

# WASTE

# A Teaching Manual

Grade 3 - Paper

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**Approximately 828,318 tonnes of waste is generated each year in Tasmania, but only about 47% is recycled or composted (EPA Annual Report 2020-21). Aside from all the wasted energy and valuable natural resources used to produce, transport and process the materials going to landfill, disposal can contaminate the soil and groundwater and lead to emissions of greenhouse gases.**

**Waste is one environmental issue we are faced with today that EVERYONE can do something about, by avoiding waste, re-using goods, recycling and composting.**

**Research has shown that giving children positive experiences with nature, role modelling, encouraging personal actions which make a difference, and keeping children focused on an optimistic future are the most effective ways to ensure that they stay engaged in environmental issues without being overwhelmed by them, throughout their lives. Also, by providing facilities in schools and homes such as for recycling, children can feel that doing something for the environment is within their reach. Paper is one component of waste that children can investigate and feel empowered to change.**

**EPA Tasmania (2021) Environment Protection Authority Annual Report 2020-2021, viewed 21 March 2022,**

**<https://epa.tas.gov.au/about-the-epa/corporate-documents/annual-reports>**



## About this Resource

This resource is one in a series of manuals to provide a sequence of pedagogically aligned, hands-on waste-related teaching units for primary school teachers. The resources in this series are designed to develop awareness in students about sustainability and waste in Tasmania while meeting requirements of the Australian Curriculum in various subject areas, including the cross-curricular priority of sustainability. Through the activities, students explore how wastes are derived, how they can act to reduce, re-use and recycle wastes, and the connection between their individual actions and broader environment impacts.

Throughout these teaching manuals, each year level is provided with a particular waste issue to tackle, both in an academic and a practical sense, in an attempt to deliver a comprehensive picture over an eight-year journey from K-6. To complement this, this manual includes reference to a resource to assist in the development of a Waste Action Plan <http://rethinkwaste.com.au/at-school/schools-program/> which offers a waste audit toolkit and a guide to schools to set up waste infrastructure and procedures, reinforcing the children's learnings.

In the early years (K-1) there is a strong focus on nature play and establishing a lifelong appreciation of the environment. This is a great springboard into managing specific wastes such as litter in Grades 2 and paper in Grade 3. Students begin to make connections between their consumption and the impacts this has on waste and the environment. For example, in this resource, students investigate paper consumption and the affect this has on biodiversity, and on landfill volumes. In Grades 4 and 5, students take on a new challenge, to look at plastic and food wastes respectively. Then in Grade 6, there is a "wrap up", providing a snapshot of where these wastes fit into the "bigger picture" of wastes in contemporary Australia, and a consolidation of the need to address waste and sustainability issues in our time. The embedded philosophy of reduce, re-use and recycle should stand the children in good stead for the future, at home, at work and in the community.

## Expected learning outcomes

After completing this Grade 3 paper waste unit students are expected to have learnt the following:

- The history of papermaking
- How paper is made and how much we use
- How paper consumption/waste affects biodiversity, water use, energy use and climate change
- How we can reduce, reuse and recycle paper, which cuts down on waste
- Ways that the school can cut down on paper use/waste



## Curricular links at a glance

The activities covered in the unit have been mapped to the Grade 3 Australian Curriculum and, in the most part, concurrently meet the sustainability cross curriculum priority. Eleven extension activities are also included where teachers want to go beyond the 5 lesson unit. Each extension also has corresponding Australian Curriculum code reference numbers.

Where appropriate, for a selection of activities relating to the **science** curriculum, the 5Es model is added as an overlay: Engage, Explore, Explain, Elaborate and Evaluate. Students experience common activities, build on prior knowledge and experience to construct meaning and continually assess their understanding of a concept. This helps teachers evaluate students' understanding.

Learning Area in Australian Curriculum			Lesson no. = (L) and Extension no. = (E)
<b>SCIENCE</b>			
Science Understanding	Biological Sciences	Living things can be grouped on the basis of observable features and can be distinguished from non-living things (ACSSU044)	L 1 L1-E1
	Chemical sciences	A change of state between solid and liquid can be caused by adding or removing heat (ACSSU046)	L 2 L4-E1
Science (human endeavour)	Nature and development of science	Science involves making predictions and describing patterns and relationships (ACSHE050)	L 1, 2 L1-E2 L4-E1
	Use and influence of science	Science knowledge helps people to understand the effect of their actions (ACSHE051)	L 1, 4 L4-E1
<b>HISTORY</b>			
	Chronology, Terms and Concepts	Pose a range of questions about the past (ACHHS067)	L1 L1-E3
Science (human endeavour)	Historical questions and research	Pose a range of questions about the past (ACHHS067)	L1-E3
	Analysis and use of sources	Locate relevant information from sources provided (ACHHS068)	L1-E3
	Explanation and Communication	Use a range of communication forms (oral, graphic, written) and digital technologies (ACHHS071)	L1-E3
<b>MATHS</b>			
Numbers and Algebra	Numbers and place value	Recognise, model, represent and order numbers to at least 10 000 (ACMNA052)	L 5
	Money and financial mathematics	Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents (ACMNA059)	L5-E1
Measurement and Geometry	Using units of measurement	Measure, order and compare objects using familiar metric units of length, mass and capacity (ACMMG061)	L 3 L3-E1
	Shape	Make models of three dimensional objects and describe key features (ACMMG063)	L3-E1, L3-E2, L3-E3
Statistics and Probability	Data representation and interpretation	Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording (ACSMP068)	L 5



Learning Area in Australian Curriculum (as at Sept 2017) continued

Lesson no. = (L) and  
 Extension no. = (E)

**MATHS CONTINUED**

		Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies (ACSMP069)	L 5
		Interpret and compare data displays (ACSMP070)	L 5

**ENGLISH**

Literature	Creating Literature	Create texts that adapt language features and patterns, for example, rhyme (ACELT1601)	L1-E2
Literacy	Interpreting, analysing and evaluating	Use comprehension strategies to build literal and inferred meaning and begin to evaluate texts by drawing on a growing knowledge of context, text structures and language features ( ACELY1680)	L1-E2

**VISUAL ARTS**

Visual arts	Use materials, techniques and processes to explore visual conventions when making artworks (ACAVAMI11)	L2 L1-E1, L5-E2, L5-E3
	Present artworks and describe how they have used visual conventions to represent their ideas (ACAVAMI12)	L5-E2,L5-E3

**SUSTAINABILITY**

Systems	The biosphere is a dynamic system providing conditions that sustain life on Earth (OI.1)	L 1, 4 L1-E2, L4-E1 L5-E2, L5-E3
	All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival (OI.2).	L 1, 2, 4 L1-E1, L1-E2, L4-E1, L5-E2, L5-E3
	Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems (OI.3)	L 1, 2, 4, L1-E2 , L4-E1, L5-E2, L5-E3
World Views	World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice are essential for achieving sustainability (OI.4)	L 1, 2, 4 L4-E1, L5-E1, L5-E2
	World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability (OI.5)	L 1,2,3,4,5 L3-E1, L3-E2 L3-E3, L3-E4 L4-E1, L5-E1 L5-E2
Futures	The sustainability of ecological, social and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future (OI.6)	L 1, 2,3,4,5 L3-E1, L3-E2 L3-E3, L4-E1 L5-E2
	Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments (OI.7)	L 1,2,3,4,5, L3-E1, L3-E2 L3-E3, L3-E4 L4-E1, L5-E2, L5-E3
	Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments, and balanced judgments based on projected future economic, social and environmental impacts (OI.8)	L1,2, 3,4,5 L4-E1, L5-E2, L5-E3
	Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments (OI.9)	L 1,2,3,4,5, L3-E1, L3-E2, L3-E3, L3-E4, L4-E1, L5-E2 , L5-E3

# LESSONS

A black and white photograph of a construction site. In the foreground, a large crane is visible, with its boom extending across the frame. The crane has a sign that says "WILE" on it. In the background, a building is under construction, with a large crane also visible. The sky is clear and blue. The overall scene is one of active construction.



