Extraordinary Journeys
Teacher Facilitation Notes

In General . . .

- Project the slide deck in edit mode–do not show it as a slideshow.
- Hide the speaker notes before projecting. (View/Show Speaker Notes)
- Hide the toolbar. (Click on the up arrow at the right end of the tool bar.)
- Call on students to read the various content shown on slides.
- For each investigation, assemble the needed materials for each group and place in a central location for ease of distribution.
- Duplicate copies of the data sheets for each student.

Materials Needed Per Group:

<u>Explore–Extraordinary Journeys</u>

Scissors	Paper fasteners	Crayons

<u>Elaborate</u>

Marble	Table Tennis ball	Sticky notes
Chenille sticks, 6	Tennis ball	

Other Materials

Student Recording Sheets	Sun-Earth-Moon Model Template
Student Quiz	Science notebooks, 1 per student
Card stock, white	Pencils

Engage: Round and Around We Go!

- Introduce the topic by asking the students to think about the two questions on the first topic slide.
- Go to the next slide and read the question: *What do you know about the relationships between the Sun, the Earth, and the Moon in space?*
- Allow time for students to discuss what they already know in their groups. Have students share. If desired, record their response on the board or using a document camera.
- Read and discuss the rest of the engage slides. If desired ask the following questions:
  - What does the Earth orbit?
  - What natural satellite orbits the Earth?
  - How long does it take the Earth to orbit the sun?
  - Why is one day added to the calendar every 4 years, resulting in Leap Year?
- Discuss as desired.

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Explore: Extraordinary Journeys

- Before beginning this lesson, duplicate a copy of the model template for each student.
- Read through the introductory slides with the students. Watch the video about the motion of the Earth and the Moon.
- Take the students to a large open area either outside or in the school. Call on three volunteers to stand in front of the class.
- Explain that Volunteer #1 is the Moon, Volunteer #2 is the Earth, and Volunteer #3 is the Sun.
- Encourage the three students to enact the movement of the Moon around the Earth and the Earth revolving around the sun. Make sure their motion is in a counter-clockwise direction. Assist as needed.
- Do this several more times with different volunteers;
- Return to the classroom and tell students that they are going to create a model they can use to show the relationships between the orbits of the Earth and the moon.
- Assist the students in creating their sun-Earth-moon model.
- Ask students to move the Moon counter-clockwise so that it revolves around the Earth. As it revolves, remind students that the Moon also revolves so that the same side (the lit side) is always facing the Earth. (The part they shaded darker represents the dark side of the moon. It is always facing away from the Earth.)
- Ask students to move the Earth counterclockwise so that it revolves around the sun. Remind students that it takes the Earth 365.25 days to orbit the sun.
- Have students work in pairs to manipulate their models so that the moon is revolving around the Earth as the Earth revolves around the sun.
- Remind students that this is a model of how the orbits of the Earth and the moon relate to each other and the Sun.
- Facilitate a class discussion using the following questions:
    - What is the Sun? The Earth? The Moon?
    - What is a model?
    - How is the model you made similar to the real orbits of the Earth and the Moon? How is it different?
    - How did the model help you understand the relationships between the orbits of the Earth and the Moon?

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Explain

- Call on volunteers to read each paragraph of the explanation slides.
- Emphasize the vocabulary terms as students read the passage.
- Watch the video.
- Discuss as desired.

Elaborate

- Read through and discuss the paragraph about models.
- Discuss the task and point out that groups may only use the given materials in constructing their 3-D models. Emphasize that the models must include labels using the sticky-notes.
- Allow time for groups to construct their models and for them to share with the class.
- Have students complete the activity by recording the requested information in their science notebooks.
- Discuss as desired.

Evaluate

- Guide students in completing the claim-evidence-reasoning graphic organizer. (If students are new to using this type of graphic organizer, use more direction or complete as a class. If students are familiar with this strategy, use less guidance.)
  - Call on a volunteer to read the question. Discuss the illustration based on what they learned during this lesson.
  - Remind students that the CLAIM is just the answer to the question. Have students record their answer in the CLAIM box. (Do not share or discuss at this time.)
  - The EVIDENCE is what students see in the illustration that leads them to the answer they gave. If needed, discuss what students see in the picture and what did they learn in this lesson. The simple answer here is that the Moon is on the dotted line and the dotted line goes around the Earth.
  - The REASONING is always more difficult for the students. The science behind this answer is that the Moon orbits the Earth once every 27 days.
- Let students complete the quiz independently.
- Discuss evaluation as desired.

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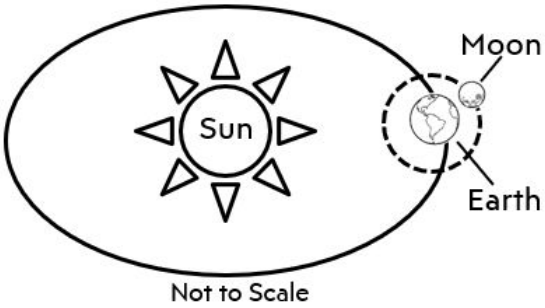
Name: KEY

Evaluation: Claim - Evidence - Reasoning

QUESTION:	**CLAIM**
A student drew this model of the Sun- Earth Moon system.  What does the dotted line in the diagram stand for?	**The dotted line stands for the Moon's orbit as it revolves around the Earth.**
EVIDENCE	**REASONING**
The moon is on the dotted line. The dotted line goes around the Earth in the illustration.	**The Earth orbits the Sun once every 365.25 days. As it revolves around the Sun, the Moon orbits the Earth once every 27 days.**

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Name: KEY

Evaluation

Directions: Place a "T" in front of each statement that is true. Place and "F" in front of each statement that is false.

