

6

SCIENCE

SAMPLE RESPONSES



Moon phases

This booklet is designed to help teachers make overall, on-balance judgments by providing examples of student responses. The responses are not an exhaustive set.

A samples



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A Sample: Response 1

Guide to making judgments — Year 6 Science

Purpose: To demonstrate understanding and interpretation of the causes of day and night, and of Moon phases.

Student

Knowledge and understanding	Investigating	Communicating	Reflecting
<ul style="list-style-type: none"> Describes the motion of the Earth and Moon. Explains the causes of day and night, as well as Moon phases. Identifies and classifies forces. 	Interprets information and uses scientific concepts and understandings to draw conclusions.	Communicates information, explanations and conclusions using diagrams and scientific terminology.	Reflects on learning to evaluate ideas.
Q 1–4, 6	Q 5, 8, 10	Q 2–10	Q 7, 9

Accurately describes the motion of the Earth and Moon. Clearly and accurately relates Moon phases and day and night to the relative

Accurately interprets visual information to represent a view of the Moon and evaluate the title of the photo. Uses scientific concepts to comprehensively justify conclusions.

Clearly conveys intended meaning through explanations, conclusions, justifications and diagrams. Makes effective use of scientific terminology.

Considers a range of relevant scientific understandings when evaluating the ball-and-string analogy and the title of the photo.

Knowledge and understanding

Clear and accurate descriptions of movements and relationships of Earth, Moon and Sun (with minor error in Q 4). Accurately identifies and classifies forces.

Investigating

Conclusions are based on scientific ideas and accurate interpretation of information. Correctly names moon phase and time of day in Q 5. Uses multiple scientific ideas to accurately explain phenomena in Q 8. In Q 10, recognises that sunrise and moonrise are caused by Earth's rotation, but that on the Moon it is different. Wrongly states that the Moon doesn't rotate, but clearly explains why the Earth is always in the same place when looking from the Moon.

Communicating

Clearly conveys intended meaning, with multiple pieces of evidence to justify conclusions using appropriate scientific terminology and labelled diagrams.

Reflecting

Considers multiple science ideas when reflecting on scientific scenarios. Clear, accurate explanation of how the string represents gravity; notes it as an invisible force (Q 7). Makes perceptive reflections on a number of relevant concepts in Q 9.

Overall grade

The purpose of this QCAT is for students to demonstrate understanding and interpretation of the causes of day and night, and of moon phases. Overall this work demonstrates a very high level of knowledge and understanding of the causes of day and night, moon phases, and of forces, despite some minor errors. Highly skilled application of the relevant ways of working is also evident, and on balance is an overall A.

A Sample: Response 1

1. Choose words from the word list to complete the paragraphs below.

Word list					
Sun	Earth	Moon	orbit	in shadow	phases
sunrise	reflecting	28 days	24 hours	day	night



- Use Diagram 1 to help you.
- Not all of the words are used.

Earth rotates once every 24 hours..... On the side facing the Sun,
it is day..... and on the other side it is night.....
because it is in shadow.....

Moonrise, sunrise..... and the appearance of the Sun and Moon
moving across the sky are actually caused by the rotation of the Earth.
The Moon is in orbit..... around the Earth, taking about 28 days.....
for one revolution.

As it moves around the Earth, the Moon appears to go through changes in shape,
called phases....., as we see more or less of the side that is reflecting.....
light from the Sun.

While orbiting the Earth, the Moon also rotates slowly, almost exactly one turn during
each orbit, so the same side is always facing the earth.....

