

PHASES OF THE MOON

Procedure:

- Each pair of students will receive seven Oreo cookies and Diagram A.
- Separate your cookies carefully, so one $\frac{1}{2}$ has all the frosting, and the other $\frac{1}{2}$ no frosting. Do not make a mistake. There will be NO replacement cookies! See *figure 1*:



Figure 1: Properly separated cookie.

- Use your plastic butter knife to scrape off the frosting from the first cookie making a shape with the frosting that resembles the cookie in *figure 2*:



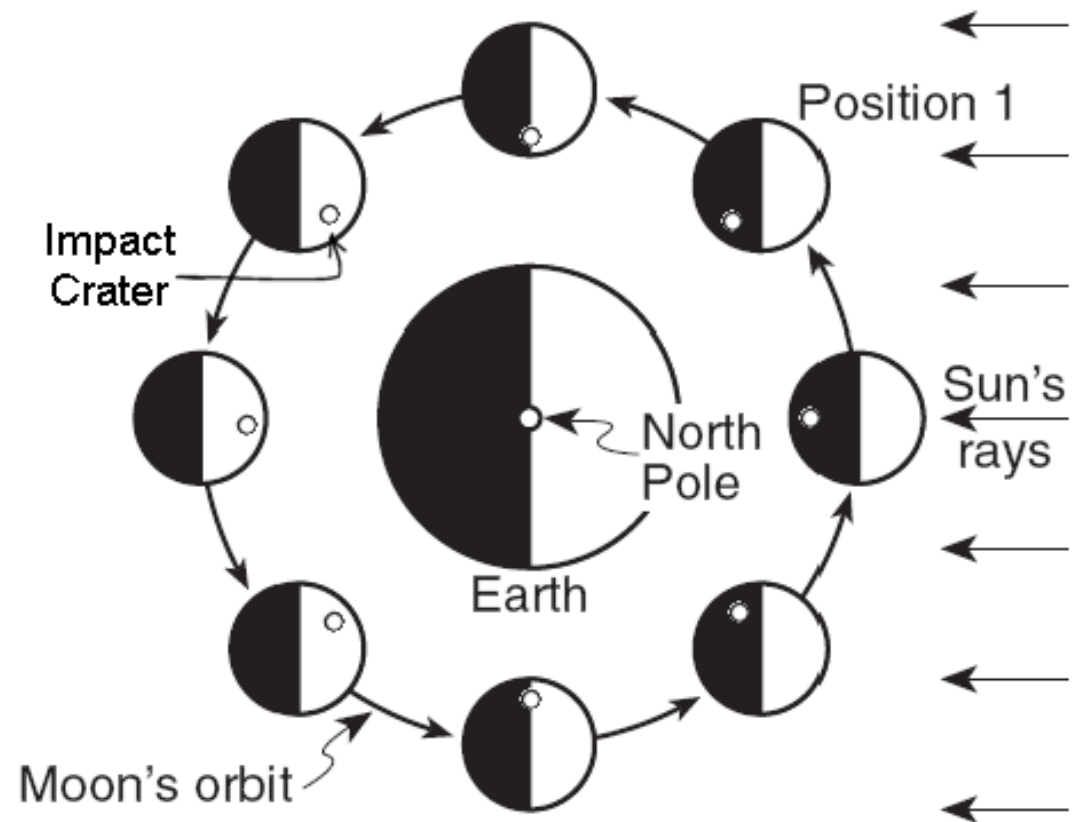
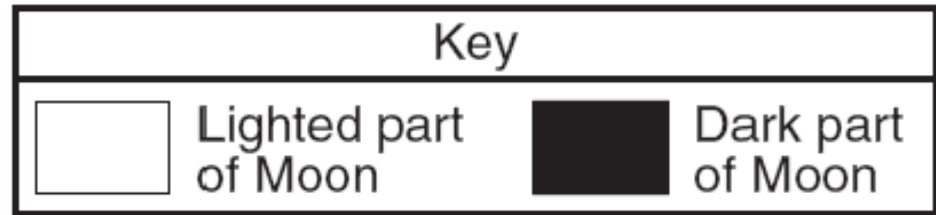
Figure 2: Oreo frosting scraped to represent a moon phase.

