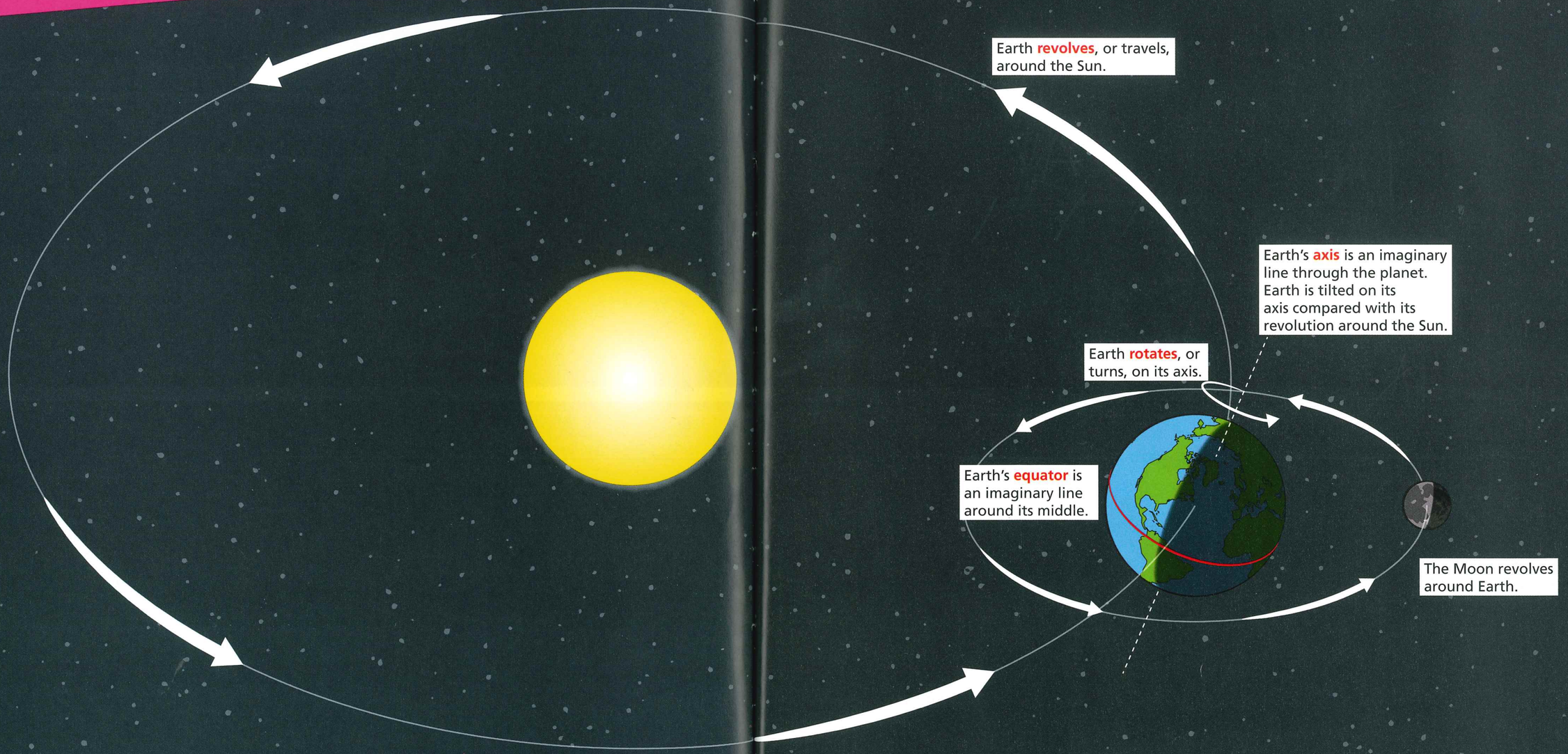
Earth Rotates and Revolves



It takes Earth 24 hours to rotate once. This is our day. It takes Earth 365 days to revolve around the Sun once. This is our year.

Earth **revolves**, or travels, around the Sun.

