line. Read about a variety of statements, e.g. "It is alright not to recycle". Students move to their preferred position. Conduct some on the spot interviews with them asking them why they have chosen that position.

Taking Action

Outcomes

What understandings will my students have at the end of the Taking Actions stage?

We can all take positive action to promote effective waste resource management.

Ways one person can make a positive difference.

Factors that will help to maintain a sustainable environment.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- attempt to convince themselves and others about whether their findings are true
- share and communicate observations, results, ideas and understandings

ELA 20 acts for an environmentally sustainable future:

- how people cooperate to care for and respect places in a community
- why it is important to conserve resources, protect the environment and participate in positive environmental action
- share responsibility for the quality of their immediate environments and for resource conservation

Assessment

What evidence will there be that they have learnt?

Share 'raps' at assembly or with peers in other classes.

Share findings from school and home audit and use to data to guide future action plans.

Design a personal action plan identifying how they will make a positive difference.

Create a list of waste wise tips and advertise them around the school.

Strategy

What is/are the most effective strategy or strategies to teach this?

Discussion and consider options

Informing others

Mini campaign in the school/classroom/unit

Design and publish

Listing

Conducting audits

Planning and presenting

Communicating with others

Activity

What is the best vehicle to deliver the learning?

Conduct waste audit on a designated area of the school or home.

Share findings.

Compare and contrast findings from initial audit from home and school, e.g. Venn diagram.

Develop an action plan for the school - include aspects such as:

- Reduce packaging for products sold in the canteen
- Package free lunch days
- Implement waste stations across school community
- Place posters and slogans designed by students around the school to refuse, reduce, reuse and recycle waste resources
- Students share what they have been learning in an assembly
- Contribute tips about how to manage waste effectively in the school newsletter

Sharing Discussion and Reflection

Outcomes

What understandings will my students have at the end of the Sharing, Discussion and Reflection stage?

Waste is a resource.

Waste can be refused, reduced, reused and recycled.

Waste impacts on our environment and society.

The effective management of waste supports a healthy environment.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- share and communicate observations, results, ideas and understandings
- attempt to convince themselves and others about whether their findings are true

ELA 3 makes considered decisions:

- notice if someone else has been affected by their decision

ELA 20 acts for an environmentally sustainable future:

- why it is important to conserve resources, protect the environment and participate in positive environmental action
- use their imagination to generate preferred future scenarios in relation to particular aspects of their local environment

Assessment

What evidence will there be that they have learnt?

Contribute to class pledge to set future goals.

Design and create a Personal Pledge.

Reflect on learning journey.

Respond to the following questions in pictures, words or writing.

What is waste?
How is waste generated?
Where does it go?
Something I can do to reduce waste is ...

Strategies

What is/are the most effective strategy or strategies to teach this?

Discussion.

Recording and designing.

Justifying current understandings, values and attitudes.

Responding to the work of others.

Continue to set goals.

Activity

What is the best vehicle to deliver the learning?

Sharing circle

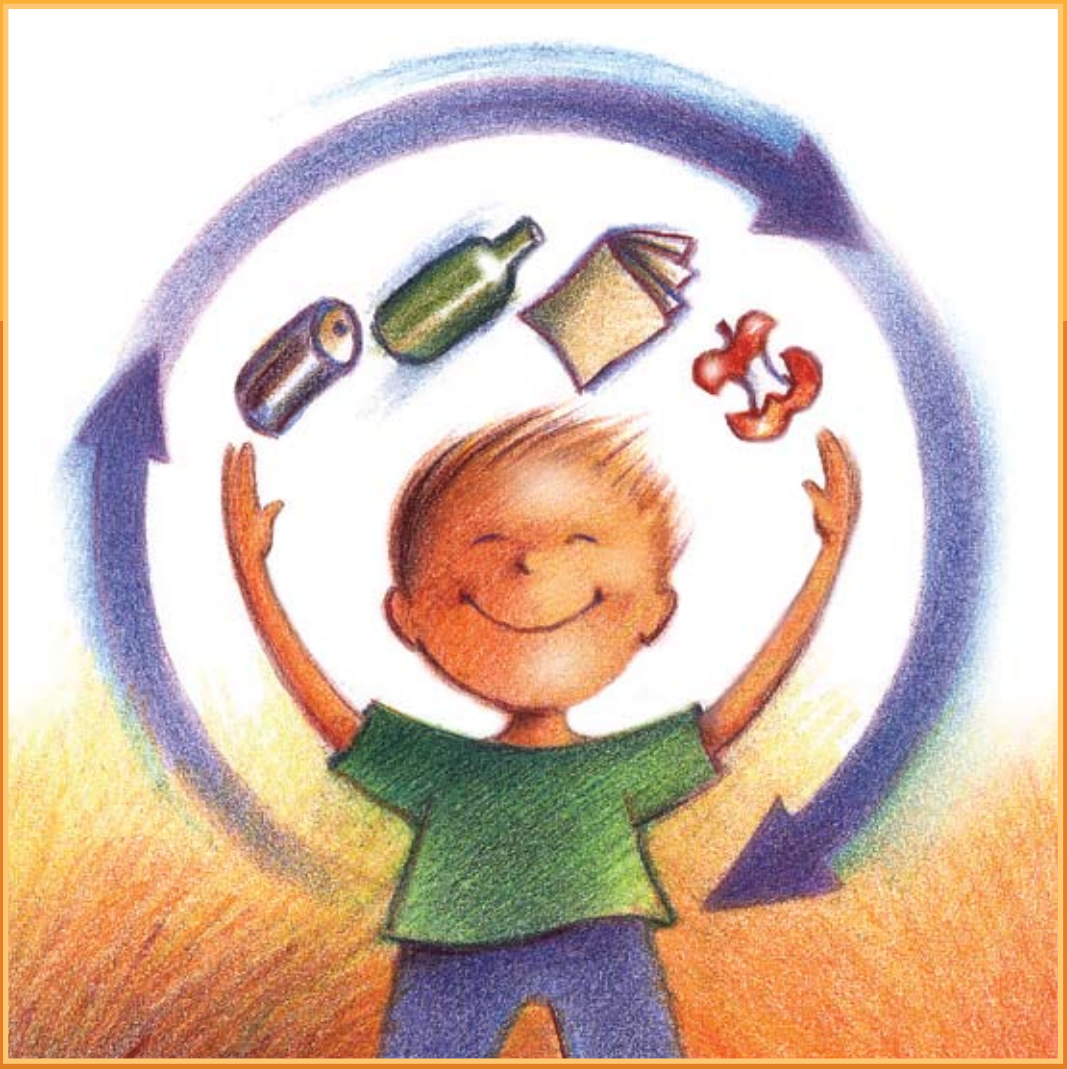
Display all work undertaken throughout Unit. Discuss and reflect on learning journey.

Students will answer the focus questions using pictures or written answers.

Students will reflect on current understandings through personal interpretation of waste management.

Brainstorm class list of possible waste wise actions. Model whole class pledge to set goals for the future. Choose one action to create a personal pledge of one thing they will do in their own life to manage waste, e.g. *Ollie Saves the Planet* DVD.

waste
for a sustainable future



later childhood
years 3–5

Australian Sustainable Schools Initiative - ACT

waste for a sustainable future

Class: Year 3- 5

Band of Development: Later childhood

Duration: Suggested 2-3 hours per week over 10 weeks

Teacher:

School:

The format for this unit of work is based on the **Kath Murdoch** model for integrated inquiry. The Essential Learning Achievements and Essential Content have been selected from the ACT Department of Education and Training, Curriculum Framework, *Every Chance to Learn*.

Unit Description:

This unit of work is designed to raise awareness in students about:

- how waste can be transformed
- how peer pressure, power of consumerism and media influence the choices we make
- how waste has a significant impact in their life and their future.

The students will explore key concepts of:

- the life-cycle of waste
- making considered decisions to promote a sustainable future
- effective Waste management practices.

Big Understandings

1. Waste is a resource. It comes in many forms. Most waste can be avoided, reduced, reused and recycled.
2. Products and materials that we use have a life-cycle.
3. Waste impacts on our environment and society.
4. Effective waste management supports a healthy environment.
5. In the ACT sustainable waste management practices address where waste comes from, how we use it, where it goes and how we can make a difference.

Values and Attitudes

During this unit of work students will have the opportunity to develop the following values and attitude about:

- appreciation of the intrinsic value of the natural world and the need to preserve the diversity of ecosystems for future generations
- respecting and caring for life in all its diversity
- responsibility as consumers and citizens to conserve and manage environmental resources and natural heritage in ways that are fair to both present and future generations
- optimism for the future through participating in informed, positive action to address local, national and global issues relating to environmental sustainability.

Essential Learning Achievements covered in this unit are ELA 2, 3, 19, 20. Essential Content has been selected from the later childhood band of development.

