Planet Scale Model

Prep Time: 15 minutes	**Grades:** 5-8	**Lesson Time:** 60 mins

Essential Questions:

- How does Earth compare to the rest of the Solar System?

Objectives:

- SWBAT create a scale model of the planets' size.

Standards:

- MS-ESS1-3: Analyze and interpret data to determine scale properties of objects in the solar system.

Teacher Prep:

- Select the type of materials students should use to create their models. Some possible materials are:
  - fruits or other household items (beans, ping pong balls, soccer balls, etc.)
  - circles on paper
  - Papier Mache (will require overnight to dry)
  - clay
  - balloons
- Set out all needed materials.

Teacher Notes/Background:

- N/A

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Engage (5 minutes)	**What does a scale model mean?** Introduce the idea of scale. For example, if 1 ft = 1 in in a drawing, how big would a 10 ft room look? How tall would you look? Where have you seen scales before? Why might they be helpful?	**Materials:** N/A
Explore (5 minutes)	**Review Let's Launch! and planet diameters** Review the information from the video and complete the diameter chart for each of the planets. It is best to round to even numbers to make the scaling easier. Students can do this research online or you can set up research stations with the information around the room.	**Materials:** N/A
Explain (15 minutes)	**Creating a Scale for Your Model** Now, it's time to create the scale. You will do the first pieces together, then groups will complete the rest of the handout. There are many ways to do this. If you prefer to do another way, do that instead. Because Mercury is the smallest, set Mercury as 1. Now, we want to know how many times larger Venus is than Mercury. We can find this out by dividing the diameter of Venus by the diameter of Mercury. Round this number and put this number in the table. Once you feel the students are comfortable with this process, have them complete the rest of the table. Depending on the materials used, it is best to determine the size of the smallest (Mercury) and largest (Jupiter) first to ensure that the model for each does not get too small or too large. Once students have created their scale (i.e. 1 cm = 1000 km), they can create the rest of their model. For additional support, walk students through creating their scale, or have a check-in with their scale before they begin creating.	**Materials:** • Planet Scale Model handout • Calculators

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Elaborate (25 minutes)	**Create the Models** Students will now create their models. There is a lot of flexibility for doing this, based on the materials and time available. Some possible materials are: • fruits or other household items (beans, ping pong balls, soccer balls, etc.) • circles on paper • Paper Mache (will require overnight to dry) • clay • balloons These models can be displayed on poster board or hung from string from poster board. *Note – if you are completing the next lesson plan on scaling model of distance, have these displayed in a temporary way so that the models can be used in the next lesson.	**Materials:** • Will depend on materials chosen for creating model and displaying the model • Ruler, meter stick, tape measure (optional)

Evaluate (10 minutes)	**Presentation of Models** Students will be evaluated based on the completeness and accuracy for their solar system size models. Ask reflection questions, such as "do any of the size differences surprise you?" "Knowing what you do about the make-up of the planets, why do you think the outer planets are so much larger?"	**Materials:** N/A

Extensions and Enrichment:

- If students have learned about solving for X and rearranging equations, you can set up the scaling math as an equation – "the diameter of Mercury times what will give you the diameter of this planet, solve for X."

Additional Resources:

- **If the Moon Were Only 1 Pixel: Interactive**
  http://joshworth.com/dev/pixelspace/pixelspace_solarsystem.html
  This digital interactive shows all the planets to scale, as well as the distances between the planets. Users are guided through the solar system and can change the units used to measure dimeters.

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Directions: Complete the chart with each planet's diameter (rounded to the nearest thousand).

	Mercury	Venus	Earth	Mars
Diameter ***(Round to the nearest thousand km)***				
	Jupiter	**Saturn**	**Uranus**	**Neptune**
Diameter ***(Round to the nearest thousand km)***				

Create a scale: _____ km = _____ cm

	Mercury	Venus	Earth	Mars
Scaled Diameter				
	Jupiter	**Saturn**	**Uranus**	**Neptune**
Scaled Diameter				

Now, create your model! Be as precise as you can to ensure your model is as accurate as possible. Don't forget to put your scale on your model.