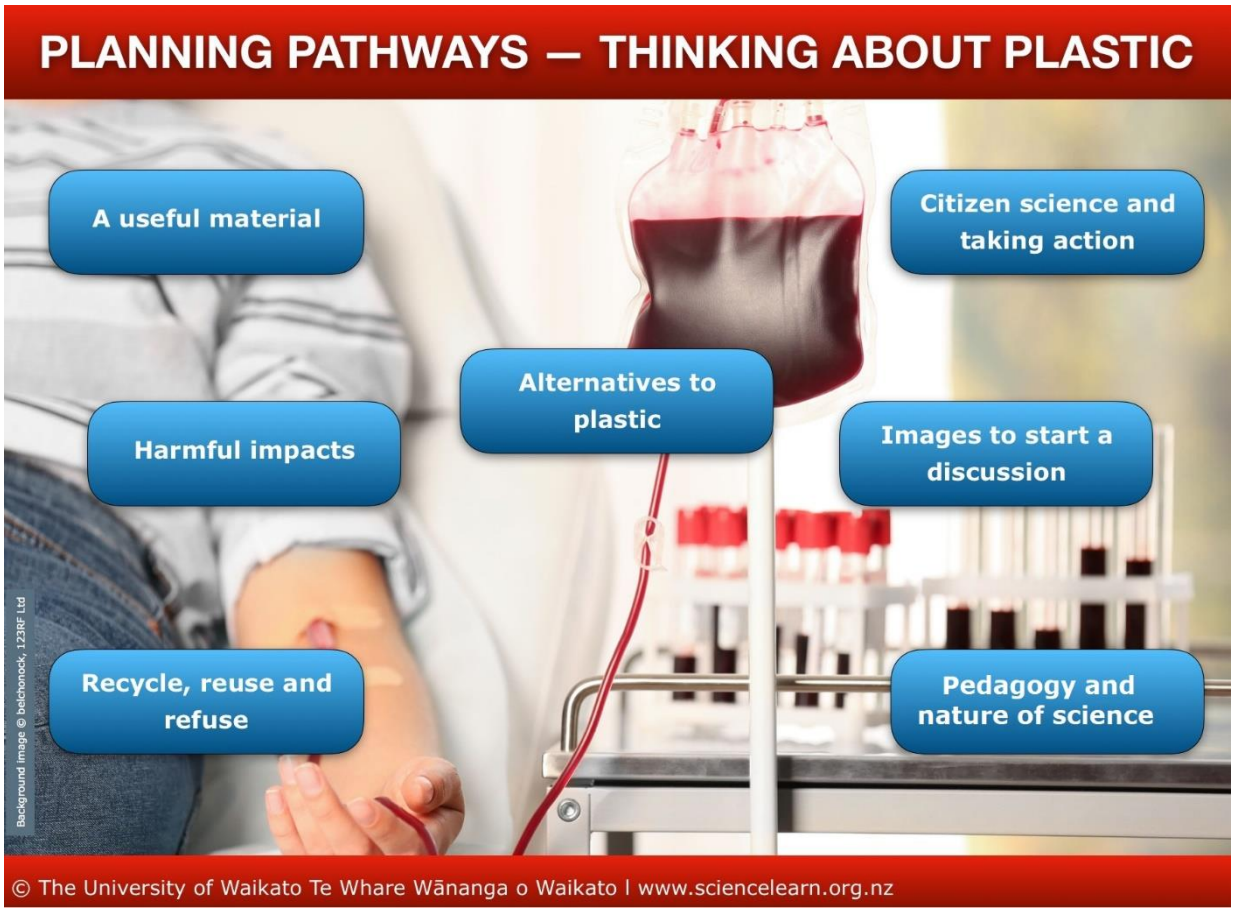
Planning pathways – thinking about plastic

This interactive groups Hub resources into key science and teaching concepts.



This interactive diagram provides a selection of pathways that allow for differing approaches and starting points using resources about plastics – their usefulness, the problems they cause and some ways in which science and technology are helping to reduce the impact. The aim is to assist educators with their planning of lessons and units of work by providing options that cover multiple science concepts. The article Thinking about plastic – planning pathways provides links to the New Zealand Curriculum.

Background image © belchonock, 123RF Ltd

Transcript index

A useful material

Plastic truly is an amazing material. Its strong, lightweight, weather-resistant qualities are ideal for so many applications. Take a moment to glance around you. Chances are there are many items within your reach that have a lightweight, durable plastic component!

Find out about the history of plastic and some of its very helpful uses.

Related articles

- Plastics and recycling
- The future of plastics: reusing the bad and encouraging the good
- Kelvin – The ThermoKennel
- What is silage?
- Composite materials

Image: Belchonock, licensed through 123RF Ltd

Harmful impacts

Our overuse of plastic products and careless disposal have created many harmful impacts on the environment. As materials scientist Kim Pickering points out: "Let's face it: it is people who are doing the littering, not the plastics themselves."

Plastic can also have negative impacts on human health, for example, if toxins leach from plastic packaging into our food.

These resources explain some of the harmful impacts plastics have on the environment and potentially on human health.

