



DAWN ACTIVITY LEADER GUIDE

IN SEARCH OF A MISSING PLANET

Goal:

Search for the missing planet amongst the constellations.

Estimated time:

20 minutes

Who to do it with:

Ages: 12-Adult

Numbers: 4 or more!

What you need:

For each group of four:

- Star Charts cut and grouped into quadrants.
 - Each sheet with four quadrants is the sky for one day
 - There are 4 days for participants to explore
 - Provide one quadrant per participant
- Copies of Dark and Starry Night

Advanced Preparation:

1. Download the Star Charts:

http://dawn.jpl.nasa.gov/DawnClassrooms/1_hist_dawn/history_discovery/Development/star_chart.pdf

How to do it:

2. Set up the activity by explaining the following:
 - In the late 1700s, the Titius-Bode rule resulted in the need to discover a "missing planet" between the orbits of Mars and Jupiter.
 - Baron von Zach had spent years searching for this planet. The method that von Zach used was tedious.
 - Using a telescope, each star that was not on von Zach's star chart was checked on successive nights to determine if it had moved.
 - In 1800, von Zach held a meeting with fellow searchers and devised a plan for finding this missing planet.
 - The astronomers dubbed themselves the "Celestial Police," whose goal was to find this elusive planet.

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3. Assemble learners into groups of four. Explain that each person will receive a star map displaying a quadrant of the sky for several nights.
4. Explain that each person will represent one of the "Celestial (sky) Police."
5. Participants will look on their star chart quadrant and identify the dot (star) that moved from one night to the next to the next in order to find a missing planet.
6. When the person locates this star-like object, it will look like a dot or another star that moves.
7. When several learners have discovered the missing planet, ask questions similar to the following:
 - a) What did you do after you made the discovery?
 - b) Did you tell others or keep the discovery a secret?
 - c) If you told others, how did they react? Did they believe you?
 - d) Did they want proof? If so, what kind of proof?
 - e) If you kept it a secret, why did you do so?
 - f) Did you do anything further to check (validate) your discovery?

Tip: One participant should be able to locate this planet by noting which dot moved in relation to the "stationary" stars.

Explain that these processes (communicating, verifying) are similar to those that scientists use during a discovery.

8. Explain the story of how Ceres was discovered:
 - a) It was on a dark and starry night of New Year's Day, 1801 that Giuseppe Piazzi, an Italian monk, was at work in his observatory on the island of Sicily. He was a member of the "Celestial Police", a group of astronomers looking for the missing planet that Kepler had predicted between Jupiter and Mars.
 - b) At first he thought it was just a dim star that had not been included on his chart, so he checked for it the next night, but *it had moved!* He continued to note its position changes on January 3 and 4. Clearly what he was observing was not a star!

Optional:

9. Have participants read "Dark and Starry Night".

Why do it:

Participants can model how dwarf planet Ceres, the second target for the Dawn mission, was discovered.