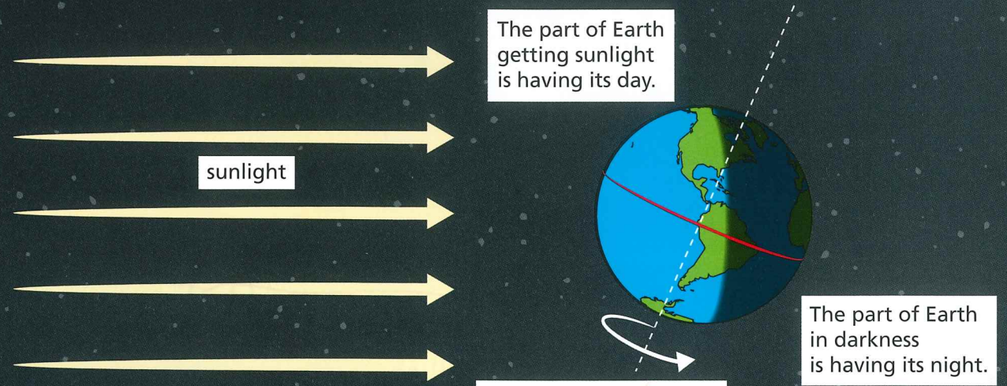
Earth's **axis** is an imaginary line through the planet. Earth is tilted on its axis compared with its revolution around the Sun.

Earth **rotates**, or turns, on its axis.

Earth's **equator** is an imaginary line around its middle.

The Moon revolves around Earth.

Q: Describe to a partner the two ways Earth moves. How are the two movements different?



The part of Earth getting sunlight is having its day.

The part of Earth in darkness is having its night.

As Earth rotates, different parts of Earth have day and night.

Q: What is realistic about this diagram? How is the real-life situation different than the diagram?

In the winter, the nights are very long in the Arctic and Antarctic. Sometimes there is no day at all!

In the summer, the days are very long in the Arctic and Antarctic. Sometimes there is no night at all!

We live in the **northern hemisphere**, the part of Earth above the equator. The part of Earth below the equator is called the **southern hemisphere**.

For part of each year, the northern hemisphere is tilted toward the Sun. We get more sunlight, and our sunlight is more intense. This is our summer.

In our spring, the Sun shines equally on the northern and southern hemispheres.

It takes Earth one year to revolve around the Sun. Because of Earth's tilt, we have four seasons every year.

Q: What would happen if Earth did not tilt on its axis?

Earth is always about the same distance from the Sun.

Q: How does Earth's tilt cause the seasons?

