

**For the Teacher**  
**ORBITING THE SUN**

What affects the time it takes for a planet (satellite) to orbit the sun? This time is defined as the period of revolution, or the **orbital period**. Let's take a look at the data for the known planets in the solar system to answer this question.

**Comment:** DYK: right now your moving 67000 mi/h due to the earth moving around the sun

## Planetary Physical Data

Planet	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Mean Distance from the Sun (AU)	0.39	0.72	1	1.52	5.20	9.54	19.19	30.06	39.48
Orbital Period (earth years)	0.24	0.62	1	1.88	11.86	29.46	84.01	164.79	248.54
Average Orbital Velocity (km/sec)	47.89	35.04	29.79	24.14	13.06	9.64	6.81	5.43	4.74
Mass of planet (Earth=1)	0.06	0.82	1	0.11	317.89	95.18	14.53	17.14	0.002

Note: One (1) astronomical unit (AU) is equal to the distance between the sun and the earth ( $1.5 \times 10^8$  km)

### Questions

1. How much further is Pluto from the sun than it is from the earth?

1 AU or  $1.5 \times 10^8$  km

2. Does the orbital period depend on the planet's distance from the sun (**orbital radius**)? How?

yes, the greater the orbital radius, the greater the orbital period

3. Does the **orbital velocity** depend on the planet's orbital radius? How?

yes, the greater the orbital radius, the lower the orbital velocity

4. Does the orbital period depend on the planet's mass? How?

no

5. If a feather was placed in orbit around the sun at a velocity of 38 km/s, where would you expect the feather's orbit to be located? What would you expect its orbital period to be? (no calculations here – just estimate)

between Mercury and Venus

answers between 0.5 and 0.6 years would be acceptable

In conclusion, at a specific radius (distance from the sun), a satellite (a planet, man-made satellite, rock, or feather) will have a specific period and orbital velocity. The mass of the satellite will not matter.