

STUDENT BOOKLET



Moon phases

Given name:

Family name:

School:

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Setting the scene: Group discussion

The picture below is a photograph of a moonrise.

If we watch the Moon over a few hours, it appears to rise above the horizon and move across the sky.

We notice the Moon and how it changes, but do we ever stop to wonder about it?

There are many questions that we could ask about the Sun and Moon. Talk about these with your class:

- What causes the Moon to rise and set?
- Why does the shape of the Moon change from one night to the next, and why does it not always rise at the same time?
- Why do we sometimes see the Moon during the day?
- The Sun also rises, but it doesn't change shape and we never see it at night. Why?

In this task you will use your scientific understanding to explain ideas about the Moon, Earth and Sun.



Image: Bad moon rising, Creative Commons: Attribution 2.0 Generic licensed photo from peterastrn's Flickr stream, accessed 20 Jan 2008, <<http://www.flickr.com/photos/53366513@N00/54511904/>>.

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

The Earth and Moon in motion

Diagram 1: Earth and Moon as seen from space

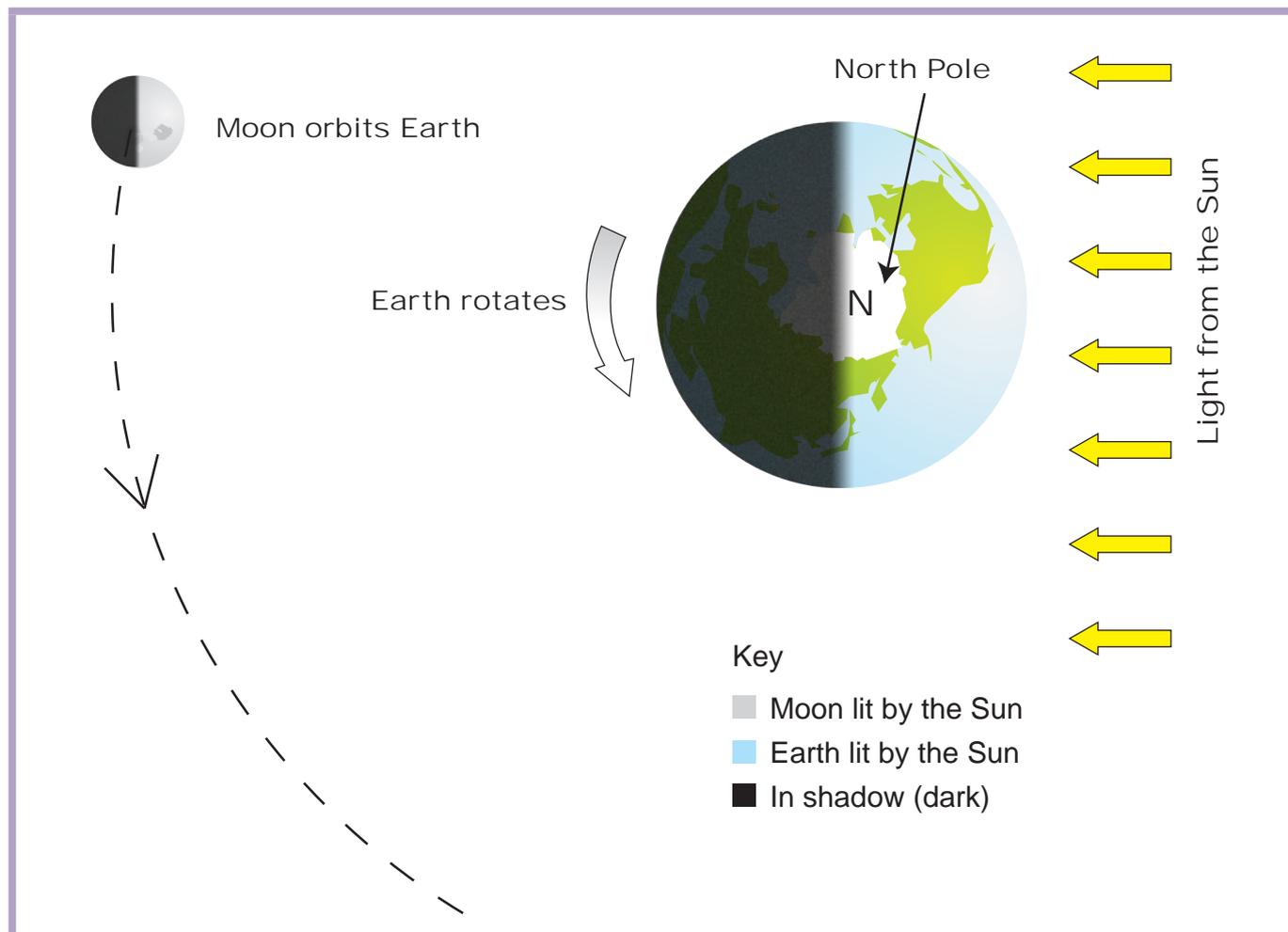


Diagram is not to scale.

