

Go to: <http://www.physics.sfasu.edu/astro/Planets/planetchart.html>

Select *Animate Planets* to start the planets moving. Each time you select *Animate Planets* the simulation will speed up; reload the page to return to the slowest pace. Observe the motions of the planets.

1. What is the dashed line the planets are following? Why do they follow this line?
2. Which planets move the fastest? Which move the slowest? Explain.
3. Mercury and Venus change direction frequently. What is physically happening to cause this? Explain with a diagram.
4. Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto show less frequent “backward” shifts than Mercury and Venus. Compared to Mercury and Venus, what is physically happening to cause these planets to appear as if they are changing direction? Explain with a diagram.
5. Which planets deviate the most from the dashed line? Is your answer consistent with planetary orbital data?

Early astronomers tracked these motions to determine the orbital structure of the Solar System. Brahe’s careful measurements and Kepler’s analysis allowed for the paths of the planets to be determined, and the establishment of Kepler’s Laws.