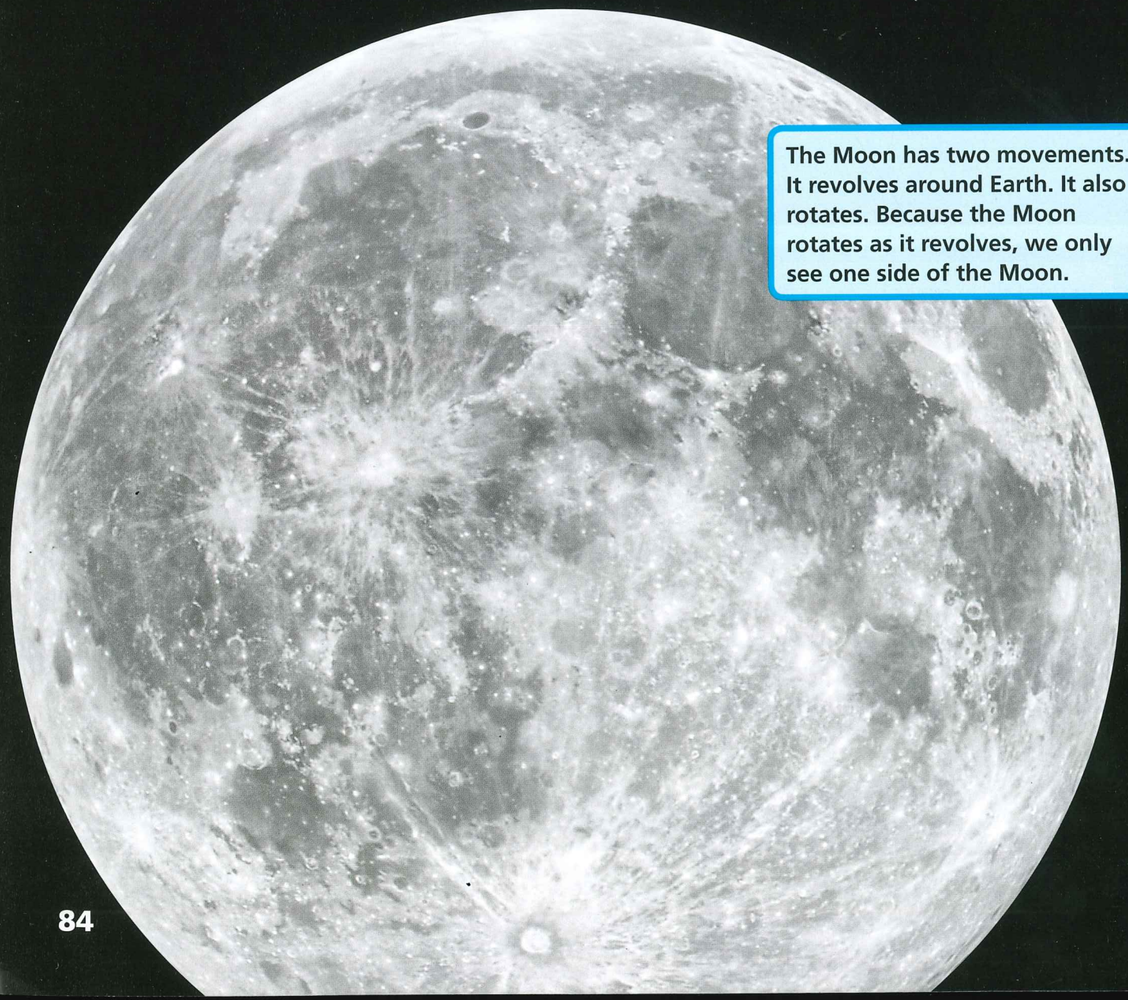
In our fall, the Sun shines equally on the northern and southern hemispheres.

For part of each year, the northern hemisphere is tilted away from the Sun. We get less sunlight, and our sunlight is less intense. This is our winter.

Q: Why don't countries near the equator have seasons the way we do?

