MOON PHASES
Session 3: Eclipses

Instructions: You and your partner should **discuss your responses** to each question, then write your answers in your own packet.

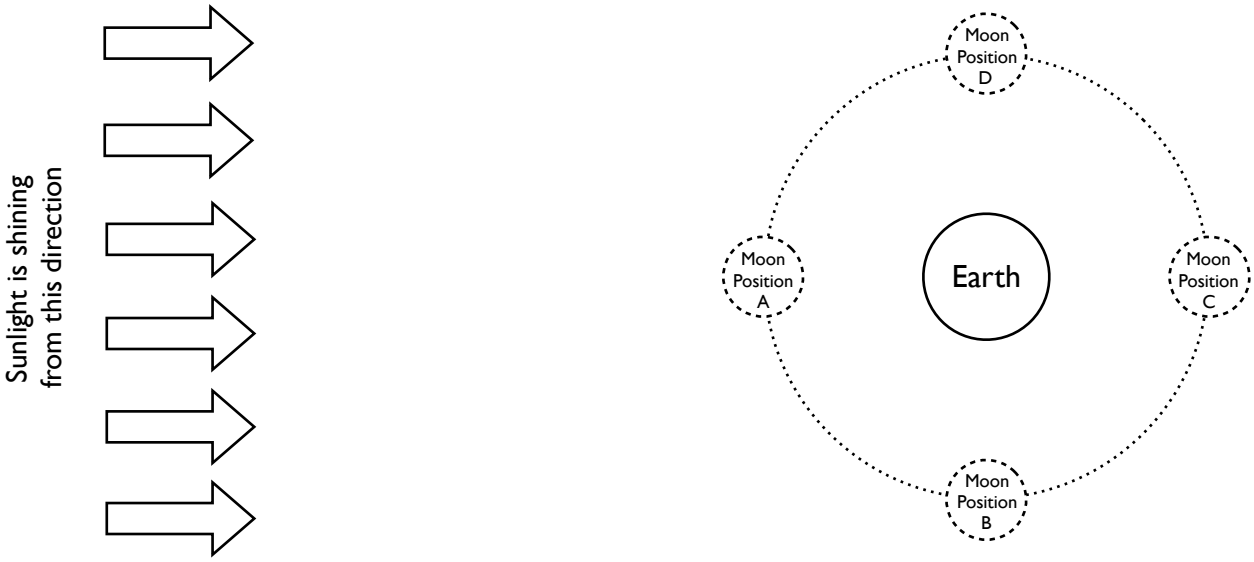
1. Lunar or Solar Eclipse?

a. During a **lunar eclipse**, something is blocking the **Moon** .
< Sun / Moon >

b. During a **solar eclipse**, something is blocking the **Sun** .
< Sun / Moon >

2. Which positions?

This diagram shows an **overhead view** of the sunlight and Earth, with the Moon drawn at 4 possible positions. *NOTE: The diagram is not to scale!*



a. Choose the Moon position that goes with a Solar Eclipse: (A) B C D

b. Choose the Moon position that goes with a Lunar Eclipse: A B (C) D

c. What is the phase of the Moon when it is at the position you chose in part a?

At this position, the phase of the Moon is **New** .
< new / crescent / half / gibbous / full >

d. What is the phase of the Moon when it is at the position you chose in part b?

At this position, the phase of the Moon is **Full** .
< new / crescent / half / gibbous / full >

3. How often do eclipses occur?

On October 27, 2004 (when the Red Sox won the World Series!), there was a lunar eclipse. Two friends at the game wondered how often lunar eclipses happen.

Jade said:
"Lunar eclipses must happen every month, when Earth is between the Sun and the Moon."

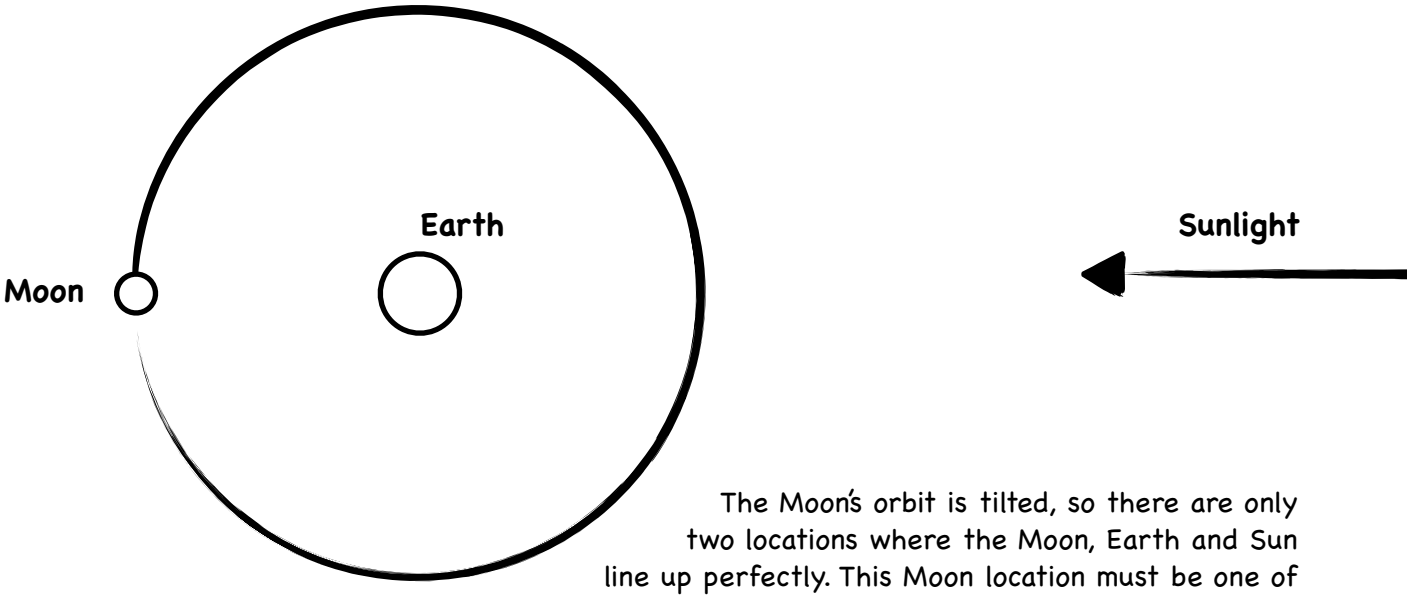
Ruby responded:
"I don't think lunar eclipses happen every month. Otherwise why would the news make a big deal out of this eclipse?"

Which friend do you agree with? Explain why.

a. I agree with **Ruby** , (< Jade / Ruby >)

because the Moon's orbit is tilted, so most of the time the Moon is above or below the Earth relative to the Sun, and Sunlight hitting the Moon does not get blocked by the Earth. Lunar Eclipses only happen when the Moon is at a location in its orbit where all three objects line up.

b. **Sketch and label** a diagram of the Sun, Earth, and Moon during a Lunar Eclipse. Include information in your diagram about the shape of the Moon's orbit, to help us understand your answer.



The Moon's orbit is tilted, so there are only two locations where the Moon, Earth and Sun line up perfectly. This Moon location must be one of the places where it is neither above nor below Earth, relative to the Sun. If the Moon is directly behind Earth from the perspective of the Sun, sunlight is blocked by the Earth and never reaches the Moon, and we have a Lunar Eclipse.