

Curriculum Organiser – Year 4, Earth and Space Science

Vocabulary and Concepts	
Learning Intention – We are learning about how Earth’s surface changes over time as a result of natural processes and human activity	
Geology	The study of the physical structure of the earth.
Geographical Changes	Changes to the physical structure of the earth.
Geologist	A person who studies the earth’s structure.
Extreme weather	Unexpected, unpredictable or very severe weather events.
Earth’s surface	The outermost level of the land or sea
Human activity	Things that human do
Naturally occurring	Things that happen in nature
Weathering	Processes that break down rocks and other substances of Earth’s surface.
Erosion	Removal of rock particles by wind, water, ice or gravity.
Glacier	Large mass of ice that is formed on land and moved across the Earth’s surface.
Sediment	Matter deposited (put somewhere) by natural processes.
Landform	A natural feature of the earth’s surface formed by erosion, transportation and deposition
Erosion	The wearing away and removal of material by a moving force, like a wave.
Transportation	Movement of material from one place to another
Deposition	When material being transported by water is dropped.
Drought	A prolonged period of abnormally low rainfall, leading to a shortage of water.
Flood	An overflow of a large amount of water beyond its normal limits, especially over what is normally dry land.
Tsunami	A long, high sea wave caused by an earthquake or other disturbance
Key Facts	
1	Changes to the earth’s surface can be natural or man-made.
2	How coasts and waterways change depend on the types of rocks that are in different areas. Harder rock, like limestone and sandstone, erodes slowly. Softer rock, like clay, erodes more quickly
3	Coasts and waterways are constantly changing due to waves, erosion, transportation and deposition
4	Global warming plays a significant part in weather patterns, extreme weather events and changes to the landscape.
5	Erosion can be caused by wind and water
Science as Human Endeavour	
Science knowledge helps people to understand the effect of their actions - for example	
<ul style="list-style-type: none"> <li>- Understanding how the earth has changed in the past can help us understand the changes that are occurring today.</li> <li>- Meteorologists study the weather and watch for dangerous storms.</li> <li>- Climatology (study of climate) helps us predict what might happen in the environment in the future</li> </ul>	

## Science Enquiry Skills

Represent and communicate observations, ideas and findings using formal and informal representations

## Aboriginal Perspectives

<https://www.creativespirits.info/aboriginalculture/land/aboriginal-land-care#toc1>

## **Australian Curriculum Achievement Standards**

### **Year 4 Achievement Standard**

By the end of Year 4, students apply the observable properties of materials to explain how objects and materials can be used. They describe how contact and non-contact forces affect interactions between objects. They discuss how natural processes and human activity cause changes to Earth's surface. They describe relationships that assist the survival of living things and sequence key stages in the life cycle of a plant or animal. They identify when science is used to understand the effect of their actions.

Students follow instructions to identify investigable questions about familiar contexts and make predictions based on prior knowledge. They describe ways to conduct investigations and safely use equipment to make and record observations with accuracy. They use provided tables and column graphs to organise data and identify patterns. Students suggest explanations for observations and compare their findings with their predictions. They suggest reasons why a test was fair or not. They use formal and informal ways to communicate their observations and findings.

Year 4 Rubric

A	B	C	D	E
reasoned discussion of how natural processes and human activity cause changes to Earth's surface	informed discussion of how natural processes and human activity cause changes to Earth's surface	discussion of how natural processes and human activity cause changes to Earth's surface	identification of natural processes and human activity that cause changes to Earth's surface	statements about changes to the Earth's surface
Use of accurate diagrams, other representations and relevant science terminology to coherently communicate ideas	Use of diagrams, other representations and relevant science terminology to communicate ideas	Use of diagrams and other representations to communicate ideas	Communication of ideas using everyday language	Fragmented communication of ideas
identification and explanation of when and how science is used to understand the effect of their actions	identification and description of when science is used to understand the effect of their actions	identification of when science is used to understand the effect of their actions	Identification of situations where science is used	statements about the use of science

NB – the following terminology will be helpful in making grading choices.