## LESSON 1

# Paper - what is it made from?

**In this lesson, students will learn what paper is made from and how a reduction in paper consumption can have a direct impact on biodiversity and habitat loss.**

**Meets Science ACSSU044** Living things can be grouped on the basis of observable features and can be distinguished from non-living things

**Science ACSHE 050** Science involves making predictions and describing patterns and relationships

**Science ACSHE051** Science knowledge helps people to understand the effect of their actions

**History ACHHS065** Sequence historical people and events

**Sustainability OI.1-OI.9** In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.



## Teachers Script

Historically, paper has been made from a variety of materials. In Egypt in 2400BC, papyrus was flattened and then written upon. In China, there are records of paper made from hemp, dated 105AD. Paper has also been made from pieces of bamboo strung together, or from silk. Europeans made paper from soft fibres like cotton. During the Black Death in the 1300s, millions of people in Europe died, resulting in a surplus of clothing and rags. Many of these rags were used to make paper; however eventually there was not enough cotton to meet the demand for paper. People began experimenting with other materials, such as wood. By the 19th century, people were producing paper very similar to the paper made today. As such, paper had evolved and this would set off one of humankind's greatest communication revolutions. As paper made from wood is lightweight, easy to transport and replicate, there was much greater access to books and writing papers.

## ENGAGE

**Discuss** these prompting questions, and write results on the board:

- *What was paper made from in olden day times (e.g. papyrus, linen, silk, cotton etc.)*
- *What is paper made from in modern times? (e.g. wood from trees)*
- *Which small and large animals live in trees, or depend on trees? (e.g. list. ....include birds, invertebrates, mammals)*
- *If we use a lot of paper, what happens to the trees? (e.g. trees would be cut down)*
- *If we use a lot of paper, what happens to the animals and birds? (e.g. they would lose their homes)*
- *Does anyone know what the words 'habitat' and 'biodiversity' mean?*

*(e.g. Habitat is the usual home of animal or plant. Habitat is the type of place that a particular animal usually lives in or the place that a particular plant usually grows in, for example a desert, forest, or lake.*

*Biodiversity is the range of organisms present in a particular ecological community or system. One measure of biodiversity is by counting the numbers and types of different species of plants and animals).*

- *How would habitat and biodiversity be affected if we cut down trees? (e.g. habitat and biodiversity would be altered/reduced)*



## LESSON 1

# Paper - what is it made from?

*continued*



Photo courtesy of Greening Australia

### EXPLORE

So that the students understand the importance of trees for biodiversity, take them to an area of the school playground that has trees or tall shrubs. Conduct a mini biodiversity investigation of these plants.

### You Will Need

- Text books identifying invertebrates
- Magnifiers if available
- A large sheet of fabric/tarpaulin

### Method

Conduct a leaf shake by shaking some branches over the sheet/tarp to collect invertebrates hiding on the leaves.

### EXPLAIN

**Discuss** which animals are dependent on these insects/invertebrates for life (e.g. *birds, lizards*). Ask the students to look for evidence of insects/invertebrates on the tree bark such as eggs, cocoons, webs, bugs. Also look for evidence of vertebrates (e.g. *birds, mammals*) using the trees (e.g. *birds' nests, possum scratches*).

Students then share their observations with the class (e.g. *there was a diverse number of animals/invertebrates, some animals are nocturnal etc*). Make conclusions (e.g. *animals need trees as habitat, the invertebrates would be eaten by birds – they are part of the food chain*).

**Discuss** whether, if an animal loses its home due to habitat destruction, it is easy for that animal to find a new home (e.g. often animals are territorial and will fight a displaced animal to death if it encroaches, some animals are not very mobile).

### ELABORATE

Identify reasons for the importance of trees. Ask the children to brainstorm some of the reasons and list them on the board, such as:

- Produce oxygen
- Clean the soil
- Muffle urban noise
- Slow stormwater runoff/erosion
- Store carbon
- Clean the air
- Provide shade and cooling
- Act as windbreaks
- Increase property values
- As trees produce oxygen and store carbon, they have a positive impact on the Greenhouse Effect and on climate change.
- Provide animal habitat/biodiversity

### EVALUATE

Ask the children to make the connections between the manufacture/consumption of paper and the destiny of the birds and animals that use the trees (e.g. *if we use less paper, it saves the trees. If it saves the trees, it saves the animals and birds, slows erosion etc*).



## LESSON 1 EXTENSION 1

# Draw or paint an animal from the biodiversity investigation

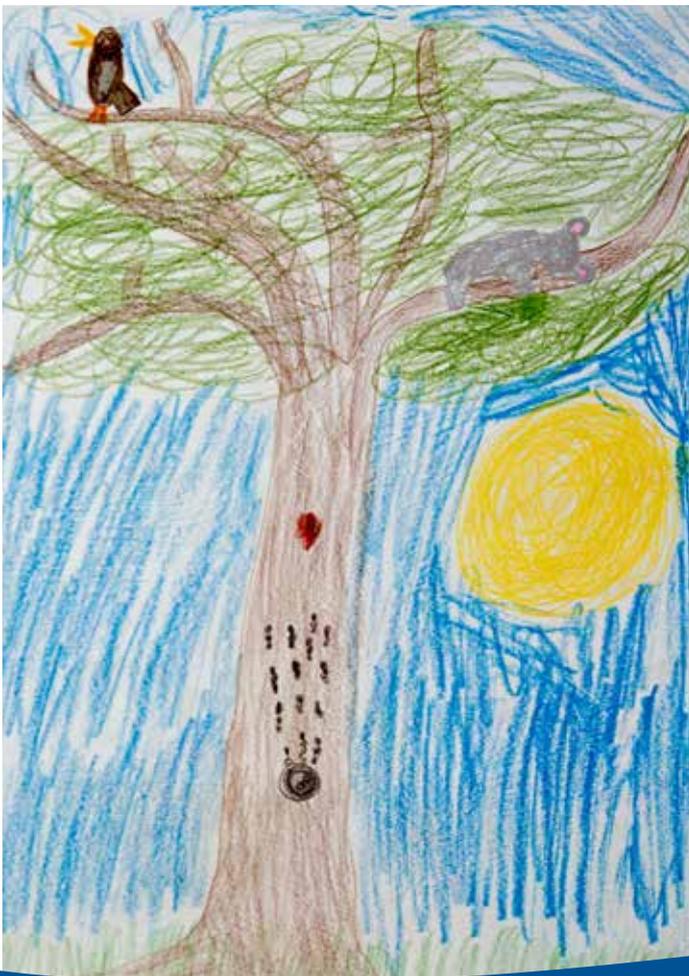
**Meets Science ACSSU044** Living things can be grouped on the basis of observable features and can be distinguished from non-living things

**Arts ACAVAMI 1.1** Use materials, techniques and processes to explore visual conventions when making artworks

**Sustainability OI.2** All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival

### Method

In the biodiversity investigation, have the students closely observe and draw and/or paint the features of an animal that was found, with some reference to its habitat. Show the pictures to the class, and explain the features and how the animals have adapted to their environment by employing these features.





