Amaze Your Brain *at Home!*

ACTIVITY

ALL AGES

SCALING THE SOLAR SYSTEM

Space is expansive and the objects in space are as massive and as far as you can imagine. How can we study the dimensions of the solar system? We create a representation of the solar system by scaling these massive astronomical bodies down to common, everyday objects. This is called a model, a three-dimensional representation of something often on a smaller scale. Scientists use models to represent ideas, objects, or even a process or system to describe and explain phenomena that cannot be experienced directly. Models are central to conducting research and communicating scientific explanations.

WARNINGS

Activity must be done with an adult in an area away from oncoming traffic.
Activity also involves light exercise.

Planets	**Actual diameter (km)**	**Representing Objects (Scale: x1.5E-10)**	**Actual distance from the Sun (rounded to the nearest km)**	**Distance from the Sun (Scale: x1.5E-10)**
Sun	1.3927 million km	Bowling (or any ball) (23 cm diameter)	0	0
Mercury	4,878 km	Pin head (on index card) (0.08 cm diameter)	58 million km	8.7 m
Venus	12,104 km	Peppercorn (0.20 cm diameter)	108 milion km	16.2 m
Earth	12,755 km	Peppercorn (0.20 cm diameter)	150 million km	22.5 m
Mars	6,790 km	Pin head (on index card) (0.08 cm diameter)	228 million km	34.2 m
Jupiter	142,796 km	Chestnut or a quarter (2.40 cm diameter)	778 million km	116.7 m
Saturn	120,660 km	Hazelnut or a nickel (2.00 cm diameter)	1,429 million km	214.35 m
Uranus	51,118 km	Peanut or coffee bean (0.90 cm diameter)	2,875 million km	431.25 m
Neptune	49,528 km	Peanut or coffee bean (0.90 cm diameter)	4,504 million km	675.6 m

CONTINUED ON NEXT PAGE

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ACTIVITY

ALL AGES

SCALING THE SOLAR SYSTEM (CONT.)

MATERIALS

- Large outdoor space
- Measuring tape
- Collect objects to represent the Sun and planets in our Solar System according to scale (metric) on previous page.

INSTRUCTIONS

1. Begin by placing the objects in the correct order starting with the Sun. Make a hypothesis! How much space do we really need to make this Solar System model?
2. Place the Sun down carefully to prevent the object from rolling away.
3. Before moving on, make another hypothesis. In our model, how far do you think the first planet should be placed from the Sun?
4. Using the scale above, place down the first object that represents Mercury.
5. Before placing the rest of the other planets, try hypothesizing their distances from the Sun.
6. Using the scale above, begin to place the rest of the other planets. (Note: Distance walking may be required)

ADDITIONAL INVESTIGATIONS

1. What were the initial guesses for the distance between the planets and the Sun? Were they too close? Were they too far apart?
2. Why do planets look so small when we view them with a telescope?
3. Why is it so difficult for us to get to Mars? Consider fuel and time.
4. What would happen if we model our solar system using a bigger scale? What objects would you use to represent the Sun and planets? What would the distances look like?
5. Using the scale above (Actual x 1.5E-10), how far would Pluto be from the sun? What about the nearest star, Alpha Centauri?