

Conceptual narrative Science: Earth in space

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 sky are related to other changes.

What concepts do I want my students to understand?

- Changes in the sky include movement and appearance of sun, moon and stars.
- Changes occur in predictable patterns.

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

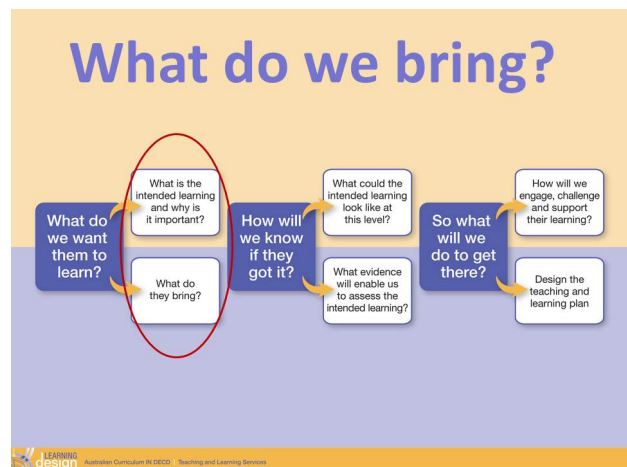
What might my students already know about this concept?

Students may be familiar with the sun, moon and other common objects in the sky.

What content could I use to explore this concept?

We could explore pictures of the night sky, and track the sun's movement over a day. We want students to see that these changes occur in predictable patterns.

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 understand the cause and effect of changes in the night sky.

Year 1 example

In this example, I will ask my students to track the daily changes of the sun by comparing day and night.

What do you notice?

How can I help my students make observations?

Using the BitL questions, I could ask:

- *What do you notice?*

I want my students to make observations of changes of the sky, using their senses. I could take my students outside at different times over a school day, and ask:

- *What do you notice in the sky?*
- *What is interesting about the sky?*
- *Can you see any changes in the sky since this morning?*
- *When can we see stars in the sky?*
- *As it is not safe to look at the sun, how can we tell where it is? How do shadows help us do this?*



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?*

I want my students to ask questions and look for cause and effect relationships about movement of the sun.

I can prompt them with:

- *What is the same about the sun each time?*
- *What is different?*
- *What can you only see in the day time?*
- *What can you only see in the night time?*
- *Can you see them every day?*
- *Are there times when you cannot see these things in the sky? If so, why?*
- *Have you seen anything unusual?
What questions do you have?*



What do you think if?

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

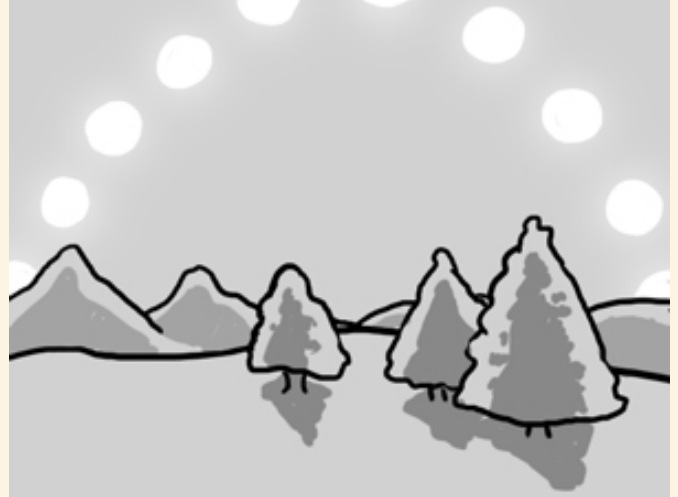
Students ask testable questions that help them to narrow the focus of the inquiry. These questions provide opportunities for students to make predictions.

Using the BitL questions, I could ask:

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

Some students in Year 1 may start to make predictions about possible changes or find answers to their questions. I might ask my students to make predictions by asking:

- *What if we were to look early in the morning or late afternoon?*
- *What do you think the sun looks like during summer? What about winter?*



How can you explore?

