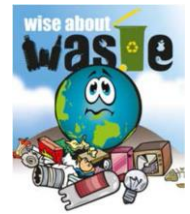


# SO MUCH STUFF – TEACHER’S NOTES



## KEY MESSAGES

Everything we have comes from the earth. Some resources are renewable, others are non-renewable. Minerals are finite – millions of years in the making. Our use of resources needs to be considered when making decisions for a sustainable future.

## CURRICULUM LINKS- NSW

- **This program explicitly teaches SCIENCE Stage 2**

### A student:

**ST2-2VA** demonstrates a willingness to engage responsibly with local, national and global issues relevant to their lives, and to shaping sustainable futures.

**ST2-4WS** investigates their questions and predictions by analysing collected data, suggesting explanations for their findings, and communicating and reflecting on the processes undertaken.

**ST2-11LW** describes ways that science knowledge helps people understand the effect of their actions on the environment and on the survival of living things.

**ST2-13MW** identifies the physical properties of natural and processed materials, and how these properties influence their use.

**ST2-16P** describes how products are designed and produced, and the ways people use them. properties influence their use

- **This program supports parts of the GEOGRAPHY Stage 2**

### A student:

**GE2-2** describes the ways people, places and environments interact.

Students investigate sustainable practices that protect environments e.g. discussion of ways waste can be managed sustainably.



# SO MUCH STUFF – TEACHER’S NOTES

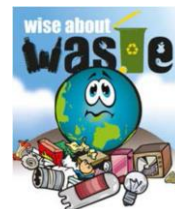


## INQUIRY QUESTION/S

- 1) What materials do we use every day?
- 2) What are things we use made of?
- 3) Where do they come from?
- 4) Are they renewable or non-renewable? (see Glossary p14 in Wise about Waste Booklet)
- 5) When we have finished with different materials how long do they take to decompose? (see Breakdown Rates table below)
- 6) What impact could these materials have on the environment?



# SO MUCH STUFF – TEACHER’S NOTES



## BACKGROUND INFORMATION

All the materials that we use every day, come from the earth – animal (meat, wool, leather, eggs, dairy), vegetable (wood, plant fibres, cotton, paper) and minerals (oil, gas, metals, glass, plastics, synthetic fabrics). In order to live sustainably both now and into the future, we must consider the overuse of natural resources and the impact of waste on the Earth. This will allow us to think through decision making in our day to day existence to better shape a healthy future for our planet.

Materials can be grouped according to observable features and properties in order for us to ascertain their origin. Although some materials such as plastic have been considerably altered from their core natural ingredients, all materials are originally from the earth. However, once altered, not all materials can follow the natural cycle of life and breakdown to replenish the earth. Some human-made materials will remain forever in their new state and some will break down to release toxins into the air, soil and waterways.

## BREAK DOWN RATES

Material	Origin	Examples	Breakdown Rate*
Organics Food & Fibre	Grown from the earth Natural fibres (cotton, wool) Cotton grows on plants and is farmed. Wool from sheep. [Synthetic fibres (polyester, nylon) see Plastics]	Food: Orange, apple or banana peel Fibre: cotton shirt, wool socks	2 months to 2 years  6 months -5 years  [synthetic fibres same as plastic rate]
Paper	Made from plantation trees, other fibres eg sugar cane	Paper, Cardboard box, newspaper, egg carton	2 -6 months if wet (or much longer if dry) [can be recycled]
Wood	Grown in natural forests and commercial plantations	Wooden ruler, desk.	1-5 years
Metal	Ore mined from the ground Bauxite to make aluminium, Iron ore to make steel	Aluminium can Tin can	50-500 years
Plastics (all kinds) Synthetic fabrics	Non-renewable Oils	PET bottle, polar fleece	Hundreds of years
Glass	Sand, soda & limestone	Glass bottle	Forever
Mixed materials	Combination of man-made materials such as plastic, glass & metal	Computer, poppers, umbrella	Forever/variable

\*Breakdown rate depends on the conditions – air, light, moisture and presence of microbes



# SO MUCH STUFF – TEACHER’S NOTES



## LEARNING ACTIVITIES

Questions for tuning in –

- *Have you ever thought about where all the things we use every day come from?*
- *Have you ever thought about what happens to it when we no longer need it?*

“Today we are learning about where the things we use every day come from and what happens to them when we no longer need them. Everything we have comes from the earth but we have created new materials that are toxic and that don’t rot.”

### 1) What Are Things Made Of?

- Brainstorm the different materials things are made of: Organics, paper, wood, glass, metal, or plastic.
- Put pictures of each up on the board or on the floor. Discuss what each item is made of. (Answers are written on the back of each picture and can be read out by a student).
- Distribute pictures of items to all students and ask them to group them with similar items.