1. T The moon orbits the Earth once every 27.3 days.
2. F The Earth revolves around the Moon once every 365.25 days.
3. F The Sun revolves around the Earth once every 365.25 days.
4. T The Sun is a star at the center of our Solar System.
5. T One orbit of the Earth around the Sun is a year.
6. F The orbit of the Earth is shorter than the Moon's orbit.
7. T The pull of gravity keeps the Earth and the Moon in their orbits.

Directions: Use your knowledge of science to answer the following questions. Be sure to use test-taking strategies you have learned.

8. One year equals one complete orbit of–

   F Earth around the sun
   G Earth around the moon
   H the moon around the sun
   J the moon around the Earth

9. Which of the following lasts about 1 month?

   A The Earth's orbit around the Sun.
   B The Moon's orbit around the Sun.
   C The Moon's orbit around the Earth.
   D The Earth's orbit around the Moon.

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Name: KEY

Evaluation

10. Another term for "Earth's Revolution" is–

F Earth's Rotation

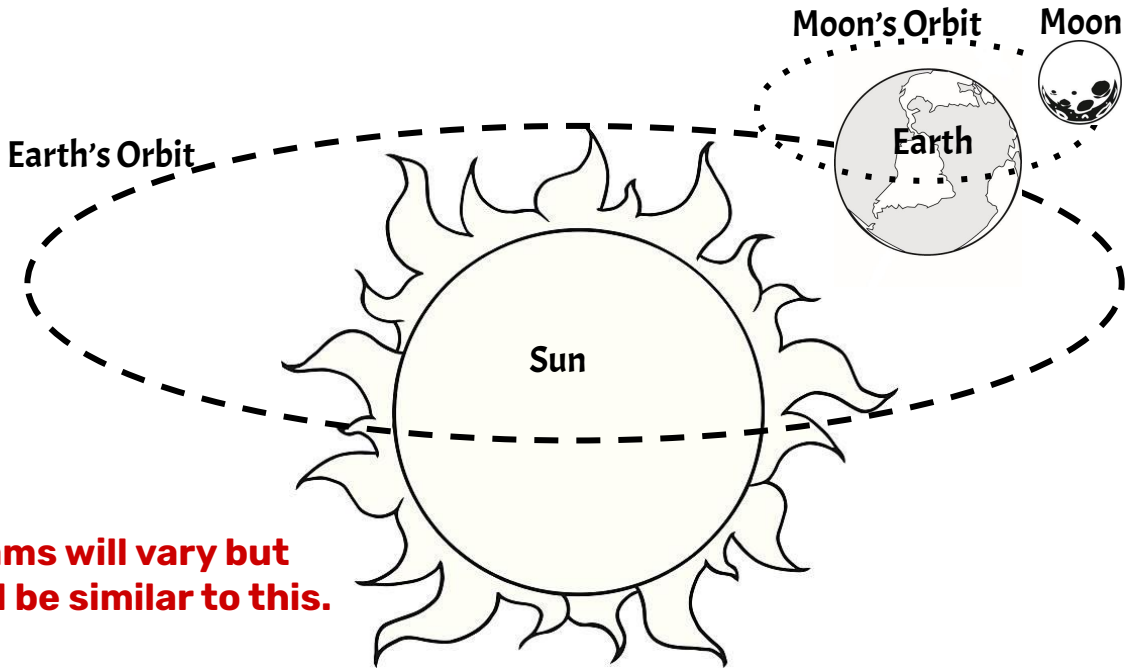
G Earth's Trip

H Earth's Journey

J Earth's Orbit

11. Draw a model that shows the relation of the orbits of the Earth, the Sun, and the Moon. Label your drawing and show the orbits of the Earth and the Moon.
As you draw your model, think about this:

- What is in the center of the Solar System?
- Which of the Sun, the Earth, and the Moon is biggest? Which is smallest?
- Is the Earth closer to the Moon or the Sun?
- Is the Moon closer to the Earth or the Sun?



Diagrams will vary but should be similar to this.

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Sun-Earth-Moon Model Template

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Name: _____

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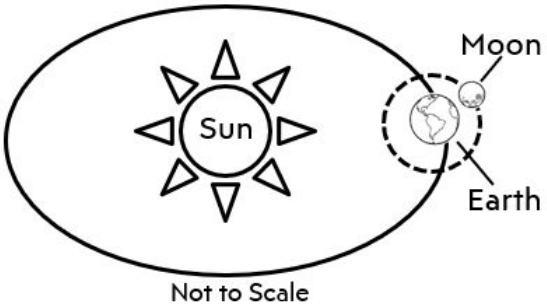
A student drew this model of the Sun- Earth Moon system.  What does the dotted line in the diagram stand for?	
EVIDENCE	**REASONING**

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Evaluation

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