A Sample: Response 1

Diagram 2: Phases of the Moon

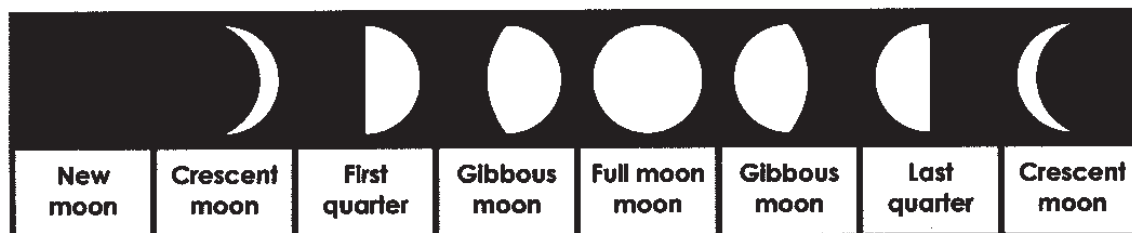
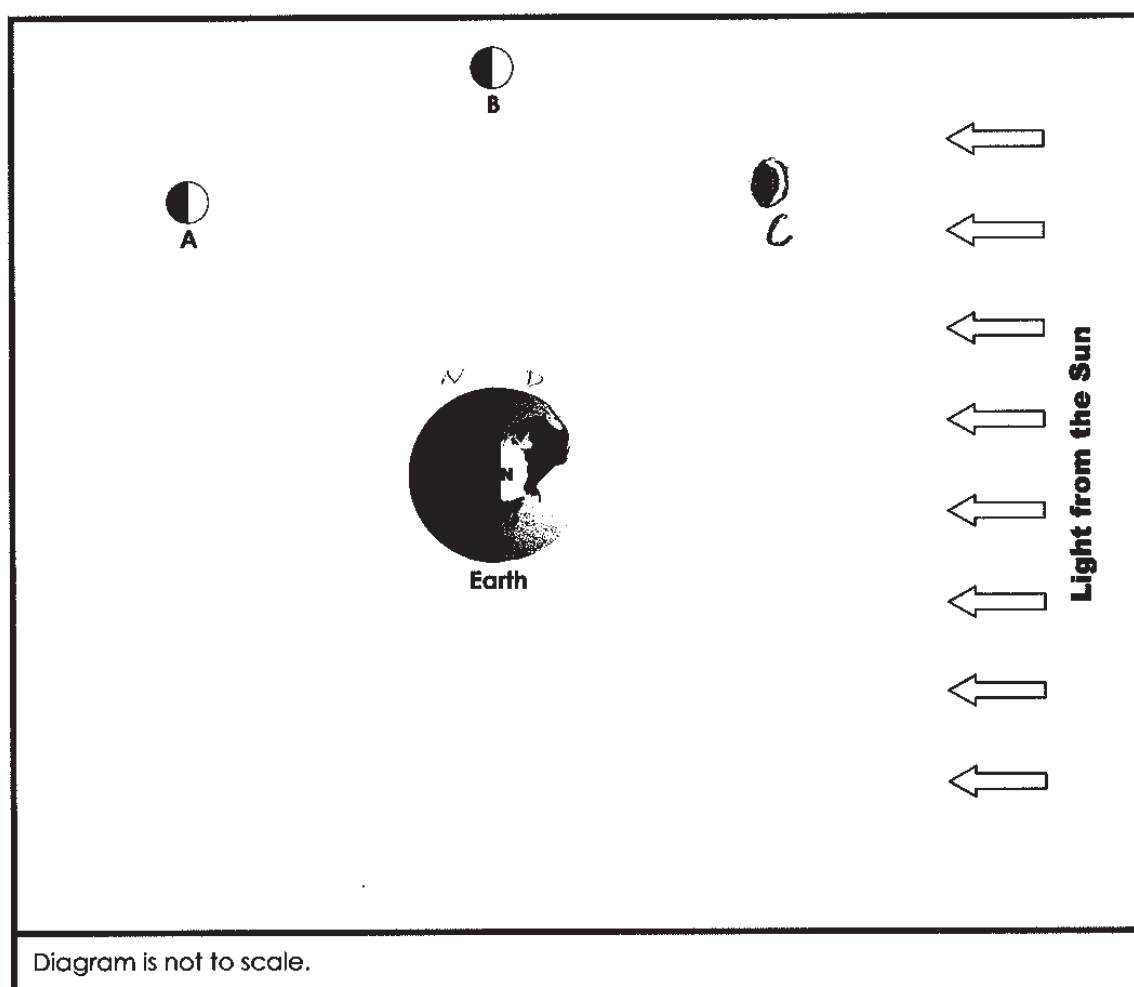



Diagram 3: Earth with the Moon in two different positions




A Sample: Response 1

Use Diagrams 2 and 3 to help you complete the following questions.

2. Shade in the shape and name the phase of the Moon when it is in position A.


View from Earth	Name of phase
	Gibbous Moon.....

