How Big is the Sun? – Teacher Sheet

Part 1 – Relative Sizes of Sun and Earth

Materials List:

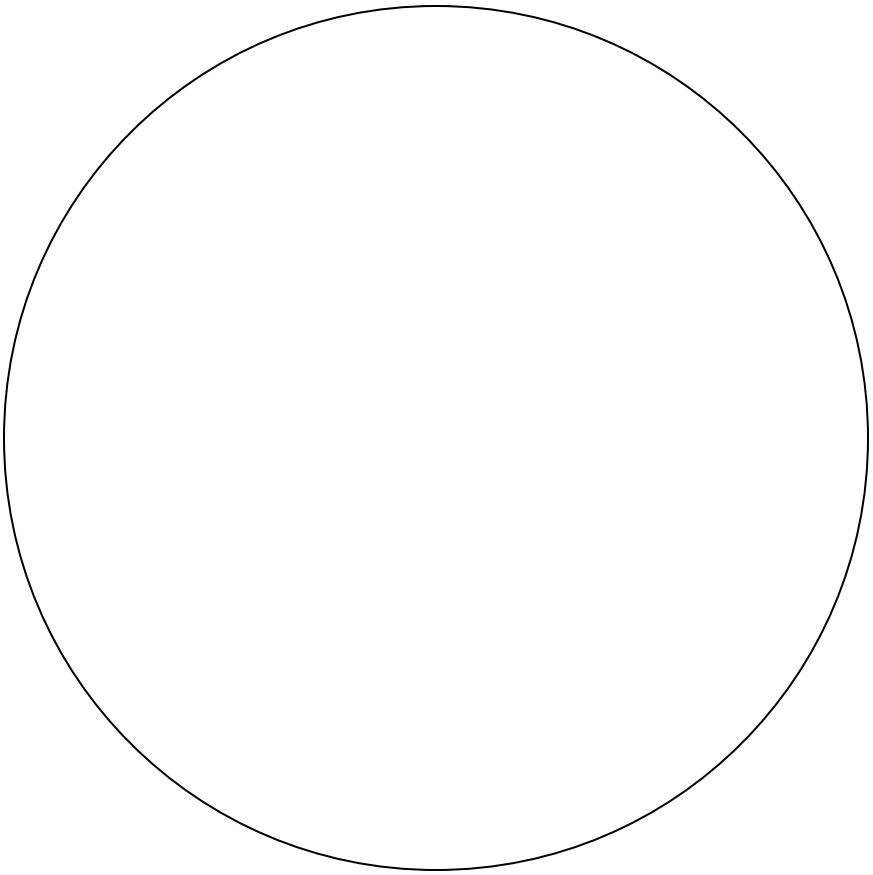
- Variety of balls/spheres (see below)
- Metric rulers and meter sticks
- Calculators

Begin your class discussion with a collection of spheres, the more the better. Choices should include as wide a variety as you can find. Check with a Physical Education teacher who may have some large exercise balls. Your largest ball should be at least as large as a beach ball, but bigger is better. Also include as many of these as possible, as well as others: basketball, baseball, volleyball, softball, golf ball, tennis ball, bouncy ball, marble and possibly even gumballs and other small round candies like Gobstoppers.

Display the spheres in a way that the students can see all their choices. The goal is to select two balls that will accurately model the true sizes of the Earth and the Sun. Give the students time to discuss and hypothesize their answers as well as fill in the chart.

Before class, you'll need to calculate the correct answer or answers, for your class. To determine the correct combination for your particular spheres, measure the diameter of your largest sphere. This will be your sun. Take its diameter and divide by 109. That is the number of times that the sun's diameter is greater than Earth's diameter. Hopefully you'll have a smaller sphere that fits close to that number. To give you a sense of how different the sizes are, if you use a normal classroom globe of the Earth, it likely has a diameter of 1 foot (30.5cm). If you imagine the globe as the Sun, your Earth would be a bit less than 1/8 inch (0.3cm).

If you do not have access to a variety of different spheres but do have a globe, you could simply start the discussion using the Earth globe as the Sun. Covering the globe with a plastic bag or labeling it "Sun" with an index card will help to avoid confusion between Earth and Sun. Have the students discuss the accurate size of the Earth. If your globe is 1 foot in diameter, which seems to be the standard size, the Earth can be represented by a bb pellet or a ball bearing roughly 1/8 inch in diameter.



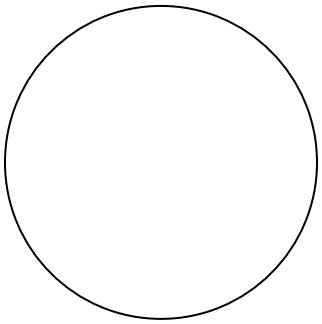
←Sun

Earth →

Analysis:

5) Roughly 1 million Earths would fit inside the sun

7a) Scan through your textbook and locate pages ahead of time. Also, you may have a traditional solar system model with inaccurate scales, such as the one below.



←Earth Moon→

Bonus Calculation: The Moon's diameter is roughly 27% that of Earth.

Part 2 – Demonstration of Relative Distance between Sun and Earth

Once the students know how much bigger the Sun is than the Earth, it is especially important for them to realize how far away from the Earth we are. There are two ways to approach this based on part 1.

1. You can take a typical classroom globe, which is likely 1 foot (30.5cm) in diameter. This will represent the Sun. To avoid confusion, label the globe as "Sun" with an index card, or cover it in a yellow plastic grocery bag. Ask the students how far away the Earth would need to be at this scale for the solar system to be accurate. To represent the Earth, you'll need a bb or similarly-sized object. Begin walking away from the Sun and ask students to call out or raise their hands when the Earth has reached its correct distance. You can even hum the Jeopardy tune as you go….You will need to go 107 feet, (32.6 m). Needless to say, you'll need to head out into the hall or even outside to get the correct distance. Bring a rollup measuring tape or mark the distance in the hall ahead of time. As an extension, you could ask how far to Jupiter, Pluto, the nearest star, etc.

2. If you want to be consistent with your class activity in part 1, you'll need to do some more calculating ahead of time. Take your sun sphere diameter from part 1 and multiply by 107. This will give you your distance to the Earth. For relative distances to other solar system objects, see the activity that follows this one in the unit.