Movements of the Moon

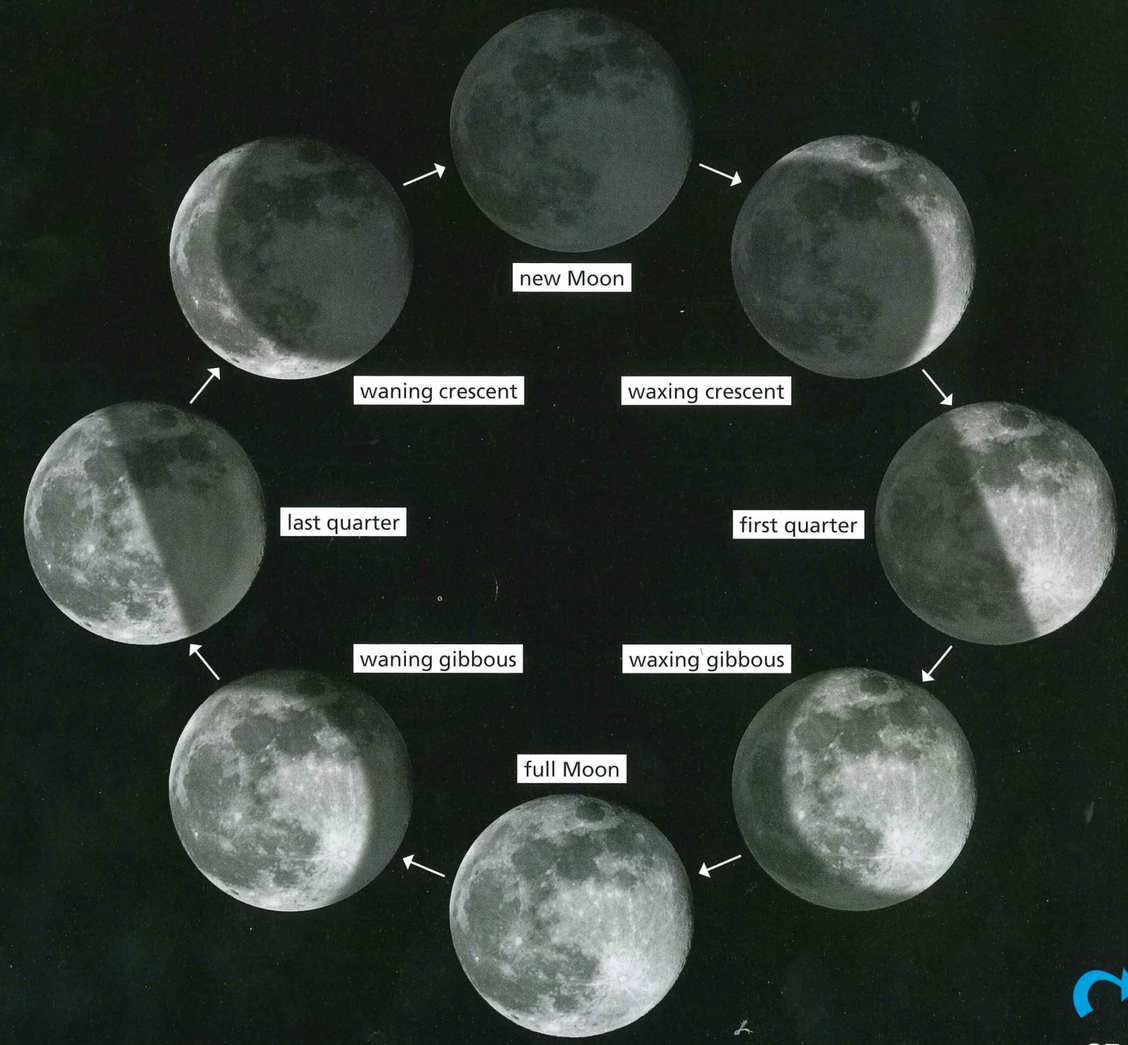
Sometimes we see a **full Moon** that looks like a circle. At other times, we see a **quarter Moon** that looks like the Moon was cut in half. And on some nights, the Moon seems to disappear. However, the **new Moon** is still there, even though it is hard to see!



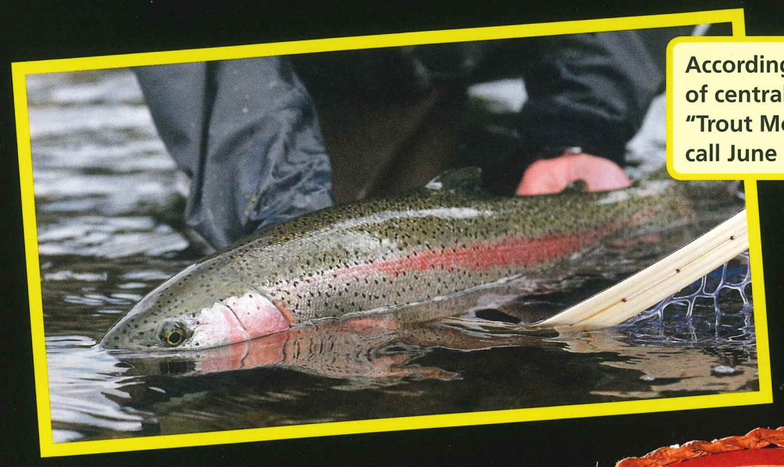
The Moon has two movements. It revolves around Earth. It also rotates. Because the Moon rotates as it revolves, we only see one side of the Moon.

The full Moon, quarter Moon, and new Moon are examples of **phases of the Moon**. The phases of the Moon form a cycle that repeats about every 29 days.

Q: What phase of the Moon is it now where you live?



People in many cultures, such as the Saanich First Peoples of southern BC, use the Moon as a calendar. When the Moon goes through one cycle of phases, one Moon month has passed.



According to the Carrier First Peoples of central BC, June is *Dukai Ooza* or "Trout Moon." Q: What would you call June based on your activities?