What is the name of this moon phase? _____

- d) Repeat step C with the other cookies scraping the frosting to the shape of the other 6 phases as seen by Earthlings. You will need to create waxing and waning phases.
- e) Diagram A represents the Moon in its orbit around the Earth, as viewed from the Earth's North Pole. *Position 1* on the diagram represents a certain location of the Moon in its orbit. On Diagram B, place the cookie moons you created in their proper locations starting from Position 1 and working counterclockwise according to the order on Diagram A.
- f) How will you represent the final phase, The New Moon?

DIAGRAM A –

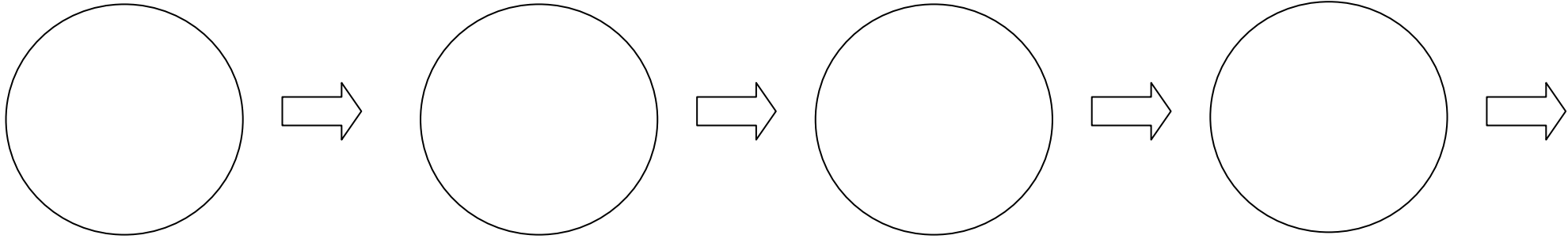
This diagram represents the Moon in its orbit around the Earth, as viewed from the Earth's North Pole. *Position 1* represents a certain location of the Moon in its orbit.



(Not drawn to scale)

DIAGRAM B – How Earthlings view the Moon (place your cookie moons here).

Position 1

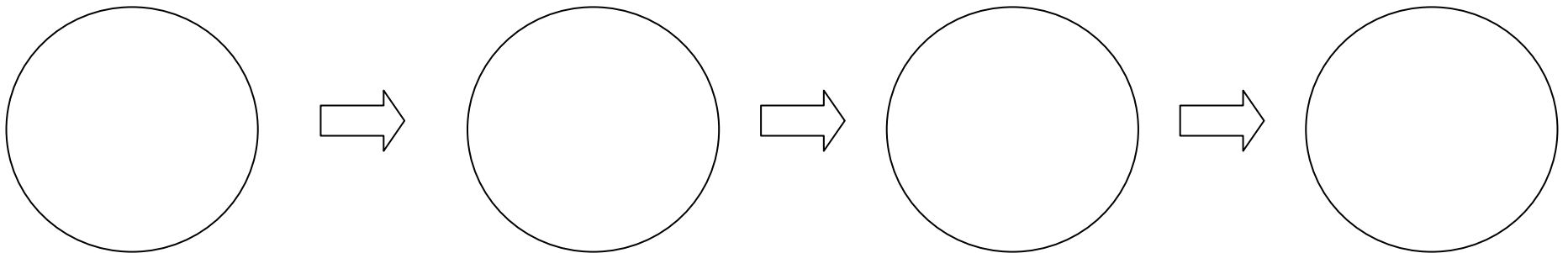


Position 1

Position 2

Position 3

Position 4



Position 5

Position 6

Position 7

Position 8

Follow-Up Questions:

1. On Diagram B, label each of the phases in order from position 1 to the final phase on Diagram A.
2. Describe the process that causes the moon to appear as these different phases to Earthlings.

