Science - How my lunch affects my world

Written by: Todd Rogers, Ferny Grove State School, Brisbane, Queensland

Number of lessons: Five

Year level(s): Year 3

Australian Curriculum content descriptions: Science

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

With guidance, plan and conduct scientific investigations to find answers to questions, considering the safe use of appropriate materials and equipment (ACSIS054)

Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends (ACSIS057)

Represent and communicate observations, ideas and findings using formal and informal representations (ACSIS060)

Achievement standard:

By the end of Year 3, students use their understanding of the movement of Earth, materials and the behaviour of heat to suggest explanations for everyday observations. They group living things based on observable features and distinguish them from non-living things. They describe how they can use science investigations to respond to questions.

Students use their experiences to identify questions and make predictions about scientific investigations. They follow procedures to collect and record observations and suggest possible reasons for their findings, based on patterns in their data. They describe how safety and fairness were considered and they use diagrams and other representations to communicate their ideas.

Cross-curriculum priority ideas:

World views

OI.4 World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice, are essential for achieving sustainability.

OI.5 World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability.

Futures

OI.6 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.7 Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

OI.8 Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments, and balanced judgements based on projected future economic, social and environmental impacts.

OI.9 Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments.

Unit Overview

Students will work to understand their impacts on the world and evaluate their footprint in terms of plastic recycling. They will look at alternatives to their use of plastic and investigate alternative pathways for the plastic which they produce by way of their school food choices. Students will work to inform their year level and school about the project which will introduce soft-plastics recycling at school by researching the resources, routines and support needed. Ahead of implementation, students will support the program by using their scientific communication skills to create informative posters and staff/student/community rosters to allow for school-wide collection and recycling of soft-plastics.

Lesson 1: What Price Convenience?

Context

Modern student lunches can be a source of numerous soft-plastic items. Although soft-plastics are commonly recycled at home, these lunchtime packets almost certainly end in landfill from school. Students will use their existing knowledge of recycling and pollution to investigate alternatives to dumping their waste into the bin. It is intended that students share learning with parents in order to help their household to make informed choices.

Materials and equipment

A3 paper, large marker pens

Safety Advice

Nil

Objectives

Students will work to understand how their choices affect the environment. They will work together to identify the impacts of plastic pollution, highlight alternatives to dumping plastic waste into landfill and evaluate their role in making change.

Introduction

Hook students' attention with the following video:

https://www.abc.net.au/btn/classroom/plastic-pollution-problems/10488932

Delve into the core lesson.

Core

Use the following guiding questions to elicit prior knowledge and understanding of plastic pollution.

Why were the actors at the start scared of the "Plastic Thing?"
What do you know about the effects of plastic pollution?
What do you know about the causes of plastic pollution?
What are you doing at home to prevent plastic pollution?

View the video: https://www.abc.net.au/btn/classroom/plastic-ocean-campaigner/10521736

Why is a young person looking to make a change in the world?
Why does Arlian want people to stop using single-use plastics?

Work to build an understanding that reducing the amount of plastic we use is the first step to preventing plastic pollution.

What are the single-use plastics used at home? (Think carry bags, drink containers, food packaging and non-food packaging [toys, stationery, household items]).
Which do you think is the most common?
Why do people purchase small portions of food, individually packaged? KEY IDEA- CONVENIENCE!
How can we change our habits to reduce the amount of single-use plastics at home? KEY IDEA- BUY IN LARGER QUANTITIES, WITH LESS PACKAGING AND SPLIT INTO REUSABLE CONTAINERS.

Brainstorm and mind-map alternatives to 4 types of single-use plastics list above (carry bags etc.). Have students choose one of these 4 areas and using supplied paper and pens, create an infographic in small groups to show reduced single-plastics use (as in image below).

How do our choices affect our environment?
What is the price of convenience?

Exit task- Have students write a postcard to their parents to ask them to consider alternatives to plastic packaging and offering to help with the next shopping trip. They should include information from this lesson (or from further reading links below) to show their learning.

Conclusion

Highlight for students that, as young people, they have a role to play in educating their friends and family about the effects of plastic pollution and ways to reduce their plastic use.

