

ICE

Study Guide

What does this Study Guide cover?

ICE

Ice is a fascinating 5-part TVNZ series which puts the spotlight on Antarctica - the coldest, most southernmost continent on the planet, and one which plays a key part in Earth's delicate ecosystem.

Presenter Marcus Lush recently visited the ice, and he takes viewers on a sometimes quirky, sometimes dramatic and always intriguing behind-the-scenes journey of the people, places, history and stories of this challenging environment.

He reminds us of a time when people first raced to conquer it, and the traces of their lives there that still remain. We find out the survival techniques needed to stay alive in this unforgiving place, and explore Antarctic weather conditions, climate change and the ongoing research taking place every day. The series also features the wildlife of Antarctica and some of the animals which accompanied the early polar expeditions.

TVNZ



How can this series support learning?

ICE takes us on a journey to our near neighbour, Antarctica. It provides an opportunity for students to consider the role this continent has played, and could play, in our past, present and possible future.

It provides springboards for inquiry-learning based explorations in areas such as science, technology, social studies and Environmental Education – Education for Sustainability (EfS).

This study guide discusses the series, unpacks some of the content, provides some ideas for before, during, and after viewing activities, suggested curriculum links, and a list of related websites.

Study Guide

What's in the Programmes?

The five programmes are grouped under the headings

1. **Misery**
2. **Monotony**
3. **Mammals**
4. **Mortality**
5. **Miscellaneous**

Each programme runs for 22 minutes.



Curriculum area: Social Studies

http://www.tki.org.nz/r/socialscience/curriculum/index_e.php

Programme examples

Episode 1: Misery

In this first episode of the series, Marcus Lush flies to Antarctica to begin his voyage of discovery about the driest continent on Earth.

He takes the survival course, learns how to dig a snow cave, and considers how the technology we take for granted today compares with what was available to those early pioneers who first challenged the terrain.

He meets some of the scientists who contribute their observations and analysis to a global body of knowledge, and discovers the secrets that lie locked in the ice which reveal a past, present and possible future view of planet Earth.

Before Viewing

Explore with your students what they think they know about Antarctica - what assumptions do we have? What are the facts and the myths? Is this the home of penguins? Do polar bears live there? Is it always cold and wet? Is it always snowing?

Discuss why Antarctica might be important about our knowledge of the health of our planet, and its role in Earth's delicate ecosystem.

Create a web album of images about Antarctica on Flickr (www.flickr.com) (or equivalent), or a classroom wall montage, showing the range of terrain and landscapes.

Consider how Antarctica - as a near neighbour of New Zealand - has influenced our history and our lives over the years.



While Viewing

While viewing, ask your students to consider these questions

Q: What were Marcus's first impressions of Antarctica

Q: What surprised him and why?

After Viewing

DISCUSSION

This episode provides some first impressions about a continent that has no equal on Earth. It also introduces us to some of the “locals”, the science teams who live and work there to record its past, present and possible future.

Ask your students to discuss the role the scientists based in Antarctica are playing in recording the health of the planet. They are using sophisticated equipment and leading edge science knowledge to analyse their findings. Consider why they are choosing to spend time there, and the career paths that led them to this remarkable continent.

SUGGESTED ACTIVITY - “Unknown Journey”

You are the leader of an expedition to an unknown distant land or planet.

Imagine what it is like to prepare for a journey where your life is at stake, and where you have no guarantee of success.

Consider what you and your team would need to do to get ready for such a journey, and how you could prepare for the unknown.

Discuss what strategies you would need to ensure how you and your team could spend a long time together and still remain friends.

Episode 3: Mammals

In this episode Marcus discovers some of the wildlife and rich mammal life of Antarctica. He takes us close up to them and even describes how they feel to the touch. We find out about the animal protocols that have had to be developed to manage the interaction between animal and people in this harsh environment.

We also hear the stories about the animals brought to the Antarctic by the explorers, and the legendary tale of Mrs Chippy. The episode explores how sledge dogs have been replaced by machines and how measures have been taken to minimise the risk of viruses being transmitted from visitors to the wild animals.

