

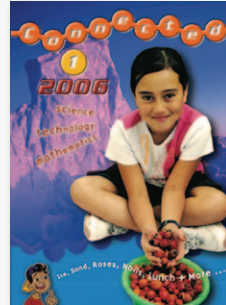
Writing in science, level 2

Weathering and erosion

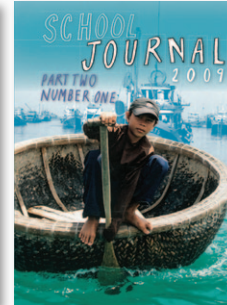
Overview

This resource provides examples of purposeful curriculum learning within the science context of weathering and erosion, but the primary focus is on the planning and teaching of the writing skills and knowledge that support students' learning in this context. Refer to Teaching Writing across the Curriculum in Years 4–6 for more information about using writing across the curriculum.

These materials use three texts from the Ministry of Education's instructional series to support the curriculum learning and the writing tasks. The selected texts have themes that relate to the context of weathering and erosion.



Connected 1
2006



School Journal
Part 2 Number 1
2009



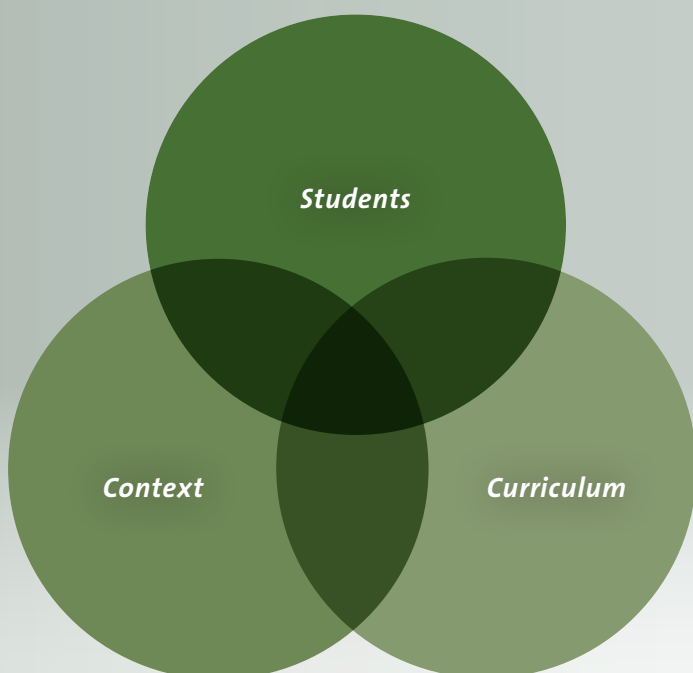
School Journal Part 2
Number 3
2010

Three aspects of planning

When planning, consider:

- the big ideas that underpin the New Zealand Curriculum and the big ideas contained in the science curriculum
- the relevance of the topics and contexts for your students
- the learning strengths and needs of your students.

These three aspects of planning (curriculum, context, and the students' learning strengths and needs in the particular focus areas – see the diagram below) are integral and reciprocal. They naturally overlap, and so learning tasks and activities address all three aspects. It is the point where the planning starts that may vary.



Students' literacy strengths and needs

Writing

What skills and knowledge do my students bring to the learning?
What support will my students need to:

- create relevant content?
- use text structures and language features appropriate to their purpose and audience?
- select and use tools to plan and organise ideas and information to meet their writing purpose?
- use vocabulary that clearly conveys ideas, experiences, and information?

Context (for inquiry and learning)

Weathering and erosion

Big idea: Rocks and landscapes are continuously changing.

- Weathering and erosion are happening continuously.
- People and natural events can have an impact on weathering and erosion.

Curriculum

Science

- Planet Earth and Beyond – Interacting systems: Describe how natural features are changed and resources affected by natural events and human actions.
- Nature of Science – Participating and contributing: Explore and act on issues and questions that link their science learning to their daily living.
- Nature of Science – Understanding about science: Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation.

Texts that support the theme of weathering and erosion

Connected 1 2006 – “The Sands of St Clair” (article)

Relevant themes:

- People’s actions can speed up and slow down the rates of weathering and erosion.
- Rocks are weathered and eroded by water and air.
- Weathering and erosion are happening continuously.