Related articles

- Oceans of rubbish
- Human impacts on marine environments
- Microplastics
- How harmful are microplastics?
- Rethinking plastics in Aotearoa New Zealand – the report

Related images

- Plastic bag on a coral reef
- Plastic debris on the beach
- Discarded plastic bottle
- Silage bales in plastic
- Beads washing up from the *Rena*
- Human litter in marine habitats
- Impacts of plastic in the ocean

Image: Richard Whitcombe, 123RF Ltd

Recycle, reuse and refuse

Many plastic items are so cheap to produce that we are very quick to dispose of them. In New Zealand and other countries, work is under way to limit single-use items like shopping bags, straws and excess packaging.

Other items – like PET bottles and containers – are readily recyclable. In the past, all of our recycling was crushed, baled and sent overseas for processing. However, New Zealand industries are closing the recycling loop by opening washing and recycling plants.

The following resources explore waste issues and recycling.

Articles

- Plastics and recycling
- Flight Plastics recycling technology
- Material World – Recycling and biodegradability – resource curation
- Rethinking plastics
- Building Science Concepts: Rubbish (article) and Rubbish: how do we deal with it? (interactive)
- Seagull Centre – reducing, reusing and recycling

Activities

- Plastic – reuse, recycle or rubbish game
- What happens to our plastic bottles?
- DIY plastic recycling plant
- Waste – a growing challenge!
- Determining the properties of plastic and glass

Video

- Flight Plastics recycling plant in action
- Auckland recycling – learning opportunity 1
- Sorting technology – learning opportunity 2
- What can we recycle? – learning opportunity 2

Image: The University of Waikato Te Whare Wānanga o Waikato

Alternatives to plastic

One way to address the growing amount of plastic in our environment is to produce alternative replacements. These alternatives are often bio-derived plastics – plastic with a biological component. It's also a win-win situation when the products are created from materials that would ordinarily be considered waste products.

As bio-derived plastics become more commonly available, it's important to understand their properties so we are aware of how to dispose of them.

Learn more about bioplastics and examples of bioplastic products.

Articles

- Bioplastics
- Biodegradability, compostability and bioplastics
- The future of plastics: reusing the bad and encouraging the good
- The ZESPRI biospife
- Starch-based disposable plates and trays
- Skateboards made out of harakeke?
- Turning old into new
- Making bioplastic clips from wine industry waste

Activity

- Testing the degradability of potato plates

Media

- The biospife story
- Making bioplastic clips from wine industry waste

Image: University of Waikato Te Whare Wānanga o Waikato

Citizen science and taking action

Citizen scientists are volunteers who contribute to scientific projects, usually by collecting or analysing data. Citizen science projects can make science education more relevant and engaging, and they help to develop students' science capabilities.

The following resources provide tips for planning and getting involved.

- Planning for students to be citizen scientists – professional development article
- Getting started with citizen science – webinar
- Online citizen science meets environmental care – video
- The Plastic Tide – case study
- The Plastic Tide – unit plan
- Down the drain – *Connected* article
- Sea science – *Connected* article

The following citizen science projects help students to identify and track trends involving litter and plastic pollution.

- Litter Intelligence – New Zealand-based project
- Litterati – international project
- Global Earth Challenge – international project

Image: Dianne Christenson, Koraunui School

Images to start a discussion

Images can be a powerful means to begin discussions and to encourage students to consider multiple perspectives.

The Futures thinking toolkit provides a structured framework for developing students' thinking skills about existing conditions and possible/preferable futures. It provides a useful next step after students have discussed/considered the images.

The Ocean Plastic Simulator online tool shows where plastic is likely to end up when it is dropped in the ocean. Use it to track the movement of virtual plastic pollution.

Consider:

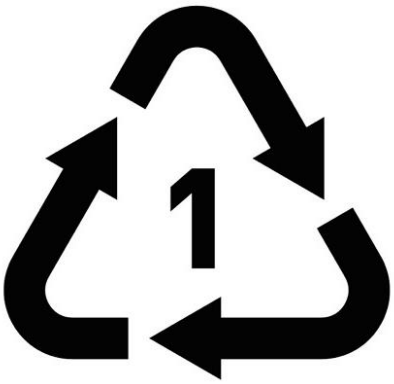
- Where is the plastic – how is it being used?
- Does the image show plastic in a positive, neutral or negative manner?
- Is the plastic causing a problem? Why or why not?
- Do the title and the caption included with the image have an effect on your opinion about the plastic?
- What should happen to the plastic in the image – can we reuse or recycle it or should we refuse it?
- What actions might you take to prevent the plastic item from becoming harmful to the environment?

Images:

- Glitter
- Plastic: a versatile material
- Silage bales in plastic
- Hair-raising static electricity!
- Flight packaging
- Preparing tasting portions
- Microbeads in face-cleaning product
- Binning bad habits
- Items for resale
- Getting rid of e-waste
- Impacts of plastic in the ocean

Image: Anna Nahabed, 123RF Ltd

Pedagogy and the nature of science



Plastic – its benefits and drawbacks – is a rich and relevant context for exploring the nature of science (NoS).

Each of the following articles has a stand-alone NoS statement. Consider and discuss the statement within the context of each article.

- Plastics and recycling
- Flight Plastics recycling technology
- Microplastics

- How harmful are microplastics?

These professional development resources provide pedagogical advice and planning tips.

- Tackling planning in science – planning advice on how to tackle big issues in science
- Teaching food web concepts – applying/transferring knowledge to local environments: how might plastic affect food webs in your area?

Image: Public domain