- The actual distance from the Earth to the Moon varies slightly, but is about 30 times the diameter of the Earth.
- If the diagram were to scale, the Moon would be 1.6 metres away from the Earth.

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 On the side facing the Sun, it is and on the other side it is because it is

Moonrise, 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 around the Earth, taking about for one revolution.

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

Diagram 2: Phases of the Moon

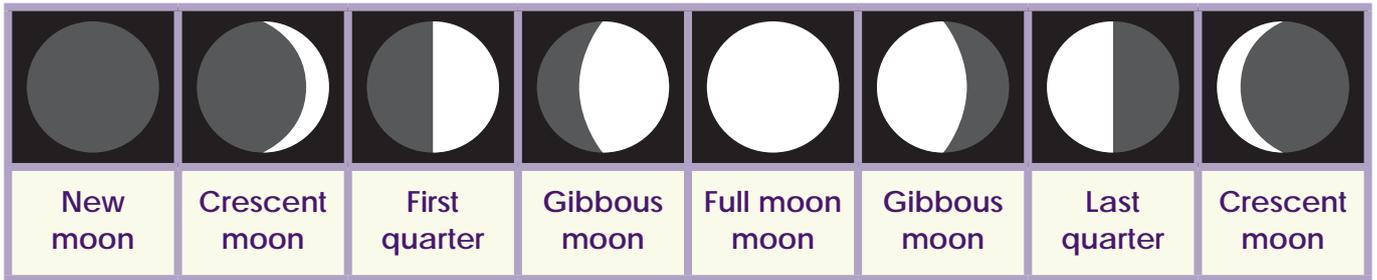
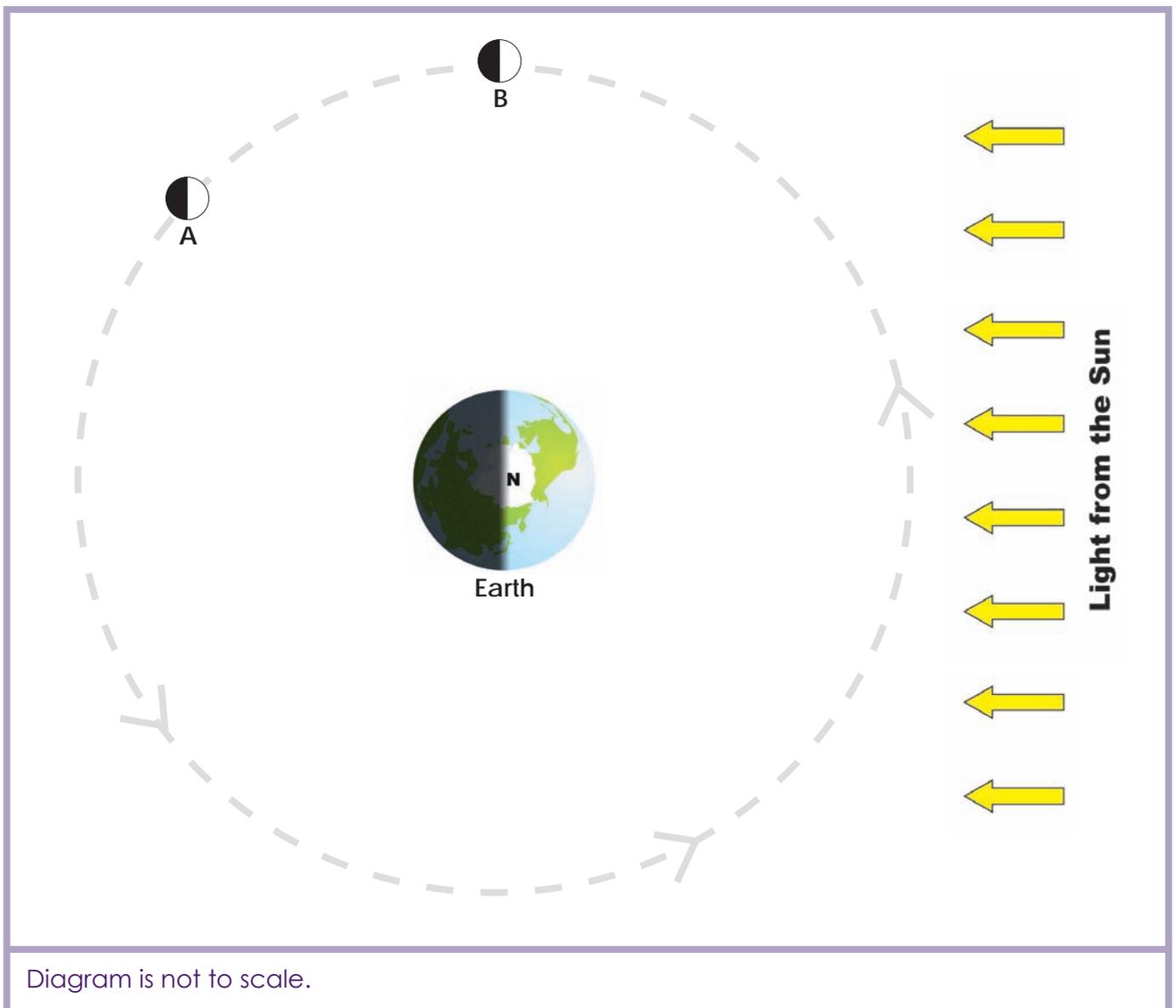
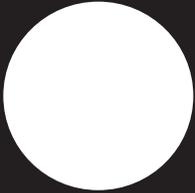