ELA 2 the student understands and applies the inquiry process

Essential Content

In later childhood, students have opportunities to learn to:

- recognise different contexts for applying the inquiry process
- understand the various stages of planning and conducting a straightforward inquiry
- create questions and predictions for investigation and testing
- contribute to planning a variety of investigations, recognising where comparisons may be fair and unfair
- make decisions about information and equipment needed and the tasks to be carried out
- collect and record data, checking and repeating observations or measurements as needed
- conduct searches for information and use a range of sources, (e.g. information texts, artefacts, maps, images)
- evaluate the accuracy, relevance and credibility of data or information
- discuss and compare the results with their questions and predictions, and draw conclusions
- explain the inquiry approach taken and communicate their findings or conclusions, generalising about them using specific instances they have observed, data they have analysed or information they have assembled

ELA 3 the student makes considered decisions

Essential Content

In later childhood, students have opportunities to learn to:

- prepare a plan containing a list of things they plan to do and a timetable for doing them
- list advantages, disadvantages and risks of various options, using the inquiry process to gather information about them
- explore how personal wants, feelings and impulsiveness can impact on decision-making
- develop and apply a small number of criteria for judging the quality of a decision
- identify what influenced them in a recent decision
- identify possible consequences of different decisions
- make decisions about how to complete a learning task and put them into effect

ELA 19 the student understands and applies scientific knowledge

Essential Content

In later childhood, students have opportunities to understand and learn about:

- comparisons of properties of an object with those of the materials of which it is made (e.g. eggs and sugar compared to meringue; sand and cement compared with concrete) and why materials are chosen for particular purposes
- different types of changes that materials may undergo
- some interactions between living things and between living things and their environment

In later childhood, students have opportunities to learn to:

- apply scientific understandings to their experiences and describe how products (e.g. hair gel, sunscreen, protective clothing) and tools (e.g. egg beater, hair dryer) have been developed

ELA 20 the student acts for an environmentally sustainable future

Essential Content

In later childhood, students have opportunities to understand and learn about:

- natural cycles and systems in the environment (e.g. water cycle, food chains)
- some effects of human action on natural environments (e.g. land clearing, air and water pollution)
- renewable and non-renewable resources, and the need to conserve non-renewable resources
- how protecting the environment requires that people work together as citizens and consumers and participate in appropriate actions as environmental stewards or in other civic action to effect positive change

In later childhood, students have opportunities to learn to:

- take responsibility for caring for a local environment (e.g. part of school grounds, class garden, local park)
- investigate how their actions contribute to sustainability of resources and local environments (e.g. investigate issues relating to packaging and plastic bags, develop reuse and recycling systems in their classroom and school)
- explore probable and preferred futures in relation to environmental issues familiar to them, and discuss actions needed to make preferred futures happen

Worthwhile Learning

Schools may choose to include other worthwhile learning linked to ELA 21 and 23 and or the following topics:

Related topics or themes:

- Impact of global waste and making connections
- Turning waste into resources
- Industry responsibility
- Indigenous Cultures - Sustainable practices
- Smart Purchasing
- Packaging
- Mineral Council for information on natural resources

Tuning In

Outcomes

What understandings will my students have at the end of the Tuning In stage?

What waste is.

People generate waste at school, home, shops, restaurants and industry.

Waste can be refused, reduced, reused and recycled for the benefit of the environment.

The words refuse, reduce, reuse and recycle.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- recognise different contexts for applying the inquiry process
- understand the various stages of planning and conducting a straightforward inquiry

ELA 3 makes considered decisions:

- identify what influenced them in a recent decision

ELA 19 understands and applies scientific knowledge:

- comparisons of properties of an object with those of the materials of which it is made (e.g. eggs and sugar compared to meringue; sand and cement compared with concrete) and why materials are chosen for particular purposes

Assessment

What evidence will there be that they have learnt?

Respond to key questions about waste resources.

Discuss what they know about waste - “Rocket writing.”

Classify waste resources generated in the classroom. Students group items of waste and explain why they have classified the waste. Did the student consider - reusable, recyclable, if the item was for compost, disposable.

Flow chart of the waste resource cycle. Provide students with a piece of waste resource.

What could be the long-term benefits of refusing, reducing, reusing and recycling?

Strategy

What is/are the most effective strategy or strategies to teach this?

Brainstorm.

Think, Pair, Share.

Making lists.

Formulate questions.

Design and make.

Representing ideas visually, pictorially and through sculpture.

Sharing ideas and working cooperatively with others.

Read and select interesting facts.

Graffiti Board.

Activity

What is the best vehicle to deliver the learning?

Class discussion and brainstorm. What is waste? Who generates waste? What do we know about refusing, reducing, reusing and recycling?

Discuss different products and evaluate using a PMI to decide whether or not the item is a waste resource?

What types of waste resources are generated in the wider community; school, home, restaurants, industry and shops.

Make a graffiti board on the waste resources generated in the wider community. Display a key word (refuse, reduce, reuse and recycle) in the middle of a large sheet of paper. Students write or draw any ideas, which may be sparked by the key words.

Begin a learning and reflection journal made from recycling paper.

Finding Out

Outcomes

What understandings will my students have at the end of the Finding Out stage?

Waste can be refused, reduced, reused and recycled for the benefit of the environment.

The ACT produces a lot of waste per person.

The Materials Resource Facility (MRF) recycles waste resources.

The environmental impact of landfill includes methane gas, leachate and space needed.

The terminology in the Life-Cycle of waste.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- collect and record data, checking and repeating observations or measurements as needed
- conduct searches for information and use a range of sources, (e.g. information texts, artefacts, maps, images)

ELA 20 acts for an environmentally sustainable future:

- natural cycles and systems in the environment (e.g. water cycle, food chains)

Assessment

What evidence will there be that they have learnt?

Personal reflection on the excursion to the MRF. Identify and illustrate the impact of landfill to the environment.

Take notes on information gathered and share understandings with others.

Show that you understand about the impact of landfill through learning journey reflection.

Create a flowchart to demonstrate the disposal of waste resources in the ACT?

Strategy

What is/are the most effective strategy or strategies to teach this?

Questioning and inferring.

Locating and selecting relevant information.

Working cooperatively and presenting ideas to others.

Explaining, reporting and organising data.

Representing ideas in a range of different ways.

Identifying and making choices when sorting waste resources.

Reading and viewing about waste on the Sustainable Schools Website.

Reflecting.

Activity

What is the best vehicle to deliver the learning?

Think, pair and share: Who do you think produces the most amount of waste resource in the wider community?

Excursion to MRF (Materials Recovery Facility in Hume) Education Centre with education focus on industrial, commercial and green waste. Make specific reference to the life cycle of waste using the terminology of the stages.

Bureau of Statistics website to identify and research the amount of waste resource produce by Canberrans.

Discover which part of the wider community produces the most waste.

Search and view the Sustainable Schools Website, Keep Oz Beautiful, Planet ark and Waste Management Association of Australia.

Footprint calculation after completion of the survey. On

http://www.epa.vic.gov.au/ecologicalfootprint/calculators/default.asp.

Use a dictionary to find the meanings for the stages of the life cycle. Identify and explore the Life-Cycle of Natural resources:

Extraction, Processing, Marketing, Consumption and Disposal.

Sorting Out

Outcomes

What understandings will my students have at the end of the Sorting Out stage?

Waste resources can be classified and are part of a bigger life-cycle.

Waste is used and disposed of differently locally and nationally.

Waste resource management has a local and national environmental impact.

Waste can be refused, reduced, reused and recycled for the benefit of the environment.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- discuss and compare the results with their questions and predictions, and draw conclusions

ELA 3 makes considered decisions:

- develop and apply a small number of criteria for judging the quality of a decision

ELA 19 understands and applies scientific knowledge:

- comparisons of properties of an object with those of the materials of which it is made (e.g. eggs and sugar compared to meringue; sand and cement compared with concrete) and why materials are chosen for particular purposes

ELA 20 acts for an environmentally sustainable future:

- natural cycles and systems in the environment (e.g. water cycle, food chains)
- some effects of human action on natural environments (e.g. land clearing, air and water pollution)

Assessment

What evidence will there be that they have learnt?

Design graphs or Venn diagram to visually represent the data collected. Respond to a variety of questions that demonstrate personal or collective understanding. For example: What are the consequences of Canberrans being the most wasteful community in Australia?

Research and draw conclusions about information gathered.

Write an explanation about each stage of the cycle and attach to the whole class collage.

Design, make and appraise a new use/life for an old/used object. Present inventions and use peer appraisal using the set criteria.

Strategy

What is/are the most effective strategy or strategies to teach this?

Working cooperatively and presenting ideas to others.

Explaining, reporting and organising data.

Representing ideas in a range of different ways.

Identifying and making choices.

Developing analytical skills.

Apply information.

Explore and expressing feelings, values and attitudes.

Review and revisit understandings.

Designing, making and appraising.

Representing ideas in a range of ways.

Selecting appropriate materials.

Learning journals.

Recognising bias.

Activity

What is the best vehicle to deliver the learning?

Compare and contrast waste resources output of Canberra's with other Australian.

Place the Life-Cycle terminology into context and display information gathered for scaffold.

In groups illustrate each Life-Cycle stage products such as plastics, food fabric, paper. Join stages together create a whole class life-cycle collage.

Revisit the graffiti board. Ask students if and how their values and attitudes have changed? Add new findings or question using different coloured post-it notes.

Reduce: Audit lunch contents for one week to determine the amount of waste resource generated. Sort, classify, record and graph findings according to the categories of paper, mixed recyclables, organic waste and landfill.

Reuse: Hold a trash and treasure day. Each student to provide one item and swap their trash for another persons treasure. (Second Hand Friday)

Find uses for object that have been used. Use ICT to display.

Design as a class explicit quality criteria to assess inventions.

Recycle: Design a class mural using recycled and reclaimed materials. Relate mural design to a sustainable environment.

Reflections in personal journals.

Going Further

Outcomes

What understandings will my students have at the end of the Going Further stage?

Waste management attitudes and disposal differs throughout and in the wider community.

Waste management strategies; refusing, reducing, reusing and recycling have an impact on their lives and their future.

Decisions we make impact directly on the environment.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- understand the various stages of planning and conducting a straightforward inquiry
- contribute to planning a variety of investigations, recognising where comparisons may be fair and unfair

ELA 3 makes considered decisions:

- identify possible consequences of different decisions
- identify possible consequences of different decisions

ELA 19 understands and applies scientific knowledge:

- some interactions between living things and between living things and their environment
- different types of changes that materials may undergo

ELA 20 acts for an environmentally sustainable future:

- renewable and non-renewable resources, and the need to conserve non-renewable resources

Assessment

What evidence will there be that they have learnt?

Survey parents or carers workplace for waste management practices. Use data to determine waste that is going to landfill that could be refuse, reduced, reused or recycled.

Identify and illustrate three strategies that would improve waste management in the workplace/ wider community.

Learning Journal Reflection: Waste management strategies are different in these workplaces/ wider community because ...

Explain the role of waste management resource in relation to a sustainable future. Why is it important to me?

Strategy

What is/are the most effective strategy or strategies to teach this?

Discussion.

Construction.

Cooperative learning.

Inferring and classifying information.

Reflecting and making positive choices.

Reporting.

Reading and writing.

Visual aids.

Individual/Group/Class Projects.

Negotiating with others.

Comparing and contrasting personal data collected.

Activity

What is the best vehicle to deliver the learning?

Review data collected from lunch waste audit. Discuss findings and pose questions such as: What type of waste going to landfill could be refused, reduced, reused or recycled?

