

Australian Curriculum: Year 3 Science Understanding Earth and Space Sciences

Earth's rotation on its axis causes regular changes, including night and day

Before transformation: Sample Year 3 task

Day and Night

*You will need**What to do*

1. The polystyrene ball represents the Earth.
 2. Mark in the position of Australia and another country e.g. Greenland.
- Polystyrene ball
 - Torch
 - Skewer
 - Pen
3. Push the skewer through the polystyrene ball to represent the imaginary axis that runs through the North and South Poles.
4. Show the direction the Earth turns (anti clockwise) with the axis slightly tilted.
 5. Switch the torch on while the room is darkened and slowly rotate the Earth so that the light is shining on one side.



Draw a diagram to explain why the two countries experience day and night at different times. Do you know how long it takes for the Earth to rotate once?

Find out more

During summer at the South Pole the sun circles the sky and never sets. It is daytime continuously for (approximately) six months. During winter the sun never rises and it is constant night-time for (approximately) the next six months.

Use your model to show why this is so. Make sure that the top of your model has a tilt towards the 'sun' (torch).

What's possible?



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Transformed task: Getting the students doing the thinking**Day and Night****What causes day time and night time?**

Make a model to show your ideas about how day and night occurs, using these materials

- Polystyrene ball
- Torch
- Skewer
- Pen

**How can you explore?**

- How can you keep yourself and others safe when using these materials?
- What does the ball represent? The torch? The skewer? Explain why. Draw Australia on the Earth. Draw another country on the other side of the Earth to Australia.
- Explore different ways to show day and night. How many ways can you try? Notice what happens to the daylight each time.

What patterns and relationships do you see?

- Is it possible to have daylight all over the whole Earth at the same time? Explain.
- Use your model to show what would happen to the daylight on Earth if:
 - the Earth moved and the sun stayed still
 - the sun moved and the Earth stayed still
 - the sun and Earth both spun around (rotated)
- Is there another way of moving the sun and Earth? Find out alternative ideas.

What do you think?

- Which idea do you think actually causes day and night? Why do you think that? What do you need to know in order to be sure? How could you find out?

What do you think if ...

- It takes about 24 hours for the Earth to rotate on its axis. Would that cause day and night? Explain.
- The Earth is tilted on its axis. How might that change the length of day and night in different places on Earth?
- If it is sunrise in Australia, what time of day would it be in a country on the other side of the world? Would all places on the other side of the Earth be at that exact same time? Explain.
- The length of daylight is longer in summer than in winter. Use your model to explain why that might be.



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Annotations: How has the task been changed?

What did the teacher do?	Why?
Reduced the information given to students about how to make and use the model.	So students apply their prior knowledge of the phenomena of day and night in the construction and manipulation of their model.
Asked 'Socratic' type questions while students explored different possibilities using the model. <small>(example questions from Bringing it to Life tool) http://www.acleadersresource.sa.edu.au/features/tree/BitL_science_F_10.pdf</small>	To guide and support students to use their model thoughtfully when exploring possible alternatives, and to help them to justify and explain their thinking.
Exposed students to a range of alternate ideas.	So students could compare, critique and evaluate several different possibilities.

***Socratic questions**

More information about Socratic questioning can be found online

For example:

http://changingminds.org/techniques/questioning/socratic_questions.htm



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