Resources

Digital: links per Core lesson section

Worksheet: nil

Useful links: Further reading for students-

https://www.natgeokids.com/au/kids-club/cool-kids/general-kids-club/plastic-pollution/
https://www.natgeokids.com/au/kids-club/cool-kids/general-kids-club/how-to-reduce-your-plastic-at-school/

Lesson 2: Buried in plastic or creative reuse

Context

Students have learned that their choices directly affect the environment- by reducing their use of plastics, they can lower their impacts. In this lesson, students will investigate recycling options for plastic.

Materials and equipment

1 plastic bottle or carton (soft drink, milk or juice container) per student
Scrap paper
Coloured jumbo pens
Masking tape
Heavy duty scissors
A6 size cardboard for each student

Safety advice

Scissors will be used to shape and trim plastic objects. With careful instruction and close supervision, students may make the cuts required but a teacher or aide should be present at all times. Alternatively, have students mark the required cuts for an adult to make on their behalf.

Objectives

Students will use tools and materials to work safely and create a reused plastic pencil holder. They will learn about the different types of plastics and the different options for recycling those plastics. Students will investigate novel ways of plastic pollution reduction.

Introduction

Begin the lesson by displaying the news article https://www.kidsnews.com.au/recycling/the-simplest-solution-to-the-worlds-waste-problem-is-to-not-produce-it-in-the-first-place/news-story/4faefcfd905fc9694f7e03b8ef75d90c

Read as a group, highlighting the easiest ideas for class members to adopt or those already in place. KEY IDEA- REUSING!!! This is the next step to our previous KEY IDEA of REDUCING.

Delve into the core lesson.

Core

As a class, discuss novel ideas for using plastics by viewing https://www.kidsnews.com.au/technology/turning-the-waste-problem-into-a-solution-with-3d-printed-prosthetics/news-story/f1be02f8001e2d8b982dbe935d42e529

Explain that the class will create a reused plastic pencil holder from plastic waste.
Visit the steps at https://hative.com/diy-plastic-bottle-pencil-holder/ to create a monster-shaped container. Another alternative is to simply shape the container as preferred with scissors and then to use scrap paper, masking tape and marker pens to decorate.

Conclusion

Students can make choices to reduce the amount of plastic they use and through clever designs and effort they can now reuse more plastic items rather than sending them to landfill. In the next lesson they will further investigate recycling.

Resources

Digital: as per lesson plan
Worksheet:
Useful links:

Lesson 2.5: Literacy rotations activity

Context

Students all know the familiar text The Very Hungry Caterpillar by Eric Carle. Here they will apply their understanding of an interesting research project to innovate upon that story.

Materials and equipment

Hard copy or digital version of Eric Carle's The Very Hungry Caterpillar
Planning paper
Good copy paper (optional)
Markers
Rulers

Safety Advice

Nil

Objectives

Students will investigate another novel way of reducing plastic pollution. They will use tools and materials to work safely and create an innovation on a classic story.