3. Shade in the shape and name the phase of the Moon when it is in position B.

View from Earth	Name of phase
	First Quarter.....

4. Draw another moon in Diagram 3, according to the following instructions:

- draw the Moon in a position to show the phase below
- label it C
- shade the dark side.

View from Earth	Name of phase
	Crescent moon

A Sample: Response 1

5. In the box below:

- a) draw the phase of the Moon you would see from the position shown in Diagram 4
- b) colour the sky to show whether it is day (blue) or night (black)
- c) name the phase of the Moon: Gibbous Moon.....



A Sample: Response 1

6. Compare the ball and string with the actual Earth and Moon, by completing this table.

	The boy with the ball and string	The Earth and Moon
What are the forces stopping the Moon and ball from moving away? Choose from this list: <ul style="list-style-type: none"> magnetism gravity reflection string pulling in string pulling out 	String pulling in	gravity
Is the force a contact force or a force acting at a distance? Circle one in each case.	<u>a contact force</u> or a force acting at a distance	a contact force or <u>a force acting at a distance</u>
Does the same side of the Moon (or ball) always face Earth (or boy)? Circle one in each case.	<u>Yes</u> or No	<u>Yes</u> or No

7. Think about using the ball and string to explain the motion of the Moon.

What is useful about the ball and string?	What is not useful about the ball and string?
The ball represents the moon... orbiting earth and the string... shows the gravity keeping... the earth and moon together.	You can see the force of... gravity in the diagram but... in real life you can't see the... force of gravity.

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

A Sample: Response 1

Look at the photo of the Earth.

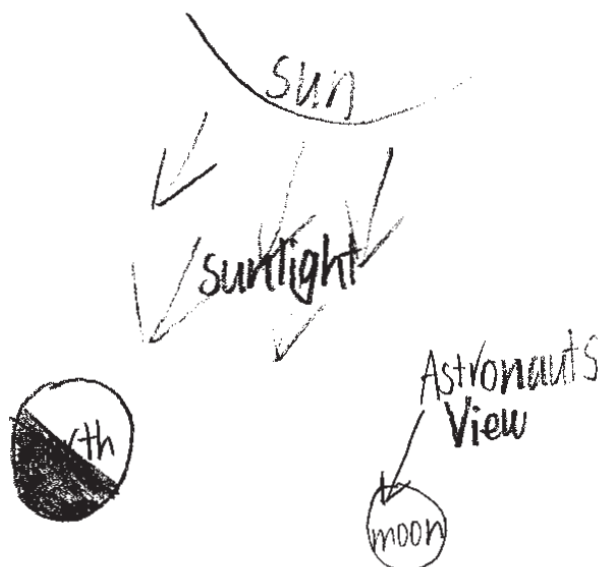
8. Explain why the Earth has that shape in the photo.



Think about what causes Moon phases.

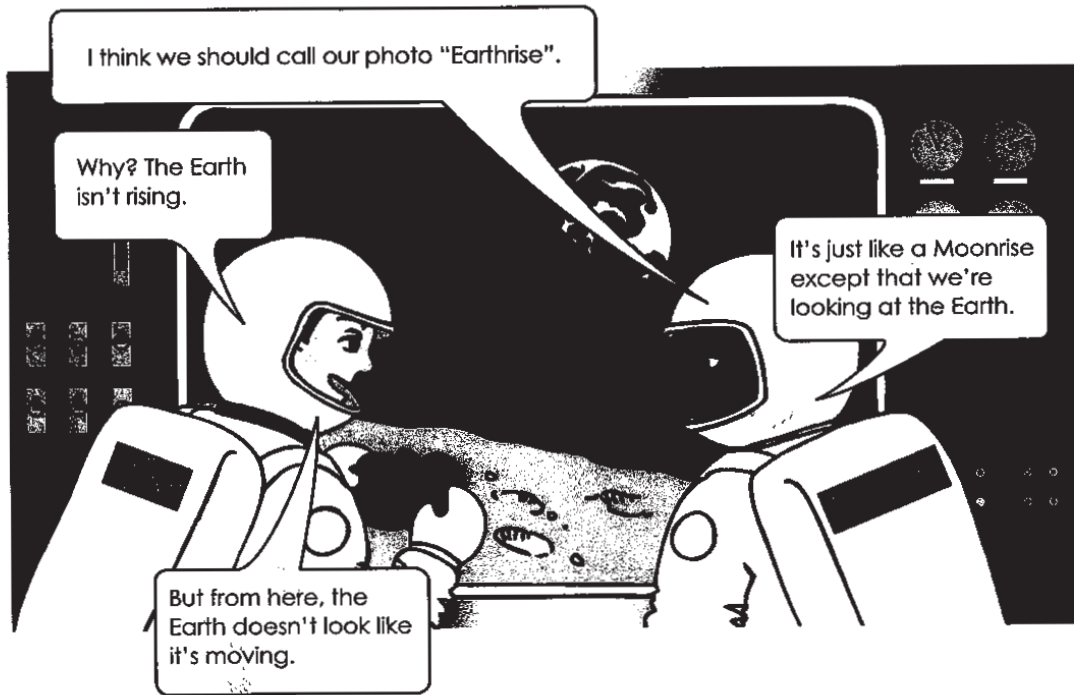
The reason is because the part of the earth that is lit up is facing the sun. When this happens it is daylight and the part of the earth that you can't see is not facing the sun and is nighttime. This happens because the earth spins once every twenty-four hours as it orbits around the sun.