This is an episode about the rich mammal life in the Antarctic and the fragile environment in which they live and survive.

Before Viewing

Ask your students to consider the wildlife they think can live on this continent, and what they need to survive. Research the history of the continent and how the wildlife came to live there.

Discuss the term ‘mammal’. Circle the mammals from the following list of Antarctic animals, birds and mammals: crabs, whale, squid, tern, octopus, sponge, coral, cod, seal, dolphin, albatross, petrel, penguin, cormorant, krill.

Consider which animals live in the Arctic and which animals live in the Antarctic, and why there are differences.

Try Professor Icespy’s game http://www.bbc.co.uk/nature/reallywild/fun/poles_apart.shtml and fly the animals back to their home in the correct Pole.



While Viewing

Ask your students to consider the answers to the following questions:

- Q:** Which mammals are shown in this episode?
- Q:** Which domestic/working animals did the explorers take to the Antarctic?
- Q:** What were these animals used for and what did they eat and drink?
- Q:** Why did the dog handler hide his dogs?
- Q:** Why was Mrs Chippy so important to the carpenter?

After Viewing

DISCUSSION

This episode explores the world of mammals in the Antarctic. It shows how they can live and thrive in temperatures of minus 40°C. It also indicates how humans have difficulty in these extreme conditions and how their presence runs the risk of harming the fragile Antarctic environment and the animals and birds which live there.

Ask your students to consider how humans protect themselves from harsh conditions and survive extreme temperatures, and compare this to how wildlife survive.

Discuss the science and technology we have had to develop to help us go beyond our usual boundaries, for example so that we can explore the ocean's depths, or travel into space.

As humans travel to places once remote to them, consider the challenge and risk this brings, and of our introducing animals to environments where they do not naturally belong.
Discuss the story of Mrs Chippy.

Debate the following questions:

1. Why did the Carpenter take Mrs Chippy to the Antarctic? Do you think this was a good decision?
2. What was the fate of Mrs Chippy and why did the leader decide this? Do you think this was a good decision?



SUGGESTED ACTIVITY - News report “Antarctica under threat?”

Scientists have warned that increasing scientific expeditions and other human activities have made a negative impact on the ecosystem of the Antarctic. For example, since the 1950s, nearly 20 countries and regions have sent scientific expeditions to the Antarctic and established more than 40 research stations there.

As well, tourists have been flocking to the region in recent years. As a result, scientists say that wildlife in the region is declining sharply. You are a news reporter and you have been asked to research and present a short news report. You need to cover the following questions:

How are humans polluting the ice?
What is it about Antarctica that conservationists want to protect?
What can we do to protect the animals that live in this environment?

Your news items will run for two minutes on the evening TV news bulletin.

To prepare your report, conduct a web search and visit the library to access the latest information about Antarctic conservation - but remember to ensure your sources are reliable. Consider what images you will use to support your story, and what copyright issues you need to address if you want to use them in your broadcast.

Episode 4: Mortality



In this episode Marcus Lush helps us to understand what it's like to live in Antarctica. He outlines the history of Scott Base, and tells us about Scott's fatal expedition to the South Pole. He explores what it means to be part of an Antarctic expedition and how these adventurers dealt with the climate, and their surroundings, companions and animals.

We have a look at the active volcano, Mount Erebus and are reminded of the fatal flight on the evening of 28 November 1979 when the 'radio went silent' and so many people lost their lives in the aeroplane crash.

This is an episode about exploration, adventures and mortality. It signals how, over the last 100 years, humanity's interest in Antarctica has changed from being primarily exploration to mainly conservation.

Before Viewing

Ask your students to research facts about Antarctica, with a particular focus on the risks and hazards it presents to human beings. Consider why people travelling to this continent must undergo survival training.

Use the following questions as discussion starters:

- Q:** How different is the landscape in Antarctica to the landscape in your region?
- Q:** Antarctica is the coldest continent on Earth. Before construction of the new Scott Base Centre, staff worked in temperatures as low as minus 45°C in an aircraft hangar built in 1960. Estimate how long you would be able to survive in Antarctica during the winter wearing the same clothes that you are wearing today



Group work

Working in groups, suggest students discuss and prepare a survival list for a one-week trip on the ice.