Brainstorm possible solutions to reducing landfill waste to include only waste that cannot be reused or recycled. Post-viable solutions on Graffiti Wall.

Compare and contrast data gathered from assessment activity. Discuss possible alternatives to solve unnecessary landfill.

Whole class flow chart to highlight waste output variables within the wider community.

Discuss the possible interconnectedness between the environment and waste resources. Choose a variety of waste materials and bury in soil in the compost bin. Cover in carpet or cardboard and monitor heat and decomposition of materials regularly. Record results.

Cooperative group task to respond to; We have been investigating waste. In your group, decide on one way we can improve waste management. Highlight the fact that some materials especially the plastics do not break down and note the time-line. Recommended items include plastic bag, grass clippings, orange skin, bread, and cotton from fabric scraps, paper of different thickness, polystyrene package, plastic cutlery or straws.

Making Connections

Outcomes

What understandings will my students have at the end of the Making Connections stage?

We are all stewards of the earth and have a responsibility towards ensuring a sustainable future.

Individual actions make a difference at a local, national and global level.

Peer pressure and media can influence choices.

Effective waste management practices benefit our environment.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- understand the various stages of planning and conducting a straightforward inquiry
- create questions and predictions for investigation and testing
- evaluate the accuracy, relevance and credibility of data or information

ELA 3 makes considered decisions:

- explore how personal wants, feelings and impulsiveness can impact on decision-making

ELA 19 understands and applies scientific knowledge:

- some interactions between living things and between living things and their environment

ELA 20 acts for an environmentally sustainable future:

- explore probable and preferred futures in relation to environmental issues familiar to them, and discuss actions needed to make preferred futures happen

Assessment

What evidence will there be that they have learnt?

Swap board games with peers and evaluate using an agreed marking guide.

Learning Journal reflection: Write about a situation where you felt left out because you didn't have a specific product. How do you feel about that situation now?

Design and make a chatterbox. Students write a question about effective waste management practises underneath each of the eight triangular sections. Play in pair and with teacher.

Modification: replace questions with answers or true or false statement.

Strategy

What is/are the most effective strategy or strategies to teach this?

Multiple Intelligences activities.

Making connections.

Accepting and responding to feedback.

Linking cause and effect.

Making inference and generalising.

Summarising and reflecting information.

Providing feedback.

Restating view.

Higher order thinking skills.

Activity

What is the best vehicle to deliver the learning?

Design a catalogue that provides ecological sustainable solutions to waste management. The contents will include sections on how to refuse, reduce, reuse and recycle in school and at home. Use data from lunch audits to determine priority areas (e.g. use of alternative to cling wrap).

Discuss and debate:

Topic: The earth can sustain the amount of waste generated by humans?

Construct Consequences Wheel to make explicit links between waste management practices and sustainability.

In small groups, use the information collected about effective waste management practices to design and create a board game. Discuss board game procedures and features. Jointly construct an agreed set of criteria for assessment.

Locate advertisements in a range of media. Focus on the key concepts of items of significant interest (e.g. current toys or other popular products). Focus on aspects of advertising that may influence or manipulate your current values, attitudes and understandings. Identify peer pressure associated with purchasing products.

View *Ollie saves the Planet* DVD and engage with Needs versus Wants section. Choose a range of products that appeal to them from magazines. Classify into needs and wants. Discuss choices and implications.

Taking Action

Outcomes

What understandings will my students have at the end of the Taking Actions stage?

Personal informed choices have a direct positive effect on the local, national and international environment.

We can all make a positive contribution to promoting a Sustainable future.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- discuss and compare the results with their questions and predictions, and draw conclusions
- make decisions about information and equipment needed and the tasks to be carried out

ELA 3 makes considered decisions:

- identify possible consequences of different decisions

ELA 19 understands and applies scientific knowledge:

- some interactions between living things and between living things and their environment

ELA 20 acts for an environmentally sustainable future:

- some effects of human action on natural environments (e.g. land clearing, air and water pollution)
- investigate how their actions contribute to sustainability of resources and local environments (e.g. investigate issues relating to packaging and plastic bags, develop reuse and recycling systems in their classroom and school)
- take responsibility for caring for a local environment (e.g. part of school grounds, class garden, local park)

Assessment

What evidence will there be that they have learnt?

Organise and implement waste free lunch day competition. Students weigh class waste to determine the class that produces the least amount of waste.

Prizes may include: Uniform free day, Principal for the day.

Produce slogans, article for myclasses or newsletter linking to advertising campaign.

Illustrate the three scenarios for a Sustainable Future using A3 card:

a) Possible future

b) Probable future

c) Preferred future

Join together to create zigzag book display.

Strategy

What is/are the most effective strategy or strategies to teach this?

Discussion and consider options.

Informing others.

Mini campaign in the school/classroom/unit.

Design and publish.

Listing.

Conducting audits.

Planning and presenting.

Communicating with others.

Activity

What is the best vehicle to deliver the learning?

Hold waste-free lunches and photocopy free days.

Share board games with students across the school.

Create an advertising campaign to promote considered decisions about refusing, reducing, reusing and recycling.

Write to the local Newspaper, editorial section imploring people to make considered decision regarding waste management and a sustainable future.

Whole class circle speak about the difference between possible, probable and preferred future. Y chart each.

Presenting information at assembly about the impact of waste resource management.

Build a compost bin or worm farm or use earth maker to change waste resources into compost.

Place compost on the surrounding gardens.

Sharing Discussion and Reflection

Outcomes

What understandings will my students have at the end of the Sharing, Discussion and Reflection stage?

The Life-cycle of waste.

The implication of making considered decisions to promote a sustainable future.

How to use and promote effective waste management practices.

That they are able to make a difference through their personal actions.

That we are all stewards of the Earth and have a responsibility to manage waste effectively.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- explain the inquiry approach taken and communicate their findings or conclusions, generalising about them using specific instances they have observed, data they have analysed or information they have assembled

ELA 3 makes considered decisions:

- prepare a plan containing a list of things they plan to do and a timetable for doing them
- identify possible consequences of different decisions

ELA 19 understands and applies scientific knowledge:

- some interactions between living things and between living things and their environment

ELA 20 acts for an environmentally sustainable future:

- how protecting the environment requires that people work together as citizens and consumers and participate in appropriate actions as environmental stewards or in other civic action to effect positive change
- investigate how their actions contribute to sustainability of resources and local environments (e.g. investigate issues relating to packaging and plastic bags, develop reuse and recycling systems in their classroom and school)

Assessment

What evidence will there be that they have learnt?

Access Island and create a pledge.

Take photos of their preferred future and add personal descriptive captions that commit to their personal stewardship towards a sustainable future.

Contribution towards the development of the mission/vision statement and SEMP.

Invite school and wider community on a print walk to engage discussion, raise awareness and influence an audience beyond their immediate classroom about how decisions influence a sustainable future.

Strategy

What is/are the most effective strategy or strategies to teach this?

Discussion.

Recording and designing.

Justifying current understandings, values and attitudes.

Responding to the work of others.

Continue to set goals.

Activity

What is the best vehicle to deliver the learning?

Sharing circle: Discuss and reflect on learning journey and journals.

Display zigzag artworks.

Print/Gallery walk around the room synthesizing.

Understanding, values and knowledge.

Play board game with family and friend to raise awareness about waste resource management.

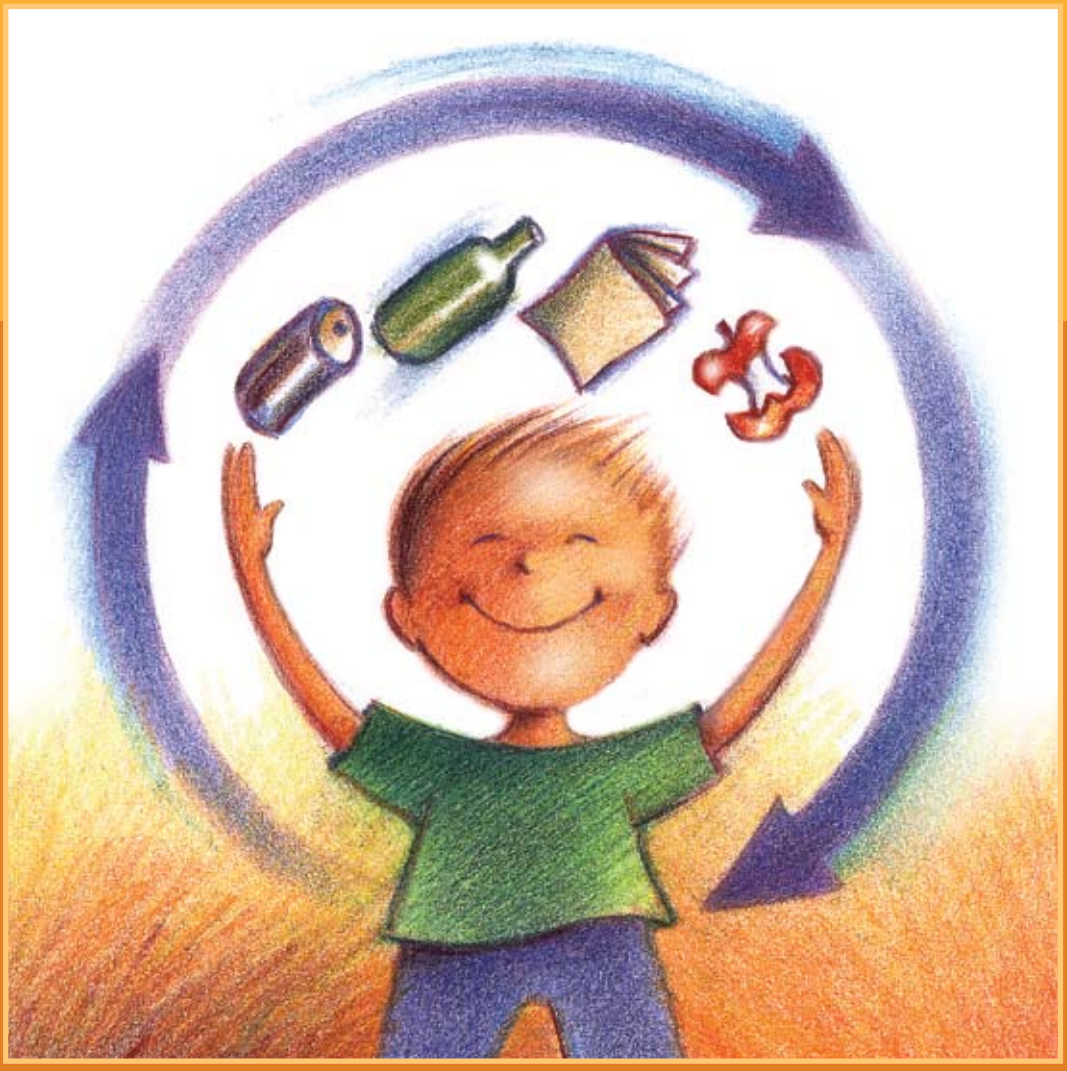
Create a time capsule filled with student pledges, and photos of personal preferred cycle of waste.