3. How long is one cycle of phases? _____

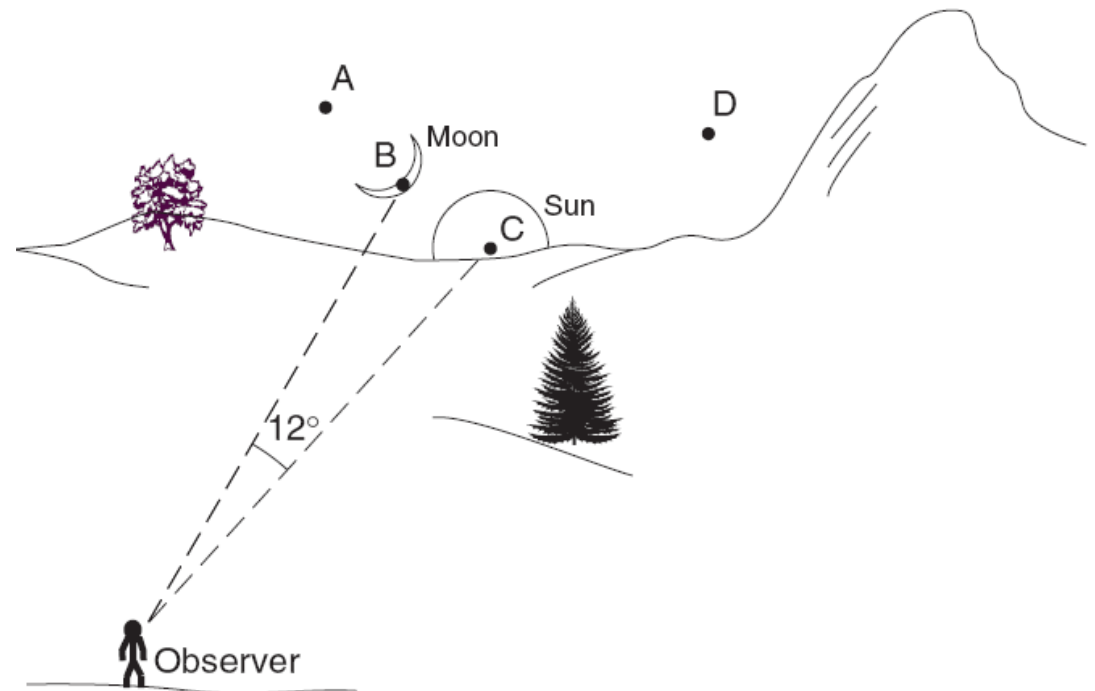
4. What is the average time (in days) between phases? _____

5. The small, white circle on each of the moons in Diagram A represents the impact crater "Tycho". Formed only 108mya it is one of the youngest craters on the moon. It was named after the famous astronomer Tycho Brahe. Explain why this crater is always facing the Earth.

6. What is the greatest number of full-Moon phases visible from Earth that are possible in the span of one year?

7. Referring to Diagram A, an observer on Earth would see a solar eclipse when the moon is at Position _____, Lunar eclipse position? _____.

8. This diagram shows the positions of the Moon and Sun at sunset during an evening in New York State. Points A, B, C, and D represent positions along the western horizon.



At which of the positions (A, B, C, D) will the Moon be located at sunset on the following evening?

Answer: _____

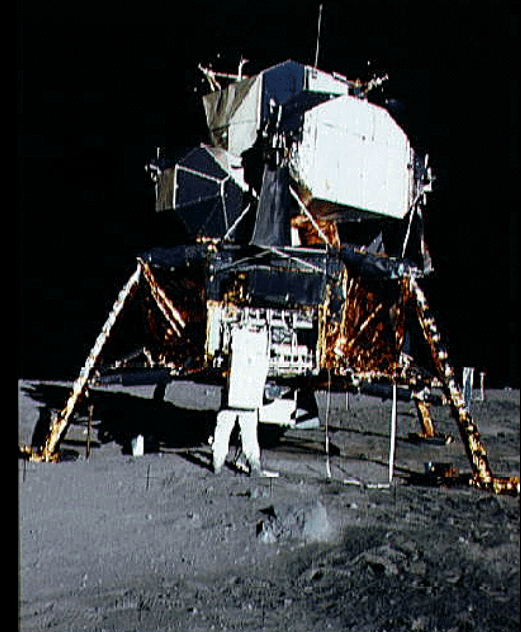
9. The images below show the vehicles that took astronauts to the moon and home safely. The Saturn V rocket launched the crew and equipment into earth orbit. The Service/Command Module took them to orbit around the moon and home again and the Lunar Excursion Module (LEM) took them to and from the Moon's surface re-docking with the Service/Command Module for their return ride home. There were six successful missions to the Moon's surface and back again.



The Saturn V



View of the Command Module orbiting the Moon



Astronaut standing on the Moon next to the LEM