Year 2

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

Resources like water move through the environment.

What concepts do I want my students to understand?

- Water is used in a variety of ways.
- Water comes from a source and is transferred to where is it used.
- We use other resources from the environment.

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

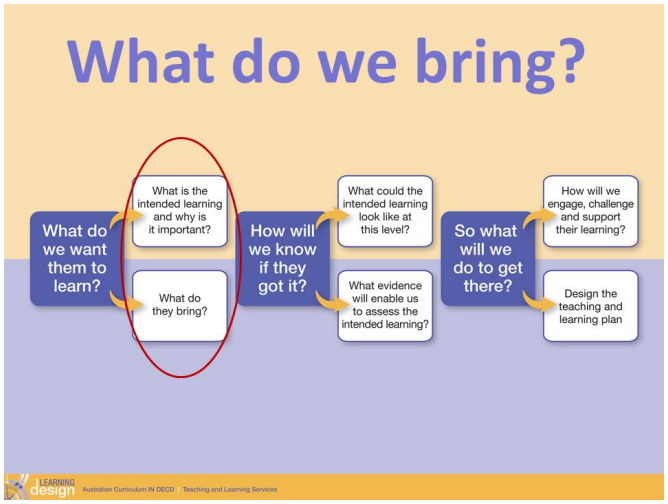
What might my students already know about this concept?

From past experience students will be aware that changes in the weather affects people's lives.

What content could I use to explore this concept?

This concept could be explored by looking at resources used in making objects or structures, investigating where our drinking water comes from or investigating the causes and effect of drought.

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 2, the science understanding is that resources like water move through the environment in predictable ways.

Year 2 example

In this example, students are going to investigate how water is used at the school and identify ways to conserve it.

What do you notice?

How can I help my students make observations?

Using the BitL questions, I could ask:

- *What do you notice?*

In Year 2, I want my students to observe patterns of change in water use. I might ask:

- *How do we use water at school?*
- *Where can you get it from?*
- *How is water from these sources the same? Or different?*
- *When do we use a lot of water?*
- *When do we use little water?*

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 2, I want my students to not only notice objects changing, but to identify cause and effect and ask questions about these changes. I might ask:

- *Where does the water in the taps come from?*
- *How does it get to us?*
- *What is it used for?*
- *When is it not what you expect?*
- *What questions do you have?*

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?*

In Year 2, I want my students to make predictions about possible changes in how water is used. I could ask:

- *What do you think it would be like if there wasn't enough water - if there was a drought?*
- *What do you think would happen if we only used rainwater?*
- *Some people say all water comes from the rain. What do you think?*
- *What do you think would happen if seawater was piped into our taps?*

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?*

At Year 2, I want my students to compare their observations to their predictions water use. I could ask:

- *How can we explore how much water we use?*
- *How can we explore how much water we need?*
- *How are you going to find out if we could get by with just rainwater?*
- *What are your ideas? Which is your best idea?*
- *How could you test your idea?*

How can you share?

How can I help students share their observations and questions?

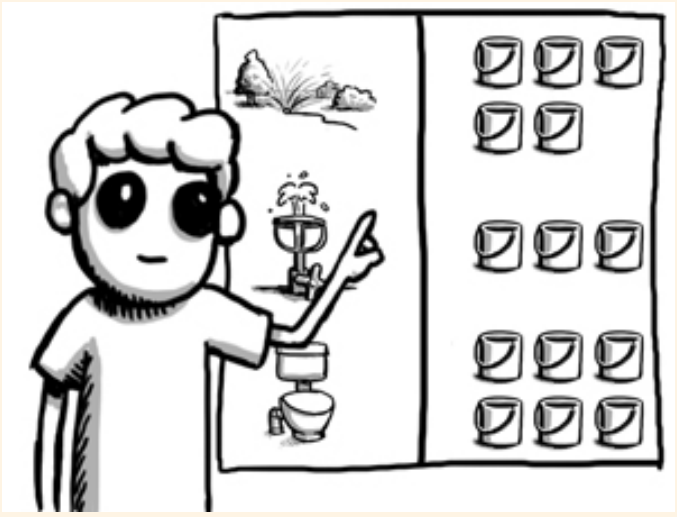
These questions stimulate student's reasoning and help them analyse, draw conclusions and make generalisations about the concepts.

Using the BitL questions, I could ask:

- *How can you share?*

In Year 2, I want students to use informal measurements to compare observations of water use and some students may be able to use the table provided. I might ask:

- *How could you record, count, draw your observations of where we use water in our school?*
- *How can we record how much water we use in our school?*
- *Was the amount of water we use at our school the same or different to what you predicted? How?*



So what?

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

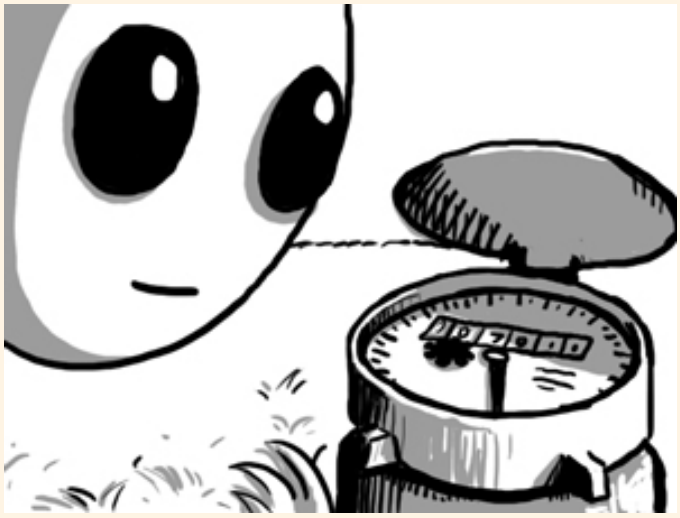
These questions support student's reasoning, to expand or change their ideas from their experience and evidence and generalise to new contexts.

Using the BitL questions, I could ask:

- *So what?*

I want my students to see this science in their everyday lives.

- *When might you need to know how much water we are using?*
- *How does knowing where we are using water help us?*
- *When do we need to know about water use?*
- *Who might use this learning about water in their work? Why?*
- *Could learning about water change how much water we use at school?*



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 be able to think, work and process scientifically. Students can connect science to their world and consider why they need to learn that water we use is a resource that moves through the environment.

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,