It Seemed like a Good Idea at the Time by Bronwen Wall

CONNECTED 3
SCIENCE • TECHNOLOGY • MATHEMATICS

Overview

This article describes an environmental decision that had terrible consequences. In the late 1800s, ferrets, stoats, and weasels were introduced into New Zealand to get rid of rabbits. However, these mustelids caused unforeseen destruction. They didn't eat only rabbits – they discovered that New Zealand's native animals and birds were very easy prey.

Curriculum context

SCIENCE

LIVING WORLD

Ecology

Achievement objective

L3 and 4: Students will explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced.

Key ideas

- When an animal is moved to another environment, it adapts to the food sources in the new environment.
- Many New Zealand animals had few predators until people introduced species that weren't native to New Zealand.

Learning goal (to be shared with your students)

In this activity, we are learning:

- to recognise how easily the habitats of unique life forms in New Zealand can be damaged by species from other parts of the world.

Life processes

Achievement objective

L3 and 4: Students will recognise that there are life processes common to all living things and that these occur in different ways.

Key idea

- New Zealand's environment can be damaged by non-native species.

Learning goal (to be shared with your students)

In this activity, we are learning:

- to explain how the environment of New Zealand can be damaged through the introduction of animals from other parts of the world.

NATURE OF SCIENCE

Participating and contributing

Achievement objectives

L3 and 4: Students will:

- use their growing science knowledge when considering issues of concern to them
- explore various aspects of an issue and make decisions about possible actions.

Key idea

- Scientific knowledge can be used to find ways to protect our environment.

Learning goal (to be shared with your students)

In this activity, we are learning:

- to describe how scientists with many varied skills work together with a wide range of professional people to protect our environment.

MATHEMATICS AND STATISTICS

NUMBER AND ALGEBRA

Number strategies

Achievement objective

- L3: Students will use a range of additive and simple multiplicative strategies with whole numbers, fractions, decimals, and percentages.

Key idea

- Mathematics is a tool that helps us to analyse and model what's happening in the real world.

Learning goal (to be shared with your students)

In this activity, we are learning:

- to convert a fraction to a percentage.

Patterns and relationships

Achievement objective

L3: Students will connect members of sequential patterns with their ordinal position and use tables, graphs, and diagrams to find relationships between successive elements of number and spatial patterns.

Key idea

- Many situations, like population growth, can be represented by number patterns.

Learning goal (to be shared with your students)

In this activity, we are learning:

- to model exponential growth using graphical tools.

ENGLISH

READING

Ideas

Achievement objectives

L3: Students will show a developing understanding of ideas within, across, and beyond texts.

L4: Students will show an increasing understanding of ideas within, across, and beyond texts.

Indicators

- Makes meaning of increasingly complex texts by identifying main and subsidiary ideas and the links between them.
- Makes connections by thinking about underlying ideas in and between texts.

Language features

Achievement objectives

- L3: Students will show a developing understanding of how language features are used for effect within and across texts.
- L4: Students will show an increasing understanding of how language features are used for effect within and across texts.

Indicator

- Shows an increasing knowledge of how a range of text conventions can be used appropriately.

The Literacy Learning Progressions

The relevant knowledge skills and attitudes for students at this level are described in the The Literacy Learning Progressions.

Suggestions for providing literacy support for the key ideas

The following strategies will support students to engage with the ideas and information as they use the text for particular curriculum purposes.

The *Connected* series includes a range of texts that provide opportunities for students to locate, evaluate, inergrate, and synthesise information and ideas.

It is expected that students will read across the range of texts in this *Connected* to develop their literacy skills and their understanding of the topic.

Text characteristics

- Non-continuous text
- A variety of sentence types, some with several clauses
- Subheadings, photographs, text boxes, and a map to supplement the text.

1. FINDING THE MAIN IDEAS

This article illustrates the repercussions of bringing living things into a new environment without regard for biosecurity. This is a complex article that introduces a range of fascinating and competing information, providing opportunities for readers to discover unexpected and interesting detail. The challenge for students is to infer from these details the work that people did to successfully bring mustelids to New Zealand, while not losing sight of the main idea – that this was a disastrous venture.

The main ideas in the text include:

- Mustelids were deliberately introduced into New Zealand in the 1880s.
- There was public debate for and against their introduction.
- It took a lot of planning to bring live animals all the way from England.
- Mustelids weren't successful at getting rid of rabbits.
- Mustelids are a major threat to our native animals.

ASK QUESTIONS to prompt the students to infer from the title and the photographs on pages 14 and 15 what this article is about.

What does the verb "seemed" suggest?

What other words in the title suggest this is an article about a plan that didn't work?

What is the link between the photographs at the top and that at the bottom of page 15? What clues do they give you about this article?

2. TRACKING INFORMATION IN TEXT BOXES

TELL the students that the writer has included text boxes to provide additional information.