Establish a class mission statement that promotes a sustainable future.

Develop a school mission/vision statement encapsulating and reflecting current knowledge, values and understanding about their stewardship towards our world.

Participate in the creation or review of a School Environment Management Plan in conjunction with all key stakeholders.

waste
for a sustainable future



early adolescence
years 6–8

Australian Sustainable Schools Initiative - ACT

waste for a sustainable future

Class: Year 6-8

Band of Development: Early adolescence

Duration: Suggested 2-3 hours per week over 10 weeks

Teacher:

School:

The format for this unit of work is based on the **Kath Murdoch** model for integrated inquiry. The Essential Learning Achievements and Essential Content have been selected from the ACT Department of Education and Training, Curriculum Framework, *Every Chance to Learn*.

Unit Description

This unit of work is designed to raise awareness in early adolescence students that waste is:

- Assess and evaluate attitudes about waste practices
- Consumerism and choices we make
- Waste management locally, nationally and internationally

Students will be introduced to the key components of the waste.

The students will explore central issues of:

- Science of materials
- Lifecycle of waste
- the effect waste has on the environment and social justice issues
- Sustainable waste management

Big Understandings

1. Waste is a resource. It comes in many forms. Most waste can be avoided, reduced, reused and recycled.
2. Products and materials that we use have a life-cycle.
3. Waste impacts on our environment and society.
4. Effective waste management supports a healthy environment.
5. In the ACT sustainable waste management practices address where waste comes from, how we use it, where it goes and how we can make a difference.

Values and Attitudes

During this unit of work students will have the opportunity to develop the following values and attitudes

- appreciation of the intrinsic value of the natural world and the need to preserve the diversity of ecosystems for future generations
- respecting and caring for life in all its diversity
- responsibility as consumers and citizens to conserve and manage environmental resources and cultural heritage in ways that are fair to both present and future generations
- optimism for the future through participating in informed, positive action to address local, national and global issues relating to environmental sustainability

Essential Learning Achievements covered in this unit are ELA 2, 3, 19, 20, 21 and 23. Essential Content has been selected from the early adolescence band of development.

ELA 2 the student understands and applies the inquiry process

Essential Content

In early adolescence, students have opportunities to learn to:

- formulate questions, predictions or propositions suitable for investigation and clarify the inquiry focus
- collect and assemble relevant data or information taking steps to minimise error (e.g. systematic observation, repeated trials)
- assess and interpret a range of primary and/or secondary sources of information (e.g. historical documents, images, oral histories, biographies, articles, media sources, statistical data sets)
- draw reasonable conclusions based on analysis of data and information

ELA 3 the student makes considered decisions

Essential Content

In early adolescence, students have opportunities to learn to:

- prepare a detailed plan covering a timeframe of several weeks and identify resources and time needed to carry out the plan successfully
- analyse strengths and weaknesses of options, using a SWOT tool or similar
- predict possible benefits, consequences and risks
- clarify feelings, values and beliefs in relation to particular decisions
- make decisions and put them into effect in authentic situations as part of topics or themes across the school's curriculum

ELA 19 the student understands and applies scientific knowledge

Essential Content

In early adolescence, students have opportunities to understand and learn about:

- the impact of science and its applications on their own lives, the ways in which people live and the environment, and ethical and social issues in science-related contexts (e.g. global warming, sustainability of resource use, health and well-being)
- features of physical and chemical changes and the reversibility of change (e.g. dissolving, crystallising, decomposing)
- food chains and webs as models of relationships within living communities

In early adolescence, students have opportunities to learn to:

- apply scientific knowledge and language in interpreting information and forming explanations, arguments and lines of reasoning
- use their scientific understandings to consider and respond to appropriate ethical and social issues relevant to them (e.g. those related to health and wellbeing)

ELA 20 the student acts for an environmentally sustainable future

Essential Content

In early adolescence, students have opportunities to understand and learn about:

- some processes by which human activities change natural environments in positive and negative ways (e.g. reduce feral cat population in a national park, ...)
- population growth impacts on environmental systems (e.g. urbanisation, locust, cane toad or weed infestation)
- responsibilities of global citizenship for individuals, organisations and governments and the roles and responsibilities of companies, producers and consumers in relation to sustainability

In early adolescence, students have opportunities to learn to:

- conduct case study investigations into local and/or national ecosystems to identify changes and predict their impacts
- investigate practical ways for individuals, households or communities to conserve resources (e.g. waste recycling, energy and water saving,) and evaluate their practicality and effectiveness
- participate in raising awareness about environmental issues
- examine issues of sustainability of the natural, built or social environment, extending from local to global perspectives (e.g. investigate arguments and studies about climate change, and its effects, generate probable, possible and preferred future scenarios for future sustainable living)

ELA 21 the student understands about Australia and Australians

Essential Content

In early adolescence, students have opportunities to learn to:

- use geographical language, tools and conventions to interpret and create representations of Australia's physical and human geography (e.g. a variety of maps, diagrams, images and data)

ELA 23 the student understands world events and issues

Essential Content

In early adolescence, students have opportunities to understand and learn about:

- the causes and effects of significant world events and their connections to current issues
- global inequalities and different life opportunities and some of their causes and effects

In early adolescence, students have opportunities to learn to:

- compare and contrast representations of a current event or issue in the media

Tuning In

Outcomes

What understandings will my students have at the end of the Tuning In stage?

Waste is a resource.

Language of waste materials.

That waste can be a problem and that there are solutions.

Waste can be a reusable resource.

People have different attitudes towards waste.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- formulate questions, predictions or propositions suitable for investigation and clarify the inquiry focus

ELA 3 makes considered decisions:

- clarify feelings, values and beliefs in relation to waste resource management

ELA 20 acts for an environmentally sustainable future:

- some processes by which human activities change natural environments in positive and negative ways (e.g. reduce feral cat population in a national park, ...)

Assessment

What evidence will there be that they have learnt?

Complete a concept map about waste as a resource.

Reflective learning journal.

Use the waste management definition in context in either verbal or written form.

Use words from glossary included in the resource list appropriately.

Strategy

What is/are the most effective strategy or strategies to teach this?

Identifying.

De Bono's six Hats.

Brainstorming.

Predicting attitudes about waste resources.

Sharing current understanding and values with others.

Questioning.

Think, pair, share about waste resource management.

Concept mapping.

Web-based ICT.

Activity

What is the best vehicle to deliver the learning?

Identify current understanding about waste as a resource and the management of waste resources through De Bono's 6 Hats.

Brainstorm that waste materials could be recycled and reused.

Walk along the line activity.

Agree disagree in two different corners. Students move to either depending on their personal values and attitudes. Use statements such as: - We recycle enough materials.

Interview students about their point of view.

Identify what waste is and create a shared definition. Display the definition in the classroom.

Create a class glossary of words associated with waste resource management.

(e.g. Methane Gas , leachate, renewable and non-renewable.)

Start writing or recording journal entries via ICT eg MyClasses, email, blog etc

Finding Out

Outcomes

What understandings will my students have at the end of the Finding Out stage?

There are different types of waste.

How and why waste is generated and managed locally, nationally and internationally.

There are consequences caused by thoughtless and inefficient waste disposal.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- collect and assemble relevant data or information taking steps to minimise error (e.g. systematic observation, repeated trials)
- assess and interpret a range of primary and/or secondary sources of information (e.g. historical documents, images, oral histories, biographies, articles, media sources, statistical data sets)

ELA 3 makes considered decisions:

- prepare a detailed plan covering a timeframe of several weeks and identify resources and time needed to carry out the plan successfully
- predict possible benefits, consequences and risks

ELA 19 understands and applies scientific knowledge:

- the impact of science and its applications on their own lives, the ways in which people live and the environment, and ethical and social issues in science-related contexts (e.g. global warming, sustainability of resource use, health and well-being)

Assessment

What evidence will there be that they have learnt?

List three types of waste and identify consequences that types of waste have on the environment.

Identify the local waste management practices and predict possible ways in which these practices could be improved.

Strategy

What is/are the most effective strategy or strategies to teach this?

Excursion.

Look at newspapers and magazines.

Visual images.

Read and retell.

Three-level guides.

CD-Rom.

Web-based ICT.

Activity

What is the best vehicle to deliver the learning?

Visit local MRF.

School waste audit.

Begin a media portfolio of items reported in the news with references to waste with a reflection and response to the article.

Look at Ollie's Island CD-Rom.

Continue writing or recording journal entries via ICT eg MyClasses, email, blog etc

Sorting Out

Outcomes

What understandings will my students have at the end of the Sorting Out stage?

Values, opinions, priorities and attitudes of different cultures, business, government, NGO's (locally, nationally and internationally) held about waste.

Of connections between behaviour and environmental impacts.

The choices available for individual and collective responses to waste.

That the materials involved in waste are part of cycles in the environment.

That these human based cycles are not separate from natural systems.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- draw reasonable conclusions based on analysis of data and information

ELA 3 makes considered decisions:

- clarify feelings, values and beliefs in relation to particular decisions

ELA 19 understands and applies scientific knowledge:

- apply scientific knowledge and language in interpreting information and forming explanations, arguments and lines of reasoning
- features of physical and chemical changes and the reversibility of change (e.g. dissolving, crystallising, decomposing)
- food chains and webs as models of relationships within living communities
- apply scientific knowledge and language in interpreting information and forming explanations, arguments and lines of reasoning

ELA 20 acts for an environmentally sustainable future:

- responsibilities of global citizenship for individuals, organisations and governments and the roles and responsibilities of companies, producers and consumers in relation to sustainability

Assessment

What evidence will there be that they have learnt?