Draw a diagram to show what you mean.



A Sample: Response 1

Here are two astronauts who have taken a similar photo.
The astronauts discussed what they should call it.



The Pilot and Commander disagree about whether "Earthrise" is a correct title.

9. List some science ideas they could use to support their opinions about "Earthrise".



- List all the evidence you can find to support one or both astronauts
- Look back over pages 4–11 for ideas.

Pilot: "The Earth isn't rising"	Commander: "Earthrise"
<p>Earth doesn't rise. The sun appears to rise because the earth rotates.</p> <p>The ball and string shows how the moon moves around the earth.</p> <p>The earth doesn't move up but rotates every 24 hours</p>	<p>The earth looks like it is rising because the sun is reflecting on the side of the earth that the astronauts see.</p> <p>Because the moon orbits the earth every 28 days, it may seem like the earth is rising because of where the astronauts are looking out from.</p>

A Sample: Response 1

10. Decide which astronaut you agree with.

Give scientific reasons to explain your opinion. You may use a diagram.

I agree with the pilot because the earth spins and this is what causes sunrise and moonrise.

and if you were on the moon, the earth would not look like it was rising because the moon isn't spinning, and the same side always faces the earth. When you look at the earth from the moon it is always in the same place in the sky.

A Sample: Response 2

Overall grade

A very high level of conceptual understanding and very effective communication of scientific ideas, along with skilled investigation and comprehensive reflection, help to make this response, on balance, an overall A.

Guide to making judgments — Year 6 Science

Student

Purpose: To demonstrate understanding and interpretation of the causes of day and night, and of Moon phases.

Knowledge and understanding	Investigating	Communicating	Reflecting
<ul style="list-style-type: none"> Describes the motion of the Earth and Moon. Explains the causes of day and night, as well as Moon phases. Identifies and classifies forces. <p>Q 1–4, 6</p>	<p>Interprets information and uses scientific concepts and understandings to draw conclusions.</p> <p>Q 5, 8, 10</p>	<p>Communicates information, explanations and conclusions using diagrams and scientific terminology.</p> <p>Q 2–10</p>	<p>Reflects on learning to evaluate ideas.</p> <p>Q 7, 9</p>

A

Knowledge and understanding

Accurately describes the motion of Earth and Moon, and shows clear understanding of Moon phases, despite apparently swapping the answers for Q 2–3. Correctly identifies and classifies forces.

Investigating

Conclusions are based on accurate scientific ideas and accurate interpretation of information. Provides a clear description of the way light travels “straight until it hits something” and reflects (Q 8). A labelled diagram adds to the explanation. A well-reasoned argument supports the Pilot’s viewpoint in Q 10.

Communicating

Clearly conveys intended meaning with well-reasoned arguments using scientific terminology and labelled diagrams. An innovative diagram adds clarity to the explanation of why the Earth doesn’t appear to move (Q 10).

Reflecting

A range of relevant scientific understandings are applied to scenarios. States two useful aspects of the “ball and string” model, and clearly explains role of gravity. Provides valid evidence in support of each side of the debate in Q 9.