School Journal, Part 2 Number 1, 2009 – “Erosion” (poem)

Relevant theme:

- Erosion is the process by which rock material is shifted away from its original site.

School Journal, Part 2 Number 3, 2010 – “Save Our Sand Dunes” (article)

Relevant themes:

- People’s actions can speed up and slow down the rate of weathering and erosion.
- Erosion is a visible process that is sometimes fast and sometimes slow.

Texts related by theme

Junior Journal 34 – “Tunnel Beach” (article)

School Journal, Part 2 Number 3, 2010 – “The Hidden Midden” (article)

Resource supporting the theme

Building Science Concepts, Book 2: *Weathering and Erosion* describes concepts and ideas from the previous science curriculum that are relevant to levels 3 and 4. These concepts and ideas can be adapted to the level 2 objectives of the current science curriculum. See: scienceonline.tki.org.nz/What-do-my-students-need-to-learn/Building-Science-Concepts/Titles-and-concept-overviews/Weathering-and-Erosion-The-Shaping-of-Our-Landscape

Texts	Text features and structure	Supporting strategies
<i>Connected 1 2006 – “The Sands of St Clair”</i>	<ul style="list-style-type: none"> • Information text, personalised through the use of three child characters to investigate • Photographs • Labelled diagrams to support description • Description of natural processes and man-made structures. 	<p>Focus on the different ways in which information is presented – photos, running text, diagrams. Discuss possible reasons why the information is presented in a non-continuous way.</p> <p>Support the students to consider how diagrams, drawings, and photos could be used to extend and explain the ideas and information they are developing and exploring through their writing.</p>
<i>School Journal 2.1.09 – “Erosion”</i>	<ul style="list-style-type: none"> • Four-stanza poem • Repetition of the first line of each stanza • Narrator addresses “Uncle Tom” directly, asking questions in two stanzas • Four lines in each stanza, with a rhyming pattern: lines two and four • Personification – “the clouds are crying” • Poetic descriptors – “stone storm beach”. 	<p>Discuss with the students possible reasons why the writer used poetry to convey information and their point of view. Compare the way in which poetry and prose can be used to impart information and ideas, and discuss the suitability of each form for different contexts.</p> <p>Encourage the students to think about their purpose for writing, their audience, and the best way of getting their information and ideas across.</p>
<i>School Journal 2.3.10 – “Save Our Sand Dunes”</i>	<ul style="list-style-type: none"> • Written in first person • Text includes a description, an explanation, and instructions • Photographs making comparisons • Captions • Map with key • Headings in text boxes. 	<p>Draw the students’ attention to the change on page 13 from the first-person, subjective point of view to the third person, objective point of view.</p> <p>Discuss with the students the writer’s purpose in making this change. Reasons could include:</p> <ul style="list-style-type: none"> • helping the reader to connect with their own experiences • moving from the familiar to the unfamiliar • adding authenticity to the topic. <p>Students could consider this technique within their own writing, as appropriate.</p>

Instructional Focus: Writing

Begin by describing for your students the sort of writing they will be doing to support their learning. As a way of creating an authentic learning experience, students could then share these texts with the wider community by using an online publishing solution – for example, a wiki or a Google website.

Three learning processes

The writing tasks described below relate to three learning processes:

1. building knowledge
2. investigating
3. developing understanding.

1. Building knowledge

Support your students to locate and gather information in order to build their knowledge and understanding – for example, reading and discussing texts; viewing online clips, animations, and short videos; using interactive online activities; visiting a local beach; and carrying out simple experiments. Help your students to know what to write, how much to write, and the best way to record their writing. For information about the language of recounting and explaining and for ideas on how to support your students, see *Supporting English Language Learning in Primary Schools: A Guide for Teachers of Years 3 and 4*, pages 14–19 and 32–37. For information about ordering a PDF of this book, go to: esolonline.tki.org.nz/ESOL-Online/Teacher-needs/Reviewed-resources/Supporting-English-Language-Learning-in-Primary-School-SELLIPS

Writing demands	Prompts to support planning
<p>The writing demands related to building knowledge include:</p> <ul style="list-style-type: none"> • general questions • using key words and phrases to record ideas and information • using a graphic organiser to collate and organise information. 	<ul style="list-style-type: none"> • What do my students already know? What are their strengths? • Do my students understand the concepts of key words and key ideas? • What support do they need to find and summarise key ideas from their reading and then organise and link them? • What graphic organisers will best support them as they do this? • How will they record information so that they can go back to the source material if required? • What support will they need to write about what they are learning?