## LESSON 1 EXTENSION 2

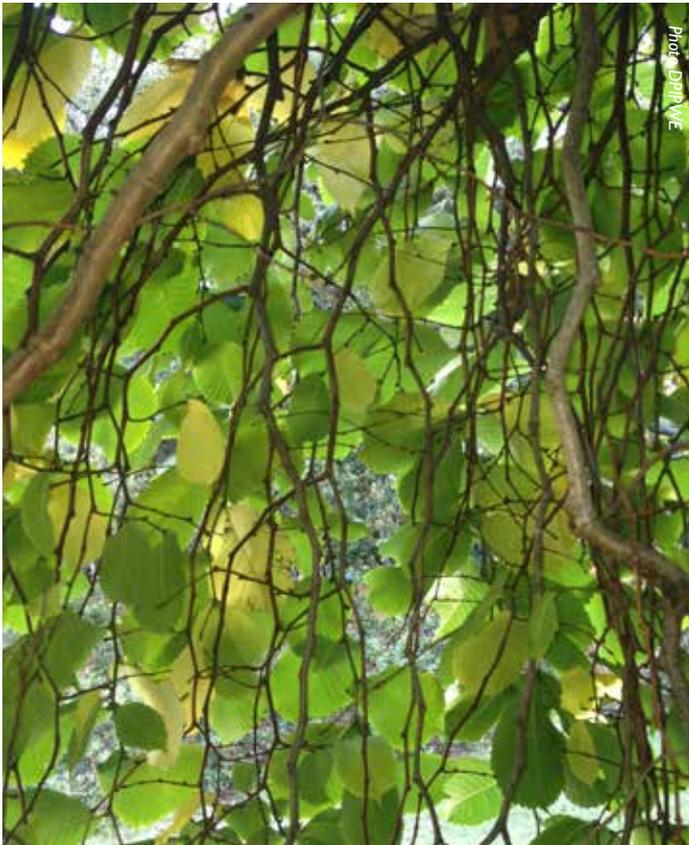
# Write a poem

**Meets English ACELY1680** Use comprehension strategies to build literal and inferred meaning and begin to evaluate texts by drawing on a growing knowledge of context, text structures and language features

**English ACELT1601** Create texts that adapt language features and patterns, for example, rhyme

**Science ACSHE050** Science involves making predictions and describing patterns and relationships

**Sustainability OI.1, OI.2, OI.3** In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems



For example

*First comes a butterfly*

*Who lays an egg*

*Out comes a caterpillar*

*With many legs*

*Oh, see the caterpillar*

*Spin and spin*

*A little chrysalis*

*To sleep in*

*Or*

*I was falling down*

*I found dragonflies on a bush*

*They were going up and down*

*Swush hush swush*

*Or*

*Bees. Need trees.*

*They please*

*Us with their honey.*

*Funny .....how bees leave us with ANY honey.*

### Method

Write a poem about the interdependence between animals and trees, or what it feels like to sit under a tree.



## LESSON 1 EXTENSION 3

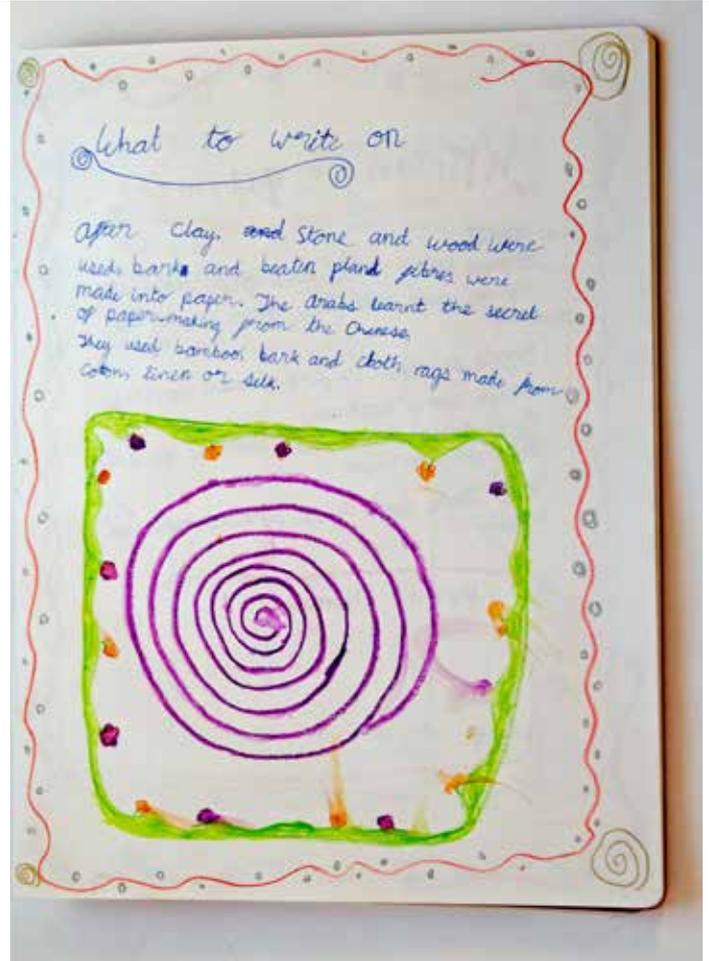
# History of paper and writing

**Meets History ACHHS065** Sequence historical people and events

**History ACHHS067** Pose a range of questions about the past

**History ACHHS068** Locate relevant information from sources provided

**History ACHHS071** Use a range of communication forms (oral, graphic, written) and digital



### Method

Students undertake research about when paper was invented and how paper was made in the past. How did paper make it easier for people to communicate? Have the students present their findings to the class using a range of communication forms (oral, graphic, written, posters, role-play, digital). Complement this with collected items relating to written communication and make a display of those in the classroom. Suggestions include a quill, an ink bottle/well and ink pen, a cartridge pen, different types of paper (e.g. made from papyrus, cotton, bamboo), an old typewriter, slate, chalk, printers letters, photos of an old print press etc.



## LESSON 2

# Environmental impacts of papermaking

Students learn about ‘other’ environmental impacts of papermaking, such as the use of chemicals, energy and water. They learn about different uses and types of paper and then create an art work from tissue paper.

**Meets Science ACSSU046** A change of state between solid and liquid can be caused by adding or removing heat

**Science ACSHE050** Science involves making predictions and describing patterns and relationships

**Arts ACAVAM 1.1.1** Use materials, techniques and processes to explore visual conventions when making artworks

**Sustainability OI.1 – OI.9** In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments



## Teachers Notes

Paper has many uses in our society, and plays a very important role in communication. However, the **production and use** of paper has a number of effects on the environment, not only on biodiversity. Logging and pulping activities contribute to air, water and land pollution. Worldwide, the pulp and paper industry is the fifth largest consumer of energy, accounting for six percent of the world's energy use (Laurijssen et al 2013). The generation of electricity can contribute to global warming and carbon dioxide emissions. The pulp and paper industry uses more water to produce a tonne of product than any other industry. The high demand for water for paper manufacture may affect aquatic life and water allocations to farmers.

Around 23% of landfill waste is discarded paper and cardboard. The inks, dyes and polymers in paper are potentially polluting when mingled with groundwater. There is, however, a trend toward using vegetable oil based inks rather than petroleum oils in recent years due to a demand for sustainability.

Where possible, we should reduce our use of paper; re-use where we can and recycle, to maximise the energy and resources that went in to making that paper. This may reduce the need to make as much new paper. We can also investigate making paper in a more environmentally friendly way.

## Method

**Discuss** how paper is made from trees. Given that most paper is made from wood, derived from trees, our paper consumption can affect biodiversity.

Point out that large scale papermaking has **other** environmental impacts as well. Watch the video, up until 1 minute:30seconds - <https://www.youtube.com/watch?v=7IP0Ch1Va44>. Discuss the film.

**Discuss** how paper manufacture involves wood, water, oil, electricity and chemical use. Chemicals could pollute our waterways, air and the soil. The generation of electricity can contribute to global warming and carbon dioxide emissions. The amount of paper and paper products we use is very large, so the environmental impact is also very significant. With the use of modern technology to harvest wood, paper has become cheap. This has led to a high level of consumption and waste. Around 23% of landfill waste is discarded paper and cardboard.

Then continue to watch the video <https://www.youtube.com/watch?v=7IP0Ch1Va44> (starting at 1 minute 30 seconds), to appreciate the environmental benefits of the reduction in cutting and processing trees and the reduced energy use and landfilling when paper is recycled.

In order to appreciate paper fibre and how it can be recycled complete the activity over the page:



## LESSON 2

# Environmental impacts of papermaking

*continued*



### You Will Need

- a variety of types of papers
- hand lenses/magnifying glasses

Give the students a variety of types of papers (e.g. *copy paper, newspaper, paper towel, newspaper, tissue paper*) and ask them to tear a piece from each. Students use hand lenses or magnifying glasses to closely examine the torn edges. The students should be able to see the fibres. Macro photos of the torn edges could be taken and projected onto the board for a closer look. Small digital microscopes that plug into a computer may be suitable for this.

Collect the pieces of torn paper to be used when making recycled paper later in the lesson.

