

## Modeling the Solar System

*You may have seen models and illustrations that compare the sizes of the planets, but do not accurately show their relative distances from the sun. In this lab, you will compare the sizes of the planets to their distances from the sun.*

**Problem** How can you model both the relative sizes and distances of the planets in the solar system?

### Materials

- calculator
- large sheet of unlined paper
- meter stick
- scale models of the sun and planets

**Skills** Calculating, Using Models

### Procedure

1. To model the relative sizes of the planets' orbits, convert the distances of the planets from the sun in astronomical units to kilometers, using Figure 3 on pages 792 and 793 of your textbook. Record these distances in scientific notation.

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2. Use the meter stick to draw a straight line down the entire length of the large sheet of unlined paper. Measure and record the length of this line in centimeters.

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3. Label one end of the line *sun* and the other end *Pluto*.
4. To calculate the scale of your model, divide the length of the line in centimeters by Pluto's average distance from the sun in kilometers.

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5. To determine Neptune's position, multiply Neptune's average distance from the sun by the scale of your model. Mark Neptune's position on the line in your model.
6. Repeat Step 5 for each of the remaining planets in the solar system.

7. Your teacher will provide a set of scale models of the sun and planets. Use a meter stick to measure and record the diameter of the model of Jupiter.

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8. To determine the scale of the planet models, divide the diameter of the model of Jupiter in centimeters by the actual diameter of Jupiter, which can be found in Figure 20 on page 811 of your textbook.

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9. To determine the size of the solar system at the scale of the planet models, multiply the actual distance from Pluto to the sun by the scale of the planet models. Convert the result from centimeters to meters and record this distance.

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### Analyze and Conclude

1. **Using Models** How big would a model of the solar system be at the scale of the planet models you used? Explain your answer.

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2. **Analyzing Data** What difficulty would you have including the relative sizes of the planets on the paper model you made in Steps 1 through 6?

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3. **Drawing Conclusions** Explain why it is difficult to model the sizes and distances of the planets at the same scale.

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