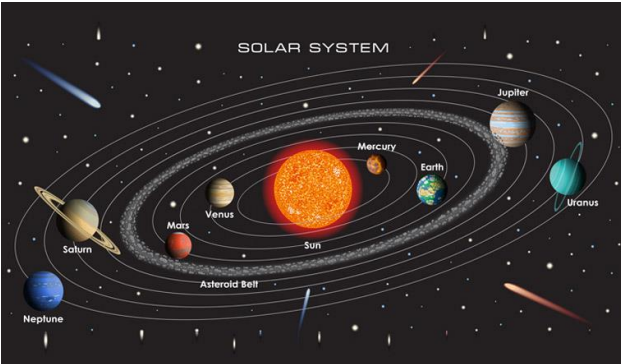


## Weight on Other Planets

It is important to explore the difference between mass and weight. In space, Astronauts are essentially weightless because gravity is not pulling down on them. While Astronauts may not weigh anything in space and can float around freely, their body shape and size does not change. They still take up just as much space as they do here on Earth. This is the important difference between mass and weight.

Let's explore the difference! Weight measures the attraction of two objects to each other. When you step on a scale, it is actually measuring the attraction between you and the Earth and gives you a



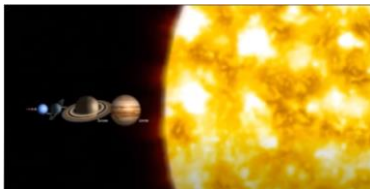
number in pounds or kilograms. Our mass is the amount of matter of which we are made. Our mass does not change when we change planets. However, if we went from Earth to Mars, our weight would change because Mars has less gravity than Earth. Gravity is a force pulling matter together. Every object (stars, moons, planets, etc.) in space has gravity. The amount of gravity an object has depends on its mass. So, a small planet has less and larger planet has more

gravity. Just like the planets, a person with more mass has more gravity and therefore weighs more.

When Astronauts visited the Moon, which has 1/6 of Earth's gravity, they bounced around on the surface as if they were floating with each step.

### Quick Facts:

- Astronauts trained for microgravity by walking "sideways."
- Neil Armstrong practiced taking off and landing in the Lunar Landing Training Vehicle in Houston.
- To simulate walking in the moon's lower gravity atmosphere, astronauts were suspended sideways by straps and then walked along a tilted wall.



To get an idea of how the various things in our universe compare in size, watch this video: [https://youtu.be/NI6QwdU\\_9UA](https://youtu.be/NI6QwdU_9UA)

1. Weigh yourself or guess your weight here on Earth.
2. Record your weight in the chart below.
3. Use the chart below and the following formula to calculate your weight on other planetary objects.



$$\text{Weight} = \text{mass} \times \text{gravity}$$

Planetary Object	Your Mass	Gravity (Compared to Earth's Gravity)	Weight
The Sun	_____ lbs	28	_____ lbs
Mercury	_____ lbs	.38	_____ lbs
Venus	_____ lbs	.91	_____ lbs
Earth	_____ lbs	1	_____ lbs
Moon	_____ lbs	.166	_____ lbs
Outer Space	_____ lbs	0	_____ lbs
Mars	_____ lbs	.38	_____ lbs
Jupiter	_____ lbs	2.14	_____ lbs
Saturn	_____ lbs	.91	_____ lbs
Uranus	_____ lbs	.86	_____ lbs
Neptune	_____ lbs	1.1	_____ lbs
Pluto (Dwarf Planet)	_____ lbs	.08	_____ lbs

**Commented [TG1]:** Do you want to put these any an particular order (smallest to largest, largest to smallest, etc.)?