ASK QUESTIONS to determine why the information in the text boxes has been presented this way.

Why didn't the writer include this information in the running text?

Where in the running text could you could place this information?

What are the advantages of using a text box?

How do you feel when you're reading and the writer goes off track to fill you in on background detail?

Does it matter if you read these text boxes before or after you read the running text? Why or why not?

Would you still get all the important information in this article if you didn't read the text boxes?

3. USING THE MAP TO MAKE INFERENCES

TELL the students that maps and charts are often important sources of detailed information when reading non-fiction texts.

MODEL by thinking aloud how the map on page 18 provides more precise information about the rabbit plague.

The map shows us where and when rabbits were first introduced to New Zealand. After I've read the key, I can see where rabbits spread over the South Island and how quickly they did this.

ASK QUESTIONS to support the students to use the map and integrate information as they are reading.

Why is only the South Island shown on the map?

What can we conclude about the spread of rabbits from the dots and the coloured areas?

What does the map tell us about how successfully rabbits bred?

What do we need to do next time we see a map when reading a non-fiction text?

Exploring the science

The following activities and suggestions are designed as a guide for supporting students to develop scientific understandings as they explore the concept of habitats and how living things respond to environmental changes.

Key ideas

- When an animal is moved to another environment, it adapts to the food sources in the new environment.
- Many New Zealand animals had few predators until people introduced species that weren't native to New Zealand.
- Scientific knowledge can be used to find ways to protect our environment.
- New Zealand's environment can be damaged by non-native species.

Begin by reading "It Seemed like a Good Idea at the Time". The article describes the effects of poor environmental decisions in the past. Show the students images of stoats, ferrets, and weasels. They could view their hunting and feeding habits at: www.youtube.com/watch?v=HNbqvqf3-14

Activity 1: *Comparing habitats*

Read aloud the following paragraph from page 19:

Stoats adapted the most successfully to life in New Zealand and are the most common mustelid here today. They live in all kinds of habitats, from farms and forests to riverbeds and sand dunes – wherever they can find food.

Have the students undertake research to answer the following question: "Why did stoats adapt so well to life in New Zealand?" Prompt them to reread the article and to use the Internet and library to expand their range of information. They should try to:

- Describe the stoats' habitat in England. (Refer to the teacher support material for the article "What Is Biosecurity?" for an explanation of "habitat".)
- Identify the stoats' diet in England.
- Identify the predators that kill stoats in England.
- Describe the stoats' habitat in New Zealand. How is it different to that of their habitat in England?
- Identify the stoats' diet in New Zealand.
- Identify the predators that kill stoats in New Zealand.

They can then prepare a class or group chart with the headings England and New Zealand where they list the information they have collected. This list can be adapted into a Venn diagram, which will highlight the similarities and differences between the two habitats.

Some useful online resources are:

- www.wildaboutnz.co.nz/index.php?option=com_content&view=article&id=82:stoats&catid=28:predators&Itemid=77
- www.landcareresearch.co.nz/research/wildlifeecol/ferrets/references.asp
- www.projectkiwi.org.nz/index.asp?s1=Ecosystem&s2=Predators

This exercise could be repeated for ferrets or weasels. Alternatively, the class could divide into three groups and each group could undertake the activity for a different mustelid.

Activity 2: *Considering a new pest*

One of the possum's natural predators in Australia is the carpet snake. Imagine that someone smuggled carpet snakes into New Zealand to deal with our possum problem. What might happen if these snakes were released into our native bush?

The students can research the carpet snake's habitat, focusing on the following questions:

- What sort of habitat do carpet snakes live in?
- What do carpet snakes eat?
- Which introduced pests in New Zealand could be "dealt to" by the carpet snake?
- Which indigenous animals could find themselves on the carpet snake's menu?
- What natural predators in New Zealand would threaten carpet snakes?

As a class, discuss the benefits and dangers of importing carpet snakes into New Zealand. Ask:

What could we gain?

What could we lose?

Could the introduction of carpet snakes be reversed?

What have we learnt from the introduction of rabbits and mustelids that could relate to the introduction of carpet snakes?

Activity 3: *Exploring a virus import*

This activity explores the use of the rabbit calicivirus to keep rabbit numbers down. Some good sources of information are:

- www.science.org.au/nova/001/001key.htm
- www.sciencecases.org/rabbits/rabbits.asp
- www.stuff.co.nz/taranaki-daily-news/2004449/Deadly-virus-wipes-out-bunnies

Discuss the damage that rabbits do to our vegetation and our agricultural industry.

In 1997, farmers in Otago had become impatient waiting for the government to approve importing the rabbit calicivirus from Australia. Someone smuggled the virus into the country and spread it across the Otago district. Initially it damaged the rabbit population but it had only short-term effects. Reports can be found at:

- www.csiro.au/promos/ozadvances/Series5Rabbit.html
- www.pce.parliament.nz/publications/all-publications/the-rabbit-calicivirus-disease-rcd-saga-a-biosecurity-bio-control-fiasco-4.

