Year 1

Conceptual narrative Science: The Earth's surface

In the Earth and space sciences sub-strand, there are two main conceptual threads being developed from Foundation through to Year 10, Earth in space and the Earth's surface.

Big ideas

Changes in the landscape cause, and are caused, by other changes.

What concepts do I want my students to understand?

- Changes in the weather causes changes in living and non-living things.

Appendix 1 shows how the three interwoven strands, Science Understanding, Science as a Human Endeavour and Science Inquiry Skills, work together to build the sophistication and complexity of the science concepts from Foundation to Year 10.

This conceptual narrative illustrates one of the nine science concepts from the Australian Curriculum: Science Content structure. It tells the story of the concept in isolation of the eight others. However, there are situations when it is advisable to teach both concepts (Earth in space and the Earth's surface) together, because they complement each other.

Note: Not all concepts are specifically addressed in each year level.

Introduction

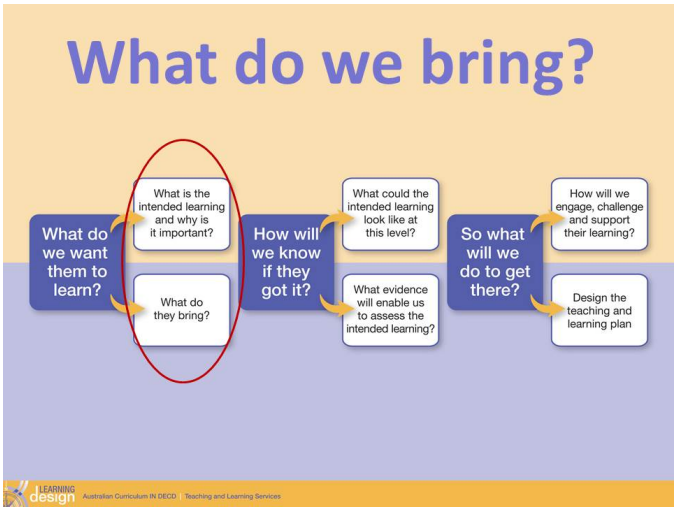
What might my students already know about this concept?

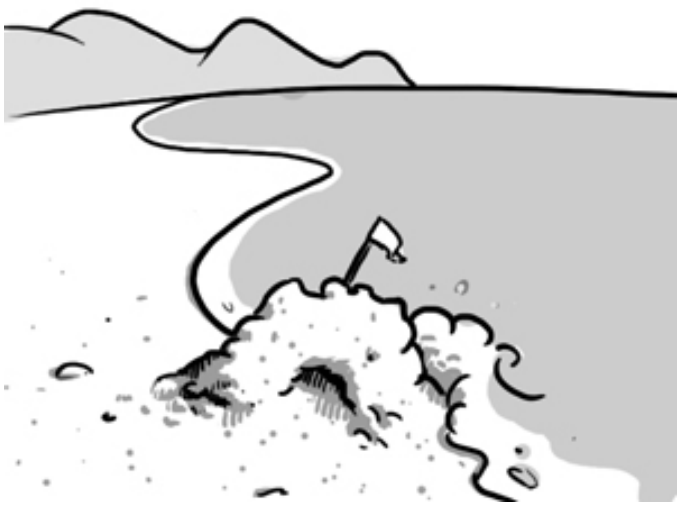
Students will have noticed changes in the weather and how they affect their lives.

What content could I use to explore this concept?

This concept can be explored by looking at seasonal changes, the effect of tides on the beach or the effect of weathering on stone and woods structures.

Now to bring the essence of scientific understanding to life, let's think about this concept through the six questions from the Bringing it to Life tool (BitL).





In Year 1, we want our students to observe changes in the sky and landscape. These changes on the ground could include changes in living things such as trees losing their leaves and grass going brown or changes in non-living things.

Year 1 example

In this example I am going to ask my students to think about changes in the structures associated with weathering.

What do you notice?

How can I help my students make observations?

Using the BitL questions, I could ask:

- *What do you notice?*

At Year 1, I want my students to make observations using their senses. I might take them outside and ask them to look at new and old wood or stone work. Questions I would ask my students are:

- *What changes do you notice in the old stone work?*
- *What doesn't change?*
- *Where does it change most? Least?*

What do you think?

How can I help students to see patterns and relationships? What questions might my students ask?