This Moon Mask was created by artist Trevor Hunt. Some First Peoples see the Moon as a symbol of power and wisdom.

The Moon does not make its own light. The light we see is reflected sunlight.

The Moon and the way the Sun shines on the Moon stay the same. As the Moon moves around Earth, we see the sunlight shining onto the Moon differently. This causes the phases of the Moon.

Q: Why do you think the Moon looks different to us as it revolves around Earth?

The Moon's Movements Cause Tides

Q: Why is it important to know about tides if you live on the coast?

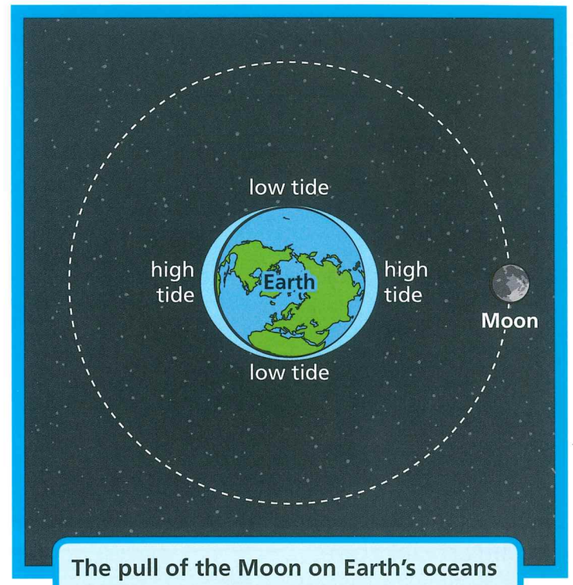
Along the coast, the level of the ocean changes in a cycle from high to low, and then back to high again. There are two cycles per day. These regular movements of the ocean are called **tides**.

TRY THIS! How Can We Show the Tides?

1. As a class, arrange chairs in a circle. With your classmates, sit in the chairs, facing out. Link your arms.
2. You are representing Earth's oceans. To represent a high tide, lean forward. To represent a low tide, lean back again. Practise these movements.
3. Choose two people to stand outside the circle. One person represents the Moon. The other represents the Sun.

Earth and the Moon are attracted to each other by the force of **gravity**. Earth and the Sun are also attracted to each other by gravity.

The Moon's pull causes Earth's oceans to bulge toward the Moon. The oceans on the other side of Earth also bulge because the Moon is pulling the solid part of Earth a little bit toward it.



The pull of the Moon on Earth's oceans causes high and low tides. As Earth rotates, and as the Moon revolves around Earth, the tides change.

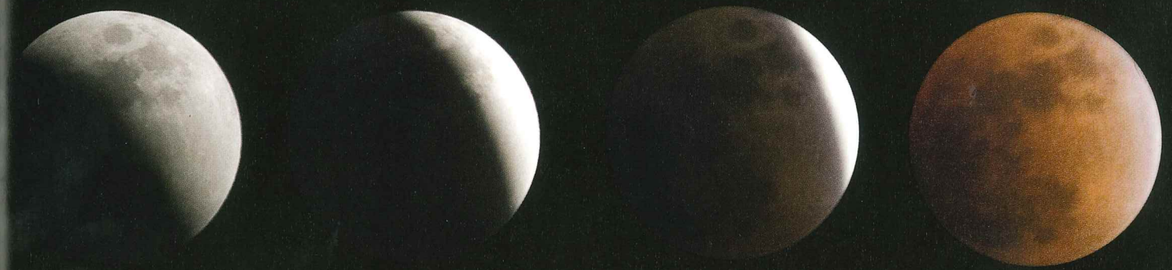
4. The Moon walks slowly around the circle. How do the oceans closest to the Moon respond? How do the oceans farthest from the Moon respond?
5. Predict how you could arrange the Sun and Moon to represent the biggest possible tide. Explain why you think this would work.
6. Predict how you could get the smallest possible tide. Explain why.