Task: Students think about and record ideas and information

Students Possible responses to the task	Teacher Possible deliberate acts of teaching						
<p><i>Question: Why are the plants important to the dunes?</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Source</th> <th style="width: 30%;">What we found out</th> <th style="width: 50%;">Why they're important</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> <i>Save Our Sand Dunes</i> SJ 2.3.10 </td> <td style="vertical-align: top;"> <i>roots and leaves hold sand</i> <i>Sand doesn't blow away</i> <i>Plants need care</i> </td> <td style="vertical-align: top;"> <i>Plants die</i> <i>Sand blows away</i> <i>Beach not protected</i> <i>Houses near the sand dunes fall down</i> </td> </tr> </tbody> </table> <p>What the writing shows</p> <p>The student has located and organised relevant facts from the source text in response to the question. The student's choice of information ("roots and leaves hold sand") and the use of cause and effect show that they understand the important role of plants in stabilising the dunes.</p>	Source	What we found out	Why they're important	<i>Save Our Sand Dunes</i> SJ 2.3.10	<i>roots and leaves hold sand</i> <i>Sand doesn't blow away</i> <i>Plants need care</i>	<i>Plants die</i> <i>Sand blows away</i> <i>Beach not protected</i> <i>Houses near the sand dunes fall down</i>	<p>Ask questions, while the students are reading and using texts, to elicit the key words and phrases:</p> <ul style="list-style-type: none"> • <i>We'll look at this page again and help each other to decide which are the important bits. What protects our beaches? Yes, the dunes, especially the plants growing on the dunes. We will write down "dunes" and "plants".</i> • <i>We will also record any questions that come up during the reading. (These could be on a group chart or in the students' books.)</i> <p>Model the use of a graphic organiser to gather and organise information. Emphasise that the source of their information is important. (Scientists always reference their sources so that they can check them later.) Encourage the students to complete their organisers in pairs or groups and to share their responses so that they develop a wider viewpoint. Encourage English language learners to record their notes in their own language:</p> <ul style="list-style-type: none"> • <i>There are some plants in the dunes already, and they are planting more. I wonder why they are so important? Let's see if we can find out why from this text.</i>
Source	What we found out	Why they're important					
<i>Save Our Sand Dunes</i> SJ 2.3.10	<i>roots and leaves hold sand</i> <i>Sand doesn't blow away</i> <i>Plants need care</i>	<i>Plants die</i> <i>Sand blows away</i> <i>Beach not protected</i> <i>Houses near the sand dunes fall down</i>					

2. Investigating

Support your students to inform and direct their research process and investigations by identifying, ordering, and recording the key questions relating to the big ideas about weathering and erosion, as well as any associated questions. Ensure that the students have access to resources and are able to find and use information.

Writing demands	Prompts to support planning
<p>The writing demands of investigating include:</p> <ul style="list-style-type: none"> refining questions recording predictions and observations noting down findings during a field trip developing simple descriptions and explanations from notes. 	<ul style="list-style-type: none"> Do my students know about different types of question? Do my students know how to ask useful and relevant questions? What do they need to know about ordering questions? How will I make sure they have the resources to follow their own investigations? What support will they need to find answers to their questions? What modelling will support their understanding?

Task: Students make sense of ideas and information

Students Possible responses to the task	Teacher Possible deliberate acts of teaching
<p>Students record questions and predictions.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p><i>My questions</i></p> <ul style="list-style-type: none"> Are there sand dunes at our beach? What plants grow there? How do they survive there? Do people or animals hurt the plants? <p><i>My predictions</i></p> <ul style="list-style-type: none"> They will be tough plants because its windy there The beach might change after a big storm Motorbikes and cars cause damage Kids running around the sanddunes make big hoels in the sand </div>	<p>Prompt the students to work with a buddy to write questions in preparation for a beach visit. Explain that the questions will guide them in their observations.</p> <p>Model how to ask useful questions and how to order them.</p> <p><i>We already know why plants are important to sand dunes, so think about what you want to know about the plants that makes them important. For example:</i></p> <ul style="list-style-type: none"> What do we know about their specific characteristics that enable them to live there? What sorts of plants best hold the sand together? Is their environment being affected in any way? <p>To support the students, especially English language learners, with the subject-specific vocabulary, prepare photos (maybe include photos and illustrations from the readings) and co-construct a shared picture dictionary for the students to refer to when making notes. Or build on vocabulary work that you've begun during reading.</p> <p>To support English language learners with writing questions:</p> <ul style="list-style-type: none"> provide sentence starters, such as "Does the beach have ...?", "Are there ...?", "What ... are there?" give them opportunities to discuss and formulate questions in their first language and to use resources to transfer their ideas into English help them to communicate their questions to you orally and recast their ideas into accurately written questions in English. <p>Explain to the students what sort of information they can record and how they could do this. Encourage them to use words and phrases (rather than complete sentences), photos, videos, diagrams, maps, and drawings. Make sure they have the vocabulary to name and describe what they see and find. Provide the names of the particular plants they will find so that they can more accurately describe them. Some of the plant names may be used in "Save Our Sand Dunes". Refer to the vocabulary list in the reading TSMs for "Save Our Sand Dunes" at: literacyonline.tki.org.nz/Literacy-Online/Teacher-needs/Instructional-Series/School-Journal/TSM-2010</p>

Students write simple descriptions.

Features of plants

Me and Jamie found lots of small plants poking through the sand. Some were like small flax. They are called pingao. They have long thin leaves and are really STRONG. The leaves are pointed. Some are quite sharp. The leaves are close together.

Students relate their learning to the big ideas and their own hypotheses.

Our big idea was that people could cause erosion by damaging the plants. We saw mountain bike tracks that went over baby plants. We saw footprints going through the grass plants and lots of broken leaves. I don't think people should be allowed to go to the beach if they don't look after it.

Students follow up their field trip with research to answer their questions. They develop or refine questions to ask an expert or a local.

Research

My interview questions:

- *Do you go to the beach regularly?*
- *Have you noticed changes to plants or areas? If so, what do you think the reason is?*
- *Do you think that people are damaging the beach, especially the dunes?*
- *What do you think people should do to help?*

What the writing shows

The students have used structures and language that are appropriate for investigating, asking questions, and making predictions. This includes bulleted phrases and subject-specific vocabulary for describing plant features (“like small flax”, “thin leaves”, “really STRONG”, “pointed”, and “sharp”). They have also used questions to refine their thinking processes and to pinpoint what is important about protecting the sand dunes.

Model how the students can develop their notes to increase their knowledge and understanding. Focus on descriptive language rather than on recounting of events. In particular, model using:

- present tense (useful for describing characteristics and things that are always true)
- factual language
- precise nouns and verbs
- subject-specific vocabulary (from the vocabulary lists gathered from reading and during research).

Model how the students can relate their learning to the big ideas.

- One of our big ideas is that weathering and erosion are happening continuously. From the information we have read and recorded, we know that plants can slow down the erosion of the dunes. I wonder if we can ever completely stop the erosion at the beach? This is a question I might ask someone.

Prompt the students to develop and refine questions for their letters or interviews. (These interviews could be online through the use of video conferencing.)

Let's look at your questions and decide:

- What is the specific information you need?
- Do you have any unanswered questions from your initial planning?
- Which questions will help you find the answers you want?
- Which questions will help the person to give lots of information?
- What follow-up questions do you need?
- Which questions do you think won't give us useful information? Why not?

Note that this interviewing process can be valuable language experience for English language learners, so they need support to participate actively. Give them time to practise their questions and take part in role-plays first (so that they get used to listening to the answers). Remember that many of these students will need to encounter the relevant language in listening and speaking (not just in reading and writing) before they can participate effectively in an interview.

Provide English language learners with recording equipment so that they can listen to their interviews later. Allow extra time for them to do this. English language learners are likely to find speaking, taking notes, and listening in English very challenging. If they can record the interview, they can focus on asking their questions and understanding and responding to the interviewee. The recording will also provide them with meaningful listening practice and feedback on their pronunciation.

Give feedback to reinforce the students' use of:

- language and structures for framing useful questions
- specific vocabulary for precise description.

3. Developing understanding

At this level, the students may need support to work as scientists and to use their information and evidence (notes, descriptions, drawings, diagrams, answers to questions, and interviews) to develop simple explanations of what they have learnt in relation to the big ideas. To do this, the students will work in groups to summarise, describe, and explain their ideas before writing about them.

Writing demands	Prompts to support planning
<p>The writing demands when developing understanding include:</p> <ul style="list-style-type: none"> shaping and organising ideas and information from notes into a text that describes and explains the processes, causes, and effects of weathering and erosion. 	<ul style="list-style-type: none"> Have I made clear the connections between gathering information and then using it to communicate knowledge and understanding? Do they understand what a scientific explanation looks like? What support do they need to develop their written explanations? How will I lead them to notice the effect of the language they use?

Task: Students communicate their knowledge and understanding

Students Possible responses to the task	Teacher Possible deliberate acts of teaching
<div data-bbox="95 940 766 1456" style="border: 1px solid black; padding: 10px;"> <p><i>My question is "How can people stop erosion from happening?"</i></p> <p><i>Plants like pingao stop erosion because their roots hold the soil in. The soil doesn't blow away if a big wind or storm come along. If the plants die the soil blows away. If the soil blows away it leaves rock. Wind rain and sun can make the rock crumbil more. And it goes on like this. Thats what happens in weathering and erosion.</i></p> <p><u>My diagram</u></p> <p><i>If we made tracks through the pine trees instead of the sand dunes then the plants might live. Fences might help too. Also, we need to put signs up to stop bikes going through.</i></p> <p><i>If we look after the plants, then the sand dunes won't disapper.</i></p> </div> <p>What the writing shows</p> <p>The student's explanation demonstrates an understanding of erosion through the description of the importance of plant roots in holding the soil or sand in place. The repeated use of "if" emphasises the consequences for the dunes if the plant dies. The sentence "and it goes on like this" demonstrates an understanding of the continuous process of weathering and erosion. The student uses specific vocabulary to support the description of the erosion and weathering process, including "blow away", "crumble", "damaged", and "disappe[r]".</p>	<p>Provide opportunities for the students to review and discuss their notes.</p> <p>Prompt the students to go back to their original questions and the information they have gathered on weathering and erosion.</p> <ul style="list-style-type: none"> What is the main point that you want to explain? How are you going to support this with details and facts? How will you explain your ideas clearly? <p>Prompt the students to craft an explanation from their notes and information (including from charts and graphic organisers).</p> <ul style="list-style-type: none"> You have written the key words "dunes" and "plants". What do you want to say about the dunes and plants? <p>English language learners will need more direct instruction. They need to know from the beginning what they will be writing and the process they will follow to get there. They need simplified models of the type of writing they will do in order to analyse the models and establish their features, including language features. They then need opportunities to co-construct this type of writing, and scaffolded opportunities to practise (for example, using writing frames) before writing independently. Throughout the process, they need to have opportunities to practise the language.</p> <p>Compare and contrast the different types of writing used in the three resources – "Save Our Sand Dunes", "The Sands of St Clair", and "Erosion" – to explain and describe the processes of weathering and erosion. For example, explore:</p> <ul style="list-style-type: none"> how ideas are introduced and explained how complex sentences support an explanation how ideas are grouped together and linked the use of factual, descriptive language the use of visual supports – diagrams, photos, and drawings. <p>Use the comparison to co-construct success criteria with your students.</p> <p>Give feedback on the students' use of:</p> <ul style="list-style-type: none"> structures that support the description of the weathering and erosion process content that is relevant to the purpose of describing and explaining the weathering and erosion process language and vocabulary choices that make the process clear.