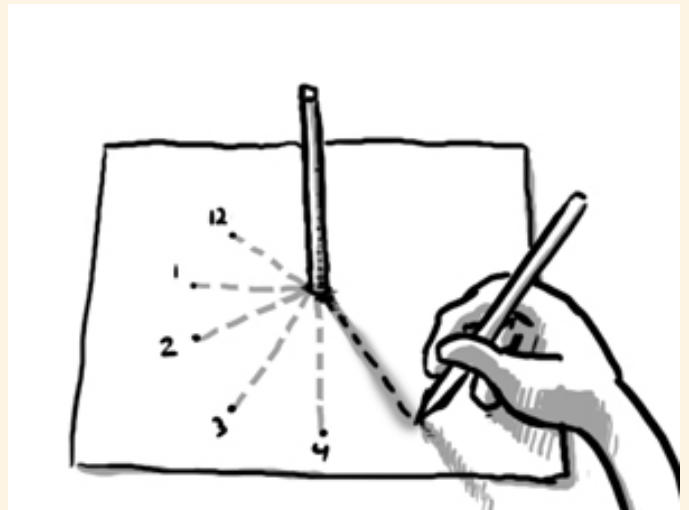
These questions support students to develop science inquiry skills and problem solve

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.

- *How could we find out how the sun changes over the day?*
- *How could you test your idea?*
- *How could you record this?*



How can you share?

How can I help students share their observations and questions?

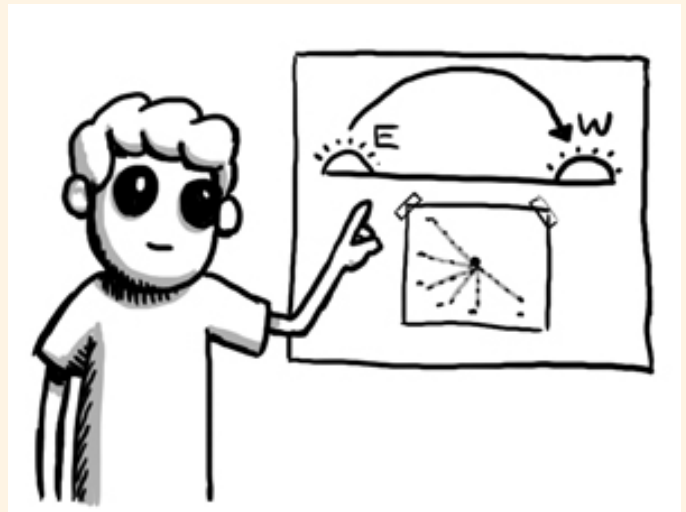
These questions stimulate students' reasoning and help them analyse, draw conclusions and make generalisations about the concepts.

Using the BitL questions, I could ask:

- *How can you share?*

In Year 1, I want my students to share their information about the position of the sun at different times using drawings. Questions I could ask my students are:

- *How could you draw your observations of the sky?*
- *How could you show the change in the sun's position?*
- *Was the position of the sun the same or different to what you predicted? If so, how?*



So what?

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

These questions support students' 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?*
- *How does knowing this help us?*

It is important to connect the concept to student's everyday lives.

- *When might you need to know about changes in the sky?*
- *How does knowing how the sun moves, help us?*
- *When do we need to know about the sun and sky?*
- *Who cares about the day or night sky in their work? Why?*



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. Students can connect science to their world and consider why they need to learn that there are daily changes in the sky.

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.

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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 Earth in space.

Let's look at the Earth in space concept

Year 1

In Year 1, students notice observable changes in the sky. For example, students can see stars at night time.

Year 3

Year 3, students are introduced to the concept of the Earth as a body in space, where Earth's rotation on its axis is used to explain day and night.

Year 5

In Year 5, students build on their understanding of Earth as a body in space and see it is part of the solar system, which includes other planets also revolving around our star, the sun.

Year 7

At Year 7, we want students to understand that phenomena such as seasons and eclipses can be explained by how the moon moves around the Earth, and the Earth, on a tilted axis, moves around the sun.

Year 10

In Year 10, students extend their perspective of the universe to include galaxies, stars and other solar systems, and can explain the origin of the universe using the Big Bang theory.

So, from Year 1 to Year 10, students develop their concept of Earth in space by using models and theories to explain their observations.