

## Retrograde Motion Lesson

### Objective:

- The student understands the apparent motion of the moon planets and stars in the nighttime sky. (Standard 8th grade: Earth Systems #3 and #4. )
- The student understands how models are used to describe scientific phenomenon.
- The student understands that models will change as more evidence is gathered.
- The student designs a model of retrograde motion.

Previous Mastery: Revolution, Rotation, inner/outer planets, orbital period and speed.

1. After completing the orrery activity, ask students to summarize the motions of the planets.
2. Ask the students the following question: How would you explain the fact that Mars **appears** to make a loop in its orbit, given what you know about how planets orbit the sun?  
-Show a model of how people tried to explain it a long time ago.:  
<http://www.scienceu.com/observatory/articles/retro/>
3. Show the students the following video: [http://youtu.be/72FrZz\\_zJFU](http://youtu.be/72FrZz_zJFU)
4. Model retrograde motion on the orrery activity.
5. **Have the students use coins, cups, etc to create their own smaller model of the motion to demonstrate understanding. The students should create their own video using a phone or POD. This is the most important part!!!!**  
-Differentiation: Allow students to model different sky motions based on ability levels.

**High School Extension and/or Math Extension: Calculate orbital period (year) for Mercury, Venus and Mars relative to Earth's year.**

**$T = 1 \text{ Earth Orbit} / \# \text{ Planet Orbits}$**