- Knowledge/information refers to facts, concepts, principles, laws, theories and models that have been established by scientists over time;
- Understanding - the concepts underpinning and connecting knowledge in a learning area, *related to a student's ability to appropriately select and apply knowledge* to solve problems in that learning area
- Fragmented - disjointed, incomplete or isolated
- Informed - Having relevant knowledge; being conversant with the topic; in the context of Science, informed means referring to scientific background knowledge and/or empirical observations
- Reasoned - logical and sound; presented with justification; in the context of Science, reasoned also means that the evidence is provided through reference to scientific background knowledge and/or empirical observations as part of the justification

Further information is available at [https://www.qcaa.qld.edu.au/downloads/p\\_10/ac\\_sci\\_yr4\\_se.pdf](https://www.qcaa.qld.edu.au/downloads/p_10/ac_sci_yr4_se.pdf)

## Possible Assessment Task 1

Download the booklet from

[https://www.qcaa.qld.edu.au/downloads/p\\_10/ac\\_science\\_yr4\\_qcat\\_12\\_student\\_booklet.pdf](https://www.qcaa.qld.edu.au/downloads/p_10/ac_science_yr4_qcat_12_student_booklet.pdf)

### How does water move soil?

One way a scientist can learn how a system works is to model it. Make this simple model of water erosion.

#### Materials

- soil mixture that contains fine soil, gravel and small rocks
- flat surface that can be tilted, e.g. tray, board, lily box
- 1 litre of water

#### Predict

How will the soil move if you pour water on it?

#### Observe

Pour the water slowly and look closely at what happens.

#### Explain

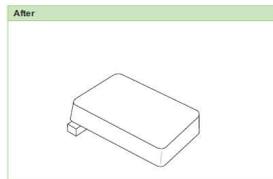
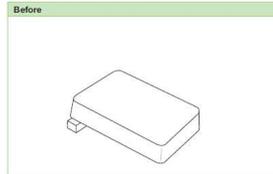
- Why did some particles move more than others?
- What did the water look like afterwards?
- What patterns or shapes formed?
- What data could a scientist like Anna collect from this model?



### Being a scientist – Modelling erosion

Think about how you modelled erosion. How would a scientist record the results?

- Show what happened to the soil when water flowed over it.
  - Draw the shape of the soil in the **Before** and **After** diagrams to show what changed.
  - Label both diagrams to describe what changed.
  - Use arrows to show movement.



**Hint**  
Your labels might use some of these words:

- soil
- sand
- rocks
- gravel
- pebbles
- large
- small
- heavy
- light
- clean
- muddy
- deep
- shallow
- gully
- ridge
- further
- faster
- slower
- moved
- carried
- rolled
- floated
- sank

Models can help us learn how nature works but they are not exactly the same as nature.

- List the ways that this erosion model is similar to nature, and how it is different.

Similar to erosion in nature	Different from erosion in nature

### Changing variables

- If we change something in the model, it can change the erosion.

Predict how the erosion will be different. Explain why you think that will happen.

(a) What if there are plant roots in the soil mix?	I predict that: because
(b) What if the soil is compacted?	I predict that: because

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## Possible Assessment Task 2

Create a 'Man-made changes – student worksheet' related to the timeline of Tennant Creek similar to the one below.

### Man-made Changes – Student Worksheet

Humans change their landscape over time depending on land use and peoples expectations.

200 years ago this area was "all trees" with kangaroos and possums. Aboriginal people would come to hunt and collect food.	139 years ago an explorer came and beat a pathway through the trees wide enough for a man and a horse.	40 years later loggers came and cut down the trees. The wood was exported to England. This was Western Australia's first moneymaking export.
A farmer needed land. He cleared away the stumps and bushes, built a house and planted wheat.	40 years ago the price of wheat fell so he brought in dairy cows and fenced off the paddocks.	The town grew and needed more land for people to live in. A new suburb was built with its own school.

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