

Skin and Bones

by Rebecca McLeod

CONNECTED
SCIENCE • TECHNOLOGY • MATHEMATICS
2012 LEVEL 4



Overview

In “Skin and Bones” students are introduced to the fascinating communities that develop in the carcasses of whales on the ocean floor.

Curriculum context

SCIENCE

NATURE OF SCIENCE

Participating and contributing

Achievement objective(s)

L4: Students will use their growing science knowledge when considering issues of concern to them.

LIVING WORLD

Ecology

Achievement objective(s)

L4: 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

- Scientists use evidence to inform their knowledge of the world.
- Scientists must explore possible scenarios when investigating potential future actions and the outcomes of these. They develop and debate ideas.
- All living things belong to an ecosystem – an interacting system of living things. If there is an increase or decrease of one species, this will affect all the other living things that are part of that ecosystem.
- Living things depend on one another and on the physical environment in which they live.
- Changes in the environment and human-induced factors can have an effect on living things.

ENGLISH

READING

Ideas

Achievement objective(s)

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

Indicators

- Makes meaning of increasingly complex texts by identifying and understanding main and subsidiary ideas and the links between them.
- Makes connections by thinking about underlying ideas within and between texts from a range of contexts.
- Makes and supports inferences from texts with increasing independence.

The Literacy Learning Progressions

The literacy knowledge, skills, and attitudes that students need to draw on by the end of year 8 are described in *The Literacy Learning Progressions*.

Meeting the literacy challenges

The following strategies will support students as they engage with the information and ideas in the text. Once they understand what the article is about (“the story”), they will be able to explore the key science ideas outlined in the following pages.

The *Connected* series includes a range of texts that provide opportunities for students to locate, evaluate, integrate, 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

- Explanatory text
- Photographs of the unusual creatures described in the text
- A text box
- Scientific vocabulary and terminology.

1. FINDING THE MAIN IDEAS

IDENTIFY aspects of the structure such as the title, headings, text box, and photographs that will help students navigate the article.

The headings on pages 28 and 29 track key stages in the consumption of the whale fall.

MODEL ways in which students can use a graphic organiser to record the living things that eat the whale fall, and the parts they consume.

Communities	Parts consumed
Scavengers: sleeper sharks, hagfish, rattail fish, amphipods, brittle-stars	Blubber, flesh
Marine worms, crustaceans	Fat in the bones

RECORDING these details will support students' comprehension as they work through the article.

Allow time for students to examine the photographs that accompany the text. These creatures are likely to be unfamiliar to them, and being able to visualise them will support their comprehension and their memory.

2. READING THE TEXT BOX

IDENTIFY the text box on page 29. **EXPLAIN** that text boxes often include additional information.

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

How does the information in the text box differ from the information in the rest of the text?

Why wouldn't you get all the important information in this article if you didn't read the boxed text?

What does the boxed text add? (Interest, up-to-date information on ongoing research, questions yet to be answered)

3. DEALING WITH SCIENTIFIC VOCABULARY

IDENTIFY the scientific vocabulary that may challenge some students.

Examples include: “array”, “ecosystems”, “photosynthesis”, “carbohydrates”, “particles”, “injects”, “scavenging”, “blubber”, “amphipods”, “community”, “crustaceans”, “invertebrates”, “bacterium”, “sulphide gases”, “sulphur-loving”, “genetics”, “reproductive biology”, “chemistry”, “larvae”, “invertebrates”, “paleontologists”, “fossilised”.

Students can **IDENTIFY** and **RECORD** vocabulary that is new to them. Have them compile their own glossaries by accessing meanings located in the text, explained in other articles in this book, or derived using word-solving strategies.

PROMPT them to use their knowledge of prefixes, root words, and derivatives to predict the meaning of unfamiliar words. A graphic organiser can help students build their vocabularies. For example:

Word	Parts I know	What I think it means	What I found out

EXPLAIN that some words have both a common meaning and a specific scientific meaning. Discuss the meaning of the word “communities” in this text.

Exploring the science

The following activities and suggestions are designed as a guide for supporting students to develop scientific understanding as they explore the concepts of adaptations, food webs, and the transfer of energy.

