

Assignment Summary

For this assignment, you will conduct research to find the actual sizes of the Sun and the planets. Then, you will use an online solar system model calculator to determine the scaled sizes of these celestial bodies. Finally, you will use this information to create a scale model of the solar system.

Background Information

Models are representations of ideas, objects, phenomena, and even systems. A drawing of a tree is an example of a model because it represents a real tree. The tree cannot be drawn on paper in its actual size because it would not fit. When real objects are too big or too small, scales are used so objects can be properly modeled. A scale is the ratio of the size of a model to the size of the real object. For example, you want to draw a tree that is 1,500 mm tall. You could draw a tree that is 150 mm tall on paper. The drawing on the paper is ten times smaller than the real tree and is called a scale model.

Scale models can be smaller, as you have seen, or bigger than the objects or systems they represent. A scale model of the solar system that shows the relative sizes of the planets is smaller than the actual solar system. Scale models are helpful for comparing the parts of a system. They are also used to show the relationships between or among the parts of a system.

Materials

- Poster boards
- Construction paper (different colors)
- A pair of scissors
- A compass
- A ruler
- Glue or tape
- A pencil
- Marking pens

Assignment Instructions

For this project, you are expected to submit the following:

1. Your Student Guide with completed Student Worksheet
2. Your scale model of the solar system

Step 1: Prepare for the project.

- a) Read through the guide before you begin so you know the expectations for this project.
- b) If anything is not clear to you, be sure to ask your teacher.

Step 2: Conduct research on the actual sizes of the planets.

- a) Do research to find the actual sizes of the Sun and the planets. This information is typically represented as diameter in kilometers (km). Recall that diameter is the length of the imaginary straight line from one side of a figure, such as a sphere, to the opposite side of the figure. This line passes through the center of the figure.
- b) Record the actual diameters of the Sun and the planets in the first column of the table in the Student Worksheet.

Student Guide (continued)

- c) Copy the link of the website you used into the space provided in the Student Worksheet.

Step 3: Determine the scaled sizes of the planets.

- a) Go to a reliable website to find a solar system model calculator.
- b) Decide how big you want the Sun in your model to be. For example, you could assign your Sun to be 300 mm. Input this figure in the calculator, and the calculator will determine the diameters of the eight planets for you. You want to make sure that the Sun is big enough so that the smallest planet will still be big enough to draw.
- c) Record information from the calculator in the second column of the table in the Student Worksheet.
- d) Copy the link of the website you used into the space provided in the Student Worksheet.

Step 4: Create a scale model of the solar system.

- a) Draw and cut construction paper models of the Sun and the planets using the scaled measurements from the table.
- b) Glue the models on the poster board. You can glue or tape poster boards together if necessary. Be sure to put the Sun in the center and to put the planets and a drawing of their orbits in order from nearest to farthest from the Sun.

Note: Remember that in this model, the diameter of the planets is scaled but the distance of the planets from the Sun is not. That means your model does not accurately represent the distances of the planets from the Sun so you need not worry about these measurements.

- c) Label the Sun and the planets.
- d) Put an attention-catching title above or below your model.
- e) Write your name on the back of your poster board.

Step 5: Complete the Student Worksheet.

- a) Make sure the table in the Student Worksheet is complete.
- b) Answer the questions in the Student Worksheet.
- c) Check to make sure you added the sources you used for this project in the Student Worksheet.

Step 6: Evaluate your project using this checklist.

If you can check each of the following boxes, you are ready to submit your project.

- Did you conduct research to find the actual size of the Sun and the planets? Did you record this information in the table in the Student Worksheet?
- Did you use a solar system model calculator to determine the scaled size of the Sun and planets? Did you record this information in the Student Worksheet?
- Did you add the links of the websites you used for this project to the Student Worksheet?
- Did you use the scaled sizes to create models of the Sun and the planets?
- Did you put your model together in a way that represents the solar system (Sun in the center and planets in order from nearest to farthest from the Sun)?
- Did you label each component of your model?
- Did you add an attention-catching title above or below your model?

Student Guide (continued)

- Did you write your name on the back of your poster board?
- Did you complete the Student Worksheet at the end of this guide?

Step 7: Revise and submit your project.

- a)** If you were unable to check off all the requirements on the checklist, go back and make sure that your project is complete. Save your project before submitting it.
- b)** Turn in your scale model of the solar system to your teacher. Be sure that your name is on it.
- c)** Submit your Student Guide through the virtual classroom.
- d)** Congratulations! You have completed your project.

Student Guide (continued)

Student Worksheet

I. Complete the table as you do your research.

Table 1. Sun and Planet Size

Part of the Solar System	Actual Diameter (km)	Scaled Diameter (mm)
Sun		
Mercury		
Venus		
Earth		
Mars		
Jupiter		
Saturn		
Uranus		
Neptune		

II. Answer the following questions:

1. What is the biggest celestial body in the solar system?
2. Which is the biggest planet?
3. Which is the smallest planet?
4. List the celestial bodies from smallest to largest based on their actual size.

Student Guide (continued)

5. List the celestial bodies from smallest to largest based on your model. Is your list from #4 the same as your list here?

6. Does your model accurately show the relative sizes of the celestial bodies? If it does not, what would you do differently to make sure that your model shows the relative sizes of the planets accurately?

III. List your sources.

Actual planet sizes:

Solar system model calculator: