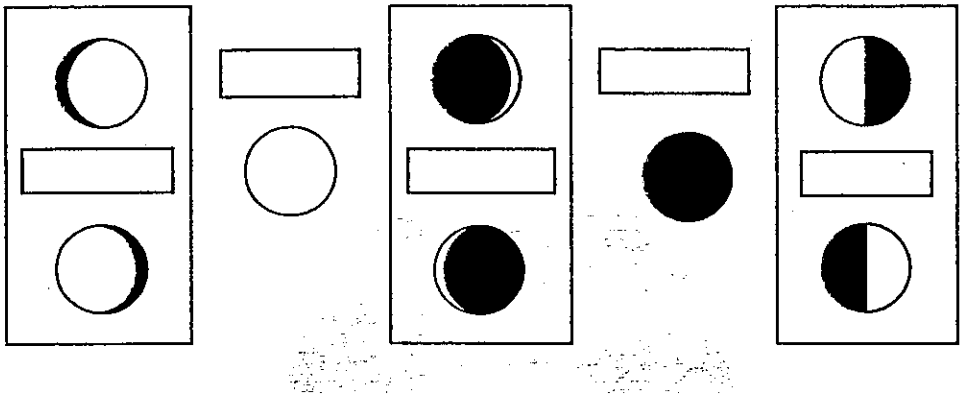
STUDENT NOTES — THE PHASES OF THE MOON

As your teacher explains the phases of the Moon, fill in the spaces in the diagram, below. This diagram will serve as your notes.



Note: These phases are not in the correct sequence.

Waxing:

Waning:

How to tell whether the Moon is in the first or third quarter:

First quarter =

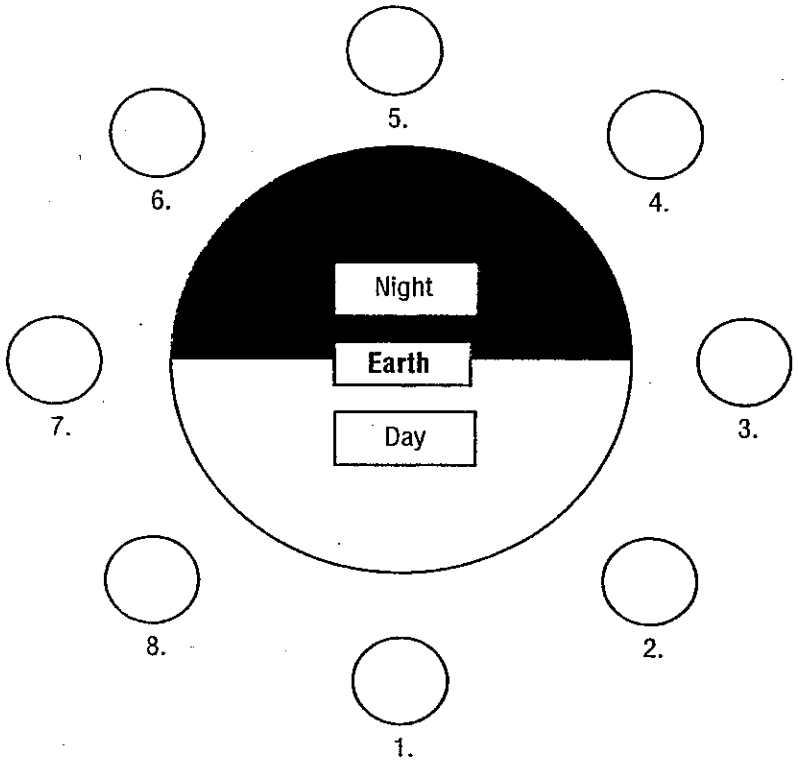
Third quarter =

ACTIVITY #2 WORKSHEET: THE PHASES OF THE MOON AND THE EARTH (continued)

Instructions for filling out this worksheet are on pages S9-S11.

Diagram 1

The Moon in Orbit As Viewed From Above



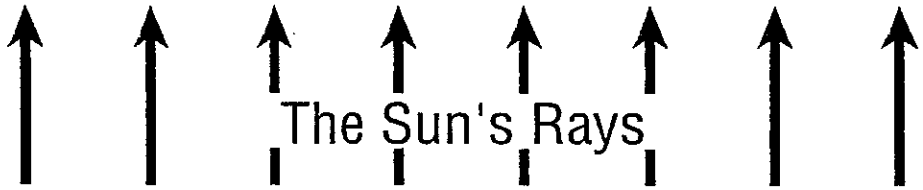
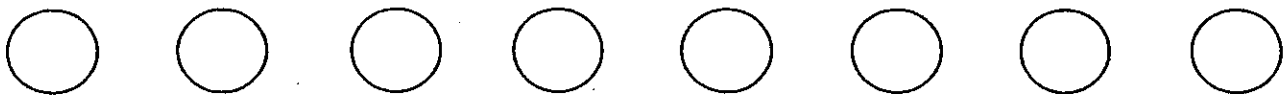


Diagram 2

The Moon Viewed From the Earth



1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____

Diagram 3

The Earth Viewed From the Moon

1. _____ 3. _____ 5. _____ 7. _____

STUDENT ACTIVITY #2 — THE PHASES OF THE MOON AND THE EARTH

Objective:

- To observe the phases of the Moon, and to observe the Moon and Earth from various perspectives.

Materials Needed:

"Orbit of the Moon" sheet
Sun model (yellow ball)
Earth model (blue and black ball)
Moon model (black and white ball)
3 caps
Your notes on the phases of the Moon

Procedure:

1. Place each model (Sun, Earth, and Moon) in a cap. This will keep the models from rolling around while you work with them.
2. Find the "Orbit of the Moon" sheet. Place the Sun model on the spot on the sheet labeled "Sun". Place the Earth model on the dot labeled "Earth." Make sure you place the Earth model so that the blue side, representing daylight, faces the Sun. Place the Moon model on top of position 1 on the sheet. Make sure you place the Moon model so that black side faces the Earth.
3. Keep the following rules in mind throughout this exploration:
   - The white side of the Moon should always face the Sun. In order to achieve this, you must not turn or rotate the Moon.
   - For a portion of this activity, you will be asked to observe the Moon from the perspective of an observer on Earth. As such, you will need to move out of your chair and crouch down to observe the Moon model at eye-level from the Earth's perspective, as shown in Figure 1. You will also need to move around the circle, to a point directly opposite the Moon model, as shown in Figure 2. For instance, when the Moon is at Position 1, you should observe it at eye-level from Position 5.; when the Moon is at Position 2, you should observe it from Position 6, and so on.
   - When identifying each phase of the Moon, be sure to note whether the Moon is waxing or waning, gibbous or crescent, full or new, or first or third quarter, as appropriate.

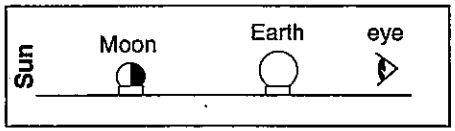


Figure 1

4. On Worksheet page S9, answer the questions for Position 1.
5. Without rotating the model, move the Moon counterclockwise from position 1 to position 2 along the Moon's orbital path, as shown in Figure 2. Answer the worksheet questions for Position 2.
6. Without rotating the model, move the Moon counterclockwise to the next position along the Moon's orbital path, as shown in Figure 2. Answer the worksheet questions for the next position.
7. Repeat step 6 for all of the remaining positions on the "Orbit of the Moon" sheet, until you have completed the entire orbit and are back at Position 1. Be sure to answer all the questions for each position and fill in the diagrams on the worksheet (page S12).

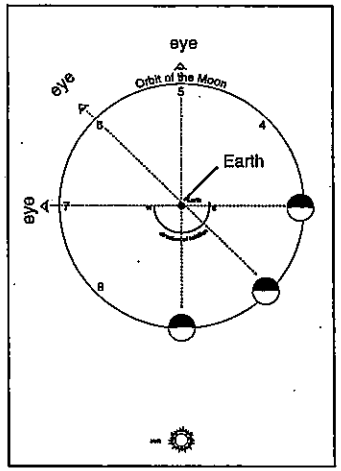


Figure 2

ACTIVITY #2 WORKSHEET: THE PHASES OF THE MOON AND THE EARTH

Name: _____

Date: _____

Class/Period: _____

Position 1

1. Locate Diagram 1 ("The Moon in orbit as viewed from above") on page S12. Use a pencil to fill in the circle at Position 1, so it shows how the Moon model appears at Position 1, when viewed from above.
2. Locate Diagram 2 ("The Moon as viewed from Earth") on page S12. Use a pencil to fill in the circle at Position 1, so it shows how the Moon model appears at Position 1, when viewed from the perspective of a person on Earth. On the line below the circle at Position 1, write the name of the phase of the Moon in this position.
3. Locate Diagram 3 ("The Earth as viewed from the Moon") on page S12. Use a pencil to fill in the circle at Position 1, so it shows how the Earth model appears at Position 1, when viewed from the perspective of a person on the Moon. On the line below the circle at Position 1, write the name of the phase of the Earth in this position.
4. What is the phase of the Moon in Position 1? _____
5. How many days will pass before this phase will be repeated? _____
6. The time period in question 5, above, is the length of a _____ month.

Position 2

7. Locate Diagram 1 ("The Moon in orbit as viewed from above") on page S12. Use a pencil to fill in the circle at Position 2, so it shows how the Moon model appears at Position 2, when viewed from above.
8. Locate Diagram 2 ("The Moon as viewed from Earth") on page S12. Use a pencil to fill in the circle at Position 2, so it shows how the Moon model appears at Position 2, when viewed from the perspective of a person on Earth. On the line below the circle at Position 2, write the name of the phase of the Moon in this position.
9. The term used to describe the Moon as the lit portion increases is _____ . The term used to describe the Moon as the lit portion decreases is _____.
10. At Position 2, which side of the Moon is lit — the left or the right? _____
11. What is the phase of the Moon in Position 2? _____