Complete a waste audit of a place regularly visited.

After the audit use the information to infer what peoples values and attitudes towards waste is.

Strategy

What is/are the most effective strategy or strategies to teach this?

Fact finding.

Graphs.

Maps.

Diagrams.

Dioramas.

Classifying.

Venn diagrams.

Writing using a range of text types.

Read and retell.

Three-level guides.

Debate.

Oral presentations.

Web-based ICT.

Activity

What is the best vehicle to deliver the learning?

Collect information from the media. News articles, newspaper articles, internet. Note how population growth impacts on waste generation.

Discuss and debate conflicting values and interests of different groups in caring for a place.

Look at various products and materials and classify by their physical and chemical properties. Assess why these materials are used for specific purposes. Consider the life cycle of these products. Consider alternatives for the same uses.

Construct a "Waste Web" (similar to food web). Emphasise cyclic rather than linear relationships. Consider energy and matter inputs/outputs. Matter should be shown as a closed system, while energy is an open one.

Create a diorama of a local area identifying what, where, how and why waste collects. Include labels and explanations of the impact that waste is having on local area.

Continue writing or recording journal entries via ICT e.g. MyClasses, email, blog.

Going Further

Outcomes

What understandings will my students have at the end of the Going Further stage?

The need to reduce waste and to have a waste resource management plan.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 20 acts for an environmentally sustainable future:

- some processes by which human activities change natural environments in positive and negative ways (e.g. reduce feral cat population in a national park, ...)
- population growth impacts on environmental systems (e.g. urbanisation, locust, cane toad or weed infestation)
- conduct case study investigations into local and/or national ecosystems to identify changes and predict their impacts

ELA 21 understands about Australia and Australians:

- use geographical language, tools and conventions to interpret and create representations of Australia's physical and human geography (e.g. a variety of maps, diagrams, images and data)

Assessment

What evidence will there be that they have learnt?

Review and draw conclusions from the findings of a waste audit.

Write a waste minimisation and litter reduction plan.

Communicate a waste management strategy within the school.

Strategy

What is/are the most effective strategy or strategies to teach this?

Contracts.

Seven at Once Multiple Intelligence Work Stations.

CDRom.

Cooperative group tasks.

Expert groups.

Individual projects.

Activity

What is the best vehicle to deliver the learning?

Seven at Once:

1. Rap songs
2. Make a video
3. Skits
4. Make a posters
5. Board games
6. Ollie Saves the Planet CDRom
7. Write a poem or prayer.

Research using internet ABS stats on demographics and how this effects the management of waste.

Continue writing or recording journal entries via ICT e.g. MyClasses, email, blog.

Making Connections

Outcomes

What understandings will my students have at the end of the Making Connections stage?

Efficient waste management is essential to keeping people and the environment healthy and sustainable.

Individuals and groups have a voice and can act to influence positive change in waste and resource management.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 19 understands and applies scientific knowledge:

- the impact of science and its applications on their own lives, the ways in which people live and the environment, and ethical and social issues in science-related contexts (e.g. global warming, sustainability of resource use, health and well-being)

ELA 20 acts for an environmentally sustainable future:

- participate in raising awareness about environmental issues

ELA 23 understands world events and issues:

- compare and contrast representations of a current event or issue in the media

Assessment

What evidence will there be that they have learnt?

Science Report based on Science Prac (see activity).

Reflective journal.

Students' responses to their understanding of key concepts about waste and consumerism eg written response, in-class activity, oral presentation.

Individual or group research task based on case study of a significant person or group and demonstrate an understanding of that person's contribution to positive change.

Strategy

What is/are the most effective strategy or strategies to teach this?

Content-based cloze.

Cross-word puzzles.

De Bono's thinking hats.

PMI.

Similes and metaphors.

Time capsules.

Board games.

Bloom's Box.

Concept maps.

Diamond display.

In my club.

Two trues and a false.

Effects wheels.

Putting you in the picture.

Learning Maps.

Question me an answer.

Guided questions.

Question ball.

Laying it on the Line.

ICT.

Activity

What is the best vehicle to deliver the learning?

Science prac - efficient v inefficient waste management - with 2 bins of unsorted garbage - treat Bin 1 with the 4 R's. Bin 2 treat as garbage sent to tip and "bury" in fish tank. Monitor over time what happens to the two treatments. Students need to gather data on mass, volume, temperature, time to decompose, effects and rates of decomposition. Students compare what happens in each case and infer how this will impact on keeping people and the environment healthy.

Students bring in and look at different products e.g. lunch using effects wheels to examine consequences of consumer choice.

Students use journal for reflecting on how individuals and groups have a voice and can act for positive change e.g. consumer product choices.

Students respond using various activities to demonstrate their understanding of these key concepts: extraction, processing, marketing, consumption, disposal, packaging.

Case study of persons that started environmental groups and events such as Clean Up Australia, Clean Up The World, WWF, Keep Australia Beautiful, Green Peace, Planet Ark.

Continue writing or recording journal entries via ICT e.g. MyClasses, email, blog.

Taking Action

Outcomes

What understandings will my students have at the end of the Taking Actions stage?

The need to implement a waste minimisation plan.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 3 makes considered decisions:

- prepare a detailed plan covering a timeframe of several weeks and identify resources and time needed to carry out the plan successfully

ELA 20 acts for an environmentally sustainable future:

- investigate practical ways for individuals, households or communities to conserve resources (e.g. waste recycling, energy and water saving,) and evaluate their practicality and effectiveness
- participate in raising awareness about environmental issues
- participate in raising awareness about environmental issues

Assessment

What evidence will there be that they have learnt?

Written a home or class waste minimisation action plan.

PowerPoint or oral presentation of waste minimisation plan.

Poster display waste minimisation plan.

Strategy

What is/are the most effective strategy or strategies to teach this?

From here to there.

Global links.

Advertising campaigns.

Annotated exhibitions.

Arts in the local community.

Design walks.

Personal pledge.

Fundraising for environment club.

SRC.

Letter writing.

Meet the press.

Activity

What is the best vehicle to deliver the learning?

Communicate the need to implement a waste minimisation plan through a poster or art display, dance festival, staff, SRC, year group or whole school assembly presentation or by writing an article for the school newsletter or home-page.

Establish and/or join a school environment club, set up and monitor recycling stations around school.

Write a letter to the school Principal, a local MP or MLA or shopping centre management voicing concern about waste, recycling and/or packaging.

Invite local MPs and MLAs in to talk about/ debate their stance on waste.

Share ideas with an online community.

Create a homepage and blog progress and ideas.

Sharing Discussion and Reflection

Outcomes

What understandings will my students have at the end of the Sharing, Discussion and Reflection stage?

Waste and resource management is everyone's responsibility.

The Earth has limited resources these need to be used carefully.

Revise their own values, opinions and attitudes about waste.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 3 makes considered decisions:

- make decisions and put them into effect in authentic situations as part of topics or themes across the school's curriculum

ELA 20 acts for an environmentally sustainable future:

- examine issues of sustainability of the natural, built or social environment, extending from local to global perspectives (e.g. investigate arguments and studies about climate change, and its effects, generate probable, possible and preferred future scenarios for future sustainable living)

ELA 23 understands world events and issues:

- the causes and effects of significant world events and their connections to current issues
- global inequalities and different life opportunities and some of their causes and effects

Assessment

What evidence will there be that they have learnt?

Complete and submit a self-reflection in their journal.

Present a report identifying how they dispose of their rubbish and areas they could use less waste.

Strategy

What is/are the most effective strategy or strategies to teach this?

Carousel sharing.

Talking stick.

Concentric circles.

Discussion.

Learning timeline.

Class meetings.

Focussed reporting.

Jigsaw sharing.

Watch this space.

Self-assessment.

Reflection roundabout.

Class diary.

Learning logs.

Photo journal.

Web-based ICT.

Activity

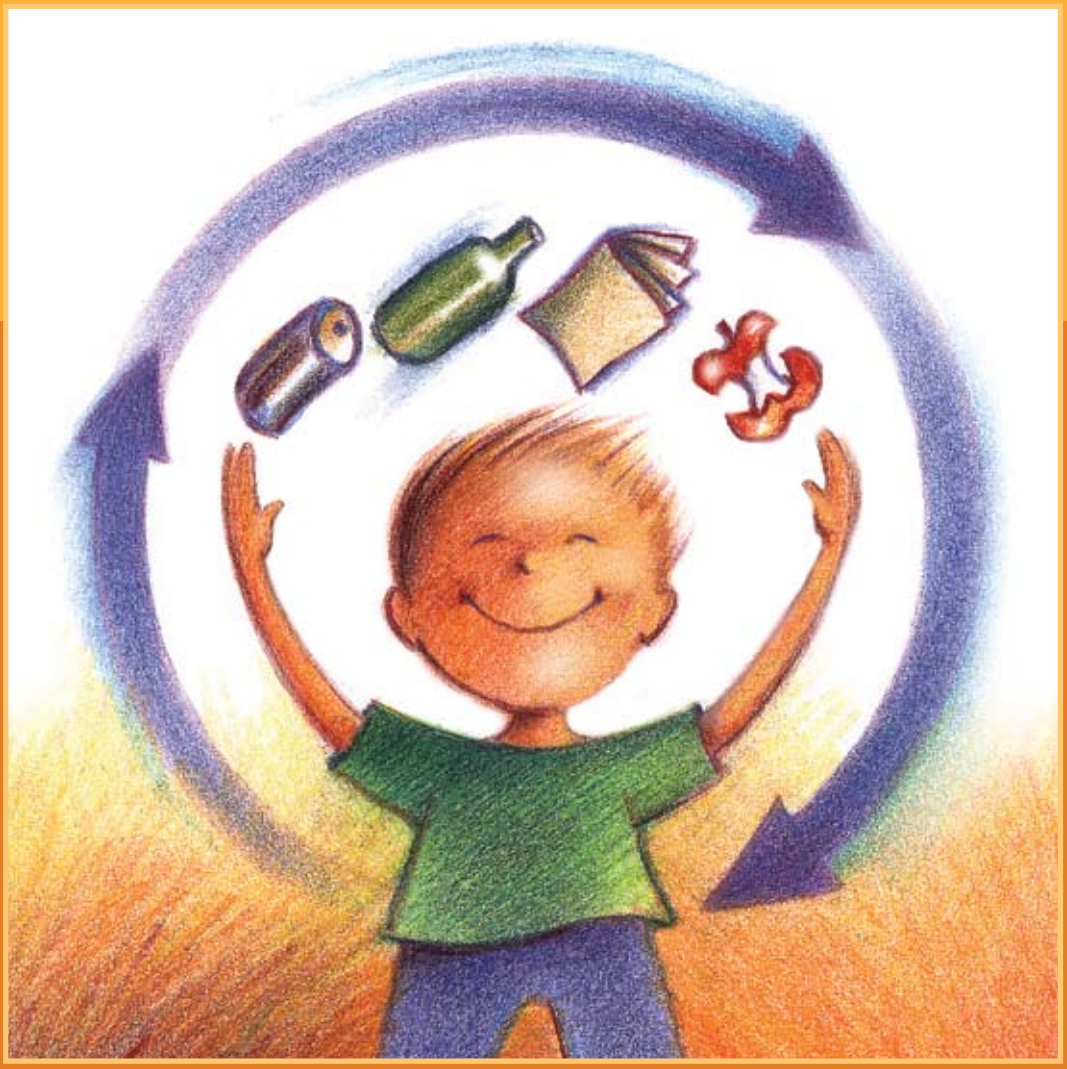
What is the best vehicle to deliver the learning?