Explain that the different uses for paper determine how they are structured (e.g. *office paper must be durable, tissue paper does not need to be as strong, newspaper goes yellow with age but it does not matter*).

Create a tissue paper artwork of a forest.

### You Will Need

- Waste tissue paper of various colours
- PVA glue
- Water
- Paintbrushes
- A4 backing paper
- Saucers or jars
- String
- Clothes pegs



### Method

Encourage the students to reflect on the importance of forests and to create an artwork of a forest using (waste/scrap) torn tissue paper in a technique similar to that used by picture book illustrator, Patricia Mullens in her book *V is for Vanishing*. If unavailable, other titles include *Crocodile Beat*, *Hattie and the Fox*, *Dinosaur Encore*.

Dilute PVA glue in 1:3 ratio (1 part glue to 3 parts water) in a saucer or jar. Cut or tear tissue into required shapes. Using the paintbrush, coat the backing paper or the back of the tissue paper fragments and place on the tissue on the A4 paper, to make a picture. Paint over the tissue paper with glue, if desired. Allow to dry, such as by pegging work on a line of string. Exhibit the children's work.



## LESSON 2

# Environmental impacts of papermaking

*continued*

**Office grade paper is not made in Tasmania. However, newspaper is produced at Norske Skog's Boyer Mill in southern Tasmania. Annual production is around 285,000 tonnes of newsprint, improved newsprint, book grades and lightweight coated paper.**

**In recent years the Boyer Mill has totally converted to softwood plantation fibre and is no longer using native timber. This was seen in a positive light by environmental groups, who had opposed the use of old growth forests. In the process involved with the conversion to softwood, water consumption, effluent volume and the use of chemicals was reduced, along with CO<sub>2</sub> emissions.**

<http://www.norskeskog.com/about-norskeskog/business-units/australasia/norske-skog-boyer>

## References

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Rose, M (undated) Educational Video for Kids: How Paper is made, viewed viewed 24 February 2022,

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[http://www.thesmartteacher.com/exchange/resource/532/3rd\\_Grade\\_May\\_Flowers\\_Bring\\_April\\_Tissue\\_Paper\\_Collage\\_Flowers](http://www.thesmartteacher.com/exchange/resource/532/3rd_Grade_May_Flowers_Bring_April_Tissue_Paper_Collage_Flowers)





## LESSON 3

# How much paper do we use?

In this lesson, students visualise how much paper is consumed in Australia each year, then discuss the role of reducing, re-using and recycling this paper. Then there are various websites suggested to inspire the teacher to lead an activity to make something creative from scrap paper.

**Meets Maths ACMMG06I** Measure, order and compare objects using familiar metric units of length, mass and capacity

**Sustainability OI.5- OI.9** In summary, actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.



## Teachers Notes

Each Australian uses approximately 115 kg of paper and paperboard per annum, which is about 3.3 million tonnes per year (Department of the Environment and Energy and Blue Environment Pty Ltd 2016). About a third of this (30%) goes to the rubbish tip/landfill.

## Method

In this exercise, students will be guided to imagine the volume that one tonne of paper occupies: that equates to the approximate weight that nine people consume per year.

### Step 1 - Discuss prior knowledge

**Discuss** the impact of papermaking on trees and habitat, the energy required in papermaking and the water and chemicals that papermakers use. Of course, it is dependent on how much paper we use.

### Step 2 – Think of all the types of paper that we use

**Brainstorm** a list of the different types of paper and cardboard that we use. List them on the whiteboard in categories. (e.g. toilet and tissue paper, cardboard like cereal packets and boxes, newspaper, office paper including diaries, paper in books, gift wrap etc.)

**Discuss** - Huge amounts of cardboard are used to package food and goods, much of this is unseen, 'out the back' of supermarkets and stores. So, it is not just what we see that is being used.

### Step 3 - Conceptualise paper volumes

Each Australian uses approximately 115 kg of paper and paperboard per annum, which is about 5.3 million tonnes per year (Department of Agriculture, Water and Environment 2021). Every tonne takes up about 1.4 cubic metres.

Choose four children to come to the front of the room and join hands, with arms outstretched, making a human cube, to show the one tonne of paper/1.4 m<sup>3</sup> volume that this would occupy. That is approximately what nine people produce every year.

If there are 3.3 million tonnes of paper used in Australia every year, that's 3.3 million times as big as the cube we have just made. If we fit, maybe, 50 of those squares made by those 4 people in this classroom, Australians use about 660,000 times this room-full every year – that is still hard to imagine!

(Thank you to these children, you can sit down now!)



## LESSON 3

# How much paper do we use?

*continued*



### Step 4 - Conceptualise paper weight

Judiciously (!) call for three new volunteers to come to the front of the class and estimate their personal weight(s). Work out how many children would make up 115kg – add to the number of children at the front of the class if necessary. Stop when the collective weight of children is about 115kg.

**Discussion points** - So, the combined weight of these children is the weight of the paper every person uses every year, on average. Is it hard to believe we all use that much paper, on average? And nine times is 115kg is about one tonne of paper, which fits into the 1.4m<sup>3</sup> square that we made, and we use 3.3 million of those in Australia every year!

Remember what impact this would have on biodiversity, energy, water and landfills?

We recycle 80% of this 3.3 million tonnes of paper, but that leaves 20% that still goes to landfill. Does anyone know what happens to paper in a landfill? (*It takes up a lot of space. If allowed to rot in wet, anaerobic conditions, it also makes methane gas, which is 21 times more powerful as a greenhouse gas than carbon dioxide. Therefore, throwing away paper contributes to climate change.*)

**Discussion points** - The best approach to saving trees and reducing the environmental impact of paper production is to think of “Reduce, Re-use, Recycle”. Has anyone heard of that? This is called the waste hierarchy. First we reduce, then we re-use, then we recycle, in that order.

- What does Reduce mean? (Use less, use only what we need for the purpose).
- What does Re-use mean? (Use something again e.g. refilling a plastic bottle, patching our trousers)
- What does Recycling mean? (making something back into its original form, or into something new, like making a window frame from aluminium cans).

All of these approaches will lead us to use less trees, less energy, less water and create less pollution. It is important that we think of reduce, re-use and recycle in that order. First, reduce, then re-use, then recycle. If we reduce what we use, then we will not need to re-use or recycle as much!

Can anyone think of a way we can **reduce** our paper use e.g. at home, at school? (*e.g. send emails, think before you print, read the ‘newspaper’ on-line, say “no” to printed advertising material/“junk mail”*)

Can anyone think of a way we can **re-use** our paper use e.g. at home, at school? (*e.g. use paper which has been printed on one side, make note pads from paper used on one side.*)

And how can we recycle paper? (*e.g. put it in the recycling bin if it has been used on both sides, make hand-made paper.*)

Today we are going to re-use some paper – instead of throwing the paper away, we are going to make something useful out of it. These can be used as gifts for others, say on Mothers Day, Fathers Day, for birthdays or for Christmas.



## LESSON 3

# How much paper do we use?

*continued*

### Teachers Notes

There has been a significant recent shift in Australians attitudes about climate change.

Often, issues around waste, the environment, sustainability and climate change are overwhelming to children – these are issues which they may feel powerless to change.

Making functional items by re-using discarded paper is a fun adjunct to learning about waste and waste minimisation. It is also a good way to ensure the product is used before being discarded. Making a practical item, such as a gift box from a used calendar, gives children a sense of empowerment. It gives them an area over which they can have control e.g. the power to reduce household waste. It may include manipulating materials by using manual dexterity, problem solving and sometimes teamwork. If they remember the technique, they can use this for the rest of their lives, build on it and/or share this with siblings or others.

### Method

Using the following links, find a suitable activity for your class:

[Gift bags from old calendars](#)

[Gift boxes from paper](#)

[Christmas trees from old magazines](#)

[Hanging ornament from old Christmas cards](#)

[Christmas decorations from strips of used paper](#)

[Pin-wheels](#)

[Bunting from scrap paper](#)

Some of these paper based craft ideas are pictured opposite.





