Hole Punch Earth

Create a scale model of the earth and sun using a hole-punch as the Earth! Thanks to Coral Clark and Lori Lambertson, who shared this idea with me.

Materials: (per pair)
• a hole punch circle (what you normally throw away when you use a hole punch)
• metric ruler or meter stick
• large square of butcher paper (about 1 meter x 1 meter)
• 1 pair of scissors
• about 50 cm string
• 2 pencils
• calculator

To Do and Notice:
Provide students with the following information:

> **Jupiter's Diameter = 10 times the Earth's Diameter**
>
> **Sun's Diameter = 10 times Jupiter's Diameter = 100 times Earth's Diameter**
>
> **Sun's Distance from the Earth = 100 Sun diameters = 1000 Jupiter Diameters**

• Give each pair of students a tiny hole-punch disk, explaining that it will represent the size of the planet earth. **Students should measure the diameter of the hole-punch using a ruler.** Next, they multiply this diameter by 10 and to get the diameter of a scaled-down model of Jupiter. Lastly, they multiply the diameter of the hole-punch by 100 and you get the diameter of a scale model Sun.

• Now that students have the diameters of a model Jupiter and the Sun, they should draw circles representing the size of Jupiter and of the Sun on pieces of butcher paper and cut out their models with the scissors.

• Using the paper models of the Earth and Sun – go outside the separate the model of the Earth and Sun so that the distance between them equals 100 times the diameter of the paper representing the Sun. Are they surprised by this distance?

What's Going On?
The sun is much larger and farther away than most people realize. The sun is about 100 earth diameters across and about 100 sun diameters away from earth. If the hole punch "earth" is .7 cm in diameter, then the correctly scaled sun should be about 70 cm in diameter. The correct distance for this earth/sun model should be about 70 meters!

Earth's Diameter:
12,756 kilometer

Sun's Diameter:
1,392,000 kilometer

Earth - Sun Distance
149,600,000 kilometer

SCALE MODEL OF THE SOLAR SYSTEM
The distance to the nine planets compared to the diameter of the sun.

Mercury = 43 solar diameters

Venus = 79 solar diameters

Earth = 110 solar diameters

Mars = 167 solar diameters

Jupiter = 572 solar diameters

Saturn = 1048 solar diameters

Uranus = 2111 solar diameters

Neptune = 3300 solar diameters

Pluto = 4348 solar diameters

Proxima Centauri (nearest star to sun) = 29,780,000 solar diameters
*(If the sun were a 1 inch marble, then this star would be
about 470 miles away.)*

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SIZE OF THE PLANETS IN OUR SOLAR SYSTEM
The size of the nine planets compared to the diameter of the sun.

If the Sun were the size of a 9-foot sphere . . . then

Mercury = 2/5th inch

Venus = 9/10th inch

Earth = 1 inch

Mars = 1/2 inches

Jupiter = 11 inches

Saturn = 9 1/2 inches

Uranus = 4 inches

Neptune = 4 inches

Pluto = 1/5th inch