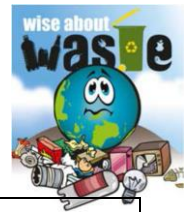
While still in student groups, the teacher can facilitate a class discussion about the origin of each material group. (Note that every item originally comes from the earth eg plastic>oil>from the earth.)

### 2) Timeline Activity - Breakdown Rates in Landfill

- Place the 5m length of jute webbing on the ground [outside if possible]. This webbing is marked out as a timeline for the purposes of this activity. It starts at “now” and continues over several hundred years to “forever”.
- Students pick up their picture card from the groups and place it along the timeline to show the estimated time the item will take to break down in landfill. (Answers are written on the back of each card).
- Working along the timeline from ‘now’ to ‘forever’ students are asked to introduce their item and comment on the time to decompose – is it what they thought it would be? How many lifetimes/generations is this?
- Discuss the impact on the environment from the breakdown rates of these items if buried in landfill. How many landfill sites will we need if humans continue to waste at current rates?
- How can we change this? [reduce, refuse, return, reuse etc.]



# SO MUCH STUFF – TEACHER’S NOTES



## 3) Video – Minecraft resources vs the real world

This 9 minute video compares the unlimited resource available on Minecraft to the real life limited resources on Earth

For more information about plastic production, view youtube video “Where does plastic come from?” <https://www.youtube.com/watch?v=6eCt0VDg-Kc>

## REFLECTION - Head/Heart/Hands

Ask students the following questions to facilitate a reflection of the lesson;

- Head – what is one thing you have learnt about materials?
- Heart – how are you feeling now about that?
- Hands – What is one thing you are going to do differently now?

## TO SIMPLIFY

- 1) Watch videos – Minecraft resources versus real life & Where does plastic come from?” <https://www.youtube.com/watch?v=6eCt0VDg-Kc> [3 mins].
- 2) Using the Wise about Waste booklet, students fill out page 5.
- 3) Look around the classroom and find objects made of different materials and consider their origins – what materials they are made of.



# SO MUCH STUFF – TEACHER’S NOTES



## GOING FURTHER

- **Students can research the ‘lifecycle’ of an object.** (eg a glass bottle, a PET bottle).

Where does it start its life?

Where does it end?

Is it more likely to be littered, landfilled or recycled?

- **Extension Timeline Activity: Zero Waste**

After laying out all the picture cards to show the break down rate, ask students to go and collect their picture card if it can be recycled, reused, returned, composted or repaired. Students justify their answer. Are there any items left on the timeline? If we are aiming for zero waste and minimum impact on the environment, then there will be no items left on the timeline. Plan a science activity – how long does it take different ‘rubbish’ to breakdown in water. Put clear plastic bottles (with lid) and filled with water on the windowsill. In each one put a different thing e.g. apple core, plastic popper straw, banksia cone, shell, ice cream stick etc. Predict, observe and record the changes over time.



# SO MUCH STUFF – TEACHER’S NOTES



- **Science Investigation**

Observe and describe the structure of materials that can be seen with the naked eye and a magnifying glass, eg grains in bread, particles in chipboard or cork, threads within a fabric or fibres in paper.

Material	Description of structure with naked eye	Description of structure or drawing with microscope
Fabric		
Paper		
Wood		
Metal		
Plastics		
Glass		
Mixed materials		



# SO MUCH STUFF – TEACHER’S NOTES



## SOURCES

- 1) [www.coolaustralia.org](http://www.coolaustralia.org) (2015). Education Resources. Retrieved from <http://www.coolaustralia.org/>
- 2) NSW Environment Protection Authority (1996). Earth Works, Living with Less Waste. Anne Munroe (ed).
- 3) <https://www.youtube.com/watch?v=6eCt0VDg-Kc> Video: Where does plastic come from? (3 minutes)
- 4) <https://www.youtube.com/watch?v=IwdUwffecsM> Video: From Oil to Plastic (9 minutes)
- 5) <https://www.youtube.com/watch?v=IjNusHQOhTM> Video: From Sand to Glass (6.5 minutes)
- 6) Story of Stuff video clips: <http://storyofstuff.org/>

## RESOURCES

- 1) 30 picture cards of material items – on the back it will say what the item is made of and its breakdown rates: cotton clothes, polar fleece jacket, sneakers, tin can, metal tongs, aluminium can, glass bottle, cardboard box, plastic bag, plastic packet, pieces of fruit, leather belt, leather shoes, plastic packet, plastic toy, magazine, computer, mobile phone, backpack, wooden spoon, coffee cup, plastic pet bottle, wooden chair, sofa/ lounge, television, can of paint, chemicals, glass window, crockery, light globe, wicker basket.
- 2) 5 metre Jute webbing time line – measured out in 1 metre lengths each representing 200 years – so 1000 years in total.

