Soda on Saturn – Weighing In & Growing Old
Student Version

Why should your team do this activity?
This activity will help you understand the differences in gravitational fields among the planets of our Solar System. Scientists must take into consideration the effects of gravity while designing spacecraft such as a rover destined for Mars. How will gravitational fields different than that of the Earth affect the rover's mobility? ow will the difference in gravity affect the rover's ability to sample Martian rocks?

Additionally, you will learn about how the length of the year, or a single revolution of a planet around the Sun, varies for different planets. Scientists must consider the length of planets' orbits while planning missions.

Background Information:
An object or person's weight on a planet is based on the strength of that planet's gravitational force pulling on it. The amount of matter that makes up the planet and the planet's size (diameter) determines how much gravitational force it has. As future astronauts venture to the other bodies in our Solar System, they will experience different "pulls" of gravity. This change in the pull of gravity will result in a change in an astronaut's weight. For instance, an astronaut who weighs 180 pounds on the Earth will weigh only about 29 pounds on the Moon. On Mars, the same astronaut will weigh approximately 68 pounds.

Your age is determined by the length of an Earth year (the time it takes for Earth to complete one revolution around the sun). Your age on another planet would be determined in a similar manner. Therefore, if you were on a planet that required less time to travel around the Sun, a year would be shorter relative to Earth. If you were on a planet that required a greater amount of time for a single revolution around the Sun, a year would be longer.

The Necessities:
- ★ Soda cans filled with different amounts of pennies *(your teacher will prepare these for you)*
- ★ *Planetary Data* table
- ★ *Multiplication Factors* table
- ★ Computer
- ★ Pen or pencil and paper
- ★ Calculator
- ★ Your Idaho TECH Lab Notebook

Directions:
Your teacher will guide you through this activity!.

Planetary Data Table

Planet	Diameter	Length of One Revolution (Earth Time)
Mercury	3,025 miles	88 days
Venus	7,502 miles	224.7 days
Earth	7,909 miles	365 days
Mars	4,212 miles	687 days
Jupiter	88,784 miles	11.86 years
Saturn	74,400 miles	29.48 years
Uranus	32,116 miles	84.01 years
Neptune	30,690 miles	164.1 years
Pluto	2,170 miles	247.7 years
Moon	2,155 miles	n/a

Multiplication Factors Table

Planet	Weight Factor	My Weight on Planet:	Age Factor	My Age on Planet:
Mercury	0.38 X my weight	=	4.200 X my age	=
Venus	0.91	=	1.600	=
Earth	1.00	=	1.000	=
Mars	0.38	=	0.530	=
Jupiter	2.53	=	0.080	=
Saturn	1.07	=	0.030	=
Uranus	0.92	=	0.010	=
Neptune	1.18	=	0.006	=
Pluto	0.03	=	0.004	=
Sun	27.8	=	n/a	n/a
Moon	0.16	=	n/a	n/a

You may want to record everyone's answers in your Idaho TECH Lab Notebook!