Introduction

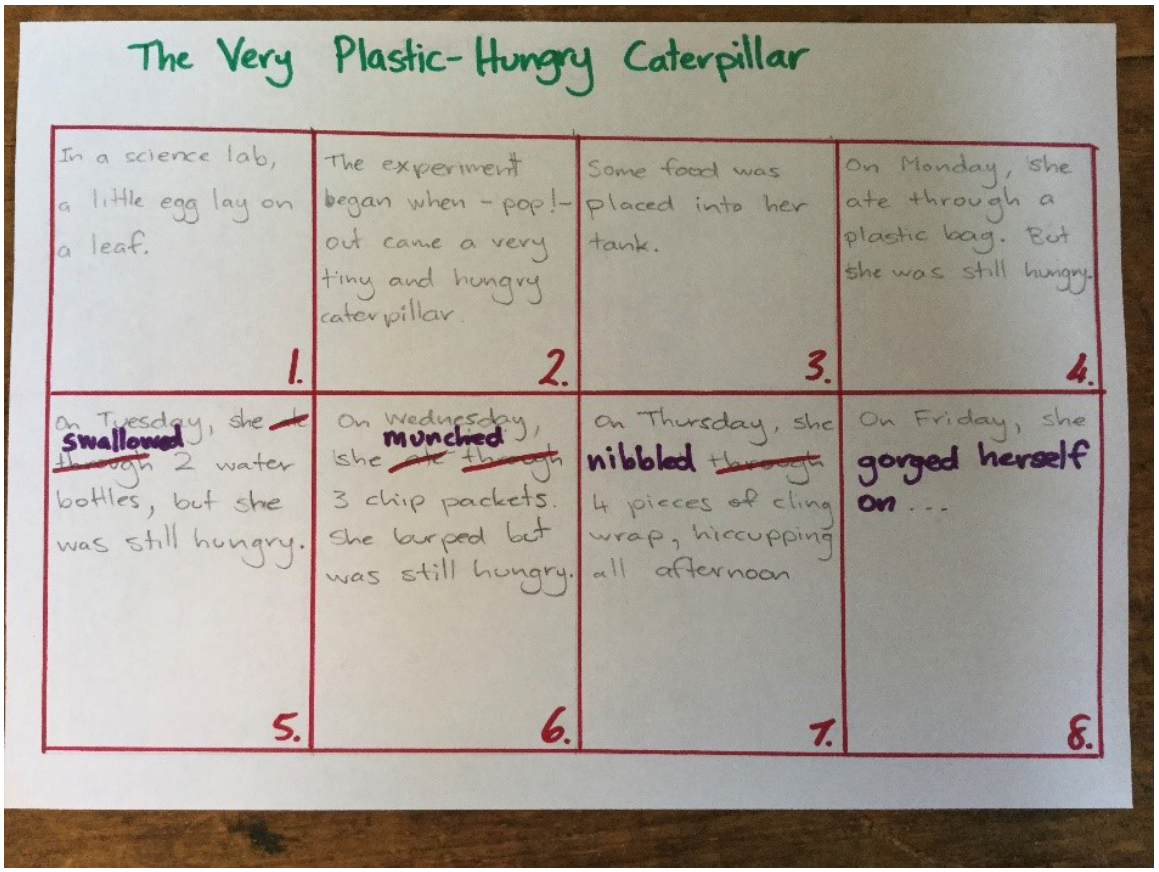
Read or view digitally The Very Hungry Caterpillar by Eric Carle.
Delve into the core lesson.

Core

Scientists are investigating new ways of dealing with plastic pollution. Some of them have been biodegradable plastics which breakdown in water and sunlight after a much shorter period. Others are more unique approaches to the problem.

View:
https://www.kidsnews.com.au/science/very-hungry-caterpillar-eats-earths-plastic-pollution/news-story/2b0f1e5c5c305aef137cb47efbb4ebed

Have students write the outline for an innovation upon the story of The Very Hungry Caterpillar by Eric Carle, as she/he devours plastic items.



Conclusion

Students can make choices to reduce the amount of plastic they use and through clever designs and effort they can now reuse more plastic items rather than sending them to landfill. In the next lesson they will further investigate recycling.

Resources

Digital: as per lesson plan

Worksheet:

Useful links:

Lesson 3: Recycling? Come again?

Context

After investigating Reducing and Reusing as methods to combat plastic pollution, students will now view the process of Recycling with a view to creating a soft plastics recycling program at their school.

Materials and equipment

A3 paper or cardboard
Jumbo markers

Safety Advice

Nil

Objectives

Students will understand the benefits and the process of recycling plastic, glass and fibre. They will more closely investigate soft plastics recycling with a view to creating a soft-plastics recycling program at school.

Introduction

Revisit the Reduce and Reuse learning from previous lessons. Ensure students are clear that their choices as consumers affect the amount of plastic pollution that they and their families produce.

Core

Display and discuss the infographic from https://waster.com.au/wp-content/uploads/2018/08/recycling-facts-australia-ig.jpg

