Update the Moon Log

Update the class *Moon Log*.
Review Moon data

Moon diameter: 3,474 km

Moon distance: 384,000 km
Focus question

• What does an Earth/Moon scale model look like?
Scale model

- What will you need to consider to make a scale model?
Scale model

Notebook sheets 25–26, Calculating a Scaling Factor A and B

Calculating a Scaling Factor A

Regulation basketball hoops are 46 cm in diameter. Use this scale drawing of a regulation hoop and a regulation basketball to determine the diameter of a real basketball.

How much smaller is this drawing than a real basketball and hoop? To find out, you will need to determine what each centimeter in the drawing is equal to in reality. This number is the scaling factor.

Calculating a Scaling Factor B

1. Diagram. Draw a diagram showing two objects.
2. Label. Draw an arrow and use an uppercase letter to label the length of each object in the diagram. Use lowercase letters when you represent the real length of the two objects.
3. List. List the two uppercase and two lowercase letters and describe what each one represents.
   Example:
   \[ \text{B} = \text{size of basketball in diagram} \]
   \[ \text{H} = \text{size of hoop in diagram} \]
   \[ b = \text{size of real basketball} \]
   \[ h = \text{size of real hoop} \]
4. Ratio. Set up a ratio with corresponding letters lined up.
   Example:
   \[ \frac{H}{h} = \frac{B}{b} \]
5. Plug in. Put in numbers for the known lengths.

Planetary Science Course, 3.2: How Big/How Far?
Step 4
Construct an Earth/Moon model

• How big do you think the Moon would be, and how far away from Earth would it be?
Record Earth’s diameter

Earth’s diameter = 12,756 km
Earth/Moon model

Teacher master I, *Earth/Moon Model*

<table>
<thead>
<tr>
<th>EARTH/MOON MODEL</th>
<th>Teacher Master I</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Find the diameter of Earth and the Moon, and the distance between them in FOSS Science Resources.</td>
<td></td>
</tr>
<tr>
<td>Actual Earth diameter = km</td>
<td></td>
</tr>
<tr>
<td>Actual Moon diameter = km</td>
<td></td>
</tr>
<tr>
<td>Actual distance = km</td>
<td></td>
</tr>
<tr>
<td>2. Measure the globe diameter.</td>
<td></td>
</tr>
<tr>
<td>Model Earth diameter = cm</td>
<td></td>
</tr>
<tr>
<td>3. Ratio: 12 cm (model diameter) = 12,756 km (actual diameter)</td>
<td></td>
</tr>
<tr>
<td>4. What is each centimeter on the model equal to on Earth? Divide both sides of the equation by 12.</td>
<td></td>
</tr>
</tbody>
</table>
| \[
| \frac{12 \text{ cm}}{12} = \frac{12,756 \text{ km}}{12} \quad 1 \text{ cm} = \text{ km} |
| The scale of the model is _______ km/cm. |
| 5. Each 1 cm of the model is equal to 1,063 km in reality. Divide the diameter of the real Moon by 1,063 km/cm to find the diameter of the Moon model. |
| \[
| \frac{3,474 \text{ km}}{1,063 \text{ km/cm}} = \text{ cm} |
| 6. Calculate the Earth/Moon distance. The same scale applies, so we divide the distance from Earth to the Moon by 1,063 km/cm to determine the distance in our model. |
| \[
| \frac{384,000 \text{ km}}{1,063 \text{ km/cm}} = \text{ cm} |

*Planetary Science Course, 3.2: How Big/How Far?*

*Step 9*
Review the finished models

1. Are the Earth models all the same size?
2. Are the Moon models all about the same size?
3. Are the Moon models all located at about the same distance from the Earth models?
A new strategy

• What is the distance from Earth to the Moon in Earth diameters?
Earth/Moon comparison

Turn to “Earth/Moon Comparison” in FOSS Science Resources on page 134.
Review vocabulary

Spend a few minutes reviewing the vocabulary for this part. Update the vocabulary index and table of contents in your notebook.

- model
- scaling factor
Answer the focus question

- What does an Earth/Moon scale model look like?
Scaling Practice

Use the scaling factor for the Earth/Moon system that you calculated in class to solve these puzzles.

1. A regulation basketball is about 23 cm in diameter. If the basketball was a model Earth, what size sphere would make an appropriate Moon to accompany the basketball, and how far apart would the two balls be?

2. If you used the 23 cm basketball as your Moon sphere, how big would an Earth sphere be, and how far would it be from the basketball?

3. A student prepared an Earth/Moon model in which the two spheres were 100 m apart. What were the diameters of the spheres?
Review notebook entries

Cut a self-stick note into three pieces.

Take 3 minutes to look back through your notebook entries to find the three most important things you learned in this investigation.

Discuss your three key points in your group.
Answer the guiding question

• What are the characteristics of the Moon?