

Student Activity Sheet 2A Name _____

Modeling Revolution in the Sun-Earth-Moon System

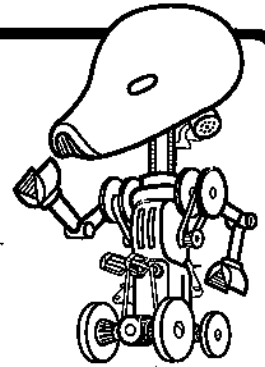
Date: _____

Team of Scientists:

A) _____ **B)** _____

C) _____

Equipment: 3 colors of modeling clay Newspaper



A. Think



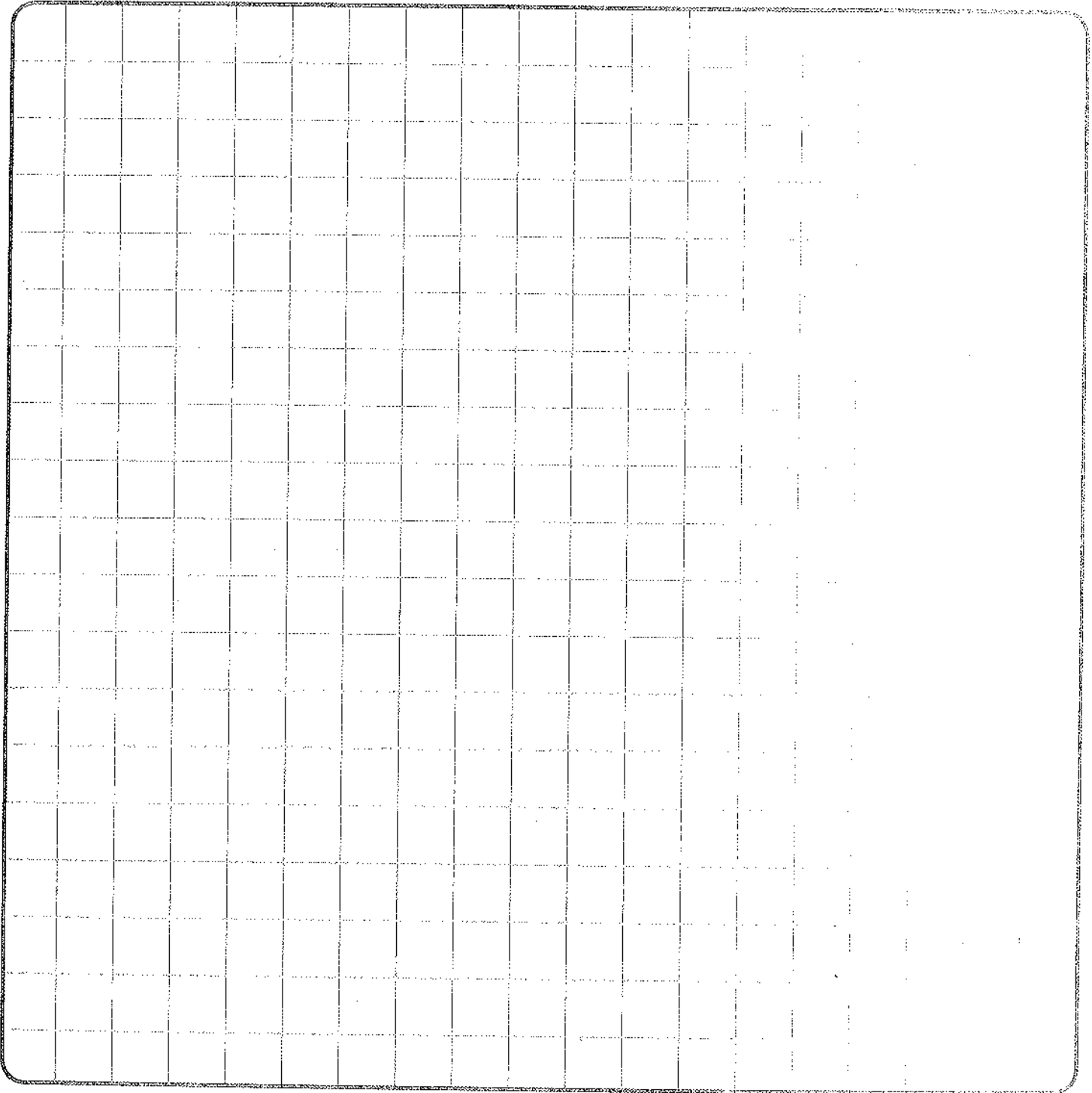
Earth

Moon

Look at the picture. Draw arrows to diagram the motion of the space objects shown. Describe the motion on the lines below.

B. Plan

1. Think about how you could use clay to make a three-dimensional model of the Sun-Earth-Moon system illustrated in Part A of this activity sheet. Your model should represent the shapes and relative sizes of the Sun, Earth, and Moon. (You do not have to represent the sizes of the space objects or the distances between them to scale.)
2. Decide how you will show the motion of the objects in their orbits. Then describe your design plan below in detail. Include a drawing with labels.

A large rectangular area filled with a grid of small squares, intended for drawing a design plan. The grid consists of 20 columns and 20 rows of squares. The lines are thin and light gray, and the grid is enclosed in a rounded rectangular border.

C. Model

Cover your desk with newspaper. Make your model. Use it to represent revolution in the Sun-Earth-Moon system by rolling the bodies along the paths that model their orbits.

D. Observe and Record

Observe carefully as you use your model. Write and draw what you observed. Label your drawing.

A large grid of graph paper with 20 columns and 20 rows, intended for drawing and recording observations.

E. Conclude

- 1.** Describe the shapes and relative sizes of your model space objects. _____

- 2.** How did you represent revolution in your model? _____

- 3.** How is your model like and unlike the real objects it represents? _____

- 4.** Why would it be hard for you to make your model to scale in terms of the sizes of the Sun, Earth, and Moon? _____

- 5.** Why might scientists find it useful to make a model of the Sun-Earth-Moon system? _____

- 6.** Write one question you have about the Sun-Earth-Moon system or the revolutions within it. _____

Student Activity Sheet 2B Name _____

Modeling the Seasons

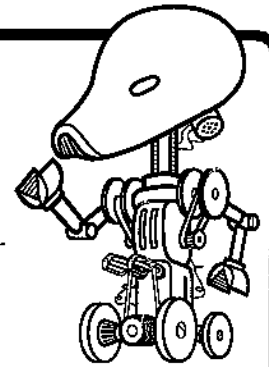
Date: _____

Team of Scientists: _____

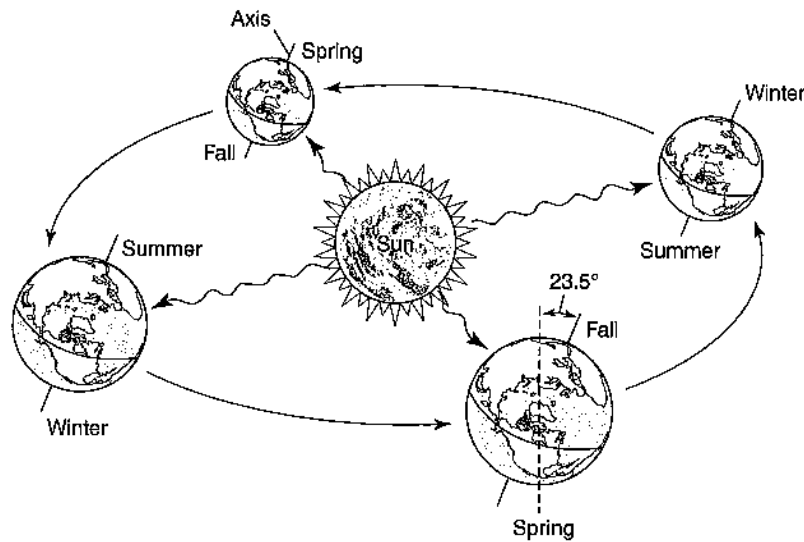
A) _____ **B)** _____

Equipment: 1 styrene sphere
2 rubber bands
2 toothpicks
1 set of colored pencils or markers

1 protractor
1 flashlight
1 globe



A. Think



Look at the picture above. Explain why the northern and southern halves of Earth experience different seasons at the same time. _____

B. Predict

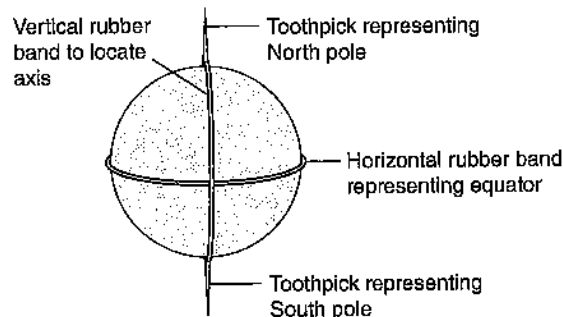
As you model the different seasons on Earth, what do you think will change or be different from what you see in the diagram in Part A?

I think _____

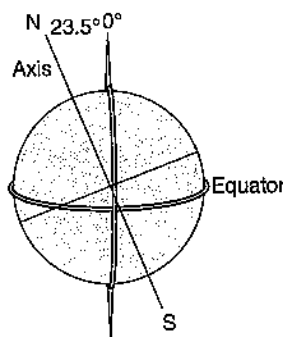
because _____

C. Model and Observe

1. Carefully stretch one rubber band horizontally around the middle of the sphere to represent Earth's equator.
2. Carefully stretch a second rubber band vertically around the middle of the sphere, perpendicular to the equator. Use this vertical rubber band as a guide to position the toothpicks to represent Earth's axis. Carefully push the toothpick partway into the sphere at about the locations of the North and South Poles, where the vertical rubber band is at the farthest points, top and bottom, from the horizontal rubber band. Nudge the vertical rubber band just slightly out of the way to insert the toothpicks.



3. Have one partner hold the model of Earth so that its axis is tilted at an angle of about 23.5° . Use a protractor to measure the angle.



4. To represent the Sun, have your partner stand several meters from the Earth model, turn on the flashlight, and shine it on the model Earth when the teacher darkens the room.
5. While Earth's axis remains tilted and one partner keeps the flashlight pointed at Earth, the other should move the model Earth in its orbit around the Sun. Model Earth's position during each of the four seasons, and observe what happens.
6. Switch roles and repeat Steps 3–5.

D. Observe and Record

Describe and draw what you observe. You may want to produce several drawings to show changes in your model of Earth's movement over time. Be sure to label your drawings.

A large grid for drawing and recording observations. The grid consists of 15 columns and 20 rows of small squares. The grid is intended for students to draw and record their observations of Earth's movement and seasons.

E. Conclude

1. Compare and contrast how you modeled winter and summer for the northern half of Earth.

2. What change did you observe in the light shining on Earth as you modeled the different seasons?

3. Was your prediction correct? Explain your answer.

4. What are two questions you have about the seasons?
