

Online Programme overview and guide

Programme framework

Kate Valley is a state-of-the-art landfill in North Canterbury, engineered to address all known environmental risks and concerns.

This programme uses the context of the Kate Valley Landfill to explore four themes: science and technology, globalisation, history and the future, and climate change. Each theme has initial class activities, four activity cards, one discussion sheet for a longer inquiry, and follow up activities.

The resources are accompanied by videos of students from nearby Amberley and Tuahiwi Schools interviewing people about the background, the work, the processes, and the area.

Suggested approaches

This resource can be used in several ways.

Guided learning

Teachers choose the theme that best relates to the learning needs of the class. Watch the videos of your theme as a class, then give activity cards to groups of three or four students. Choose the activity card from the theme that is the most relevant, or give each group a different card. Once they have discussed the activity cards, share back to the class then give the group the discussion card from the theme. Groups can then complete the follow up activity.

One-off lessons

The activities and discussion cards can be used as stand-alone activities to support other learning in the class.

Inquiry with student agency

Create bus stops with each of the activity cards. Students can go around the bus stops, pausing at the ones which interest them and discuss them together. They can then choose a theme they are interested in to explore more deeply using the discussion cards, and complete the associated follow up activity.

NZC principles

All the resources in this programme meet the principles of the New Zealand curriculum: high expectations, Treaty of Waitangi, cultural diversity, inclusion, learning to learn, community engagement, coherence, and future focus.

Key competencies

Students are encouraged to use the key competencies in these resources in the following ways.

Thinking: the questions in the activities and discussion cards are designed to prompt high level creative and critical thinking.

Using language, symbols and texts: students read short texts, interpret infographics and graphs, and use this information to create their own texts or decide on an action.

Relating to others: the majority of the activities are designed for groups of students to work together. Some also require students to think about different points of view and perspectives.

Participating and contributing: many of the activities require students to design an action they would like to take that would benefit others and the planet.

Curriculum areas

This resource covers achievement objectives at levels 3 and 4 in science, technology, and social science. It uses the '*understand, know, do*' structure that will form the basis of the learning areas in the refreshed curricula.

Themes

Science and technology

Question: What technology is used at Kate Valley?

Science level 3 and 4:

Properties and changes of matter

- Group materials in different ways, based on the observations and measurements of the characteristic chemical and physical properties of a range of different materials.
- Compare chemical and physical changes.

Chemistry and society

- Relate the observed, characteristic chemical and physical properties of a range of different materials to technological uses and natural processes.

Technology level 3:

Outcome development and evaluation

- Investigate a context to develop ideas for potential outcomes. Trial and evaluate these ideas against key attributes to select and develop an outcome to address the need or opportunity. Evaluate this outcome against the key attributes and how it addresses the need or opportunity.

Technology level 4:

Outcome development and evaluation

- Investigate a context to develop ideas for feasible outcomes. Undertake functional modelling that takes account of stakeholder feedback in order to select and develop the outcome that best addresses the key attributes. Incorporating stakeholder feedback, evaluate the outcome's fitness for purpose in terms of how well it addresses the need or opportunity.

Understand

Different materials react in various ways in a landfill.

It's important to know the material of an object so we know how to dispose of it correctly.

An important outcome when designing the Kate Valley landfill was to care for the environment. Technology is used to ensure this outcome is met.

Know

Organic waste comes from things that were once alive – either plants or animals.

Inorganic waste comes from minerals like oil.

Chemical changes during decomposition create gasses.

These gasses can harm the planet if allowed to escape.

Technological solutions help catch these gasses and convert them to electricity or burn them off safely.

Do

Design a technological solution for your school that either improves the way waste is grouped and disposed of, or that uses some waste in a productive way.

Whole class activities before completing the discussion cards:

Watch these videos before completing page 1 of the science and technology discussion card: 'Jenbacher engines'. <https://www.youtube.com/watch?v=7BCpH3AfV5w>

'How gas turbines create electricity' (up to 2:00).
<https://www.youtube.com/watch?v=zcWkEKNvqCA>

Watch these videos before completing page 2 of the science and technology discussion card:
'What's in your rubbish' <https://vimeo.com/233560281>
'Landfill friendly and landfill unfriendly rubbish' <https://vimeo.com/233560886>

Activity after completing the discussion cards

Use the school's technological inquiry model to plan, model, and test a technological solution that improves waste management in the school.

Climate change

Social studies level 3:

- Understand how people make decisions about access to and use of resources.

Social studies level 4:

- Understand how people participate individually and collectively in response to community challenges.

Understand

Decisions about resources can be made at a national, local, global, or individual level.

The impact of decisions can be felt at a national, local, global, or individual level.

We can influence how resources are protected through individual or collective social action.

Know

Waste management affects climate change through the following processes:

When organic waste breaks down it creates two greenhouse gases: methane and carbon dioxide.

Greenhouse gases contribute to global warming, climate change and increase the acidification of oceans.