Diagram 3: Earth with the Moon in two different positions

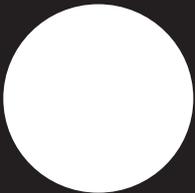


Use Diagrams 2 and 3 to help you complete the following questions.

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

View from Earth	Name of phase
	<p>.....</p>

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

View from Earth	Name of phase
	<p>.....</p>

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
	<p>Crescent moon</p>

Look at Diagram 4 and imagine you are standing at the position shown on the Earth's surface, then answer the questions on page 9.

Diagram 4: Earth and the Moon



Moon

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:

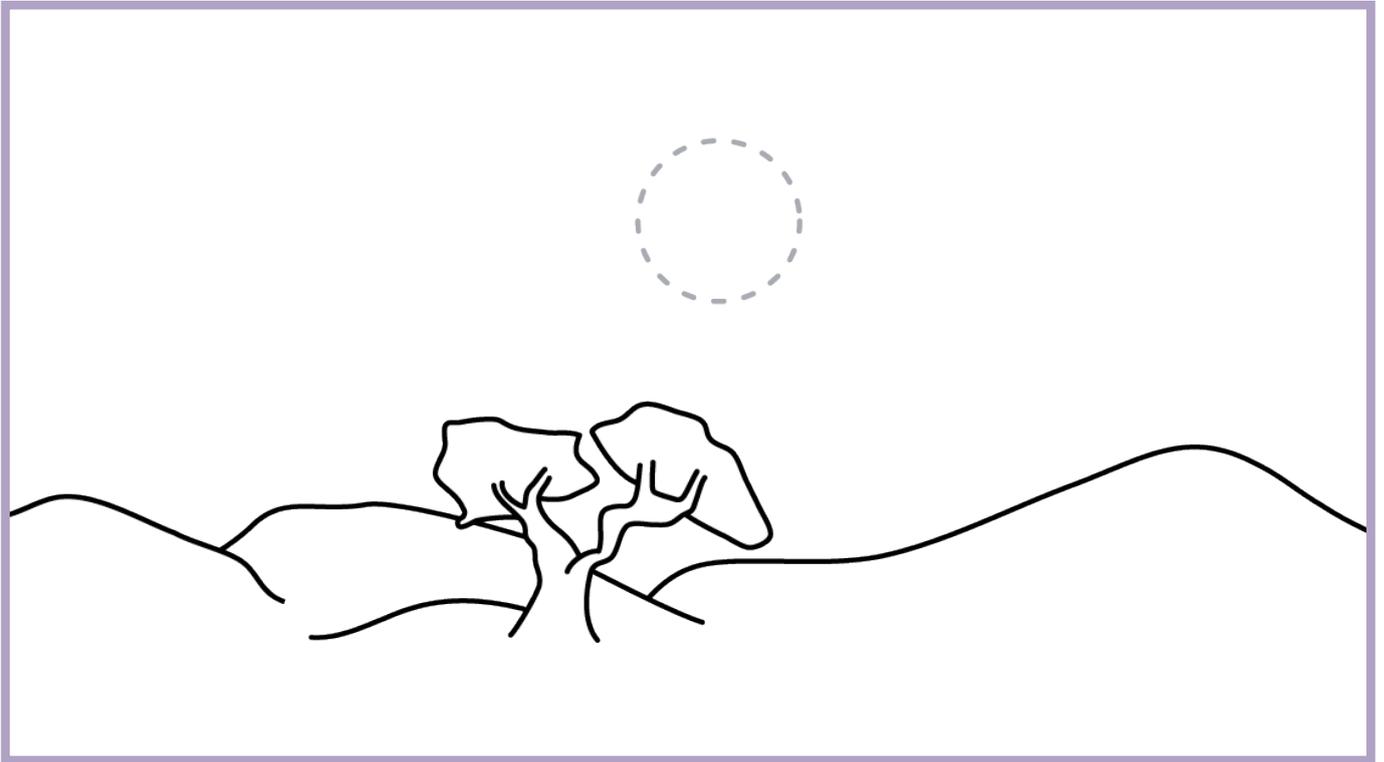
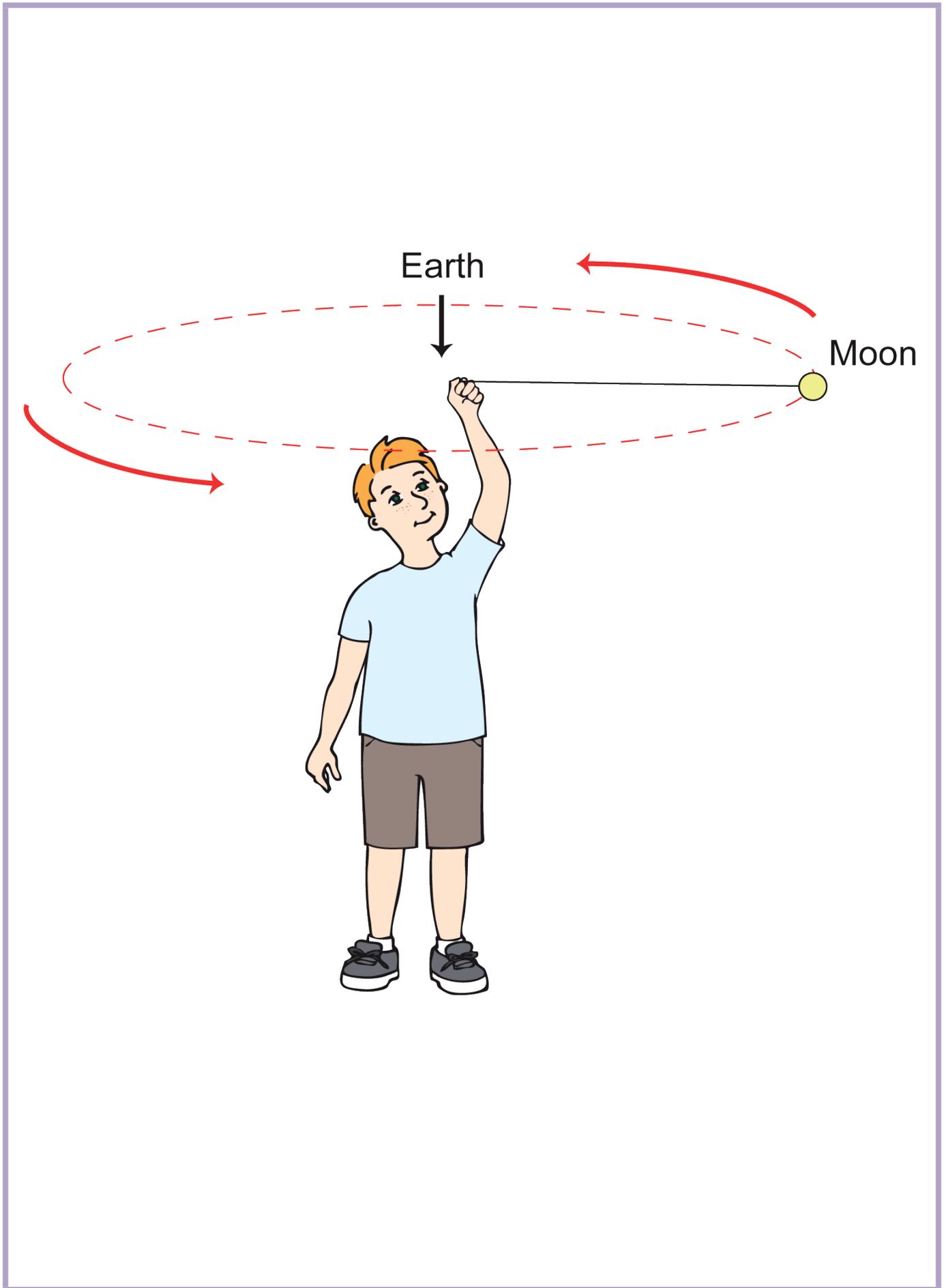


Diagram 5: Using a ball and string to show how the Moon moves around the Earth



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 		
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?
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STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

Earthrise?