Considers a range of relevant scientific understandings when evaluating the ball-and-string analogy and the title of the photo.

Clearly conveys intended meaning through explanations, conclusions, justifications and diagrams. Makes effective use of scientific terminology.

Accurately interprets visual information to represent a view of the Moon and evaluate the title of the photo. Uses scientific concepts to comprehensively justify conclusions.

Accurately describes the motion of the Earth and Moon. Clearly and accurately relates Moon phases and day and night to the relative positions of the Sun, Earth and Moon.

A Sample: Response 2

1. Choose words from the word list to complete the paragraphs below.

Word list					
Sun	Earth	Moon	orbit	in shadow	phases
sunrise	reflecting	28 days	24 hours	day	night



- Use Diagram 1 to help you.
- Not all of the words are used.

Earth rotates once every 24 hours. On the side facing the Sun, it is day and on the other side it is night because it is in shadow.

Moonrise, sunrise and the appearance of the Sun and Moon moving across the sky are actually caused by the rotation of the Earth.

The Moon is in orbit around the Earth, taking about 28 days for one revolution.

As it moves around the Earth, the Moon appears to go through changes in shape, called phases, as we see more or less of the side that is reflecting light from the Sun.

While orbiting the Earth, the Moon also rotates slowly, almost exactly one turn during each orbit, so the same side is always facing the Earth.

A Sample: Response 2

Diagram 2: Phases of the Moon

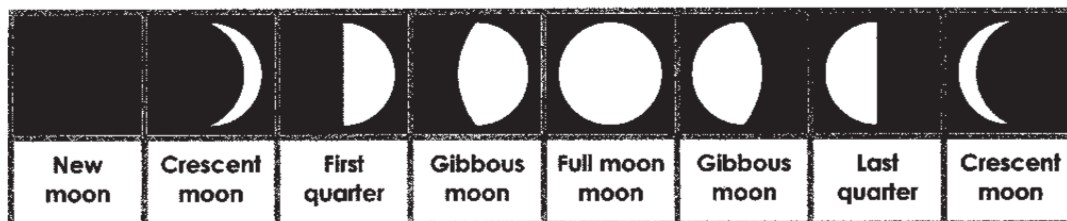
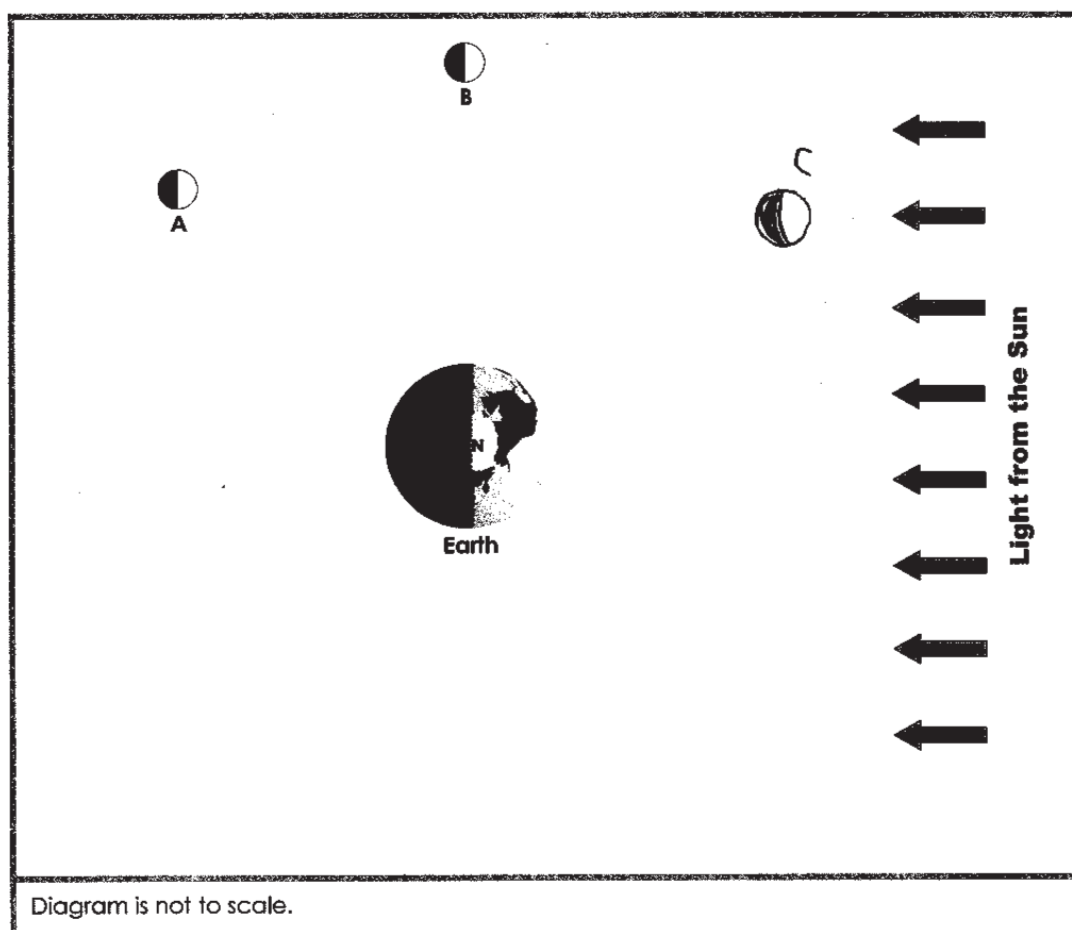