Global warming and climate change contribute to rising sea levels and change weather patterns leading to stronger and more frequent storms.

Ocean acidification threatens some sea life and ocean ecosystems such as coral, algae and molluscs.

Do

Create an infographic to share important information with others.

Carry out an action on an important issue around waste and climate change.

Whole class activities before completing the discussion cards:

Display the following graph and discuss how our CO₂ emissions have changed and how New Zealand compares with other countries.

Annual CO₂ emissions. This is an interactive graph that allows you to choose which countries you show on the graph, and whether you show a line graph or a map. If you want to see change on the line graph for New Zealand, you will need to deselect 'world'.

https://ourworldindata.org/grapher/annual-co2-emissions-per-country?tab=chart&time=1800..2019&country=OWID_WRL~NZL

If students are interested, they can explore the different visualisations on this page.

<https://ourworldindata.org/co2-emissions>

Watch the video 'Global warming from 1880 to 2020' and discuss why they think the changes have occurred.

https://climate.nasa.gov/climate_resources/139/video-global-warming-from-1880-to-2020/

Activity after completing the discussion cards

In groups, students create infographics to communicate something they think is important about waste and climate change. Use any tools you are familiar with, or you could use Visme

<https://www.visme.co/> or Canva. <https://www.canva.com/>

If students want to visualise the amount of greenhouse gasses produced, these statistics may be useful:

1 tonne of methane gas is 1800 cubic metres

1 tonne of carbon dioxide is 545 cubic metres

Once they have created their own infographics, students can choose an action they would like to take. For example, they could write letters to sector leaders to encourage them to reduce their emissions, they could explore ways the school can reduce their emissions, or they could look at how the school's waste can be reduced.

Globalisation

Following our waste from source to landfill

Social studies level 3:

- Understand how people make decisions about access to and use of resources.

Social studies level 4:

- Understand how producers and consumers exercise their rights and meet their responsibilities.

Understand

People make decisions about what to buy and how to dispose of their purchases for a variety of reasons.

Producers and consumers can exercise their rights and responsibilities by choosing what they buy or sell, or by choosing how they use and dispose of resources.

Know

The products we buy are often made overseas. The way products are made can be bad for the environment.

Rules and laws can have different positive and negative impacts on people and groups.

Do

Analyse the reasons for people's consumption and disposal of goods.

Analyse the impact of laws.

Generate recommendations for more effective laws.

Whole class activities before completing the discussion cards:

Watch *The Story of Stuff*.

<https://www.storyofstuff.org/movies/story-of-stuff/>

Discuss some items you use in the classroom to analyse where they have travelled from and where they might go when they are no longer needed. Display a wall map and use different coloured pins for each stage and string to show where the items have travelled.

Activity after completing the discussion cards

1. Create a survey to find out what influences people's decisions. Students may like to explore online survey tools to do this such as Survey Monkey, Mentimeter or Poll Everywhere.

Work with the students to develop questions that explore how people decide what to buy and how to dispose of things when they are no longer needed.

Aspects they could look at includes purchase decisions regarding local vs global, packaging, environmental impact, convenience, price, and wants. Disposal decisions might relate to convenience, environmental impact, time, etc.

2. Use the results of the surveys, their understanding of the life cycle of products, and the impact of plastic to write letters to their local MP suggesting changes to a law relating to purchasing or disposing of products.

History and the future

How our waste tells a story.

Social studies level 3:

- Understand how people make decisions about access to and use of resources.
- Understand how people remember and record the past in different ways.

Social studies level 4:

- Understand how producers and consumers exercise their rights and meet their responsibilities.
- Understand that events have causes and effects.

Understand

We can learn about the past from what people leave behind.

These objects tell stories about people and what they valued.

What we leave behind will tell a story about us for the people in the future

Know

Middens in New Zealand often have moa bones in them. The types of bones tell us how different groups lived.

Māori hunted moa to extinction and this is thought to be the catalyst for Māori values of kaitiakitanga for te taio.

In the future people might look at our rubbish and think we were very wasteful and greedy. We can change this by changing what we throw away.

Do

Make and carry out a plan to improve the story our waste would tell.

Whole class activity before completing the discussion cards:

Watch 'The Aotearoa History Show' (7:40-10:25) and discuss how midden 'rubbish dumps' show how the eating habits and life of Māori changed. Ask students how life was different in different areas.

<https://www.youtube.com/watch?v=AmGdmLW2HTo>

Activity after completing the discussion cards

In groups, students make a detailed plan for how they could improve the story that is told by the waste at their school. This might include what items are brought to school, how they are used, and what is done with them when they are no longer needed.

If possible, support students to turn their plan into action.

Videos

Watch this short documentary showing what happens regarding waste disposal in Canterbury from recycling to burying and beyond. (*Post link here*)

Watch interviews with students from Tuahiwi and Amberley Schools and people involved in the waste disposal process.