ECLIPSES

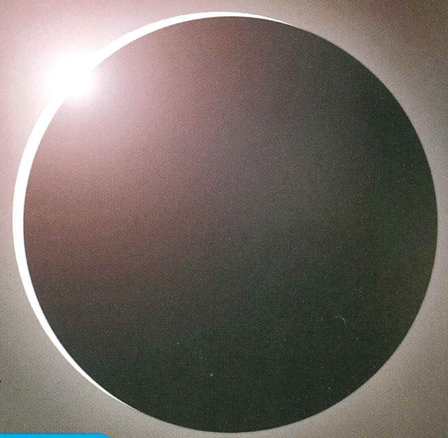
When you are in the sunlight, you cast a shadow. In the same way, Earth casts a shadow as the Sun shines on it.

A lunar eclipse can last from a few minutes to a few hours. Q: How is a lunar eclipse different from the phases of the Moon? How is it similar?

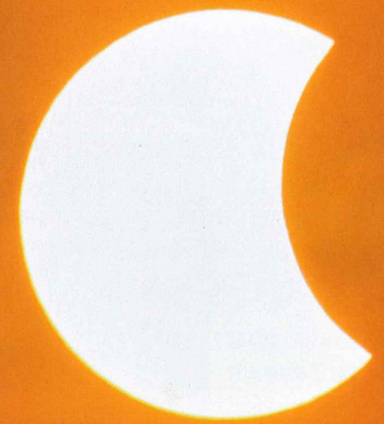
When one object moves into the shadow of another object, an **eclipse** occurs. During a **lunar eclipse**, the Moon moves into Earth's shadow.



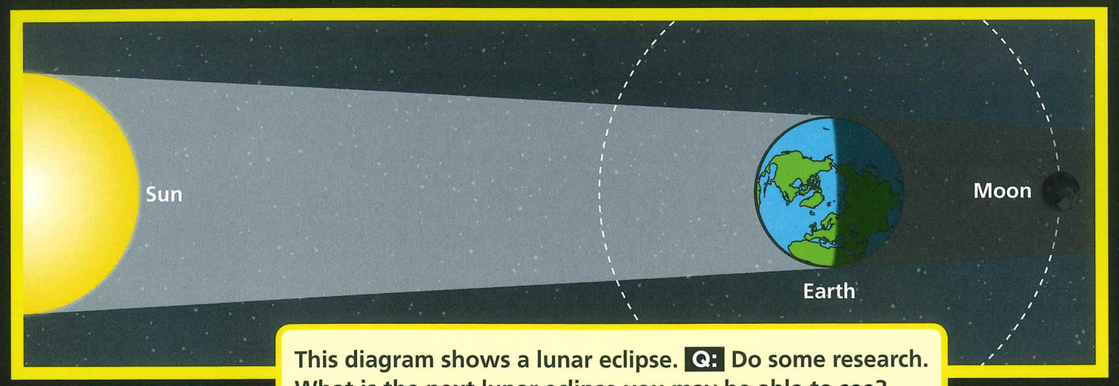
The Moon also casts a shadow. During a **solar eclipse**, Earth moves into the Moon's shadow.



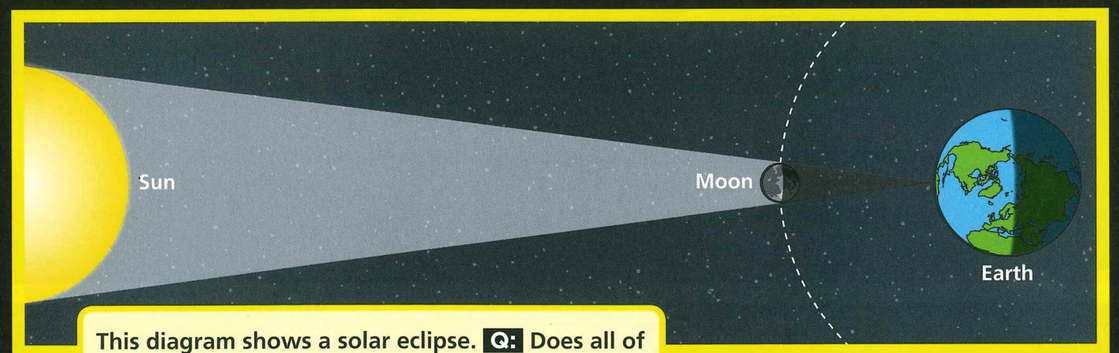
A solar eclipse lasts from a few minutes to a few hours.