Use Carousel sharing, Talking stick, Concentric circles, Focussed reporting, Jigsaw sharing, Watch this space to share and discuss and feedback about their learning over the course of the unit.

Share specialist learnings using Focussed reporting and Jigsaw sharing.

Share journal learnings via ICT e.g. MyClasses, email, blog.

waste
for a sustainable future



later adolescence
years 9–10

Australian Sustainable Schools Initiative - ACT

waste for a sustainable future

Class: Year 9-10

Band of Development: Later adolescence

Duration: Suggested 2-3 hours per week over 10 weeks

Teacher:

School:

The format for this unit of work is based on the **Kath Murdoch** model for integrated inquiry. The Essential Learning Achievements and Essential Content have been selected from the ACT Department of Education and Training, Curriculum Framework, *Every Chance to Learn*.

Unit Description

This unit of work is designed to raise awareness in later adolescence students that waste wise is:

- environmental values and attitudes held by individuals and groups in society.
- ethics of marketing, packaging and processing.

Students will be introduced to the key components of the waste wise.

The students will explore central issues of:

- extraction, processing, manufacturing, distribution, marketing, purchasing and recovery.
- local, national and international policy, programs, regulation and practices.

Big Understandings

1. Waste is a resource. It comes in many forms. Most waste can be avoided, reduced, reused and recycled.
2. Products and materials that we use have a life-cycle.
3. Waste impacts on our environment and society.
4. Effective waste management supports a healthy environment.
5. In the ACT sustainable waste management practices address where waste comes from, how we use it, where it goes and how we can make a difference.

Values and Attitudes

During this unit of work students will have the opportunity to develop the following values and attitudes:

- appreciation of the intrinsic value of the natural world and the need to preserve the diversity of ecosystems for future generations
- respecting and caring for life in all its diversity
- responsibility as consumers and citizens to conserve and manage environmental resources and cultural heritage in ways that are fair to both present and future generations
- optimism for the future through participating in informed, positive action to address local, national and global issues relating to environmental sustainability

Schools may choose to include other worthwhile learning linked to the unit:

- Year 9 Exhibitions

Essential Learning Achievements covered in this unit are ELA 2, 3, 19, 20, 21 and 23. Essential Content has been selected from the later childhood band of development that is specific to this unit of work.

ELA 2 the student understands and applies the inquiry process

Essential Content

In later adolescence, students have opportunities to learn to:

- formulate questions, hypotheses propositions and conjecture suitable for testing or investigation in relevant disciplines and frame these to clarify the purpose and scope of the inquiry
- manage and organise data and information in ways that assist in its interpretation, analysis and synthesis
- present and discuss their investigation using appropriate representations, conventions and terminology specific to the discipline
- draw conclusions that are consistent with the data or information and provide evidence or supporting details
- evaluate methodologies, reasoning and conclusions, and discuss specific improvements to their investigation or ways to conduct further investigations

ELA 3 the student makes considered decisions

Essential Content

In later adolescence, students have opportunities to learn to:

- make plans and decisions and put them into effect as part of topics, themes or activities across the school's curriculum
- generate multiple viewpoints in relation to options and criteria for judging the quality of a decision
- evaluate the role of intuition, feelings, values, beliefs in decision-making and strengthen their capacity for moral and ethical decisions
- make plans about key aspects of their lives (e.g. the location of resources and agencies in the community and online) and well-rehearsed skills (e.g. preparing a business plan, a resume, a letter of application and performing in presentations and interviews)

ELA 20 the student understands and applies scientific knowledge

Essential Content

In later adolescence, students have opportunities to understand and learn about:

- how contemporary scientists often draw on concepts and process across scientific disciplines in multi-disciplinary teams and how science can provide rewarding careers
- scientific models and terms to explain the properties of materials, the changes materials undergo and the conservation of matter
- explanations of physical and chemical changes in terms of types and arrangements of particles (e.g. atoms, molecules, elements, compounds)

- factors that affect chemical changes (e.g. factors that affect rate) and applications in everyday situations
- scientific concepts and models to explain the interdependence of populations of organisms and the environment, and predict the consequences of changes ot an ecosystem

In later adolescence, students have opportunities to learn to:

- examine and consider scientific ideas, concepts and theories
- apply scientific knowledge in exploring and constructing views around ethical and social issues relating to science (e.g. genetic modification, stem cell research, animal testing of products, nuclear energy)

ELA 20 the student acts for an environmentally sustainable future

Essential Content

In later adolescence, students have opportunities to understand and learn about:

- key concepts used in contemporary information and debates about environmental sustainability (e.g. biodiversity, carrying capacity, ecological footprint, preservation, conservation, wilderness, heritage, sustainability, sustainable development)
- how environmental decision-making often involves dealing with conflicting values and interests of different individuals or groups (e.g. preservation of wilderness, development of non-renewable and renewable resources)
- how peoples' views on the environment influence government policy and non government organisations, and ways in which governments attempt to address issues of development and sustainability

In later adolescence, students have opportunities to learn to:

- apply relevant scientific understandings to form personal views and make responsible and informed decisions about issues concerning sustainability (e.g. salinity, nuclear energy production, land degradation)
- consider and explain their own decisions about lifestyle choices and participation in social actions for environmental sustainability
- examine examples of individual and global actions to create sustainable futures, assess their strengths and limitations, and propose further appropriate actions

ELA 21 the student understands about Australia and Australians

Essential Content

In later adolescence, students have opportunities to learn to:

- natural and human processes that form and transform Australian environments over time (e.g. explanations of the origins of Australia, factors changing communities, geographical issues affecting Australian environments)
- how government policies have affected indigenous peoples and their pursuit of citizenship rights
- ways in which Australia is presented, nationally and internationally (e.g. stereotypes of Australian people and places)
- select and apply appropriate geographical tools (e.g. maps, graphs, photographs) to identify and represent Australia's physical features and patterns
- analyse theories and arguments, and explain silences and gaps, in accounts of past and current events

ELA 23 the student understands world events and issues

Essential Content

In later adolescence, students have opportunities to understand and learn about:

- significant social justice or human rights issues around the world
- the role that international agreements and organisations in protecting human rights
- human agency as a significant factor in world events and issues
- Australia's relationship with other nations and the influence of global events and issues on these relationships (e.g. military alliances, trade partnerships, independence movements)
- the influence of past international events on governments in Australia (e.g. rise and decline of Communism, colonisation of East and West Papua)

In later adolescence, students have opportunities to learn to:

- analyse and explain different perspectives on a significant world issue or event
- interpret people's motives and actions in order to understand a current world event or issue in depth, considering different perspectives or bias in accounts

Tuning In

Outcomes

What understandings will my students have at the end of the Tuning In stage?

The values and attitudes students hold towards waste.

Different types of waste.

The language of waste and related concepts.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- present and discuss their investigation using appropriate representations, conventions and terminology specific to the discipline

ELA 3 makes considered decisions:

- generate multiple viewpoints in relation to options and criteria for judging the quality of a decision

ELA 19 understands and applies scientific knowledge:

- examine and consider scientific ideas, concepts and theories

ELA 20 acts for an environmentally sustainable future:

- key concepts used in contemporary information and debates about environmental sustainability (e.g. biodiversity, carrying capacity, ecological footprint, preservation, conservation, wilderness, heritage, sustainability, sustainable development)

Assessment

What evidence will there be that they have learnt?

Brainstorm of values and attitudes.

Vocabulary quiz.

Journal entry.

Participation in-group tasks.

Strategy

What is/are the most effective strategy or strategies to teach this?

Brainstorming.

Rocket writing.

Mind-mapping.

Word association and definitions.

Startling statements.

Finish the sentence.

Paired interviews

Think Pair Share.

Visual representation.

Activity

What is the best vehicle to deliver the learning?

Use video footage or an image of “Smoky Mountain” in the Philippines to stimulate a whole class discussion about waste.

Vocabulary building using Word association and definitions, Brainstorming, Graffiti Board, Bundling, Topic wheels and Quizzes.

Stimulate small group or pair discussions using Startling statements. Did you know...?

Divide class into small groups of 5 students with a different question about waste. Each group writes down response, passes question onto next group and then share responses with class.

Finding Out

Outcomes

What understandings will my students have at the end of the Finding Out stage?

Issues associated with waste.

Changing attitudes towards waste management.

Composition of materials.

Methods used to extract and process resources.

Where resources are located in Australia and where and how waste is managed.

Technology and machinery of waste management solutions.

