

## Mars for Earthlings

### LESSON 21: Kepler

#### *In-Class Activity 1*

#### *Seeing like Kepler*

**Purpose:** Understand how Kepler locates planets outside our solar system.

#### **Searching for Exoplanets**

Observe the orrery demonstration by your instructor

1. You need to detect a planet, thousands of light years away, orbiting its star. What problems inhibit this detection? List at least 3.
  
2. How might you overcome these issues?

#### **Determine a Detection Method**

Utilizing the help of a few students around you, develop a detection method for observing and studying exoplanets. Explain your detection method and the instruments you will use below (you may do some outside research or consult your instructor to help guide your ideas).

#### **Finding Exoplanets in the Habitable Zone.**

1. Navigate to the following link:  
<http://kepler.nasa.gov/multimedia/Interactives/keplerFlashAdvDiscovery/?CFID=9187896&CFTOKEN=28729865>. Follow simulation instructions and record the following:
  - a. Choose and record the star system you are observing.
  
  - b. Manually record and make calculations throughout the simulation below:



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- c. At the end of the simulation, what kind of planet did you find? The program offers an “artist’s rendition” of the planet surface. What does it look like?
    - d. Determine if your star system has a planet in the habitable zone. Explain the reasoning for why the planet is or is not in the habitable zone.
  2. From your experience in the Kepler simulation, what is the habitable zone and how does it relate to Earth? What criterion makes a zone “habitable”?
  3. Explain the “transit method” of detecting planets below.