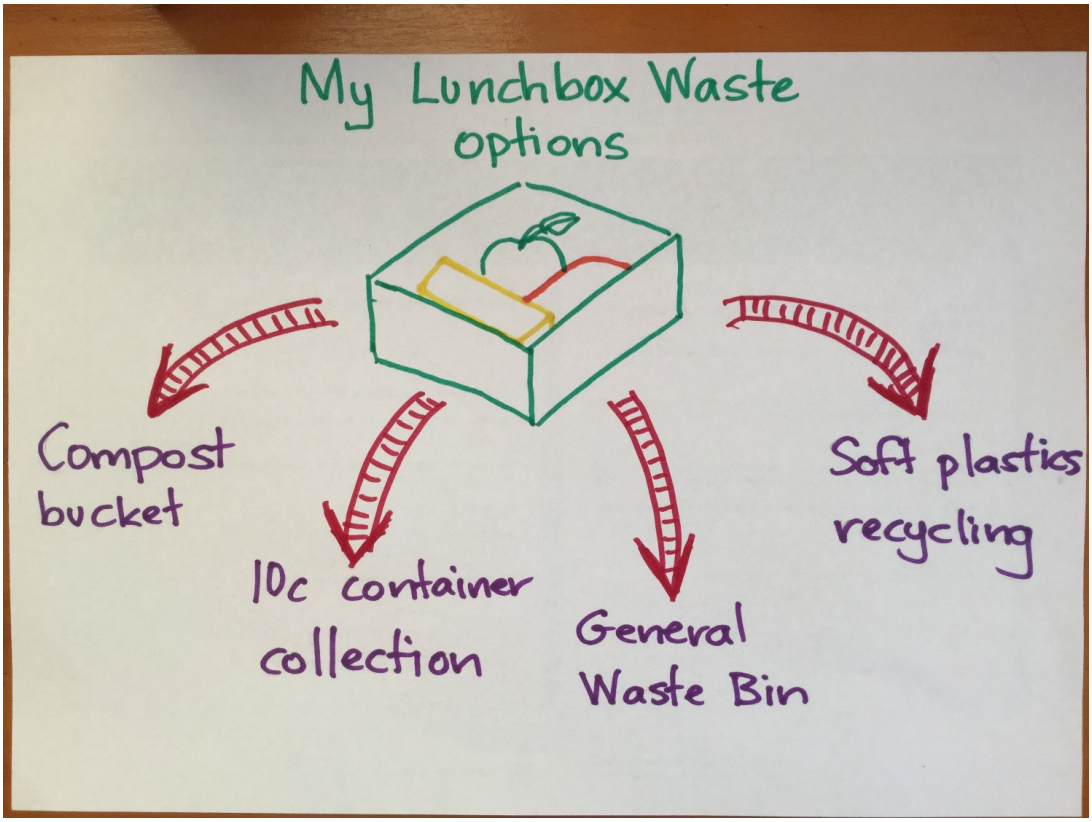
Highlight the benefits of recycling- saving landfill, pollution, raw materials, energy and water. Discuss what is already done at home in recycling bins, discuss what is already done at school (think compost, paper/card recycling, bottle/can recycling). Focus on the What Not to Recycle section for what may be a target area for future recycling- soft plastics!

Why can't these go in your recycling bin at home?
What can be done with them instead?

View the website https://www.redcycle.net.au/what-to-redcycle/
Discuss the green list- **are there any items here that school will produce a lot of?**
Would this stop a lot of waste going to landfill or possibly polluting?
What does soft-plastic recycling look like?

View the video at https://www.youtube.com/watch?v=dM7vQsOQ550

In groups, create a recycling poster showing the pathways of different materials. Students may like to create a what-to-do list based on existing school recycling programs.



Conclusion

View the posters of groups and discuss recycling as a last step in the process of fighting plastic pollution.

Resources

Digital: as per lesson plan
Worksheet:
Useful links:

Lesson 4: How does you lunchbox rate?

Context

Students now understand that their choices and those of their family affect their impact on the environment through reducing, reusing and recycling. Next they will work to understand how the choices of the community impact on the environment.

Materials and equipment

Student lunchboxes before any food is eaten.
Blank A4 paper, 30cm rulers and jumbo coloured pens.
Opaque small bag/box
10 marbles, counters, beads etc. in 2 colour versions (ie. 5 of one colour, 5 of another)

Safety Advice

Nil

Objectives

Students will make predictions around their own soft-plastic consumption and compare results with their peers. They will learn about fair sampling and the limitations of testing. Students will design a research question, prepare a data recording table and clarify a method for sampling student lunches across the school. The results will determine the soft-plastics amount produced by the school weekly, monthly and annually.

Introduction

Hook student attention by displaying the cover of https://sites.google.com/site/zackanddot/comics/ttack-of-the-killer-muckwads

Lead discussion and predictions of what it might be about and how it is linked to the work of this unit. Read the story pages 2, 3 and 4 as a class.

