

ASTRONOMY 1010 – End of Semester Project

Building a True Scale Model of the Solar System

Start by facing the solar system model in the display case opposite Room 215 in Bruner Hall

Commercial models, such as this, give a very misleading picture of the relative sizes and distances of objects in our solar system. To get a better feel for the true scale of the solar system, the ASTR 1010 class has constructed such a model, using the Sun in this commercial model to set the scale. On this scale, all of the solar system, apart from the Oort cloud (see below), will only just fit on the TTU campus!



Sun

In this model the Sun you see in the display case in front of you is about 14 cm (~6 in) in diameter. Before going on to some of the more familiar objects, read about the Oort cloud while you are still at the starting point.

Oort Cloud

This cloud is thought to be a spherical distribution of icy asteroids stretching almost halfway to the next star. On the scale of the Sun in the case, its extent is so great we can't fit it on campus, let alone Cookeville, or even Tennessee. In fact it's represented on a map in the display case next to the Sun in Bruner Hall and stretches out to almost a thousand miles, even on our scale model.

Now let's turn our attention to the inner planets.

All of these are located somewhere in the same hallway as the Sun. See if you can find them.

Mercury (Scale size = 0.5 mm, Scale Distance = 5.6 m)

Mercury is the closest planet to the Sun, yet on this scale it is already about 19 ft away! You can find a tiny bead representing Mercury on the wall along the hallway to your left.

Venus (Scale size = 1.2 mm, Scale Distance = 10.9 m)

Venus is the hottest planet (>800°F on surface) due to a runaway greenhouse effect. You can find it on the wall a little beyond Mercury.

Earth (Scale size = 1.2 mm, Scale Distance = 15 m)

In terms of size Earth and Venus are 'sisters'. However, Earth's distance from the Sun allows water to exist in liquid form, which makes a big difference! On this scale the Moon is a 0.3 mm dot about 3.8 cm from the Earth. To find the Earth and Moon in our model, walk back past the Sun. They are on a Math Dept. notice board past the main entrance to the building.

Mars (Scale size = 0.6 mm, Scale Distance = 23 m)

Mars is only about half the size of the Earth. This smaller size, and increased distance from the Sun mean it has a much thinner atmosphere and is significantly colder than the Earth. Nevertheless there is strong evidence there was once liquid water on its surface. To find Mars in our model, keep going past the Earth and look on the wall close to Room 235 B.

Ceres (Scale size = 0.1 mm, Scale Distance = 40 m)

The largest of the asteroids, Ceres is now classified as a dwarf planet but on our scale it would still be less than 0.1 mm in diameter. In our model it is just in Bruner Hall on the window at the east end of the hallway.

Asteroid Belt, (Scale sizes less than 0.1 mm, Scale Distance = 30 m to 45 m)

Thousands of small rocks between the orbits of Mars and Jupiter. They would stretch from the within Bruner Hall well into the Volpe Library. In our model the belt is represented by some grains of sand next to the entrance at the east end of the building. (Go downstairs from Ceres.) Though many think of the Asteroid Belt as being full of tiny rocks, in reality they are an average of a million miles apart, so the sand grains should really be spread all around the Sun at an average of about of 15 cm apart.)

You'll have to leave Bruner Hall to find all the other objects!.

Jupiter (Scale size = 14 mm, Scale Distance = 78 m)

The largest planet is only about half an inch across on this scale! To find it go to the western end of Brown Hall (across the parking lot from Bruner). Jupiter is located on the wall opposite the men's restroom on the second floor. Its four largest moons, Io, Europa, Ganymede, and Callisto, which are mere specks less than 0.6 mm across, should lie within 18 cm of Jupiter, but in our model they have been placed on the floor below it. A couple of these moons are thought to have liquid water oceans below their icy surfaces!

Saturn (Scale size = 12 mm, Scale Distance = 144 m)

Saturn (without its rings) is only slightly smaller than Jupiter. To visit Saturn, go into the main entrance of the Volpe library and head diagonally to the right past the service desk. It is located on the wall close to the elevator.

Uranus (Scale size = 5 mm, Scale Distance = 290 m)

Beginning to get really out there now. In our model, Uranus is represented by a small bead in Memorial Gym. Go in the main entrance and then down the hallway on your left. Uranus can be found on the left wall after a few yards.

Neptune (Scale size = 5 mm, Scale Distance = 450 m)

Neptune, the furthest major planet from the Sun, is the same size as Uranus but about twice as far away! Our model representation can be found to very right of the front wall of the Baptist College Ministry, just across 7th Street opposite Dunn Hall.

Pluto (Scale size = 0.2 mm, Scale Distance = 590 m)

Today we understand that Pluto is just one of the larger icy objects in what is called the Kuiper Belt, but it still holds some extra fascination because it was classified as a planet for so long. In our model Pluto is a small speck in Foundation Hall, on the right wall just inside the main entrance.

Kuiper Belt (Scale sizes: less than 0.2 mm, Scale Distance = 450 m to 750 m)

This wide belt of icy asteroids surrounds the eight planets outside the orbit of Neptune. We now know that Pluto is just one of the larger Kuiper Belt objects. The class representation of the Kuiper Belt is a large display under the TV to the left of Room 139 in the STEM Center (Ray Morris Hall).

Approximate locations in Bruner Hall, Brown Hall, & Volpe Library



Other locations

