



“The universe is a pretty big place. If it's just us, seems like an awful waste of space.” –Carl Sagan

Understanding Transit Photometry

People have always wondered what is out there beyond Earth and its neighborhood. Over the centuries storytellers have woven incredible tales about life on other planets and beings living among the stars, while scientists have created bigger and better instruments for peering out into space and making new discoveries.

One way that astronomers can detect planets in our galaxy is to watch the stars closely. If they see a star dim and then brighten again, an orbiting planet has passed in front of the star and blocked some of the star's light. This dimming and brightening can be detected when the observer, the planet, and the star are lined up perfectly. (That takes some luck, but it does happen.) This method is called **transit photometry**.

Explore “NASA Searching for Shadows” at <https://exoplanets.nasa.gov/alien-worlds/ways-to-find-a-planet/#/2> for a more detailed explanation.

Demonstrating Transit Photometry

Obviously we can't practice transit photometry ourselves by going outside and watching for something to pass in front of the sun (our closest star). Staring at the sun would harm our eyes and we wouldn't be able to see anything - not a good idea.

What we can do is simulate what is happening around that distant star as those astronomers study their instruments. **Explore** "Table-top Models to simulate what the Kepler Mission does" at <https://www.nasa.gov/kepler/education/models> to see a selection of models that can be purchased or built from various materials in your classroom or maker space.

This model can be done easily with household items.

- Place a table lamp (minus its shade) on a table or stool to situate the bulb at eye level. This lamp will be the star.
- Then use a small ball (foam or clay) as an exoplanet. You may wish to suspend it from fishing line or place it on the tip of a small dowel or wooden skewer so that it can be passed around the lamp.
- As your “exoplanet” crosses in front of the bulb, its shape will block a small portion of the light. This demonstrates the event that makes the transit method of identifying exoplanets possible.