Position 3

12. Locate Diagram 1 ("The Moon in orbit as viewed from above") on page S12. Use a pencil to fill in the circle at Position 3, so it shows how the Moon model appears at Position 3, when viewed from above.
13. Locate Diagram 2 ("The Moon as viewed from Earth") on page S12. Use a pencil to fill in the circle at Position 3, so it shows how the Moon model appears at Position 3, when viewed from the perspective of a person on Earth. On the line below the circle at Position 3, write the name of the phase of the Moon in this position.
14. Locate Diagram 3 ("The Earth as viewed from the Moon") on page S12. Use a pencil to fill in the circle at Position 3, so it shows how the Earth model appears at Position 3, when viewed from the perspective of a person on the Moon. On the line below the circle at Position 3, write the name of the phase of the Earth in this position.
15. At Position 3, the Moon has now completed _____ percent of its orbit around the Earth.
16. In an actual lunar or synodic month, approximately how long does it take for the Moon to travel from position 1 to position 3? (HINT: How many days make up 25 percent of the a lunar cycle?)

    _____
17. What is the phase of the Moon in Position 3? _____

Position 4

18. Locate Diagram 1 ("The Moon in orbit as viewed from above") on page S12. Use a pencil to fill in the circle at Position 4, so it shows how the Moon model appears at Position 4, when viewed from above.

19. Locate Diagram 2 ("The Moon as viewed from Earth") on page S12. Use a pencil to fill in the circle at Position 4, so it shows how the Moon model appears at Position 4, when viewed from the perspective of a person on Earth. On the line below the circle at Position 4, write the name of the phase of the Moon in this position.

20. What is the phase of the Moon in Position 4? Be sure to note whether the Moon is waxing or waning.

    _____

Position 5

21. Locate Diagram 1 ("The Moon in orbit as viewed from above") on page S12. Use a pencil to fill in the circle at Position 5, so it shows how the Moon model appears at Position 5, when viewed from above.

22. Locate Diagram 2 ("The Moon as viewed from Earth") on page S12. Use a pencil to fill in the circle at Position 5, so it shows how the Moon model appears at Position 5, when viewed from the perspective of a person on Earth. On the line below the circle at Position 5, write the name of the phase of the Moon in this position.

23. Locate Diagram 3 ("The Earth as viewed from the Moon") on page S12. Use a pencil to fill in the circle at Position 5, so it shows how the Earth model appears at Position 5, when viewed from the perspective of a person on the Moon. On the line below the circle at Position 5, write the name of the phase of the Earth in this position.

24. The Moon has now completed _____ percent of its orbit around the Earth.

25. In an actual lunar or synodic month, approximately how long does it take for the Moon to travel from position 1 to position 5? _____

26. What is the phase of the Moon in Position 5? _____

Position 6

27. Locate Diagram 1 ("The Moon in orbit as viewed from above") on page S12. Use a pencil to fill in the circle at Position 6, so it shows how the Moon model appears at Position 6, when viewed from above.

28. Locate Diagram 2 ("The Moon as viewed from Earth") on page S12. Use a pencil to fill in the circle at Position 6, so it shows how the Moon model appears at Position 6, when viewed from the perspective of a person on Earth. On the line below the circle at Position 6, write the name of the phase of the Moon in this position.

29. As the Moon moves from Position 5 to Position 6, does the lit portion appear to increase or decrease?

    _____

30. What is the term used to describe your answer to question 29? _____

31. What is the phase of the Moon in Position 6? _____

(continued on next page)

Position 7

32. Locate Diagram 1 ("The Moon in orbit as viewed from above") on page S12. Use a pencil to fill in the circle at Position 7, so it shows how the Moon model appears at Position 7, when viewed from above.

33. Locate Diagram 2 ("The Moon as viewed from Earth") on page S12. Use a pencil to fill in the circle at Position 7, so it shows how the Moon model appears at Position 7, when viewed from the perspective of a person on Earth. On the line below the circle at Position 7, write the name of the phase of the Moon in this position.

34. Locate Diagram 3 ("The Earth as viewed from the Moon") on page S12. Use a pencil to fill in the circle at Position 7, so it shows how the Earth model appears at Position 7, when viewed from the perspective of a person on the Moon. On the line below the circle at Position 7, write the name of the phase of the Earth in this position.

35. The Moon has now completed _____ percent of its orbit around the Earth.

36. In an actual lunar or synodic month, approximately how long does it take for the Moon to travel from position 1 to position 7? _____

37. What is the phase of the Moon in Position 7? _____

Position 8

38. Locate Diagram 1 ("The Moon in orbit as viewed from above") on page S12. Use a pencil to fill in the circle at Position 8, so it shows how the Moon model appears at Position 8, when viewed from above.

39. Locate Diagram 2 ("The Moon as viewed from Earth") on page S12. Use a pencil to fill in the circle at Position 8, so it shows how the Moon model appears at Position 8, when viewed from the perspective of a person on Earth. On the line below the circle at Position 8, write the name of the phase of the Moon in this position.

40. What is the phase of the Moon in Position 8? _____

Position 1 (at completion of orbit)

41. What is the phase of the Moon when it has returned to Position 1? _____

42. From new moon back to new moon means that the Moon has completed one _____ month.

43. Explain why the Moon appears to go through a cycle of phases.