Diagram 3: Earth with the Moon in two different positions




A Sample: Response 2

Use Diagrams 2 and 3 to help you complete the following questions.


2. Shade in the shape and name the phase of the Moon when it is in position A.

View from Earth	Name of phase
	First quarter

3. Shade in the shape and name the phase of the Moon when it is in position B.

View from Earth	Name of phase
	Gibbous Moon

4. Draw another moon in Diagram 3, according to the following instructions:
- draw the Moon in a position to show the phase below
 - label it C
 - shade the dark side.

View from Earth	Name of phase
	Crescent moon

A Sample: Response 2

5. In the box below:

- a) draw the phase of the Moon you would see from the position shown in Diagram 4
- b) colour the sky to show whether it is day (blue) or night (black)
- c) name the phase of the Moon: *Gibbous Moon*.....



A Sample: Response 2

6. Compare the ball and string with the actual Earth and Moon, by completing this table.

	The boy with the ball and string	The Earth and Moon
What are the forces stopping the Moon and ball from moving away? Choose from this list: <ul style="list-style-type: none"> • magnetism • gravity • reflection • string pulling in • string pulling out 	The string pulling in	Gravity
Is the force a contact force or a force acting at a distance? Circle one in each case.	a contact force or a force acting at a distance	a contact force or a force acting at a distance
Does the same side of the Moon (or ball) always face Earth (or boy)? Circle one in each case.	Yes or No	Yes or No

7. Think about using the ball and string to explain the motion of the Moon.

What is useful about the ball and string?	What is not useful about the ball and string?
shows how the moon goes around the earth and 1 side always faces the moon.	that the ball is on a string but the earth and moon doesn't have a string holding them together, they have gravity.

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

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A Sample: Response 2

Look at the photo of the Earth.