Key ideas

- All living things belong to an ecosystem – an interacting system of living things. If there is an increase or decrease of one species, this will affect all the other living things that are part of that ecosystem.
- Living things depend on one another and on the physical environment in which they live.
- Changes in the environment and human-induced factors can have an effect on living things.
- Scientists use evidence to inform their knowledge of the world.
- Scientists must explore possible scenarios when investigating potential future actions and the outcomes of these. They develop and debate ideas.

The article describes the interconnected nature of living things in the sea. To find out more about marine ecosystems, visit the Science Learning Hub marine interactive: www.sciencelearn.org.nz/Contexts/Life-in-the-Sea/Sci-Media/Animations-and-Interactives/Marine-ecosystem

Begin by reading “Skin and Bones”.

Activity 1: Whale falls

Whale falls are whale carcasses that lie on the seafloor. A whale fall provides food and a habitat for a wide variety of marine life. In this activity, students use the article to identify living things that are dependent on whale falls.

Before reading the text, ask the students:

What do you think happens when a whale dies?

Record their predictions.

Tell the students that when a whale dies, the carcass falls to the sea floor and living things eat it. Ask the students to make a prediction about the types of living things that might eat a dead whale.

Read “Skin and Bones” as a shared reading exercise. Have the students note down the names of the different types of living things.

To help students understand whale-fall communities, show them this footage of a whale fall: www.youtube.com/watch?v=vQbGk4sHROg

Further information about whale falls can be found at www.mbari.org/news/news_releases/2002/dec20_whalefall.html

Using the list of living things, have the students create a graphic to show the relationships between the whale carcass and the living things that are dependent on it.

Why do different living things come to the whale fall at different times?

What might happen if the small marine worms and crustaceans arrived at the whale fall first?

How do you think living things find a whale fall in the depths of the ocean?

Activity 2: Identifying the needs of living things

To survive, living things depend on their physical environment and the other living things that they interact with. In this activity, the students explore the whale-fall community and identify the needs of each living thing.

Discuss the needs of living things in a marine environment and record the students' ideas. Try to separate the students' ideas into the categories of food, shelter (from wave motion and predators), and a place to reproduce.

Have students read the text and note down the different living things in the whale-fall community. Apply the students' ideas about the needs of living things in a marine environment to the members of the whale-fall community. Assign groups of students a different member of the whale-fall community and collate their information in a table like the example below:

Name of living thing:	
Needs that are met by other plants or animals	Needs that are met from the physical environment
Food needs	Shelter under rocks
Safety from predators – staying together as a group	Shelter under bones

Students could also further research the member of the whale-fall community that they have been assigned to add more detail to their table.

Discuss with the students the concept of change in ecosystems and how a change in any part of an ecosystem will affect whether the needs of living things in the ecosystem are met or not.

Activity 3: Balance within ecosystems

Ecosystems are a balanced, interconnected web of living things. In this activity, students consider outcomes when a potential change is made to an ecosystem.

After reading the text as a class, organise the students into five groups. Tell them that they are going to work together like a group of scientists would to explore all possibilities when a change is made to the whale-fall ecosystem. Tell the students that scientists use knowledge of what has occurred with other species in similar situations to predict what might occur in future situations. In this activity, students will draw on their prior knowledge and the information in the text to make conclusions about what could happen in the future.

Tell the students that they will be thinking about the possible effects on the whale-fall community when each scenario occurs. Give each of the groups some pens and a large sheet of paper with one of these five scenarios written at the top:

- A new type of fish is introduced to the whale fall.
- Fishing boats start hunting more whales.
- An oil spill occurs in the ocean.
- A disease has just started that is spreading among hagfish and causing them to die.
- There is a population boom of small marine worms.

Students can work on one scenario, or each group can have an amount of time with their scenario before rotating to another scenario as a bus stop activity.

Share the potential outcomes with the class. Students should come to the conclusion that changes to an ecosystem, either natural or human-induced, can have flow-on effects to all living things in the ecosystem.

MINISTRY OF EDUCATION RESOURCES

- www.sciencelearn.org.nz/Contexts/Life-in-the-Sea/Sci-Media/Animations-and-Interactives/Marine-ecosystem
- Building Science Concepts: Book 22: *Tidal Communities: Interdependence and the Effects of Change*

FURTHER RESOURCES

- www.mbari.org/news/news_releases/2002/dec20_whalefall.html
- www.youtube.com/watch?v=rdl3eFrTGs8