

Teacher Notes

Themes

- The Sun as a star
- Earth's seasons and climates
- Constellations

Key learning outcomes

- Our Sun is a star that makes life possible on Earth
- Days, weather, climates and seasons are all determined by the Sun's movement and position
- Collections of distant stars in the night sky make patterns we call constellations

Key curriculum areas

- **Science:** Science Understanding (Biological sciences, Earth and space sciences, Physical sciences)
- **English:** Language; Literature
- **Arts:** Media arts

Publication details

Shine, Star, Shine!

ISBN: 9781486316823

These teacher notes are licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 Licence (CC BY-NC-SA). They may be reproduced free of charge but may not be offered for commercial sale.

Teacher notes prepared by Mike McRae.

CSIRO Publishing
Private Bag 10
Clayton South, VIC 3169, Australia

Website: www.publish.csiro.au
Tel: 1300 788 000 (local call in Australia)
Email: publishing.sales@csiro.au



Shine, Star, Shine!

Dom Conlon and Anastasia Izlesou

About the book

Travel with Star (the Sun) as her light zips across 150 million kilometres of space from her home to Earth, where she ripens crops, keeps us warm, creates weather and reveals a waking world full of life.

With rich language and enchanting art, *Shine, Star, Shine!* is written by Dom Conlon and illustrated by Anastasia Izlesou and features fascinating facts to inspire a love of science and the natural world.

Recommended for

Readers aged 5 to 8; notes for Years 2 to 5



PUBLISHING

Teacher Notes

About the author and illustrator

Dom Conlon is a double Carnegie-nominated poet and author whose work is guided by nature and the stars. He's written poetry and picture books, fact and fiction – sometimes all in the same book. Dom hopes to inspire everyone to read and write poetry.

Anastasia Izlesou is a multidisciplinary illustrator and designer from the UK. Using a mix of digital and traditional media, she creates vibrant works full of bold natural elements. Her inspirations range from natural sciences, literature and folklore to everyday items and objects of kitsch.

Pre-reading questions or activities

Ask students to name the kinds of objects they might see in the sky, either in the daytime or at night. This could be things we might see with the naked eye, or using a telescope. Write these on a white board or on cards and then invite the class to decide among themselves which objects are closest to us, and which are furthest away.

Invite them to come up with other characteristics to describe all of them, such as brightness, apparent size or colour. Lead the class into a conversation on how the Sun and stars in the night sky are similar, or how they differ.

Ask them how our world might be different if all the stars disappeared. How would they feel? How would it affect their lives?

Now ask what if the Sun disappeared. What would each day be like? What about seasons? How would plants and animals cope?

Discussion questions

Science

1. Read pages 11 and 12 of *Shine, Star, Shine!* Ask students to describe the Sun's path during the day. Where is the Sun when they first see it each day? Where is it before it sets? What happens to the Sun after it's gone down for the day? Where is it at night?
2. Show the students a calendar of the year and instruct them to nominate their birthdays. Ask a few students what the weather is typically like on their birthday. Is it hot? Raining? Windy? Does the Sun set early or late? Depending on where you are in Australia, use this as a basis to discuss how the year is divided into seasons.

Teacher Notes

3. Ask students how other living things depend on the Sun. What animals use sunlight for extra warmth? What needs sunlight to grow? What living things avoid sunlight?
4. Ask students what they know about life at the North and South poles. Read pages 23 and 24 and ask them to describe things like temperature, plant life, whether it rains or snows, and what the days might be like there.
5. Return to page 8 and ask students to consider the words 'some stars are big, some stars are small'. Remind them our own Sun is a star. Ask them their thoughts about other stars having planets. Use the word 'exoplanet' to describe planets around other stars. Invite them to imagine the kind of conditions – including life – that could be on those exoplanets.

English

1. Compare pages 8 and 9. Ask students why the book's publisher included pages with no text on them. How do the pictures work with the text in the book? Discuss how the shape, colour and size of the letters and number of words all influence emotions and interpretation of the story.
2. Read page 11 and ask the students to consider which words rhyme. Ask them if they think the book is a poem or a story, or both? Why might the author use rhyming words to talk about stars and the Sun?

Arts

1. Read page 28 and show students the illustration of constellations. Ask them why they think people throughout time have imagined pictures among the stars.
2. Invite the students to each find a favourite page, one with an illustration that speaks to them. Ask them why the illustrator used those colours and shapes. Is it a realistic scene, like a photograph, or a collection of patterns and images? What does it make them feel or think about?

Activities

Science

It's Sun time

Safety: This activity requires standing outside on a cloudless, sunny day. Remember sun protection for all – hat, collared shirt, sunscreen and sunglasses.

