Activity 10: The Scale of the Solar System

Question: *How big is the solar system? In relations to each other, how big are the celestial bodies that make up the solar system?*

Materials

- 9 small peppercorns (about 2.5 mm across) (These are not essential- even SmartiesTM would do as markers!)
- measuring tape
- 9 pieces of paper
- an 8.6 metre path on the floor or ground outdoors

Instructions

1. Clear a straight path indoors that is 8.6 m long - that might be more than twice the length of your bedroom! If you do not have that much space inside, go outdoors to do this activity. On your path, think of each centimetre representing approximately 7 million kilometres in space. (That's 12,000 round trips between Edmonton and Calgary in each centimeter.)

2. Label the 9 small pieces of paper as the Sun and each of the planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune).

3. Place one peppercorn at one end of the path, and label it Sun.

4. Measure 8 cm and place the second peppercorn. Place the label for Mercury next to it —it is the planet closest to the sun. (If you were making a scale model of the solar system, it would not be the same size as the peppercorn sun, but it would be practically invisible to the naked eye: 0.005 mm across!)

5. Return to the Sun and measure 15.7 cm along the path. Place the third peppercorn and label it Venus.

6. Measure 21.8 cm out from the Sun, and place the next peppercorn. This is Planet Earth-Home Sweet Home!

7. The next planet is Mars, and it should be placed 33.3 cm from the Sun.

8. Return to the Sun and measure 1.1 m before placing the next peppercorn. Label this planet Jupiter. (This is the largest planet, but if the Sun were the size of a peppercorn, it would still be smaller than a grain of table salt.)

9. The next peppercorn represents Saturn, which will be 2.1 m from the Sun.

10. Measure 4.2 m from the Sun before placing the next peppercorn, which is Uranus.

11. The last planet in our solar system is Neptune. Measure 6.6 m from the Sun, and place your final peppercorn and planet label there.

12. Stand next to the Neptune peppercorn and look at the Sun.

13. As you place each of the Sun and planets on the floor or ground, make a drawing of the solar system or take a picture after you have finished placing all your "planets". Be sure that you draw the planets and Sun in their relative sizes.

You may take a digital photo, or print your image and attach it or draw it in the space provided below.

The Scale of the Solar System Image

Activity 10: The Scale of the Solar System Extra Help

Question: Do you want to get a better sense of how small the planets are compared with the Sun?

Materials

- 1 grapefruit
- 2 grains of table salt
- 2 grains of sea salt
- 10.7 metres of space in at least one direction

Instructions

1. Try using a grapefruit (about 10 cm in diameter) as the Sun. If the planets were to be proportionally sized and spaced in this model,

- Mercury (the planet closest to the Sun) would be a grain of table salt 4.2 m away-and you would not be able to find it on your path!

- Venus would be about the size of a grain of sea salt 7.9 m away from the Sun.

- Earth would be about the size of a rough grain of sea salt 10.9 m away from the Sun.

- Neptune would be more than 431.6 m away from a grapefruit-size Sun.

2. If you need further description on how large the solar system is, go to the *Astronomy for Kids* website that takes you on a walk through the solar system.