Different levels of government and their policies on waste management.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- formulate questions, hypotheses propositions and conjecture suitable for testing or investigation in relevant disciplines and frame these to clarify the purpose and scope of the inquiry
- manage and organise data and information in ways that assist in its interpretation, analysis and synthesis

ELA 19 understands and applies scientific knowledge:

- examine and consider scientific ideas, concepts and theories

ELA 20 acts for an environmentally sustainable future:

- examine examples of individual and global actions to create sustainable futures, assess their strengths and limitations, and propose further appropriate actions

ELA 21 understands about Australia and Australians:

- select and apply appropriate geographical tools (e.g. maps, graphs, photographs) to identify and represent Australia's physical features and patterns

ELA 23 understands world events and issues:

- human agency as a significant factor in world events and issues

Assessment

What evidence will there be that they have learnt?

Report and reflection on excursion or guest speaker identifying three key issues raised.

Summarise and write a conclusion of the survey results about attitudes towards waste.

Use molecular models to explain the formation of polymers and plastics.

Show the relationship between the extraction method and the Activity Series and metals.

Poster of extraction processes, explaining how and why these work.

Strategy

What is/are the most effective strategy or strategies to teach this?

Ask an expert.

Excursion.

Experiment.

Media - film, video, TV.

ICT.

Question of the day.

Survey of attitudes.

Media file.

Models.

Posters.

Graphs.

Charts.

Activity

What is the best vehicle to deliver the learning?

"Change makers" and agents of change throughout history - past, present and future.

Invite a guest speaker from TAMS. Write a list of questions about waste issues in the ACT for speaker.

Survey attitudes towards waste management, recycling, government policy, home, business, industry.

Excursion run by the Minerals Council, to North Parkes Mine.

Investigate and list the different materials in the classroom.

Experiment: make plastics and polymers.

Select a metal and find out about the chemical and physical processes to extract it from its ore including how much energy is used. Relate chemical processes to the Activity Series.

Conduct extraction processes such as froth flotation and flocculation as well as displacement and oxidization/ reduction reactions as science activity.

Use CDRoms, Internet, library to research about extraction of resources.

Use CDRoms, Internet, library, interviews etc to find out about different levels of government and their policies on waste management.

Students collect media over the course of the unit relating to key concepts and collate into a file to share at the end of the unit.

Sorting Out

Outcomes

What understandings will my students have at the end of the Sorting Out stage?

Cycle of waste management.

Comparisons of practices - packaging, marketing, purchasing.

The need to question practices relating to resource use and waste management.

Nexus between resource extraction, demand, population, consumption.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- draw conclusions that are consistent with the data or information and provide evidence or supporting details

ELA 19 understands and applies scientific knowledge:

- scientific models and terms to explain the properties of materials, the changes materials undergo and the conservation of matter
- explanations of physical and chemical changes in terms of types and arrangements of particles (e.g. atoms, molecules, elements, compounds)
- scientific concepts and models to explain the interdependence of populations of organisms and the environment, and predict the consequences of changes of an ecosystem
- scientific concepts and models to explain the interdependence of populations of organisms and the environment, and predict the consequences of changes of an ecosystem

ELA 20 acts for an environmentally sustainable future:

- how peoples' views on the environment influence government policy and non government organisations, and ways in which governments attempt to address issues of development and sustainability
- apply relevant scientific understandings to form personal views and make responsible and informed decisions about issues concerning sustainability (e.g. salinity, nuclear energy production, land degradation)

ELA 21 understands about Australia and Australians:

- natural and human processes that form and transform Australian environments over time

ELA 23 understands world events and issues:

- analyse and explain different perspectives on a significant world issue or event
- interpret people's motives and actions in order to understand a current world event or issue in depth, considering different perspectives or bias in accounts

Assessment

What evidence will there be that they have learnt?

Poster, sound-scape or diorama of waste cycle of a product.

Describe and compare each of the following practices in relation to waste: packaging; marketing; purchasing.

Venn diagram comparing resource extraction, population, demand and consumption.

Strategy

What is/are the most effective strategy or strategies to teach this?

Models.

Video and multi media presentation.

Soundscape.

Puppet play or role play.

Skit.

Talk show.

Radio play.

Graphs.

Charts.

Venn-diagrams.

Oral presentation.

Rap song/ dance.

Activity

What is the best vehicle to deliver the learning?

Categorise the different materials in the classroom.

Compare the amount of energy used to extract a resource to how much energy (inc transport) is needed to recycle it.

Create a model or diorama of the waste cycle.

Create a sound scape, diorama or poster of the life-cycle of a product e.g. aluminium can.

Use a Venn diagram to compare resource extraction, population, demand and consumption between places.

Simulate an interview with different representatives from the consumer cycle e.g. miner, manufacturer, consumer, waste management service provider.

Going Further

Outcomes

What understandings will my students have at the end of the Going Further stage?

Of policies, regulations and practices of governments at different levels.

How policies affect them and the environment.

How Australian government policies on waste have effected indigenous people and lands (e.g. radioactive wastes).

Ethics of industry - consumer choices.

The environmental, social, economic and political consequences of waste management practices.

International treaty obligations and Australia's international standing and positioning on environmental issues related to waste (e.g. intractable toxic waste).

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- formulate questions, hypotheses propositions and conjecture suitable for testing or investigation in relevant disciplines and frame these to clarify the purpose and scope of the inquiry

ELA 3 makes considered decisions:

- evaluate the role of intuition, feelings, values, beliefs in decision-making and strengthen their capacity for moral and ethical decisions

ELA 19 understands and applies scientific knowledge:

- examine and consider scientific ideas, concepts and theories
- apply scientific knowledge in exploring and constructing views around ethical and social issues relating to science (e.g. genetic modification, stem cell research, animal testing of products, nuclear energy)

ELA 20 acts for an environmentally sustainable future:

- how peoples' views on the environment influence government policy and non government organisations, and ways in which governments attempt to address issues of development and sustainability
- examine examples of individual and global actions to create sustainable futures, assess their strengths and limitations, and propose further appropriate actions

ELA 21 understands about Australia and Australians:

- natural and human processes that form and transform Australian environments over time
- analyse theories and arguments, and explain silences and gaps, in accounts of past and current events
- how government policies have affected indigenous peoples and their pursuit of citizenship rights

ELA 23 understands world events and issues:

- significant social justice or human rights issues around the world
- interpret people's motives and actions in order to understand a current world event or issue in depth, considering different perspectives or bias in accounts

Assessment

What evidence will there be that they have learnt?

Research task drawing conclusions from comparisons of policies, regulations and practices of governments at different levels. Explain how local policies affect you and your family.

Demonstrate how changing attitudes affect ethics in industry.

Debate on economy versus environment.

Strategy

What is/are the most effective strategy or strategies to teach this?

Cooperative group tasks.

Individual projects.

Expert groups.

Contracts.

Seven at once: multiple intelligence work stations.

Activity

What is the best vehicle to deliver the learning?

Students research a particular area of interest in greater detail using Cooperative group task model, individual projects, contracts, expert groups.

Seven at Once:

1. Rap songs
2. Make a video
3. Skits
4. Make posters
5. Board games
6. Ollie Saves the Planet DVD
7. Write a poem or prayer

Plastic is ubiquitous. Students are challenged to live without plastic for a day.

List and discuss some issues about uranium mine waste and radioactive waste storage on Aboriginal lands and investigate how it has affected the traditional custodians.

Making Connections

Outcomes

What understandings will my students have at the end of the Making Connections stage?

Opportunity costs - the environmental, social and economic cost of not acting responsibly.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 2 understands and applies the inquiry process:

- evaluate methodologies, reasoning and conclusions, and discuss specific improvements to their investigation or ways to conduct further investigations

ELA 3 makes considered decisions:

- evaluate the role of intuition, feelings, values, beliefs in decision-making and strengthen their capacity for moral and ethical decisions

ELA 19 understands and applies scientific knowledge:

- scientific concepts and models to explain the interdependence of populations of organisms and the environment, and predict the consequences of changes of an ecosystem

ELA 20 acts for an environmentally sustainable future:

- key concepts used in contemporary information and debates about environmental sustainability (e.g. biodiversity, carrying capacity, ecological footprint, preservation, conservation, wilderness, heritage, sustainability, sustainable development)
- apply relevant scientific understandings to form personal views and make responsible and informed decisions about issues concerning sustainability (e.g. salinity, nuclear energy production, land degradation)

ELA 21 understands about Australia and Australians:

- natural and human processes that form and transform Australian environments over time
- how government policies have affected indigenous peoples and their pursuit of citizenship rights

ELA 23 understands world events and issues:

- human agency as a significant factor in world events and issues
- Australia's relationship with other nations and the influence of global events and issues on these relationships

Assessment

What evidence will there be that they have learnt?

Use Effects wheel or In My Club to assess students understanding of key concepts covered.

Written or oral response to Laying it On the Line activity.

Students prepare graphs on tonnes of materials extracted and tonnes of material recycled, compare data and write an analysis showing social (littering, pollution of land, air, water, consumption of land as landfill) and economic (costs of local rates, materials, transport, energy) outcomes.

Strategy

What is/are the most effective strategy or strategies to teach this?

Effects wheels.

Laying it on the line.

In My Club.

Graphs and comparative data.

Two Trues and a False.

Activity

What is the best vehicle to deliver the learning?

In small groups or pairs use the Effects wheel method to map out environmental, social and economic effects of poor waste management.

Whole class or small group In My Club activity. Make a list of key concepts covered in the unit. Draw up a yes/ no table. Students try to guess the chosen key concept by asking questions. Key concepts might include extraction, stewardship, opportunity costs, society, government, economy, environment, policy, ethics, population, intractable waste, consumer, and supply and demand.

Laying it on the Line - Students work in small groups or pairs to prepare 2 or 3 statements about topic e.g.

Everyone has a responsibility to ensure that waste is managed responsibly.

Our values about waste determine how we act.

International governments aren't doing enough to manage waste.

The opportunity cost of not recycling is faster and greater use of resources.

Students take a position on these statements - strongly disagree, disagree, agree, strongly agree - and justify their position.

Use Two Trues and a False to revise key concepts.

Students collect "waste" items for a time capsule relevant to their lifestyle eg mobile phones, CDs, fast food containers, movie tickets, clothing, shoes, DVDs, and a letter explaining the items. Question for the future are these items being recycled now?