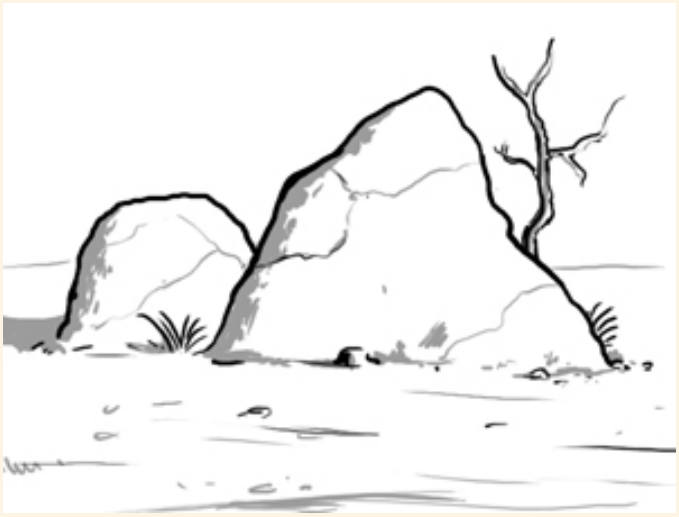
Student's curiosity leads them to ask questions. These questions help students to order their findings into a pattern to be able to make comparisons or find relationships. These questions support students to be more precise and foster analysis and classification of the observations.

Using the BitL questions, I could ask:

- *What do you think?*

In Year 1, I want my students to not only notice objects changing, but to identify changes as cause and effect, in these changes. I might ask:

- *Where else have you seen changes like these?*
- *Why are some places changed more than others?*
- *What might cause these changes?*
- *What questions do you have about these changes?*



What do you think if?

How can I help students to identify and formulate investigable questions?

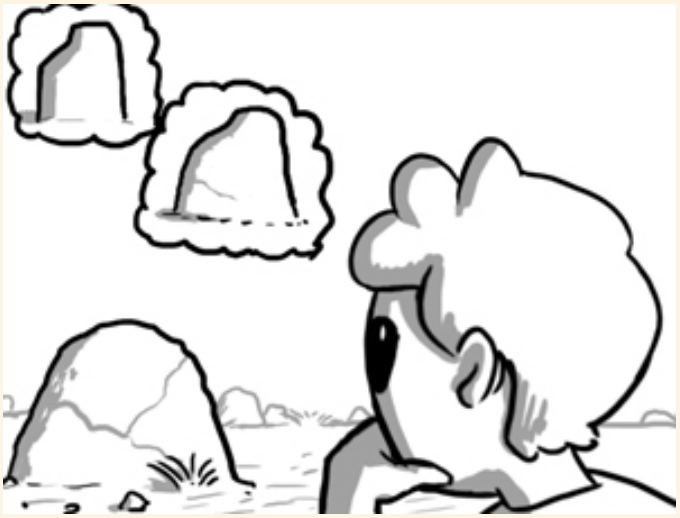
Students ask testable questions that help them to narrow the focus of the inquiry. These questions provide opportunities for students to make predictions.

Using the BitL questions, I could ask:

- *What do you think if...?*

Some students in Year 1 may start to make predictions about possible changes, or answers to their questions. To develop the students' ability to think scientifically I could ask:

- *What would it be like if we looked tomorrow? In a week's time?*
- *Which changes are quick?*
- *Which happen slowly?*
- *What do you think if we had to extend the wall using the same stone?*



How can you explore?

These questions support students to develop science inquiry skills and problem solve.

Using the BitL questions, I could ask:

- *How can you explore?*

In Year 1, I want my students to start exploring their questions and predictions. I could ask students to make suggestions about how they could explore their questions.

- *How could you find out what it looked like before it changed?*
- *How could we find out how long these changes take?*
- *What could we use to see what this looked like in the past?*

How can you share?

How can I help students share their observations and questions?

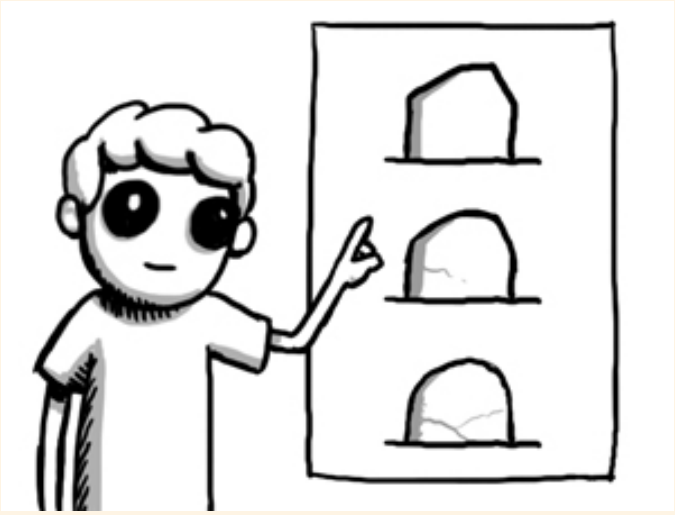
These questions stimulate student's reasoning and help them analyse, draw conclusions and make generalisations about the concepts.