Consider:

- clothing
- food
- drink
- transport
- accommodation
- survival kit



While Viewing

Ask your students to take notes about the clothing, food, drink, transport, and accommodation people have in Antarctica, and compare their findings with the initial survival list.

Find answers to the following questions:

- Q:** Why does Marcus have to hurry when he takes a shower in Scott Base?
- Q:** Why did the 25 officers and men in Scott's expedition only eat together on special occasions?
- Q:** "To strive, to seek, to find and not to yield" was written on the Scott's wooden cross March 1912. Can you explain what this means?
- Q:** Why do you think that beautiful Mt Erebus reminds Marcus Lush of the "mortality of the place"?

After Viewing

RESEARCH AND DISCUSSION

Ask each group to research one of the following questions and report back to the class.

Research topics:

- What was the focus of early Antarctic exploration?
- What experiments did they carry out then? What scientific discoveries did they make?
- Do you think that Antarctica should be protected? Construct three good reasons from your point of view "Why we should bother".
- Why do you think that the purposes of scientific study in Antarctica have changed?
- What measures have been taken to make a journey to the Antarctic safer in 2007?
- What do people living at Antarctica need to do to ensure they don't pollute or affect the environment?
- What do you think Antarctic scientists will want to find out about in the future?

SUGGESTED ACTIVITY: Design an Antarctic expedition hut for the year 2017

Imagine that you are the leader of an Antarctic Expedition to monitor climate change. You will be living with 25 men and women on the ice for three years. As part of your work, you have been asked to design a suitable building in which you will all live. You have been given enough money to design, build and equip the building for the job.

Use the website

<http://www.kellytarltons.co.nz/aquarium-attraction-sharks-penguins/60/Scott's+Antarctic+Adventures.aspx>

to read about Scott's hut and to identify the things that he found important to bring to the Antarctic in 1910.

For your design you can choose the latest equipment, materials and technology you'll need for your survival in 2017. In your design, show what the hut would look like. Estimate the size it should be, how it should be heated, and what facilities and equipment you would install.

Consider the environment in each decision you make and how you will make the least impact on the animals and birds, the ground, the air, the water and the sea.

Prepare your design on one A3 sheet of paper, or use a drawing programme, and present your designs and ideas to the class, describing why you made the decisions you did.

CURRICULUM LINKS

Social Studies in the New Zealand Curriculum

http://www.tki.org.nz/r/socialscience/curriculum/index_e.php

Place and Environment

Students will demonstrate knowledge and understandings of:

- how the activities of people influence the environment of places (Level 2)
- how places reflect past interactions of people with the environment (Level 4)
- why particular places and environments are significant for people (Level 5)

Social Organisation

Students will demonstrate knowledge and understanding of:

- how leadership of groups is acquired and exercised (Level 3)
- how people organise themselves in response to challenge and crisis (Level 4)

Science in the New Zealand Curriculum

http://www.tki.org.nz/r/socialscience/curriculum/index_e.php

Making Sense of the Living World

Students can

- research and describe how some species have become extinct or are endangered (Level 3)
- investigate and describe special features of animals or plants which help survival into the next generation (Level 4)
- investigate and describe structural, physiological, and behavioural adaptations which ensure the survival of animals and flowering plants in their environment (Level 5)

Making Sense of the Planet Earth and Beyond

Students can

- investigate the major features, including the water cycle, that characterise Earth's water reserves (Level 3)
- research a national environmental issue and explain the need for responsible and co-operative guardianship of New Zealand's environment (Level 5)

Technology in the New Zealand Curriculum

http://www.tki.org.nz/r/technology/curriculum/p4l_43_e.php

Strand C: Technology and Society

Students' technological experiences should reflect the interlinking nature of the strands: technological knowledge and understanding, technological capability, technology and society. When involved in any technological activity, students should adapt and apply knowledge, understandings, and skills from a variety of sources.