Delve into the core lesson.

Core

Today, we want to find out if soft-plastics recycling is right for our school. To do that, we will work as scientists to design a question, create a fair method for answering that scientific question and gather the data to answer that question.

Why do scientists work so hard to design a question? What could happen if we were not clear in what we wanted to find out? Would our answers be reliable if we asked an unclear question? To find out the amount of soft-plastic which our school produces- what could be our investigation question to ask? Who would we ask?

Work as a class to create an investigation question.

Why do scientists always record their method or steps of investigating? Why should we plan what we will do before we do it? What could happen if we didn't think through our method first? To find out the amount of soft-plastic which our school produces, what would be our steps?

Work as a class to outline a method.

Why do scientists create a data recording table before they begin their work? What will our recording table look like?

Work as a class to create a recording table for the expected data.

Have students make predictions of their own plastic use and if it will be higher or lower than their friends. Work as a class to count, classify and record soft-plastic items in each student lunchbox. Create a total for the class and an average per child. Discuss if they think other classes would be the same or different. Discuss any limitations in testing just one class on one day. Extrapolate to 1 week, month, year and for all classes. Share the activity with your school by asking students to be peer teachers running the activity in other classes.

Have students prepare a persuasive paragraph for soft-plastics recycling to the student council, P&C association and school administration as appropriate for your setting. If you plan to use a local REDcycle drop-off point, it would be courteous to ask for their permission and support in a class letter too.

Conclusion

Students can now see their contribution to plastic pollution. Have students consider how this information might affect their future decisions for lunch choices.

Resources

Digital: as per lesson plan.
Worksheet:
Useful links:

Lesson 5: Plan for action

Context

Students have learned how their choices affect their environment and what options they have for improving their choices. They will now work to implement a recycling program for their community to alleviate the waste that they produce.

The steps outlined in this lesson will vary greatly from school to school depending on amount of soft-plastic waste produced, proximity to soft-plastics recycling points, size of group participating and your specific community. Use it as a guide only.

Materials and equipment

A3 paper/cardboard
Jumbo marker pens
Lettering books
Digital publishing tools if preferred

Safety Advice

Nil

Objectives

Students will work to create a soft-plastics recycling program. This will involve brainstorming for what resources and support will be needed.

Introduction

Warm up with the following video to recap the lesson sequence: https://www.kidsnews.com.au/recycling/the-simplest-solution-to-the-worlds-waste-problem-is-to-not-produce-it-in-the-first-place/news-story/4faefcfd905fc9694f7e03b8ef75d90c

Discuss the main points of REDUCE, REUSE and RECYCLE.

Launch into the core lesson.

Core

Today, we want to find out if soft-plastics recycling is right for our school. To do that, we will work as scientists to design a question, create a fair method for answering that scientific question and gather the data to answer that question.

To start a soft-plastics recycling program, we are going to need some expert advice. Who in our school could guide us? Who might have experience in things like this? Think administration, student council, P&C association.

Read through the letters from last lesson. Impress upon students the community aspect of school, REDcycle pint and recyclers are going to work together to reduce the plastic pollution problem. A large change for the better is difficult to enact on your own- it takes a group of positive thinking people but is very much doable.

Today we will begin the program by designing how recycling will work at our school. Next, we will need to apply to the school for the resources we need. Last, we will inform the school what they will need to do to help our plan succeed.

Organise students into groups of 3. Have them brainstorm for their ideas on:
How will soft-plastics be collected each meal break?
How will they be stored before depositing at the REDcycle drop-off point?
How often will the collection be taken to the drop-off point?
Who will take the collection to the drop-off point?
What items will we need for collection, storage and transport to the drop-off point?

Come together and share ideas to formulate the best plan for your setting.

Now that we have a plan, we need to inform the school. Science Communication skills are essential for getting science findings to those people who we are trying to benefit. We will make science communication posters to inform why we are doing this, what we are doing and how they can help.

Use the A3 paper/cardboard, stationery and digital design tools to create a series of posters.

Conclusion

With a plan formulated by young people seeking to make a change at home and at school, we can enable a community to make a change to their buying habits, creative reuse and recycling routines.

Resources

Digital: as per lesson plan.
Worksheet:
Useful links: