Preparing to teach this sequence – Year 5 – Wear on Earth

**Year 5**

# Science journals

Create a class science journal, either in hard-copy or digitally. You might:

* use/create a large scrap book or flip chart.
* use poster/butchers’ paper so learning can be displayed in sequence on the wall.
* create a digital journal using your platform/ technology of choice.
* any combination of the above.

Plan for students’ creation of an individual science journal, either in hard-copy or digitally. They might:

* use an exercise book, scrap book or flip chart to record their thinking and gather resource sheets together.
* use a folder to store and collate resource sheets, diagrams, photographs etc.
* use a digital folder to store work samples, images and videos.
* any combination of the above.

See [Using a science journal throughout inquiry](https://primaryconnections.org.au/using-science-journal-throughout-inquiry) for more detailed information on the importance of science journals.

# Additional preparation

* Read through the teaching sequence.
* Note any adaptations you would like to make to suit your school’s and students’ context.
* Prepare demonstration copies of Resource sheets as required.
* Be mindful that chalk dust may be an allergen for some students. Cleaning up with a damp cloth or paper towel minimises dust particles. Dust masks may be worn if required. Alternatively, select sugar cubes instead of chalk for Lesson 2.
* Locate an area away from electrical hazards to use for water-based investigations e.g. a wet area or veranda (Lessons 6 and 8).
* Read the information below to make further decisions relevant to the teaching of this sequence.

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## Selecting the prompt for the Act phase

At the end of this teaching sequence, in the Act phase, students design an erosion control strategy for an area of need in their school/local environment.

**Where is the erosion issue?**

The erosion issue(s) that students act on may be within the school grounds or you may choose to include a field trip (virtual or in person) to a local nature reserve, park, beach, sand dunes, national park etc. Google Maps can be used to access field sites virtually.

**What size groups do students work in?**

Developing the erosion control strategy can be adapted further to suit the context of your students. They could work individually, in pairs, collaborative teams or as a whole class, depending on the experience and needs of the students.

**What items are required to test the erosion control strategy?**

There is an optional activity for students to develop a means of testing the effectiveness of their strategy. This provides an opportunity for students to further develop their science inquiry and design thinking skills, making changes to their erosion control strategy based on test results. If students are going to test erosion strategies, collect appropriate equipment as required e.g. sand, trays, pop sticks, leaves, bark.

**Who will students share their erosion control strategy with?**

Students share their erosion control strategy with a chosen audience. The audience may include other students, parents at an evening science fair, local paper/newsletter, local council or Landcare member etc. Select an audience that best suits your needs and school context.

**How will students communicate their ideas?**

The communication method will depend on the audience, context and cross-curricula opportunities you choose to include. Some examples include:

* a written field report.
* a verbal presentation (live or recorded) such as an erosion site tour, news report, interview, science quiz, podcast.

## Sourcing limestone or cement sample for Lesson 4

Rocks, including samples of limestone, can be sourced in many places. This includes the school grounds, local parks, bush reserves, or riverbeds. However, care should be taken not to remove too many rocks from any one location. You should also check local restrictions and permissions around removing natural resources from a location, as this is restricted or forbidden in some places. Landscape supply stores or local stone masons may be able to supply schools with excess or off-cuts for no (or a nominal) fee.

Construction sites might be a source of discarded cement pieces. Alternatively a bag of dry mix can be purchased at a hardware store, and a sample made for student testing.

## Collecting soil/sand samples for Lessons 6 and 8

Soil and sand are needed for students to construct model landscapes in Lesson 6, and for potential testing in Lesson 8.

If collecting soil and sand from a natural area, consider taking samples from different locations to minimise potential detrimental environmental impacts. Removing too much soil from any one location can expose tree roots, increase erosion, and harm animal habitats.

Potting mix might also be used as a source of soil, and sand can be purchased from hardware stores.

**Safety considerations for soil/potting mix**

Soil, mulch, compost and bagged potting mix are living products and can contain microbes, both helpful and potentially harmful. Of particular concern is Legionella bacteria.

It is important that any bagged product is opened and poured out in well-ventilated spaces, away from students. Open bags slowly with a pair of scissors, and away from the direction of your face.

Teachers and students should wear a mask and gloves when handling soil, mulch, compost and potting mixes. You should always wash your hands carefully after touching soil, particularly before eating and drinking.

## What cross-curricula opportunities exist?

* This sequence could be taught along-side a literacy sequence to develop informative written ([AC9E5LY06](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/science_hass-f-6_english_design-and-technologies_digital-technologies/year-5/content-description?subject-identifier=ENGENGY5&content-description-code=AC9E5LY06&load-extra-subject=HASHASY5&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&achievement-standard=f52cc793-dc87-43f6-9e19-c1704a39c32e&side-by-side=1&strands-start-index=0&view=quick)) or spoken ([AC9E5LY07](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/science_hass-f-6_english_design-and-technologies_digital-technologies/year-5/content-description?subject-identifier=ENGENGY5&content-description-code=AC9E5LY07&load-extra-subject=HASHASY5&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&achievement-standard=f52cc793-dc87-43f6-9e19-c1704a39c32e&side-by-side=1&strands-start-index=0&view=quick)) texts.
* The erosion control strategy could also link with the maths curriculum by planning and conducting a statistical investigation ([AC9M5ST03](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/mathematics/year-5/content-description?subject-identifier=MATMATY5&content-description-code=AC9M5ST03&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&view=quick)).
* The design and technology requirements of an erosion strategy provide an ideal opportunity to stretch the investigation and address multiple outcomes. ([AC9TDE6K05](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/design-and-technologies/year-5/content-description?subject-identifier=TECTDEY56&content-description-code=AC9TDE6K05&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&view=quick) [AC9TDE6P01](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/design-and-technologies/year-5/content-description?subject-identifier=TECTDEY56&content-description-code=AC9TDE6P01&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&view=quick) [AC9TDE6P02](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/design-and-technologies/year-5/content-description?subject-identifier=TECTDEY56&content-description-code=AC9TDE6P02&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&view=quick) [AC9TDE6P03](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/design-and-technologies/year-5/content-description?subject-identifier=TECTDEY56&content-description-code=AC9TDE6P03&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&view=quick) [AC9TDE6P04](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/design-and-technologies/year-5/content-description?subject-identifier=TECTDEY56&content-description-code=AC9TDE6P04&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&view=quick) [AC9TDE6P05](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/design-and-technologies/year-5/content-description?subject-identifier=TECTDEY56&content-description-code=AC9TDE6P05&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&view=quick))
* The study of Australian landscape features through this sequence may be used as inspiration for the [Arts](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/dance_drama_media-arts_music_visual-arts/year-5?view=quick&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0) subjects.

## What incursions & excursions can be incorporated into this sequence?

* At school, participate in the [Community DustWatch citizen science program](https://www2.environment.nsw.gov.au/topics/land-and-soil/soil-degradation/wind-erosion/community-dustwatch).
* Invite a First Nations guest to share local knowledge about Caring for Country and how soil resources are preserved for future generations.
* Visit an old cemetery and observe and measure the [weathering of head stones/grave stones](https://www.ucl.ac.uk/earth-sciences/impact/public-engagement/londons-geology/londons-geology-fieldwork/st-pancras-gardens/gravestone) made from various rock types.
* Take a guided tour through a cave or gorge to observe the formations made by weathering and erosion.
* Visit a mine or construction site to learn about the role of humans in weathering and erosion, the importance of raw materials, and sediment and erosion control measures used on the site.

# Materials required for this teaching sequence

|  |  |
| --- | --- |
| Resource | Lesson in which this resource is required |
|  | **Lesson 1** | **Lesson 2** | **Lesson 3** | **Lesson 4** | **Lesson 5** | **Lesson 6** | **Lesson 7** | **Lesson 8** |
| Class science journal (digital or hard-copy) | X | X | X | X | X | X | X | X |
| Individual science journal (digital or hard-copy) *per student* | X | X | X | X | X | X | X | X |
| Materials to create a word wall or glossary | X | X | X | X | X | X | X | X |
| **Optional:** Materials to create a TWLH chart.These might include sticky notes, slips of paper, a display space | X | X | X | X | X | X | X | X |
| Equipment to access the internet to view suggested video clips and websites | X | X | X | X | X | X | X | X |
| Schoolyard or local site for observation walk to introduce the issue of erosion.Some landscapes suitable for this introductory observation walk include:* school grounds.
* nearby park or garden.
* bushland/forest/desert/sand dunes.
* local creek/river/beach.
* cave/gorge/rocky outcrop.

\*Alternatively, Google maps can be used | X |  |  |  |  |  |  |  |
| 2 x small rocks that are easy to hold |  | X |  |  |  |  |  |  |
| Chalk or sugar cubesFor demonstration, plus 3 x pieces *per group* |  | X |  |  |  |  |  |  |
| Small piece of coarse grit sandpaperFor demonstration and *per group* |  | X |  |  |  |  |  |  |
| Glass jar with lidFor demonstration and *per group* |  | X |  |  |  |  |  |  |
| 1 x teaspoon of saltFor demonstration and *per group* |  | X |  |  |  |  |  |  |
| Timing device *per group* |  | X |  |  |  |  |  |  |
| Damp paper towel for clean-up *per group* |  | X |  |  |  |  |  |  |
| **Optional:** Dust mask *per student* |  | X |  |  |  |  |  |  |
| 1 x syringe (10ml or 20ml, catheter tip or similar, no needle) For demonstration and *per group*The demonstration versions should be sealed with blu-tac or similar and filled with liquid.Syringes for each group should be emptyAlternatively, any other container that can hold water, be frozen and allow students to easily see a change in water volume can be used. |  |  | X |  |  |  |  |  |
| Access to water *per group* |  |  | X |  |  |  |  |  |
| A small piece of blu-tac or similar *per group* |  |  | X |  |  |  |  |  |
| Access to a freezer |  |  | X |  |  |  |  |  |
| **NOTE:** Students will fill the syringe with a specific amount of water and use the blu-tac to create a stopper at the end. The syringe will then be frozen.Pre-frozen examples can also be created if you cannot conduct the lesson in 2 parts.However, do not skip the section where students prepare the samples as this element is vital to their understanding of the concept. |
| **Reaction time investigation *per group***1. 2 clear cups/jars
2. 2 pieces of either limestone or cement
3. White vinegar
4. Water
5. Texta or label to indicate which substance in each cup
 |  |  |  | X |  |  |  |  |
| **Drip drip investigation *per group***1. 2 sugar cubes
2. Clear cup/jar
3. Vinegar diluted in water, using a 1:1 or 1:2 vinegar to water ratio
4. Dripper (syringe/eye-dropper/straw) to drip the diluted vinegar
 |  |  |  | X |  |  |  |  |
| **Altered sculptures investigation *per group***1. 2-5 sugar cubes or toffee (commercially available or homemade), to represent rock
2. Sculpting tools (popsticks/nail files/toothpicks/butter knife)
3. Dripper (syringe/eye-dropper/straw)
4. Vinegar diluted in water, using a 1:1 or 1:2 vinegar to water ratio
5. Optional: icing to glue together sugar cubes
 |  |  |  | X |  |  |  |  |
| **Caves and sinkholes** **investigation *per group***1. Sugar cubes
2. Clay or biscuit/cracker
3. Clear cup/jar
4. Dripper (syringe/eye-dropper/straw)
5. Vinegar diluted in water, using a 1:1 or 1:2 vinegar to water ratio
 |  |  |  | X |  |  |  |  |
| A small sample of ‘soil’, made of food stuffs of varying sizes and weights, for example: flour, salt or sugar (fine and/or coarse), lentils, rice grains, breadcrumbs *per group* |  |  |  |  | X |  |  |  |
| A paper plate or other flat surface *per group* |  |  |  |  | X |  |  |  |
| **Optional:** A device for taking photos and/or recording video *per group* |  |  |  |  | X |  |  |  |
| **Water erosion caused by rainfall on a sloping landscape *per group***1. 1 x large aluminium or plastic tray
2. Sand and/or soil
3. A container holding at least 500ml water
4. Optional: A spray bottle/cup with holes in the bottom to simulate rainfall
5. Book wrapped in plastic, a chunk of wood, or another item to prop up the tray
 |  |  |  |  |  | X |  |  |
| **Water erosion caused by waves *per group***1. 1 x large aluminium/plastic tray
2. Sand and/or soil
3. A container holding at least 500ml water
4. Wide piece of hard plastic to push the water
 |  |  |  |  |  | X |  |  |
| **Water erosion of riverbanks caused by heavy rainfall *per group***1. 1 x large aluminium/plastic tray
2. Rocks/block/small containers
3. Sand and or soil
4. A container holding at least 500ml water
 |  |  |  |  |  | X |  |  |
| **All teams might also use any of the following materials to build their landscapes**, such as:1. Rocks, plastic containers or building blocks to act as bedrock
2. Modelling clay, plaster to build embankments
3. Coloured aquarium stones to act as small rocks that appear in the landscape
4. Twigs, string, uprooted weeks to model trees and grasses in the landscape
5. Access to scissors, glue, sticky-tape, blu-tac to use as required
 |  |  |  |  |  | X |  |  |
| Sticky notes |  |  |  |  |  |  | X |  |
| Markers |  |  |  |  |  |  | X |  |
| Buckets/bottles/containers of water |  |  |  |  |  |  | X |  |
| Materials to support students to design an erosion control strategy.These are variable and depend on the erosion issue each team tackles, the strategy they design, and whether they actually test their strategy.They might include:1. Soil, sand, rocks, grass/weeds
2. Plastic containers
3. Sticks, wire, string
 |  |  |  |  |  |  |  | X |
| Student resource sheetsBoth **demonstration copies** for whole class reference, and **individual copies for each student/group** are required.Whilst students often work collaboratively in teams to plan and carry out investigations, you might prefer for each student to create their own record to assist in the assessment of their Science understanding and Science inquiry. Instances where **demonstration** or **individual/group** copies ONLY are required are noted in the list below, as well as any resource sheets that are **optional**. Teachers are best placed to make decisions about any modifications resource sheet may require to best suit the needs of their students. |
| Thinking about landscapes Resource sheet  | X |  |  |  |  |  |  |  |
| Vulnerable to erosion? Resource sheet **Demonstration only** | X |  |  |  |  |  |  |  |
| Scrape it, shake it Resource sheet |  | X |  |  |  |  |  |  |
| What broke the bottle? Resource sheet **Demonstration only** |  |  | X |  |  |  |  |  |
| Variables grid Resource sheet **Demonstration only** |  |  | X |  |  |  |  |  |
| Freeze-thaw investigation planner Resource sheet **Demonstration only** |  |  | X |  |  |  |  |  |
| PROE Resource sheet Printed as many times as required |  |  |  | X |  |  |  |  |
| pH scale Resource sheet **Demonstration only** |  |  |  | X |  |  |  |  |
| Chemical weathering investigation Resource sheet. Note, there are multiple investigations detailed in this sheet. Groups only need pages pertaining to the investigations they will carry out |  |  |  | X |  |  |  |  |
| Modelling water erosion Resource sheetNote, there are multiple investigations detailed in this sheet. Groups only need pages pertaining to the investigations they will carry out |  |  |  |  |  | X |  |  |
| 2 x Time scale statements Resource sheet, printed and cut to separate each statement |  |  |  |  |  |  | X |  |
| **Optional:** Variables grid Resource sheet |  |  |  |  |  |  |  | X |
| Erosion control testing investigation planner Resource sheet |  |  |  |  |  |  |  | X |
| **Optional:** Erosion report Resource sheet |  |  |  |  |  |  |  | X |