Within a range of technological areas and contexts, students should:

- develop awareness and understanding of the ways the beliefs, values, and ethics of individuals and groups
 - promote or constrain technological development
 - influence attitudes towards technological development
- develop awareness and understanding of the impacts of technology on society and the environment
 - in the past, present, and possible future
 - in local, national, and international settings

Environmental Education - Education for Sustainability (EfS)

Guidelines_ http://www.tki.org.nz/r/environ_ed/guidelines/index_e.php

Environmental education is a multi-disciplinary approach to learning that develops the knowledge, awareness, attitudes, values and skills that will enable individuals and the community to contribute towards maintaining and improving the quality of the environment.

Aims:

1. awareness and sensitivity to the environment and related issues
2. knowledge and understanding of the environment and the impact of people on it
3. attitudes and values that reflect feelings of concern for the environment
4. skills involved in identifying, investigating, and problem solving associated with environmental issues
5. a sense of responsibility through participation and action as individuals, or members of groups, whanau, or iwi in addressing environmental issues.

RELATED WEBSITES

Curriculum links

Te Kete Ipurangi – The Online Learning Centre
www.tki.org.nz

TKI: Science Community

<http://www.tki.org.nz/e/community/science/>

Curriculum statement: http://www.tki.org.nz/r/science/curriculum/index_e.php

Pūtaiao http://www.tki.org.nz/r/science/curriculum/contents_m.php

TKI: Technology Community

<http://www.tki.org.nz/e/community/technology/>

Curriculum statement: http://www.tki.org.nz/technolgy/curriculum/contents_e.php

Hangarau http://www.tki.org.nz/r/technology/curriculum/contents_e.php

TKI: Social Sciences Community

<http://www.tki.org.nz/e/community/socialscience/>

Curriculum statement: http://www.tki.org.nz/r/socialscience/curriculum/index_e.php

Tikanga ā Iwi http://www.tki.org.nz/r/socialscience/curriculum/tikanga/index_m.php

TKI: Education for Sustainability

http://www.tki.org.nz/r/environ_ed/guidelines/aims_enviro_e.php

TKI: The New Zealand Curriculum: Draft 2006-2007

<http://www.tki.org.nz/r/nzcurriculum>

TKI: Te Kaupapa Marautanga o Aotearoa

http://www.tki.org.nz/r/marautanga/index_m.php

Research and resource links

Antarctica – ESOL online activity

http://www.tki.org.nz/r/esol/esolonline/secondary_mainstream/classroom/units/antarctica/home_e.php

Andrill video conference

<http://digitalconversations.org.nz/vc/andrill/>

Antarctic Heritage Trust

<http://www.heritage-antarctica/org>

Antarctica
<http://www.antarcticanz.govt.nz>

Antarctic History – Timeline
<http://www.antarcticconnection.com.antartic/history/timeline.htm>

Antarctica: the Frozen Continent at the South Pole
<http://www.enchantedlearning.com/school/Antarctica/>

International Antarctic Centre
<http://www.iceberg.co.nz/>

International Association of Antarctic Tour Operators website
www.iaato.org

Te Ara: The Encyclopedia of New Zealand
<http://www.teara.govt.nz/ENZ-Utility/Search/en?q=antarctica>

Te Kete Ipurangi: Changes in Scientific Research
http://www.tki.org.nz/r/science_is/activities/isact_research-antarctica_e.php

The New Zealand Biotechnology Hub
www.biotechlearn.org.nz

People in Science: Dr Victoria Metcalf
http://www.biotechlearn.org.nz/people_in_biotech/metcalf_dr_victoria

The Big Ice - event
http://www.biotechlearn.org.nz/events/antarctica_the_big_ice

Careers
What do icicles and cows have in common?
http://www.biotechlearn.org.nz/multimedia/hotshots_student_videos/wellington_girls_college_niwa_hotshots/careers_measuring_greenhouse_gases_from_icicles_to_cows_v0220

For more information about “Ice”, email: info@jamtv.co.nz

screenrights

TVNZ

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<http://www.screen.org/nz/>

Enjoy!