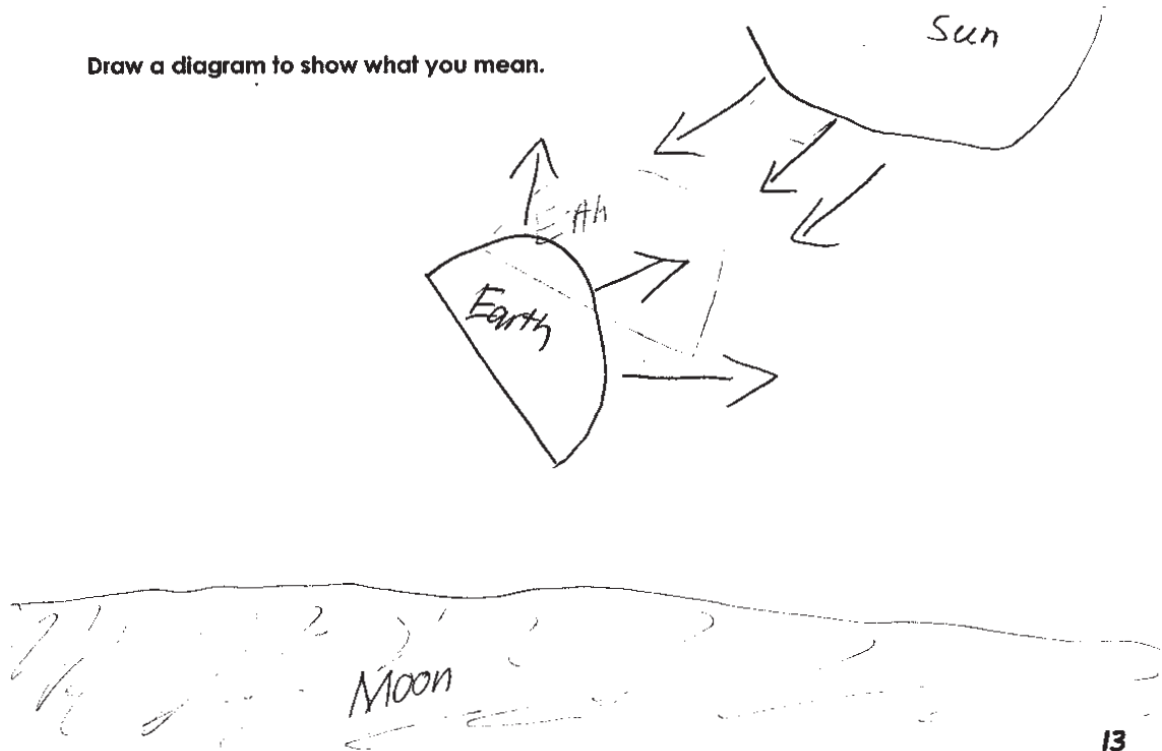
8. Explain why the Earth has that shape in the photo.



Think about what causes Moon phases.

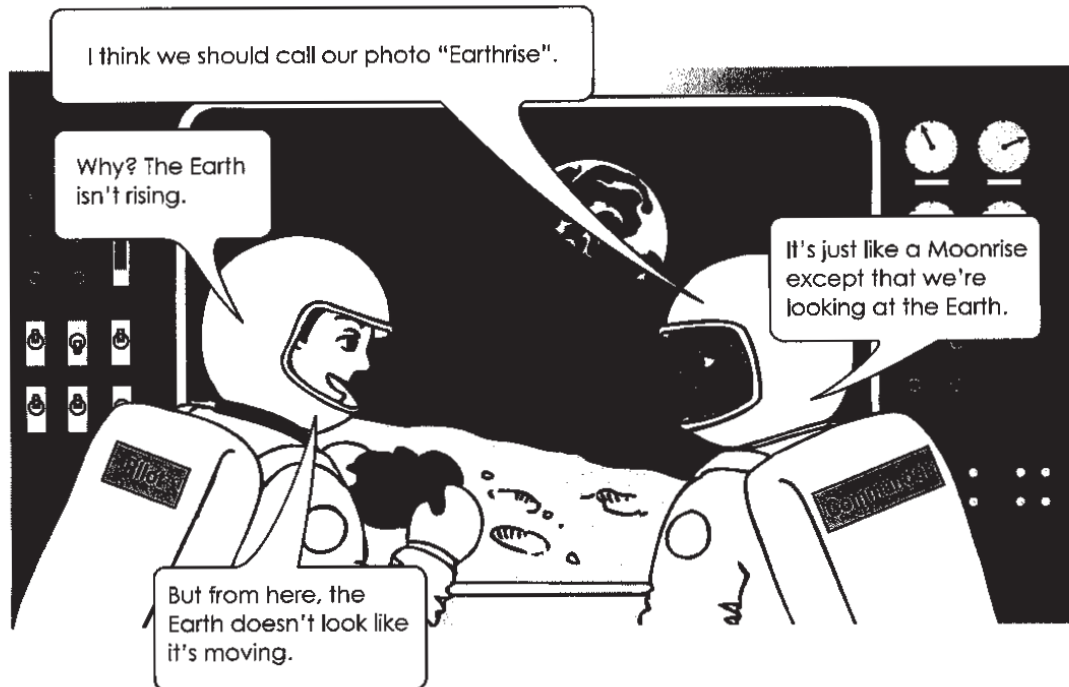
The Earth has that shape because the sun's light comes from one side and goes straight until it hits something so the light hits one side and bounces off so the other side gets no light and you cannot see the dark side.