Use graphs and compare data to draw conclusions about the opportunity cost of not applying three R's to resource use.

Taking Action

Outcomes

What understandings will my students have at the end of the Taking Actions stage?

Political involvement.

Affirmative action.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 20 acts for an environmentally sustainable future:

- consider and explain their own decisions about lifestyle choices and participation in social actions for environmental sustainability
- apply relevant scientific understandings to form personal views and make responsible and informed decisions about issues concerning sustainability (e.g. salinity, nuclear energy production, land degradation)

Assessment

What evidence will there be that they have learnt?

Peer-assessed self-guided waste walk.

Poster of self-guided waste walk.

School action plan.

Report on involvement and participation in a community action group, protest.

Strategy

What is/are the most effective strategy or strategies to teach this?

Advertising campaigns.

Arts in the local community.

Design a self-guided walk.

Poster of waste walk.

Develop an action plan for the school.

From here to there.

Global links.

Hear all about it.

Letter writing.

Meet the press.

Activity

What is the best vehicle to deliver the learning?

Write to political parties.

Prepare a school action plan.

Avoid buying certain products - smart-purchasing.

Design and print a T-shirt logo.

Organise a protest.

Organise a Second Hand Sunday.

Design a self-guided walk around school or local area in small groups pointing out waste management practices.

Use communication technology to make links with other students in sustainable schools across the ACT and in other states and countries.

Invite The Canberra Times or The Chronicle to school to inform others about waste action plan.

Sharing, Discussion and Reflection

Outcomes

What understandings will my students have at the end of the Sharing, Discussion and Reflection stage?

Of all issues and key concepts covered in this unit.

Their own values, attitudes, beliefs and thinking about waste.

Essential Content

What do I want them to have opportunities to learn? (Taken from identified Essential Learning Achievements).

ELA 3 makes considered decisions:

- evaluate the role of intuition, feelings, values, beliefs in decision-making and strengthen their capacity for moral and ethical decisions
- make plans about key aspects of their lives (e.g. the location of resources and agencies in the community and online) and well-rehearsed skills (e.g. preparing a business plan, a resume, a letter of application and performing in presentations and interviews)

Assessment

What evidence will there be that they have learnt?

Learning Journal.

Individual or group presentation about what they have learnt in this unit.

Strategy

What is/are the most effective strategy or strategies to teach this?

Learning log.

Learning maps.

Carousel sharing.

Print walk.

Reflection roundabout.

Self-assessment.

Activity

What is the best vehicle to deliver the learning?

Students use a Learning Map and their Journal reflections to map the progress of their learning and understanding throughout the unit.

Use Carousel sharing to display and share self-guided waste walk posters and other group work products.

Use Print walk technique to share contents of media file. What patterns do you notice? Find one thing that you didn't know. One thing that surprised you.

Waste Walk around school or local area - walk over guided walk area and assess whether waste is managed more efficiently.

Resources and References

Books and Articles

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Barnham, K 2006, *Recycle,* Hodder Wayland, Great Britain

Barraclough, S 2006, *Recycling Operative,* Franklin Watts, London

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Boehm-Jerome, K 2003, *Protecting the Planet,* Rigby, Port Melbourne

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Walker, K 2004, *PAPER, Recycle, Reduce, Reuse, Rethink,* MacMillan Education Australia Pty Ltd, South Yarra, Victoria

Walker, K 2004, *STEEL, Recycle, Reduce, Reuse, Rethink,* MacMillan Education Australia Pty Ltd, South Yarra, Victoria

Websites

ACT Sustainable Schools Website - provides excellent links to websites and other resources about waste.
http://www.sustainableschools.act.gov.au/waste

Bureau of Statistics website www.abs.gov.au

Ecological Footprint calculator website http://www.epa.vic.gov.au/ecologicalfootprint/calculators/default.asp.

Keep Australia Beautiful website http://www.kab.org.au

Ollie's Island and Ollie Saves the Planet website http://www.olliesworld.com/

Planet Ark website http://www.planetark.com

Waste Management Association of Australia website www.wmaa.asn.au

CD-ROMs, DVDs, Videos, Kits, Posters and Guest Speakers

Ollie's World Series

Ollie Saves the Planet 2002, CD-ROM, Sustain Ability International Pty Ltd, Camberwell, Victoria

Ollie's Island 2007, CD-ROM, Sustain Ability International Pty Ltd, Camberwell, Victoria

Materials Recovery Facility (MRF) Education Centre - Hume

Glossary

compost bins	A container to house different fertilizes substances, in a mass where they will decompose and form into compost.
consumer cycle	What people buy, how the resource is made, when they buy and why they buy, how they use it and how they dispose of it. Once used then the impact on the environment of that waste resource.
consumer	A person who buys or uses goods or services.
consumption	The act or process of consuming.
demand	A diligent seeking or search; manifested want; desire to possess; request; as, a demand for certain goods.
decompose	Is to break down into simple substances through the activity of tiny living organisms called bacteria.
displacement	The act of displacing, or the state of being displaced; a putting out of place. The process of extracting soluble substances from organic material and the like, whereby a quantity of saturated solvent is displaced, or removed, for another quantity of the solvent.
disposable	Subject to disposal; free to be used or employed as occasion may require; not assigned to any service or use.
disposal	The act of disposing, or disposing of, anything; arrangement; orderly distribution; a putting in order.
economy	Orderly arrangement and management of the internal affairs of a state or of any establishment kept up by production and consumption; esp., such management as directly concerns wealth; as, political economy.
environment	The word 'environment' means 'home'. Earth is our home planet and provides all the necessary requirements for life.
ethics	A particular system of principles and rules concerting duty, whether true or false; rules of practice in respect to a single class of human actions.
extraction	The act of extracting, or drawing out; as, the extraction of a tooth, of a bone or an arrow from the body, of a stump from earth, of a passage from a book, of an essence or tincture.
flocculation	The process by which small particles of fine soils and sediments aggregate into larger lumps.
froth	The bubbles caused in fluids or liquors by fermentation or agitation; spume; foam.
flotation	The act, process, or state of floating.
government	The act of governing; the exercise of authority; the administration of laws; control; direction; regulation; as, civil, church, or family government.
intractable waste	Waste that is not tractable; not easily governed, managed, or directed.
landfill	Waste material use to landscape or reclaim land. A process of waste disposal. Large holes dug into the earth where waste material is buried.
leachate	A polluted liquid that drains from a landfill, it varies widely in composition regarding the age of the landfill and the type of waste that it contains. It can usually contain both dissolved and suspended material.
manufacturer	Make or produce (goods) on a large scale by machinery.
marketing	Advertising, promotion of services or goods for selling
Methane	A colourless, odourless gas that is the main constituent of natural gas.
miner	A person who works in a mine.
MRF	Materials Recovery Facility in Hume, ACT.
natural resources	Materials taken from the earth and used to make products, such as iron ore used to make steel.
non-renewable	Not being able to be renewed, made or grown again.
organic waste	Waste resource that contains biodegradable substances which are made from or found in living things.
oxidization	Combine or cause to combine with oxygen.
packaging	Wrapping or containers for goods.
plastics	A synthetic resinous substance that can be given any permanent shape by moulding it under pressure while heated.

Glossary

policy Guiding principle, rule, strategy or procedure.

polymers A compound of one or more large molecules formed from repeated units.

population The whole number of people, or inhabitants, in a country, or portion of a country; as, a population of ten millions.

processing Typically describes the act of taking something through an established and usually routine set of procedures to convert it from one form to another.

reclaimed Save and reuse.

recyclable materials Called "recyclables" or "recyclates", may originate from a wide range of sources including the home and industry. They include glass, paper, aluminium, asphalt, iron, textiles and plastics. Biodegradable waste, such as food waste or garden waste, is also recyclable with the assistance of micro-organisms through composting or anaerobic digestion.

recycle Recycling turns materials that would otherwise become waste into valuable resources. In addition, it generates a host of environmental, financial, and social benefits. Materials like glass, metal, plastics, and paper are collected, separated and sent to facilities that can process them into new materials or products.

reduce Waste prevention, or "source reduction," means consuming and throwing away less. It includes:

- purchasing durable, long-lasting goods;
- seeking products and packaging that are as free of toxics as possible;
- redesigning products to use less raw material in production, have a longer life, or be used again after its original use.

refuse Indicate that one is unwilling to accept, give or do something.

renewable A product that can be recycled, regenerated it can be made or grown again.

resource extraction Mining of valuable minerals or other geological materials from the earth.

reuse Reusing items by repairing them, donating them to charity and community groups, or selling them also reduces waste. Reusing products, when possible, is even better than recycling because the item does not need to be reprocessed before it can be used again.

S.E.M.P. School Environment Management Plan.

society The persons, collectively considered, who live in any region or at any period; any community of individuals who are united together by a common bond of nearness or intercourse; those who recognize each other as associates, friends, and acquaintances.

stewardship Is promoting, acting and persevering with sustainable practices in everyday life.

supply and demand Describe the market relations between prospective sellers and buyers of a goods.

uranium An element of the chromium group found in certain rare minerals, as pitchblende, uranite, etc., and reduced as a heavy, hard, nickel-white metal which is quite permanent. Its yellow oxide is used to impart to glass a delicate greenish-yellow tint that is accompanied by a strong fluorescence, and its black oxide is used as a pigment in porcelain painting. Symbol U. Atomic weight 239.

waste To squander or misuse waste resources. Something that is not needed any more.

waste audit A waste audit is a formal, structured process used to quantify the amount and types of waste being generated by an organisation. Information from audits will help identify current waste practices and how they can be improved. Being waste-wise can mean:

- a more efficient and effective organisation
- reduced waste management costs
- better use of limited natural resources.

waste management service provider A body or organisation that provides a service at a cost to remove waste resources from a designated location.

waste resource management Is the collection, transport, processing, recycling or disposal of waste materials, usually ones produced by human activity, in an effort to reduce their effect on human health or local aesthetics or amenity. A sub focus in recent decades has been to reduce waste materials' effect on the natural world and the environment and to recover resources from them.

waste wise To reuse, reduce or recycle waste resources.

worm farms Composting with worms, also known as vermiculture.