Using the BitL questions, I could ask:

- *How can you share?*

In Year 1, I want my students to represent their observations and findings through discussions, drawings and role plays. If I want my students to draw their observations, they need to have been actively engaged in the process of inquiry. I might ask the students:

- *How can we share what we found?*
- *Can you draw what the stone looked like when it was new and what it looks like now?*
- *How could we label these photos to show this?*
- *What other information would we need to add?*



So what?

How can I help students apply the concepts in a range of authentic contexts?

These questions support student's reasoning, to expand or change their ideas from their experience and evidence and generalise to new contexts.

Using the BitL questions, I could ask:

- *So what?*

It is important to connect the concept to students' everyday lives, so they can see why it is important to know this. I could ask:

- *Who is concerned about changes to wood and stone?*
- *What could they do to protect them?*
- *What really important wood and stone do you know of?*
- *How might we look after it?*

Concluding comments

What concepts might students develop through working with the BitL questions in this way?

By exploring this science understanding through these questions, we can help our students to think, work and process scientifically. Through Foundation to Year 1, students make observations using their senses, ask questions about changes in the landscape and consider why they need to learn about changes in the sky and landscape.

Appendix 1

Appendix 1 shows how the three interwoven strands, Science Understanding, Science as a Human Endeavour and Science Inquiry Skills, work together to build the sophistication and complexity of the science concepts from Foundation to Year 10.

This conceptual narrative illustrates one of the nine science concepts from the Australian Curriculum: Science Content structure**.** These concepts develop in depth and breadth of understanding from Foundation to Year 10. This conceptual narrative tells the story of the concept in isolation of the eight others. However, there are situations when it is advisable to teach both concepts (Earth in space and the Earth's surface) together, because they complement each other.

Note: Not all concepts are specifically addressed in each year level.

Earth and space sciences

In the Earth and space sciences sub-strand, there are two main conceptual threads being developed from Foundation through to Year 10. They are the concepts Earth in space and the Earth's surface. Let's look at the concept the Earth's surface.

Foundation

This begins in the Foundation year with students linking the weather to the effects it has on their daily life, for example how the weather can determine what clothing they wear.

Year 1

In Year 1, students observe changes in the landscape, such as water evaporating from a puddle or a sand castle washing away after the tide comes in.

Year 2

In Year 2, students focus on how we use resources from the Earth, including water. We want students to understand how they use water so they can identify ways to conserve water.

Year 4

At Year 4, students look at a range of changes to the surface of the Earth over time. Students group these changes as those caused by natural agents such as erosion or by human activity such as deforestation.

Year 6

In Year 6, students learn that sudden geological changes like earthquakes and volcanoes, and extreme weather conditions like hurricanes can affect the Earth's surface.

Year 7

In Year 7, students group the Earth's resources as renewable or non-renewable. For example, students can compare fossil fuels which take millions of years to form with wood that grows in decades and biofuel that grows in months. They also learn about the water cycle and that water is as an important resource.

Year 8

In Year 8, students develop an understanding of the rock cycle. They consider the timescale of the processes and formation of igneous, sedimentary and metamorphic rocks. Students also learn that rocks are made up of minerals.

Year 9

When students are in Year 9, they use the theory of plate tectonics to explain how major continental plate movement predicts areas prone to earthquakes and volcanic activity. Students identify global patterns of geological activity, such as considering the role of heat energy and convection currents in the movement of tectonic plates, and relating the extreme age and stability of a large part of the Australian continent to its plate tectonic history.

Year 10

In Year 10, students understand the connections between the different systems that make up the surface of the Earth. They appreciate how cycles of carbon and other materials involve interactions in the hydrosphere, lithosphere, atmosphere and biosphere. Students learn the role of carbon in the greenhouse effect and its effects on biodiversity.

So from Foundation to Year 10, students broaden and deepen their understanding by building on from their thinking about changes in their immediate surroundings, to consider those in the wider world, and then use models and theories to describe, explain, predict and generalise.