Today rabbit populations are on the rise and calicivirus is being re-released in some areas in New Zealand.

As a class, research and discuss the following questions:

- What were the risks of introducing the calicivirus before tests were complete?
- How was the virus imported and smuggled from farm to farm? (Search media news sources.)
- To what areas has the calicivirus been spread since 1997?
- How successful has it been in reducing rabbit numbers?
- What environmental damage has there been as a result?
- What risk does the calicivirus pose to agricultural animals and pets?
- Does the calicivirus story justify the random importation of other viral material into New Zealand to be used as bio-control agents? (Read the article "A Helpful Immigrant" for a definition of the term "bio-control agent".)

MINISTRY OF EDUCATION RESOURCES

- *Making Better Sense of the Living World* (2001), pages 43–72
- *Connected* 1, 2001, "Nibbling and Gnawing"
- *Connected* 2, 2000, "Kiwi in the City"
- *Connected* 3, 2001, "The Weevil's Last Stand"
- Building Science Concepts (BSC series) Book 3: *Birds*; Book 4: *Animal Life Histories*; Book 55: *Mammals*

FURTHER RESOURCES

- www.biosecurity.govt.nz/
- www.pce.parliament.nz/publications/all-publications/the-rabbit-calicivirus-disease-rcd-saga-a-biosecurity-bio-control-fiasco-4
- www.stuff.co.nz/taranaki-daily-news/2004449/Deadly-virus-wipes-out-bunnies
- www.csiro.au/promos/ozadvances/Series5Rabbit.html
- www.science.org.au/nova/001/001key.htm
- christchurchcitylibraries.com/Kids/NZBirdsAnimals/Mustelids/
- www.biosecurity.net.nz/mustelids.html

Exploring the mathematics

The following activities and suggestions are designed as a guide for supporting students to develop their mathematical understanding as they explore the growth and decline of specific animal populations.

Key ideas

- Mathematics is a tool that helps us to analyse and model what's happening in the real world.
- Many situations, such as population growth, can be represented by number patterns.

MATHEMATICAL IDEAS AND LANGUAGE

- Vocabulary (population, sample, average, mean, random, percentage)
- Units (hours, minutes, dollars)

FOCUS QUESTIONS

- If an animal population doubles every year, how long before it becomes a menace?
- If each member of this population were to eat half its body weight in food every day, what would happen if the food source doesn't increase at the same rate?

Activity 1: *Explaining exponential growth*

This activity demonstrates exponential growth using a simple visual grid-based tool. Distribute a map of an area of New Zealand printed on grid paper to each student. Students can:

- Select a square where the rabbit infestation will begin and colour it in with a distinct colour. This will be the spread of generation 1 of the rabbits.
- Select a different coloured pencil and colour in two squares near the generation 1 square. This is the second generation spread.
- Select another colour and shade in two blank squares near each of the previous generation's squares.
- Continue in this way for 10 generations.

As a class discuss the following questions:

- How many generations would it take for this entire region to be infested?
- Suppose each shaded block represented 10 rabbits. How many rabbits would there be in the area after 10 generations if none died? (Add an extra column to the table.)
- What if it were 50 rabbits to a block?

See also Mathematics Activity 2 (How fast does infection spread?) in the TSM for "What is Biosecurity?" and Activity 2 (Exponential growth) in the TSM for "A Helpful Immigrant".

Activity 2: *Preparing and presenting a timeline*

This article offers an opportunity to produce a timeline on which the entire story about the introduction of mustelids can be represented in a graphical form.

Attach a length of paper to the wall and choose a suitable scale: 1 centimetre representing one year works well. On this scale, 10 years will need 10 centimetres, and a century will need 1 metre of paper. In groups the students can map out the timeline from the introduction of rabbits and mustelids to the present day. After marking in the decades, they can prepare diagrams and/or illustrations of the main events in the story. These can be pinned onto the timeline at the appropriate dates. Prompt the students to continue the story forward from the events covered in the article. They can include the introduction of the rabbit calicivirus, the recent development of improved pest traps, even the first annual Easter bunny hunt in Central Otago. This task combines art and design with mathematics and is appropriate to be undertaken in groups.

Activity 3: *I'm hungry*

On page 19, students are challenged to calculate the food needs of a male and female stoat and to relate this information proportionally to themselves.

In 2010, the Ministry for the Environment said there were approximately 70 million possums in New Zealand, eating around 21, 000 tonnes of plant material every 24 hours. You could challenge your students to work out what this means in terms of food per possum. The calculation is easy, whether done using appropriate mental strategies or by calculator. The challenge for students is to get the decimal point in the correct place and to interpret the answer. Students could then calculate what this means over the course of a year.