SCIENCE ON ICE

An Antarctic Adventure!

Lesson Plan to support Episode 4: Poo-eating Bugs

Contents

WhitebaitMedia
Antarctica New Zealand
NZ On Air
Irirangi Te Motu

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Achievement Objectives

SCIENCE

Nature of Science: Understanding about science, Investigating in science, Communicating in science, participating and contributing

Levels One and Two	Levels Three and Four
Living World – Ecology Life processes • Recognise that all living things have certain requirements so they can stay alive. Ecology • Recognise that living things are suited to their particular habitat. Evolution • Recognise that there are lots of different living things in the world and that they can be grouped in different ways.	**Living World – Ecology** Life processes • Recognise that there are life processes common to all living things and that these occur in different ways. Ecology • Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced. Evolution • Begin to group plants, animals, and other living things into science-based classifications.
Planet Earth and Beyond Earth systems • Explore and describe natural features and resources. Interacting systems • Describe how natural features are changed and resources affected by natural events and human actions.	**Planet Earth and Beyond** Earth systems • Appreciate (L3) / Develop an understanding (L4) that water, air, rocks and soil, and life forms make up our planet and recognise that these are also Earth's resources. Interacting systems • Investigate the water cycle and its effect on climate, landforms, and life.
Physical World Physical inquiry and physics concepts • Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.	**Physical World** Physical inquiry and physics concepts • Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.

ENGLISH

Levels One and Two	Level Three	Level Four
Purposes and audiences • Recognise / show some understanding (L2) of how to shape texts for different purposes and audiences. **Structure** • Organise texts, using a range of structures	**Purposes and audiences** • Show a developing understanding of how to shape texts for different purposes and audiences. **Structure** • Organise texts, using a range of appropriate structures	**Purposes and audiences** • Show an increasing understanding of how to shape texts for different purposes and audiences **Structure** • Organise texts, using a range of appropriate structures.

MATHEMATICS AND STATISTICS

Levels One and Two	Level Three	Level Four
n/a	**Number and Algebra** Number strategies • Use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages Number knowledge • Know basic multiplication and division facts.	**Number and Algebra** Number strategies and knowledge • Use a range of multiplicative strategies when operating on whole numbers. • Find fractions, decimals, and percentages of amounts expressed as whole numbers, simple fractions, and decimals.

Key Competencies

- Thinking
- Using language, symbols, and texts
- Managing self
- Relating to others
- Participating and contributing

Learning intentions

- Support the vision of Antarctica New Zealand: Antarctica and the Southern Ocean - valued, protected, understood
- Watch the episode, infer information, reflect and summarise
- Understand the challenges faced in keeping Scott Base functioning smoothly
- Evaluate different energy sources, including both non-renewable and renewable
- Identify microorganisms from descriptions and pictures

Key Vocabulary

Manuhiri	visitor, guest
whare hokohoko	shop
rūma noho	lounge, sitting room
rūma moe	bedroom, dormitory
rūma horoi kākahu	laundry
kīhini	kitchen
reka	delicious
whare paku	toilet
mahi	work
Scott Base	New Zealand's Antarctic base and research facility
waste streams	the flow of different types of waste from when it is made through to when it is disposed of.
food-contaminated waste	waste that has been in contact with food, though is not food or food waste itself
self-contained	has everything it needs within it, produces all it needs, and disposes of all it creates.
impact	an effect on something, causes change
(wind) turbine	a machine that converts the kinetic energy of the wind into electrical energy
generator	a machine that converts mechanical energy (often created from burning fossil fuels) into electrical energy
membrane	a layer that separates a liquid into two different streams containing different concentrations of a substance

Key Vocabulary

filtration	a method of separating solid particles from a liquid as it is passed through a filter
waste water treatment	a process of cleaning waste water or sewage (by removing contaminants) so that it can be returned to the environment without causing negative impacts
sewage	human waste
micro-organisms	living things not visible to the human eye
digest	break down into smaller parts
Tardigrade – water bear (lion of the wharepaku)	a microorganism important in the treatment of waste water
stalked ciliates	a microorganism important in the treatment of waste water

Lesson Sequence

Activity 1 – Watch Science on Ice Episode 4

To introduce this it would be good to get the students thinking about what kind of people would be needed down in Antarctica besides research scientists, and what other things they need to keep these people safe and healthy.

Activity 2 – Grocery Shopping for Scott Base

In groups make a simple meal plan for a day, or use the example provided. Now work out how much of each food would be needed for all people at Scott Base (up to 86 over Summer). Then imagine it is summer, so you need enough food for three weeks. How many shopping trolleys do you think you'd need? For younger groups, it may be more suitable to just do one meal, or just one food item (e.g. bread)

> **Extension:** Repeat the above activity but for winter – only around 12 people stay at Scott Base over winter, but there is at least six weeks between food deliveries.

Resource: Ep4, Resource 1 – How much food?

Activity 3 – Renewable energy

On Scott Base they use fuel-powered generators and wind turbines to generate electricity. Have a teacher-led discussion as to why we would want to reduce the use of generators, and why wind turbines alone are not enough to power Scott Base (not always wind, not enough power generated).

In pairs, or as a class, investigate different ways of producing electricity (hydroelectricity, solar panels etc) – decide if each of these would be a suitable method for electricity generation in Antarctica.

Activity 4 - Visitors' Guide to Scott Base

Students to create an informative brochure for visitors to Scott Base. They should include sections explaining how the following things work on Scott Base:

1. food and food waste
2. electricity generation
3. fire safety
4. drinking water
5. waste water

Activity 5 – Microorganism "Guess Who?"

Scientists need to be able to recognize features of microorganisms to help them identify what they are. This is not always easy. Here we play a form of "Guess Who" to help students focus on the physical characteristics of different types of microorganisms.

MICROORGANISM GUESS WHO

What you need

1. One copy of the chart per student. (You could also print an extra copy for each pair of students to act as playing cards)
2. Counters

How to play

Students play in pairs. Each student chooses a microorganism and writes it down on a secret piece of paper (or, if you've printed out "playing cards", each student can choose a card). The students take turns asking each other yes/no questions about the appearance of the microorganisms to try to identify their opponents microorganism. They can use the counters to indicate which microorganisms they have eliminated.

Resource: Ep4, Resource 2 – Guess Who, Microorganisms

Supporting Resources

School Journals

Frozen food by WERRY, Philippa
Reading Level: Year 7, Edition: Part 04 No. 01, Year: 2006, Pages: 26-32

Websites

https://www.antarcticanz.govt.nz/

https://coolantarctica.com

https://www.antarcticanz.govt.nz/scott-base

http://kiwikids2antarctica.blogspot.com/

https://www.schoolgen.co.nz/teachers/resources/

https://www.sciencelearn.org.nz/topics/microorganisms