## LESSON 3

# How much paper do we use?

*continued*

**Each year the Resource Co-operative hosts the Art from Trash exhibition in Hobart. Schools are encouraged to enter the exhibition: there are often awards for collaborative art pieces made by students.**

**Paper and cardboard are great resources to use for art works. Get your inspiration from previous works at**

**[www.resourceart.blogspot.com.au](http://www.resourceart.blogspot.com.au)**

## References

- Department of Agriculture, Water and Environment (2021) Assessment of Australian paper & paperboard recycling infrastructure and 2018-19 exports, including to China, viewed 22 March 2022, [www.awe.gov.au/environment/protection/waste/publications/assessment-australian-paper-paperboard-recycling-infrastructure-2018-19-exports](http://www.awe.gov.au/environment/protection/waste/publications/assessment-australian-paper-paperboard-recycling-infrastructure-2018-19-exports)
- Filian, C (2011) Make It: Recycled Card Ornament, viewed 21 March 2022, <http://cathiefilian.blogspot.com.au/2008/12/make-it-recycled-card-ornament.html>
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- KV Crafts (2011) KV Crafts Magazine or Book Christmas Tree, viewed 21 March 2022, <https://www.youtube.com/watch?v=I8iW2Re-NG8>
- Scribble (2012) How to Make Your Own Paper Box, viewed 21 March 2022, <https://www.youtube.com/watch?v=P3YVYLixFUA>
- The Elli Blog (undated), DIY Gift Bag Tutorial, viewed 21 March 2022, [www.pinterest.com.au/pin/146930006575222676/?mt=login](http://www.pinterest.com.au/pin/146930006575222676/?mt=login)
- Tryon, L (undated) Make a Pinwheel, viewed 21 March 2022, <http://www.leslietryon.com/3dcolorcutout/makepinw/makepinwheel.html>
- Unknown (undated), Things to Make and Do, Paper Bunting, viewed 21 March 2022, <http://www.things-to-make-and-do.co.uk/paper-and-card-projects/paper-bunting/paper-bunting.html>



## LESSON 3 EXTENSION I

# Box-in-a-Box Game

**Meets Maths ACMMG061** Measure, order and compare objects using familiar metric units of length, mass and capacity

**Maths ACMMG063** Make models of three-dimensional objects and describe key features

**Sustainability OI.5, OI.6, OI.7, OI.9** In summary, sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments



### Teachers Notes

If the students become competent at making gift boxes (see <https://www.youtube.com/watch?v=P3YVYLixFUA>), they might like to try the Box-in-a-Box Game below.

### You Will Need

For each team:

- 25 pieces of A4 scrap photocopy paper (from the recycle bin!)
- Rulers
- sticky tape
- pencils

For the class:

- digital scales e.g. kitchen scales

### Method

1. Divide the class into groups of about 4-5 people.
2. Give each group 25 pieces of A4 scrap paper rulers, sticky tape, scissors and pencils.
3. With the digital scales, document the weight of the 25 sheets of paper from each group.

4. All children practice how to make a box as per [Gift boxes from paper](#). Allocate 10-15 minutes. Indicate that by making the pieces of paper incrementally smaller or larger, you get a smaller or larger box.
5. Explain the objectives of the game, which are (a) to use team work to make a nest of boxes, all fitting into each-other like a nest of 'Russian dolls' and (b) not to make the most boxes, but to have the LEAST waste. (Suggest that they can/should use the scraps/offcuts). There should be no 'stray' boxes that do not fit snugly into another e.g. multiple identical boxes. Sticky tape is NOT allowed to be used to construct the boxes, only to join paper to make larger sheets. No waste paper should go into the recycling/bin at this stage.
6. Make boxes in teams for 20 minutes: set the clock. (Teams may wish to allocate individual roles e.g. a paper-cutting/measuring person, others to make the boxes). Remember, sticky tape can only be used to stick pieces together to make a square larger than that provided by the A4 sheets.
7. Stop the clock after 20 minutes. Weigh the waste paper remaining to see how effectively the children have used the paper waste, or visually estimate the amount of paper waste. Weigh any stray boxes and add those to the waste weight/volume. Document the waste from each team.
8. Choose a winning team, based on the **least** waste.

**According to a kerbside waste bin audit in northern Tasmania, approximately 9% of waste in kerbside waste bins (by weight) is paper and cardboard.**

**Paper and cardboard should be recycled if clean, or composted if contaminated with food or cooking oil.**

**Some paper products cannot be recycled easily, such as waxed cardboard boxes (often used to transport fruit and vegetables) and plastic coated paper cartons, such as long-life milk containers, which are a combination of plastic, metal and paper.**

### References

Rethink Waste Tasmania (2016) Waste Composition Audits 2015, viewed 21 March 2022,

<http://rethinkwaste.com.au/?s=waste+composition>

Scribble (2012) How to Make Your Own Paper Box, viewed 21

March 2022, <https://www.youtube.com/watch?v=P3YVYLixFUA>



## LESSON 3 *EXTENSION 2*

# Origami Flowers

**Meets ACMMG063** Make models of three-dimensional objects and describe key features

**Sustainability OI.5, OI.6, OI.7, OI.9** In summary, sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments.



### Method

Create origami flowers from waste paper, such as old maps, learning about fractions at the same time.

See examples such as

[http://www.brighthubeducation.com/lesson-plans-grades-3-5/128320-fraction-focused-flowers/?cid=parsely\\_rec](http://www.brighthubeducation.com/lesson-plans-grades-3-5/128320-fraction-focused-flowers/?cid=parsely_rec)

### References

Bright Hub Education (2016) Creating Fraction Focused Flowers, viewed 21 March 2022 [http://www.brighthubeducation.com/lesson-plans-grades-3-5/128320-fraction-focused-flowers/?cid=parsely\\_rec](http://www.brighthubeducation.com/lesson-plans-grades-3-5/128320-fraction-focused-flowers/?cid=parsely_rec)

Gilbank, J (2018) PlanetJune Craft Blog, viewed 21 March 2022 <https://www.planetjune.com/blog/papercraft/kusudama-flowers-tutorial/>



## LESSON 3 EXTENSION 3

# Crazy Birds

**Meets ACMMG063** Make models of three-dimensional objects and describe key features

**Sustainability OI.5, OI.6, OI.7, OI.9** In summary, sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments.



### Method

Grade 3 students can use scrap paper to make 'crazy birds', introducing the vocabulary of cylinder, form, two dimensional, three dimensional, rectangle, right angle, symmetry.

<http://www.brighthubeducation.com/lesson-plans-grades-3-5/128345-crazy-birds-math-integrated-art-lesson/#>

### Reference

Bright Hub Education Crazy Birds – A Math Integrated Art Lesson for 3rd Graders, viewed 21 March 2022,

<http://www.brighthubeducation.com/lesson-plans-grades-3-5/128345-crazy-birds-math-integrated-art-lesson/#>



## LESSON 3 EXTENSION 4

# Junk mail

**Meets Sustainability OI.7-OI.9** Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.



### Method

How much advertising material ('junk mail') do you think is delivered to your house every week? Each student should collect all the 'junk mail' placed in their letter box over one week, then bring it to school. There may be children who do not receive junk mail. That is OK! As a class, count the number of pieces of junk mail, then average this out for every person in the class, then for the whole school.

Do people like receiving this mail? Is it wanted? What is the impact of this consumption of paper? What can be done about unwanted advertising material (e.g. put a 'no advertising material sticker' on the letterbox, write or phone the companies involved, etc.).



## LESSON 4

# How much paper are we recycling?

**Students investigate the role and benefits of paper recycling. This lesson can be done in conjunction with Lesson 4 Extension 1, which shows how to make hand-made paper as a way of recycling. Collectively you will need approximately 1.5 hours.**

**Meets Science ACSHE051** Science knowledge helps people to understand the effect of their actions

**Sustainability OI.1-OI.9** In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.



### Before the Lesson

Collect packets of recycled paper (or photos of packets) and any other note pads, cards, etc made from recycled paper. It is recommended that this lesson be conducted in conjunction with Lesson 4 Extension 1 - Making Handmade Paper.