You will need:

- Plasticine
- 1 skewer or thin piece of dowel
- Toothpicks
- sticky labels (or small pieces of paper with sticky tape)
- Pen or marker
- 30-centimetre ruler
- An open, undisturbed area
- A sunny day
- A camera (optional)

What to do:

1. This activity is best started first thing in the morning.
2. Roll a lump of plasticine into a ball roughly 10 centimetres in diameter.
3. Insert the skewer or dowel into the ball far enough that it nearly passes through to the other side of the plasticine. This will be the centre of the sundial.
4. Flatten the side of the ball opposite the skewer so it can stand upright. Place the plasticine with skewer into an open area far from any trees or structures that might cast a shadow over it.
5. Roll a second ball of plasticine into a smaller ball, about 5 to 7 centimetres in diameter. Insert a toothpick a short distance into the plasticine.
6. Fold a sticky label or small piece of paper around the toothpick and stick it in place.
7. Choose a time close to the hour, such as 9 am. Write this time on the label.
8. Align the ruler along the shadow formed by the skewer making up the sundial's centre marker. Place the 9 am plasticine ball at the end of the ruler. Optional: record this scene in a photograph.

Teacher Notes

9. Repeat steps 5 to 8 an hour later, such as 10 am, writing this new time on a new label.
10. Perform steps 5 to 8 throughout the day.
11. Optional: compare the photographs taken of the moving shadow, noting how far it moves each hour. Also note the length of the shadow in each step.

What's happening?

As our planet turns, the Sun appears to move slowly across the sky. It does this at a slow, steady pace we can use to mark out time like a clock.

Depending the time of year and how far from the equator you are, the shadow follows a curving shape that can be seen in changes to its length. If you're south of the equator, the shadow also points towards the south with the Sun's position in the north. Why not perform the activity in summer and then again in winter and compare the length of the shadow?

Sun to scale

You will need:

- A ball of string or a long length of rope
- A baseball cap (or legionnaires hat)
- A LEGO® minifigure
- Reusable adhesive putty
- A large open area, such as a sports hall

What to do:

1. Measure out 16.5 metres of string or rope. Have two students hold the ends and pull it tight.
2. Explain to the class that this represents the Sun's diameter – the distance from one side of the Sun to the other.
3. Give a student a baseball cap, and use adhesive putty to stick a LEGO® minifigure to its brim. Place the cap on their head and ask them to stand next to the Sun.
4. Explain that the student's head represents the Earth's size. Make it clear the minifigure is not to scale.
5. Ask the students to imagine the difference between the Sun's size and the Earth's. Ask them why the Sun might look so small to us.
6. Instruct the student with the cap to walk as far as they can in one direction. Instruct the students with the string to walk as far as they can in the other direction, keeping the string tight.

Teacher Notes

7. Explain to the students that for the distance between the Sun and the Earth and their sizes to accurately represent the real Earth and Sun, the students would need to keep walking until they were around 1.8 kilometres apart. (Note: find convenient landmarks near the school, such as shops or a familiar playground, that might represent this distance to make it easier for them to picture it.)
8. Instruct the student with the cap to face the Sun. Explain that it is now daytime, and their LEGO® minifigure is eating lunch.
9. Ask them to put their arms out to their side. Tell the class their left hand is east, their right hand is west, the top of their cap is the North Pole, and their feet point to the south.
10. Instruct the student to rotate slightly to their left, so their right arm points towards the Sun. Ask them which compass point the Sun would line up with for their LEGO® minifigure.
11. Ask the student to keep turning more until their back is to the Sun. Can their LEGO® minifigure see the Sun now? What time of day might it be?
12. Ask the student to continue turning until the Sun 'rises' in the east again.
13. Perform the activity with different students to share the experience of sunrise and sunset.

What is happening?

The Sun's diameter is around 1.4 million kilometres, while Earth's is a touch over 12 700 kilometres. That means the Sun's diameter is around 110 times that of Earth's, a ratio that can be represented by the 16.5-metre-long string and a baseball cap that's around 15 centimetres across.

Using scales like these, it's easier to appreciate the massive differences in sizes and distances of our nearest star and the Earth.

This can be used to explain other massive objects and distances, such as the size of other stars and planets or the width of our own galaxy.

Sun spotting

Safety: This activity requires using a telescope to capture an image of the Sun. At no point in this activity should anyone look through the telescope at the Sun. Make this risk clear to all students.

This activity requires standing outside on a cloudless, sunny day. Remember sun protection for all – hat, collared shirt, sunscreen and sunglasses.

Teacher Notes

You will need:

- Telescope
- Large sheet of stiff cardboard (such as from a large box)
- Scissors
- Pen
- Masking tape
- Stiff white board (a square of wood painted white works well)
- Camera

What to do:

1. Before going outside, cut a square of stiff cardboard with a side of roughly 30 centimetres.
2. Use a pen to trace the large end of the telescope (the circular opening) onto the centre of the square card.
3. Cut out this circle so the square can fit over the end of the telescope like a collar. Use masking tape to fix it in place, making sure you don't obscure the opening.
4. Wind the telescope's focus as far in as it will go.
5. Find a place outside on a sunny day where the Sun is easily visible relatively high in the sky.
6. Lean the stiff white board against something so it is mostly upright. This will be the screen for the image of the Sun.
7. Position the telescope so it is pointing roughly towards the Sun. Remember, do not look into the eyepiece at any time. Ensure students are a small distance away so none look into the eyepiece.
8. Swivel the telescope until the shadow of the collar is cast across the white board and a bright spot can be seen. You might need to move the board or the telescope until the bright spot is a clear white circle.
9. Can you see any dark dots inside the white circle? Take a photograph of it for discussion later in class.