This picture is a photo of the Earth.
It was taken from the Moon by an astronaut.



(Image: AS8-14-2383, NASA, The Project Apollo Archive, <www.apolloarchive.com/apollo_gallery.html>, accessed 28 May, 2008.)

Look at the photo of the Earth.

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



Think about what causes Moon phases.

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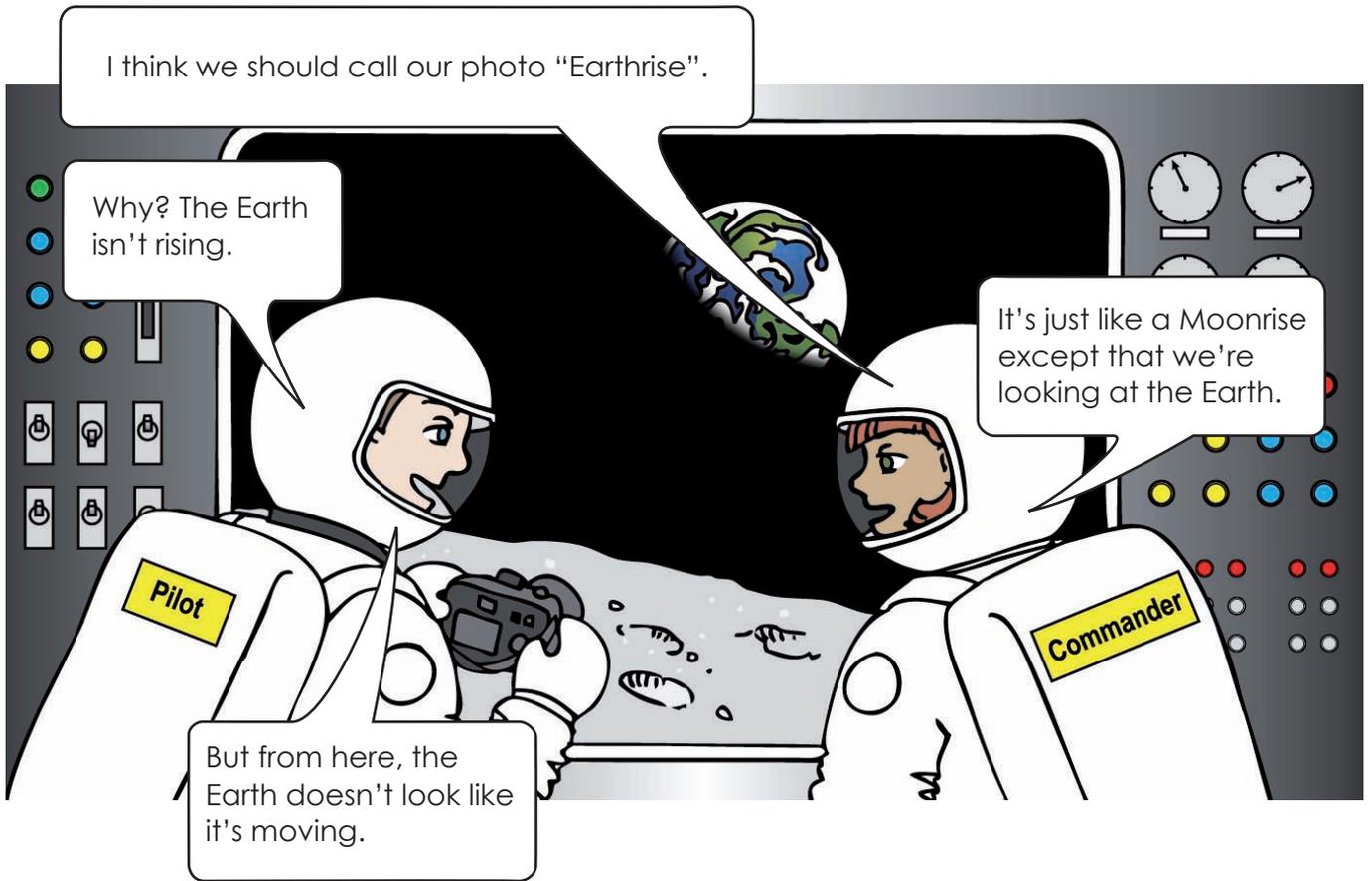
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Draw a diagram to show what you mean.

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"

10. Decide which astronaut you agree with.

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

I agree with the because

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and

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