### Method

Re-cap with the students about where paper comes from (e.g. *historically papyrus in Ancient Egypt, cotton after the Plague, now trees*). We use a lot of paper in our society : list some uses (e.g. *tissues, writing paper etc.*) Which animals use trees as their home/habitat? (list some animals/birds/invertebrates. ...) What happens if we make paper from trees? (e.g. *uses trees, animals lose homes, could cause erosion, poor water quality, desertification, lack of shade, reduced CO2 absorption*) What happens if we re-use or recycle our paper? (*saves trees, saves on the use of chemicals, saves energy, reduces climate change*). Where does our waste end up if we don't recycle it? (e.g. *landfill*). What is wrong with that? (*makes methane, takes up space, affects climate change*).

Show the students packets of recycled paper (or photos of packets) and any other note pads, cards, etc made from recycled paper.

Discuss the meaning of 100% recycled versus other percentages of recycled.

### Suggested Teachers Script

- Of course, we have to buy and use recycled paper in order to 'close the loop' and keep the cycle going. If we buy recycled paper, we will encourage people to keep making it.
- Australia is amongst the world leaders in the recovery and recycling of paper and paperboard waste. . . but we still waste a lot!
- Of the 3.3 million tonnes of paper and cardboard Australian households and businesses used in 2018-19, there is 660,000 tonnes of paper per year that we are sending to landfill. (Department of Agriculture, Water and Environment 2021)
- Of course, when we make books, we store paper for many years, so that particular paper is not available for recycling. However, much of the remaining paper and cardboard is potentially recyclable, and can be recycled a second, third or fourth time.
- When we do recycle, it is important to make sure that the paper we put out for recycling can be recycled: if it is contaminated with food, it cannot be recycled. For example, pizza boxes can be recycled if they have no food left in them.
- Don't forget – Reduce, Re-use and Recycle your paper.

### References

Department of Agriculture, Water and Environment (2021) Assessment of Australian paper & paperboard recycling infrastructure and 2018-19 exports, including to China, viewed 22 March 2022, [www.awe.gov.au/environment/protection/waste/publications/assessment-australian-paper-paperboard-recycling-infrastructure-2018-19-exports](http://www.awe.gov.au/environment/protection/waste/publications/assessment-australian-paper-paperboard-recycling-infrastructure-2018-19-exports)



## LESSON 4 EXTENSION I

# Making handmade paper

**Meets Science ACSSU046** A change of state between solid and liquid can be caused by adding or removing heat

**Science ACSHE050** Science involves making predictions and describing patterns and relationships

**Science ACSHE051** Science knowledge helps people to understand the effect of their actions

**Sustainability OI.1-OI.9** In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.



### Teachers Notes

ONE way to recycle paper is to make new paper from used paper. When paper is recycled on an industrial scale, it is treated in a way which is essentially similar to the method of making hand-made paper. As your students make their own paper, they will observe that water and heat are required to reprocess paper fibre, and observe the paper fibres and the way they blend together to form a new sheet of paper.

### Preparation before the class

It is recommended that a timeslot of 1.5 hours be allocated for this exercise, depending on the size of the class. Be prepared to nominate small groups at a time to make paper in 15-20 minute rotations, accompanied by an extra adult. Remaining children stay in the classroom until it is their turn.

### You will need

You will need a 'wet area' or verandah/outside area to conduct this activity.

1. About 40 sheets of used office paper – preferably paper which has been printed on both sides. Some coloured paper can be added too.
2. Papermaking moulds\* and deckles\* (purchased from craft shops OR instructions on how to make these are below OR embroidery frames)
3. A (rectangular) tub/trough large enough to immerse the moulds and deckles
4. A paint stirrer with hand-held electric/battery powered drill plus hand-held 'stick' blender; or as an alternative to those, an electric blender with a large jug
5. Approx 100 couching cloths (e.g. Chux superwipes) cut to approx. 1.5 times the size of your moulds
6. An old newspaper
7. Two buckets
8. Access to hot and cold water
9. A (wooden) board, larger than the size of your mould
10. Soft petals, scrap thread, fine yarn, small flat paper pieces, glitter (all optional)
11. Two or three benches, tables or trestles (which are allowed to get wet) – one low bench can be for the pulp, one can be for the finished paper sheets and one table can be for decorating the paper sheets.
12. Small pieces of paper approx. 3x1 cm, to be used as name labels (the children can prepare these ahead of time, or in the session – maybe each child will make 2-3 pieces of hand-made paper; so 2-3 labels are required.
13. A BIRO to write the name on each label – (not felt tip pen, as that ink will bleed)
14. String
15. Clothes pegs
  - (\*If you make the mould and deckle, you will also need
    - 2 similarly sized wooden frames that are flat across their top surfaces (old picture frames work OK)
    - A piece of fly screen (available from hardware stores or some-one's back shed), larger than the wooden frame
    - Tacks or heavy duty staples
    - A hammer (if you use tacks)



## LESSON 4 EXTENSION I

# Making handmade paper

*continued*



Stretch the fly screen tightly over the surface of one of the matching frames and attach the screen to the back of that frame with the tacks/heavy duty staples. The second frame will be used as the deckle, which frames the pulp and makes the sheet of paper the desired size. If you use an embroidery frame, the deckle will sit around the screened frame to create a slight rim or lip for the pulp to be captured in).

### Method

Do this ahead of time

#### Shred and soak your paper

1. In the classroom, the children can tear the used-on-both-sides office paper into small pieces, roughly 2cm square. Alternatively, put the paper through a paper shredder.
2. Place the torn/shredded paper in a bucket and add enough **BOILING HOT** water to cover the paper.
3. Soak **OVERNIGHT**.

#### Prepare the pulp

4. The next day, blend all of the shredded and soaked paper in the first bucket with the paint stirrer attached to the drill. Once coarsely pulped, use the stick blender to complete the pulping, to make it fine. **ALTERNATIVELY** put a handful of soaked paper in the blender and add water until the blender is  $\frac{1}{2}$  to  $\frac{3}{4}$  full. Cover the blender and turn it on high for about two minutes. This will turn your paper into pulp. Repeat this process until all your paper has been blended and is very soft to touch. (Do not keep adding pulp to the same water, as this may break your blender).

#### Just before the class

Set up the rectangular paper pulp tub, preferably on a low table, with the bucket of pulp nearby. Put some warm water in the tub (up to two thirds full) and put in three or four handfuls of pulp. Set up another table as a 'wet' table to decorate the paper on, and a third table to place the finished paper pieces on. Have 10-15 couching cloths soaking in cold water in a second bucket near/beneath the third table. Have the paper labels in a container nearby, with the biro. Put the newspaper on table number three. Wet the newspaper by pouring water on top. Place one wet couching cloth flat on the wet newspaper.

#### ENGAGE

Ask the students if they have made paper before from used paper. If you haven't already discussed the origins of papermaking, the uses of paper and the environmental impacts of papermaking and paper consumption, have this discussion (as per Lesson 4).

At this stage, nominate small groups at a time making paper in 15-20 minute rotations, accompanied by an extra adult. Remaining children stay in the classroom until it is their turn.

#### EXPLORE

##### Make the new paper using the pulp

1. Hold the mould, screen side up. Place the deckle on top. Place thumbs over the deckle frame with fingers holding the frames of the mould and deckle together. Do not have thumbs touching the screen of the mould.





## LESSON 4 EXTENSION I

# Making handmade paper

*continued*



2. Dive the mould, with deckle on top, into the pulp along the closest inner side of the wall of the tub, then scrape almost along the bottom. Wait for a few seconds. Gently wiggle it side-to-side until the pulp on top of the screen looks even. Ensure that thumbs are not touching the screen of the mould.
3. Slowly lift the mould and deckle up until they are above the level of the water and wait for a moment until most of the water has drained from beneath the new sheet of paper. Keep the mould flat.
4. Place the mould and deckle on the decorating table. Lift the deckle off the mould.
5. Thinly decorate the wet paper pulp with petals, fine wool or thread (if desired).
6. Make the name labels, with biro. Place the named label in one corner of the piece of wet paper.
7. Carry the mould over to the wet newspaper pile.
8. Flip the mould with the newly made sheet of paper over onto the couching cloth so that the decorated side is down.
9. Gently press the mould to squeeze out some of the water.
10. Slowly lift the edge of the mould. The wet sheet of paper should remain on the couching cloth. Otherwise, flick the mesh with your fingers. If it is broken, you can place another piece of paper on top, using the same process.
11. Place another wet couching cloth over the wet sheet of paper in anticipation for the next person's piece of paper (it is most polite!). Repeat the steps above and stack the sheets of paper (with the wet couching cloths in between each piece).