During a partial solar eclipse, only part of the Sun is blocked by the Moon.



This diagram shows a lunar eclipse. **Q:** Do some research. What is the next lunar eclipse you may be able to see?



This diagram shows a solar eclipse. **Q:** Does all of Earth experience a solar eclipse at the same time?

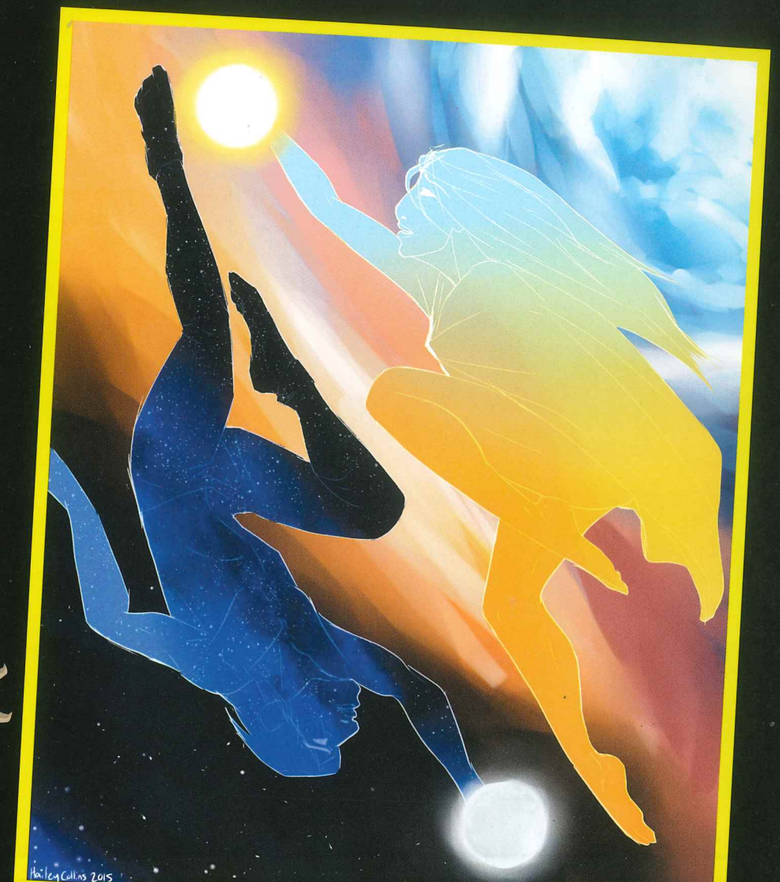
TRY THIS!

How Can We Show Solar and Lunar Eclipses?

You will need: model of Earth; model of the Moon; flashlight; camera (optional)

1. Arrange models of Earth, the Moon, and the Sun (the flashlight) to show a solar eclipse.
2. Arrange the models to show a lunar eclipse.
3. Make observations for each eclipse. Sketch what you see.
4. Use a Venn diagram to sort and classify the characteristics of lunar and solar eclipses.
5. Communicate your ideas and findings to a partner.

Many cultures tell stories about eclipses.



Inuit stories tell of the Moon god, Anningan, and his sister the Sun goddess, Malina. When Anningan and Malina meet in the sky, a solar eclipse occurs. **Q:** What science knowledge does this story teach about solar eclipses?

In China, traditional stories tell about a dragon that eats the Sun. Similar stories in India tell about a monster eating the Sun. **Q:** What kind of eclipse do these stories explain?

Knowledge-Building Circle

Sit in a circle with your classmates. Think about what you have learned about the effects of the positions and movements of the Sun, Moon, and Earth.

- What do you know now about the movement of the Moon and Earth that you did not know before? What new understandings do you have?
- What have you learned about First Peoples' perspectives and knowledge about the seasons and about other topics?
- How has your thinking changed? What questions do you still have?

Share your learning and your questions with your classmates. Listen to their ideas. Work together to review and extend your learning as a group and to identify any questions you still have.