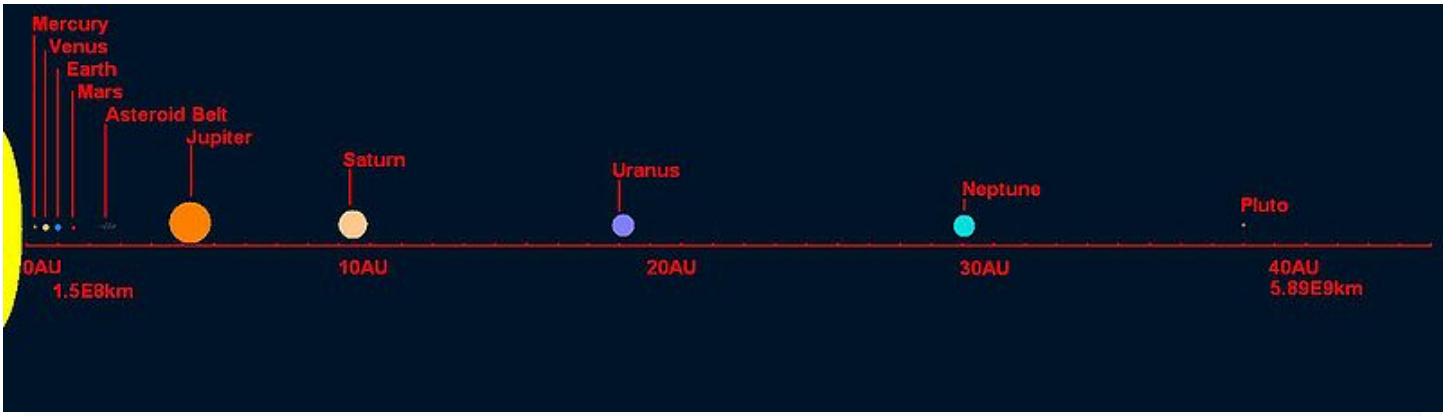
Name: _____ Period: _____ Date: _____

The Planets of Our Solar System Laboratory Activity – Student Edition

Solar System Bead

Background Information:

Our solar system consists of the sun, the planets and their moons, and other celestial bodies like comets, asteroids, and meteoroids. It is a star system that is immense in size and is held together by a strong gravitational force. Given that the solar system is huge in size, it is just right to assume that planets are far apart from one another and are also distant from the sun, otherwise, they will get sucked up by its strong gravitational force. These distances are difficult to express in standard units of measurements such as kilometers or miles simply because they can get very large. Hence, scientists use **astronomical units (AU)** when measuring distances in the solar system. One astronomical unit is interpreted as the distance of Earth from the sun. This unit provides an easy way to calculate the distances of the other planets from the sun and build a scale model with the correct relative distances.



This image shows the relative distances between planets in our solar system. The sun and planets are not on the same scale, but are approximately scaled by size ratio. The diameters of the planets and the distance between planets are not on the same scale either due to size constraints.
Image source: Solar system distances by Aeddub_commonswiki is licensed under CC 3.0 via Wikimedia Commons.

In this laboratory activity, you will make a scale model of a solar system using arts and crafts materials such as strings and beads. Making a scale model of the solar system is easy if you remember to use each planet's distance from the sun measured in AU and convert this measured distance to centimeters through simple calculations.

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Learning Objectives:

At the end of this laboratory activity, students are expected to:

- Convert measured distances in AU to centimeters using a scale factor.
- Construct a scale model of the solar system.
- Observe the relative distances of the planets, asteroid belt, and dwarf planet Pluto from each other and the sun.

Pre-lab Questions:

1. List down the planets in the solar system starting from the **nearest to farthest** from the sun.

   _____

   _____

2. How are inner and outer planets different?

   _____

   _____

3. Describe asteroid belt and Kuiper belt.

   _____

   _____

Laboratory Proper:

Materials:

- Large craft pony beads (11 different colors — roughly approximating the appearance of the planets and the sun)
- Five meters of string
- Small piece of cardboard to wrap solar system string (around 10 cm x 10 cm)
- Ruler with centimeter markings

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Procedure:

1. Calculate the scale value for each solar system object using a scale factor of 10 centimeters per astronomical unit (AU).

Solar System Object	AU	Scale Value (centimeters)	Bead Color
Sun	0.0		yellow
Mercury	0.4		solid red
Venus	0.7		cream
Earth	1.0		clear blue
Mars	1.5		clear red
Asteroid belt	2.8		black
Jupiter	5.2		orange
Saturn	9.6		clear gold
Uranus	19.2		dark blue
Neptune	30.0		light blue
Pluto	39.5		brown

2. Measure and cut a piece of string 4.5 meters long.
3. Using the calculated centimeter distance, tie the bead onto the string using a double knot.
4. When finished, wrap the solar system string (with beads) around the cardboard holder.

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Post-lab Questions:

1. How will you describe the distances of the solar system objects from the sun?

   _____
   _____

2. Why do you think outer planets are hugely spaced out from one another?

   _____
   _____

3. What do you think will happen if planets are closer to one another?

   _____
   _____