*KEEP ADDING SOME PULP DURING THE SESSION, TO ENSURE PAPER IS THICK ENOUGH. KEEP ADDING WARM WATER TO THE BATH THROUGHOUT THE SESSION TO ENSURE THE PULP IS SOFT.*

12. Over the last piece of paper, place a couching cloth, then place the wooden board on top of the whole pile – then put a few bricks or heavy books on top of that pile.
13. Leave this pile for a couple of days. Outdoors is OK.

### EXPLAIN

Ask the students to develop an explanation as to how the paper pulp 'stuck together' to form new paper (e.g. with the addition of mechanical breakdown and heat, the fibres broke then knitted together).

On Day 3, peel the paper off each cloth

22. Take the weights off, then peel each couching cloth off, with its attached piece of paper. (If the paper is too wet, it will fall off the cloth. In that case, continue to press the paper for another day). Hang each piece of couching cloth (with its paper sheet attached) from a clothes line (e.g. made with the string) under a verandah or in the classroom, using a peg on two corners of the cloth, so the paper dries flat (but vertical!).
23. In a day or two, depending on the weather, the paper should be dry. Peel off the couching cloth. Keep these couching cloths for the next paper-making session. You should be able to identify each child's piece of paper using their name labels which will still be attached to each piece of paper. These labels can be peeled off later.
24. Flatten the bundle of dry sheets of paper beneath some heavy books for about a day.
25. Voila! – handmade paper!

### Further ideas

### ELABORATE

New techniques can be tried to enhance the paper. For example, wildflower seeds can be added on top of the wet paper pulp before the next couching cloth is placed. The recipient of this gift card/paper can plant it directly in the garden (but do not use weed seeds)!



## LESSON 4 EXTENSION I

# Making handmade paper

*continued*



Materials such as petals can be added directly to the pulp. Food colouring can also be added to the pulp, although the colour tends to fade. If coloured paper is desired, coloured paper should be used in the pulp.

A leaf could be placed on a thick wet paper sheet, then the leaf peeled off once the paper is dry – an impression of the leaf will be left on the paper.

Be aware that the colours in tissue paper and crepe paper may bleed – this can be used to great effect if desired, when added to the paper sheet, but the colours may run from one piece of handmade paper to the next person's paper in the pile.

When making the pulp, it is OK not to fully macerate all the pulp. If paper with text has been used to make the pulp, you may get the occasional piece of pulp with letters/text on it – the children might enjoy finding these letters.

Paper pulp can be pressed into a cup greased with cooking oil, then dried to make a plant pot – a plant can be planted in this

paper pot, given as a gift, then the whole pot planted directly into the ground.

PVA glue can be added to paper pulp and this combination can become a sculptural material, or a stronger vessel or bowl, but it will not be waterproof!

A piece of wool can be embedded between two pieces of wet paper pulp. Students could even write their name in wool. Once the paper is dry, it will look as if a worm lives inside the paper!

A gum leaf may be placed over the wet paper, which will give a relief impression once peeled off.



Handmade paper can be used as note paper or attached to card paper to make gift cards.

### Trouble shooting

It takes a while for the pulp to soften in the warm water in the trough. If you can, allow about 10-15 minutes for the pulp to soften in the warm water – otherwise the first (demonstration!) pieces of paper pulp may not bind well together. You can add pulp and keep working with this pulp as the session progresses.



## **LESSON 4 EXTENSION I**

# **Making handmade paper**

*continued*

As a general rule, if you can see the screen through the paper pulp once the deckle is lifted, then the pulp is too thin and the paper will tear. More pulp should be added to the mix, and that thin layer on the deckle should be put back in the trough. Alternatively, if a given piece of wet paper is too thin on the couching cloth, another piece of wet paper could be placed on top of that thin one.

Too many embellishments could compromise the strength of the paper – remember, less is more!

### **Cleaning up**

Left-over pulp should be disposed of thoughtfully. Paper fibres can clog drains, so leftover pulp should not be drained into the sink. Left-over pulp could be used as a mulch around the base of trees.....if it is OK with the school grounds staff.

Pulp can be frozen for later use.

### **EVALUATE**

Encourage the students to admire each beautiful and unique piece of handmade paper they have created. Indicate that they have gained a first-hand understanding of the papermaking process and an appreciation of the importance of paper recycling and paper conservation.

Remind them that paper is made from trees, and that recycling saves trees, energy and water. If they cannot make their own recycled paper at home, they should buy recycled paper where possible.

**Paper products are one of the most recycled waste materials over the whole of Australia , with a recycling rate of 80%.**

**High levels of recycling largely reflect the extent of recycling services or facilities available to households.**

**In many areas of Tasmania, cardboard, office paper, newspaper, letters and envelopes, magazines, pamphlets and phone books can be recycled at the kerbside.**

**Paper and cardboard must be free of food scraps before they go into a recycling bin. Pizza boxes can be recycled as long as there are no food scraps in the boxes.**



## LESSON 5

# Waste paper reduction in school

**This exercise requires prior planning one week before the lesson. It involves tracking personal paper consumption, paper re-use and recycling at school, and auditing the school's consumption and recycling of paper. The audit of paper use/recycling in the school is best conducted with little notice so that the students get a genuine snapshot of paper use at the school.**

Meets **Maths ACMNA052** Recognise, model, represent and order numbers to at least 10,000

**Maths ACSMP068** Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording

**Maths ACMSP069** Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies

**Maths ACMSP070** Interpret and compare data displays

**Sustainability OI.5-OI.9** In summary, actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.



### Prior planning

One week before the allocated lesson, children record the number of sheets of paper they use at school.

Also, on the day of the 'Other classrooms audit', this must be the day before paper recycling boxes are emptied and, also, before class waste bins are emptied on that particular day by the cleaners.

### Tracking classroom paper use

One week before the lesson, children each start to record the number of sheets of paper they personally use in the classroom during the week, including copy paper, art and craft paper and newspaper. Only include 'disposable' paper, not books.

Teach students to tally like so: 

A sample chart could look like this:

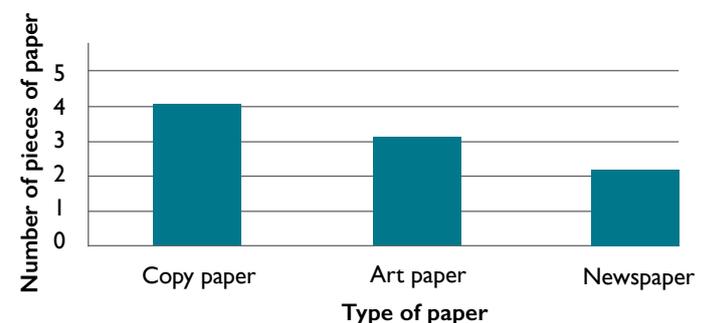
STUDENTS NAME	
Type of paper I used this week	Number of sheets/items I used this week
copy paper	
art paper	
newspaper	
Other?	
<b>TOTAL</b>	

Give the children a daily reminder to tabulate their paper use.

Students could have a page dedicated in an exercise book to this activity.