What's happening?

The Sun's light is so bright, it's hard to believe there's anything to see in its rays. But the surface of our closest star is a complex mix of patterns and swirls.

Some of these are what we call sunspots. These dark dots are slightly cooler patches of the Sun's surface. Some are as big as our own planet, if not bigger! Watching how they move slowly from day to day can tell us a lot about the Sun's activity, and how the light and radiation it emits might grow and fade in coming weeks.

Teacher Notes

English

Musical star

The star in the book is described as a character on a journey around the world.

Read the story slowly, out loud, with soft music playing in the background. Instruct a responsible student to stop the music at least once every 20 seconds. Write the word you stopped upon on the board and ask students what category the word or its phrase belongs to, such as a noun, verb or adjective. For those they can't agree upon, place a question mark and come back to it.

As an extension, ask students if they can come up with a similar word to explain the word you stopped on.

Arts

Making constellations

You will need:

- A3 sheets of paper
- Star stickers (various sizes if possible)
- Pencil
- Black marker

What to do:

Give each student one A3 sheet of paper and 15 star stickers. Ask them to place the stars anywhere on the paper to create a fictitious scene of a night sky of their making.

Collect the sheets and hand them out randomly again, ensuring each student gets another student's sheet.

Share images of old celestial maps and constellation guides with the students to inspire them. Discuss how navigation relied on remembering constellations and their positions at different times of the year.

Instruct the students to create their own constellation using the patterns of stars they have in front of them by joining a number of the stars using a marker, like a dot-to-dot. Let them know they don't need to use all of the stars.

Invite them to embellish their drawing using a pencil, drawing their imagined constellation in more detail.

Share the students' invented constellations. Ask them to come up with stories explaining the constellation.

Teacher Notes

Australian curriculum links

Year level	Learning area: science	Other learning areas
Year 2	Science Understanding: Biological sciences Living things grow, change and have offspring similar to themselves (ACSSU030)	English: Language - Understand that spoken, visual and written forms of language are different modes of communication with different features and their use varies according to the audience, purpose, context and cultural background (ACELA1460) - Understand that nouns represent people, places, concrete objects and abstract concepts; that there are three types of nouns: common, proper and pronouns; and that noun groups/phrases can be expanded using articles and adjectives (ACELA1468) Media arts - Explore ideas, characters and settings in the community through stories in images, sounds and text (ACAMAM054)
Year 3	Science Understanding: Earth and space sciences - Earth's rotation on its axis causes regular changes, including night and day (ACSSU048) Physical sciences - Heat can be produced in many ways and can move from one object to another (ACSSU049)	English: Language - Understand that languages have different written and visual communication systems, different oral traditions and different ways of constructing meaning (ACELA1475) - Identify the effect on audiences of techniques, for example shot size, vertical camera angle and layout in picture books, advertisements and film segments (ACELA1483)
Year 4	Science Understanding: Earth and space sciences Earth's surface changes over time as a result of natural processes and human activity (ACSSU075)	English: Language - Understand differences between the language of opinion and feeling and the language of factual reporting or recording (ACELA1489) - Understand that the meaning of sentences can be enriched through the use of noun groups/phrases and verb groups/phrases and prepositional phrases (ACELA1493) - Explore the effect of choices when framing an image, placement of elements in the image, and salience on composition of still and moving images in a range of types of texts (ACELA1496)
Year 5	Science Understanding: Earth and space sciences - The Earth is part of a system of planets orbiting around a star (the sun) (ACSSU078) Physical sciences - Light from a source forms shadows and can be absorbed, reflected and refracted (ACSSU080)	English: Language - Understand how texts vary in purpose, structure and topic as well as the degree of formality (ACELA1504) - Explain sequences of images in print texts and compare these to the ways hyperlinked digital texts are organised, explaining their effect on viewers' interpretations (ACELA1511) Media arts - Explore representations, characterisations and points of view of people in their community, including themselves, using settings, ideas, story principles and genre conventions in images, sounds and text (ACAMAM062)

Teacher Notes

Related books from CSIRO Publishing

For younger readers (aged 5–8):

- *Swim, Shark, Swim!* (<https://www.publish.csiro.au/book/8069>) – by same author/illustrator team as *Shine, Star, Shine!*

For older readers (aged 8–12):

- *How to Survive on Mars* (<https://www.publish.csiro.au/book/8011>)
- *The Encyclopedia of STEM Words: An Illustrated A to Z of 100 Terms for Kids to Know* (<https://www.publish.csiro.au/book/8084>)

Other CSIRO resources

CSIRO has developed and delivered a broad range of high-quality STEM education programs and initiatives for nearly 40 years. Our programs aim to inspire the pursuit of further STEM education among students and the community, to equip the emerging workforce with tomorrow's skill sets, and to strengthen collaboration between industry and classrooms across Australia. For more information visit: <https://www.csiro.au/en/Education>