Draw a diagram to show what you mean.



A Sample: Response 2

Here are two astronauts who have taken a similar photo.
The astronauts discussed what they should call it.



The Pilot and Commander disagree about whether "Earthrise" is a correct title.

9. List some science ideas they could use to support their opinions about "Earthrise".



- List all the evidence you can find to support one or both astronauts
- Look back over pages 4–11 for ideas.

Pilot: "The Earth isn't rising"	Commander: "Earthrise"
The part of the moon they are on will always face the earth so it won't rise or set.	Because you see different parts of the moon Earth at different times as the sun shines on different parts of it.

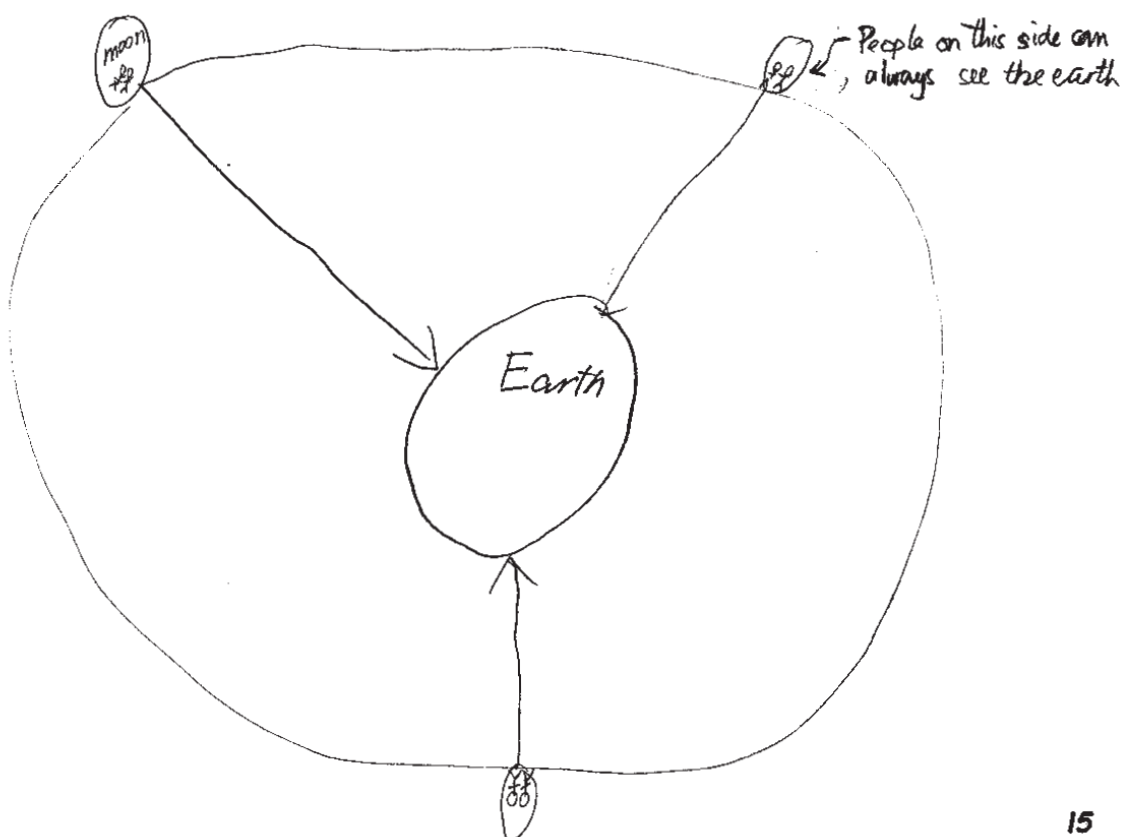
A Sample: Response 2

10. Decide which astronaut you agree with.

Give scientific reasons to explain your opinion. You may use a diagram.

I agree with the Pib because the earth
doesn't move because the part of the
moon they are on will always face
the earth.

and because you can always see the earth.
it won't rise or set, but you will see
different parts lit by the sun.



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