At the commencement of the lesson, ask the students to compile a personal graph, by hand, of the paper **used** last week. The graph of personal paper consumption (by type) may look like this:

### Paper used by me





## LESSON 5

# Waste paper reduction in school

*continued*

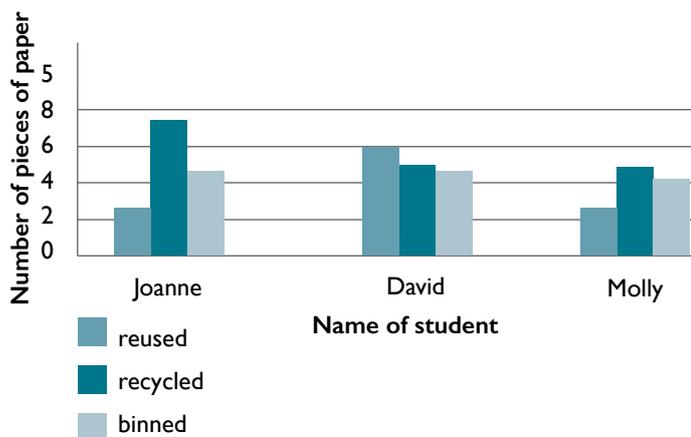
Students ALSO track the destination/disposal route of paper used in the classroom/s for that week. Each student keeps an individual tally of the number of sheets that they put into the re-use tray, recycling bins (if they exist) and garbage bin. The students could create personal graphs of their results.

A sample recording page would look like this:

My name:	
Number of sheets of paper I put in the re-use tray	
Number of sheets of paper I put in the recycling bin	
Number of sheets of paper I put in the rubbish bin	
Total number of sheets of paper I re-used, recycled and/or disposed of last week	

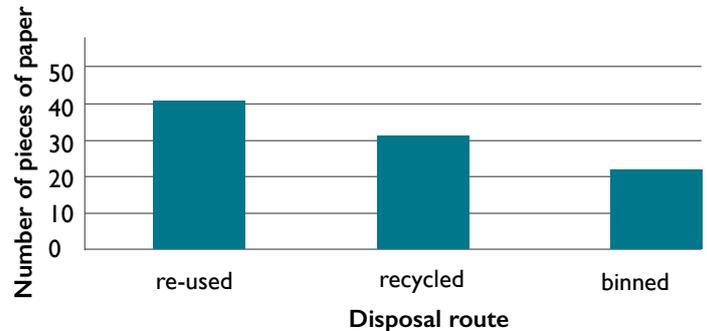
Then the teacher could compile a graph for the whole class of the disposal route of paper for the week, like the following:

### Disposal Route of Paper by individuals in Grade 3 last week



Then, total results for the whole class could be tallied and graphed by the teacher, as per below.

### Whole Class Paper Disposal Route last week



Discuss these outcomes: is it possible, as individuals, to re-use and recycle more paper, and put less in the bin? Why did your paper go in the bin? Did doing this exercise make you realise how much is going in the bin?

Discuss ways that the class could reduce, re-use and recycle paper. (Ideas could include purchasing the use of paper with a high degree of recycled content. Notebooks could be made from paper used on one side. In every classroom, paper used on one side could be put aside for re-use and paper used on both sides should be set aside for recycling. The art room, library, office and photocopy room could have re-use and recycling facilities etc.).

### Waste paper 'mini-audit'

Conduct a waste paper audit of **every classroom, the office and library** on one afternoon during the week to provide a 'snapshot' of how paper is disposed of at school. **This should IDEALLY be done the day before paper-recycling boxes are emptied and before class waste bins are emptied.**

To conduct this audit, allocate teams of approx. 2-3 students (of varying literacy levels) to walk to each of the various classrooms and office/library, and ask the staff the following questions:

On the next page is a pro-forma sheet for these audits. Encourage each group of children to select 'yes' or 'no' where appropriate, and write in Question 7. Allow 10 minutes.



## LESSON 5

# Waste paper reduction in school

*continued*

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### Mini-audits of Other Classrooms/office/library/photocopy room

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(Tick the correct answer below)

- 1) Is there a paper re-use box or tray?  Yes or  No
- 2) Is the paper re-use box in a place where people could see it?  Yes or  No
- 3) Is the paper re-use box labelled as a 're-use' box?  Yes or  No
- 4) Is there a paper recycling box?  Yes or  No
- 5) Is the paper recycling box in a place where people could see it?  Yes or  No
- 6) Look in the paper recycling bin – is there any paper in there that could be re-used (e.g. only used on one side)?  Yes or  No
- 7) Look in the RUBBISH bin. How much waste PAPER was in the RUBBISH bin, as a fraction or percentage. For example, half paper; a third paper; a quarter paper; less than a quarter?

Write your answer here

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- 8) Other comments/observations

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## LESSON 5

# Waste paper reduction in school

*continued*



### Do we need to change?

Assemble in the classroom. Refer to the other classrooms, office and library audits of school paper recycling and disposal. Students reflect on their findings and understandings. Ask the students if there could be **changes** in the way that people use and dispose of paper in the classrooms, office and library.

Also **brainstorm** ways in which **less paper** could be used (e.g. *newsletter online, using exercise books instead of worksheets, class Wiki space or blog for communication, duplex copying in office etc.*).

Did anyone notice that the school uses cardboard? How could the use of cardboard be minimised in the school? What other papers are used at school – could they be reduced, re-used or recycled?

Discuss the school canteen – could there be a way of reducing paper and cardboard generated by the canteen? (e.g. *food cooked at the school served in washable bowls, purchasing products with less packaging etc.*).

Discuss the paper wrappers from lunches – could they be reduced? How? (e.g. *maybe beeswax coated cloth wrappers, compartmentalised lunchboxes, promote a 'nude' lunch several times a year*).

Pose the following question: Could there ever be a paperless school?

Potential solutions to the issues should also be included. Groups could record their discussion on a **Futures Line**, listing their ideas under the headings: 'What We'd Like to Happen' and 'What Could Happen'.

Report solutions and mission statements back to the school executive. Ask if the students can create reduce, re-use, recycle reminders to fellow students (e.g. *at assembly, via the use of posters etc.*).

Develop an idea to take to the school executive, such as "Copy paper purchased is made from at least 85% recycled content".

### Review

Remember what paper is made from? How does paper manufacture affect biodiversity? (e.g. *trees are used, affecting habitat for flora and fauna. Water is needed in paper manufacture, affecting aquatic life. Energy is used to power the paper manufacturing plant – where does this energy come from and what impact does this have?*).

Reduce, re-use, recycle: Discuss how easy it is to buy/consume things, use things, then throw these things away. Discuss whether it is harder to reduce (minimise waste) and/or re-use (compared to recycling). How do the students feel about recycling? Will it have an impact on trees, water, energy, landfills?

Encourage children to do paper crafts from used paper in order to reduce the purchase of new materials. Encourage them to make their own recycled paper and to 'close the loop' and purchase recycled paper when they can. All these seemingly small things can have an impact.



## LESSON 5 EXTENSION 1

# Paper Bag Game

Meets **Maths ACMNA059** Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents

**Sustainability OI.4-OI.5** In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems.

### Method

The Paper Bag Game is a fun, interactive game which gives a representation of what life is like for poor people living in India. Students form family groups and have to race to make as many paper bags as possible from newspaper, as people do in India, in order to survive. They need to establish a weekly budget e.g. for food, medicine, clothing and can be subject to changing economic conditions. See

<https://www.christianaid.org.uk/schools/paper-bag-game>

### Reference

Christian Aid (undated) The Paper Bag Game, viewed 21 March 2022, <https://www.christianaid.org.uk/schools/paper-bag-game>





## LESSON 5 *EXTENSION 2*

# Make a school recycling poster

Meets **Arts ACAVAM 1.1.1** Use materials, techniques and processes to explore visual conventions when making artworks

**ACAVAM 1.1.2** Present artworks and describe how they have used visual conventions to represent their ideas

**Sustainability OI.1-OI.9** In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.



### Method

Make a poster for the school, to encourage reducing, re-using and recycling paper.

Display these posters around the school, particularly near the recycling bins.



## LESSON 5 *EXTENSION 3*

# Hand-made books

Meets **Arts ACAVAM 111** Use materials, techniques and processes to explore visual conventions when making artworks

**ACAVAM 112** Present artworks and describe how they have used visual conventions to represent their ideas

**Sustainability OI.1-OI.3, OI.7-OI.9** In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.



### Method

Learn how to make handmade books. Use old maps as covers for these books, as a suggestion. Sell them at the school fair or to raise money e.g. for school materials for children in developing countries.

Or display them for the school community to view.

