Exoplanet Transits – NISEnet

Materials:

- Desk lamp
- Light box with 16-square grid
- 1 large, medium, and small cube
- Canvas bag to hold the cubes
- Acrylic stand
- Mystery Objects Data Collection worksheet
- Pencils
- Electrical outlet (not provided)
- Activity and facilitator guides
- Information sheets
- Tips for Leading Hands-on Activities

Resources:

http://www.nisenet.org/catalog/exploring-universe-exoplanet-transits-2018 Activity guide, facilitator guide, table sign, info sheets, worksheets, and training videos.
https://exoplanets.nasa.gov/5-ways-to-find-a-planet/#/2 NASA resource on the transit method. Click "more info" to learn more about how scientists use this method.
https://exoplanets.nasa.gov/the-search-for-life/exoplanets-101/ an article to read for background on the concepts yourself or assign to older students.

Learning Goals:

- Scientists are searching the universe for planets orbiting distant stars.
- When a planet, or other object, moves between its star and Earth, some light from that star gets blocked from view.
- The transit method is one of the ways NASA scientists search for distant planets

Intro (example):

Exoplanets can be detected using a variety of methods. The one most closely modeled in this activity is called the transit method. With the transit method, astronomers first scour the universe to find stars that "blink," indicating that there might be a planet passing between the star and Earth. In this model, the cubes (planets) block a lot of the light from the lamp (star). In reality, an exoplanet blocks only a tiny amount of light, so researchers must use very sensitive instruments to detect that small change.

Steps:

1. Without looking inside the box, count how many squares are mostly dark and how many are mostly light. Record your observations on the worksheet.
2. Close your eyes while a second object is placed in the box, and count the squares again. Record your observations. Then, count and record one more time for a third object.
3. Make a guess! Based on the number of dark and light squares, which of the mystery objects was biggest and which was smallest? What else could you tell about the object? What couldn't you tell?

Reflection (throughout): How do scientists learn about things they can't see directly? What could the speed of a blinking star tell you about the planet orbiting it?
Relevance: What can you tell about the size of an object from the shadow? What other things could you use this technique for on Earth?

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