

Title: Solar System Hoppers

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Subject(s): Science, Mathematics

Topic(s): Plotting, Coordinates, Graphing, Communication, Solar System, Space Science, Planets

Grade/Level: 5-8

Objective:

By the end of this activity, students will be able to map a path through the Solar System using facts about the planets.

Summary of Activity: Students will draw paths through the Solar System using clues provided by their partner.

Time Allotment: 20-30 minutes

Procedures/Instructions:

1. Students should sit back-to-back with the Map and Destination Information on a clipboard.
2. Identify one student as the Tour Guide, the other as the Visitor.
3. Starting at Earth, the Tour Guide should prepare a tour for their partner by drawing 5 lines, connecting 6 celestial objects together (Earth should be the first).
4. The Tour Guide will begin the tour by directing their partner to the first stop using only a single description from the Available Destinations sheet. (Example: "Our next stop has a diameter of 2,300 km." [Pluto])
5. The following rules must be followed when giving clues:
 - No celestial object may be visited more than once.
 - No clue "type" may be used more than once i.e., diameter, number of moons, etc....
 - A clue can only be repeated one time.
 - A path line cannot be drawn over a celestial body. (For example, the tour could not move from the comet to Saturn's moon Titan; its line would cross over Saturn.)



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6. If the passenger knows where to go, he can proceed to that point. If not, he must guess and make a move to any celestial body, then try to get back on course with the next hop.
7. The students can play a second round by drawing 10 lines and connecting 11 celestial objects together (Earth is always the first).

Variations:

- Make the first AND final destinations Earth.
- Increase the number of stops and decrease the amount of time allotted.

Instructional Materials:

- Clipboard for each student
- Pencils
- Copies of [Map](#) and [Available Destinations](#) sheet for each student
- [Student Instructions](#)
- Rulers

National Science or Mathematics Standards:

Science

Unifying Concepts and Processes

CONTENT STANDARD: K-12

As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes

- Systems, order, and organization
- Evidence, models, and explanation

Earth and Space Science

CONTENT STANDARD D:

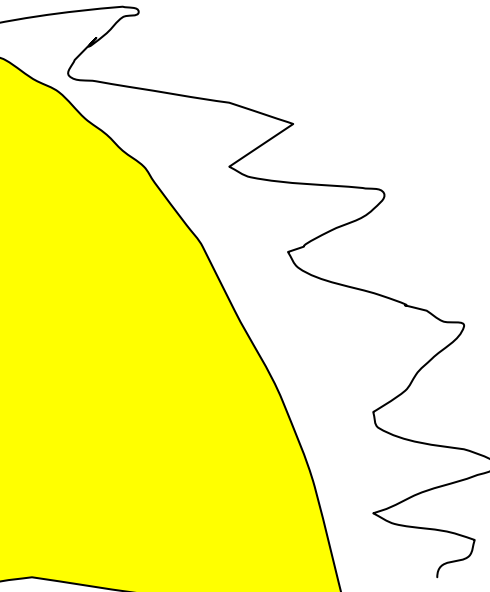
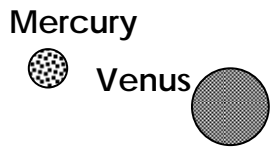
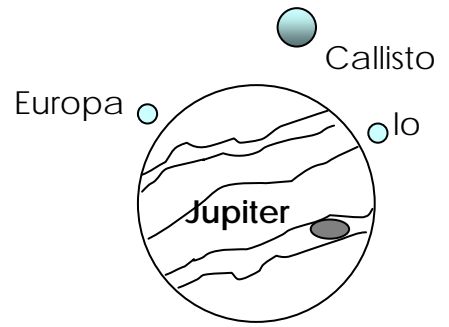
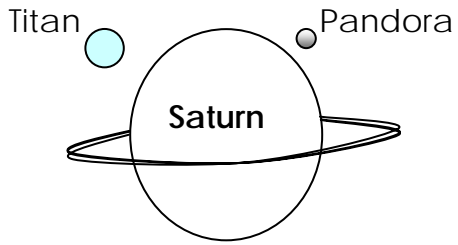
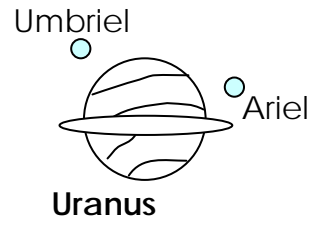
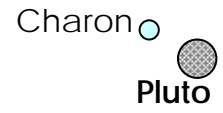
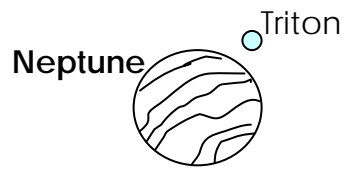
As a result of activities in grades 5-8, all students should develop an understanding of

- Structure of the earth system
- Earth in the solar system

Assessment Plan:

- 10 points for each correct path (50 points possible)
- 50 points for ending at the correct destination

Map



Available Destinations

<p>Jupiter Average Distance from Sun: 778.3 million km Diameter: 142,984 km Revolution: 11.9 years Rotation: 9 hours 55 minutes Average Temperature: -157 ° C Number of Moons: 39</p>	<p>Mars Average distance from Sun: 227.9 million km Diameter: 6,796 km Revolution: 687 days Rotation: 24 hours 37 minutes Temperature: -143° to 17°C Number of Moons: 2</p>	<p>Mercury Average distance from Sun: 57.9 million km Diameter: 4,878 km Revolution: 88 days Rotation: 59 days Temperature: -173° to 427°C Number of Moons: 0</p>
<p>Neptune Average distance from Sun: 4,504.3 million km Diameter: 49,500 km Revolution: 164.9 years Rotation: 16 hours 57 minutes Average Temperature: -214° C Number of Moons: 8</p>	<p>Pluto Average distance from Sun: 5,900 million km Diameter: 2300 km Revolution: 248.8 years Rotation: 6 days Temperature: -210° to -235°C Number of Moons: 1</p>	<p>Saturn Average distance from Sun: 1,429.4 million km Diameter: 120,530 km Revolution: 29.5 years Rotation: 10 hours 39 minutes Average Temperature: -178°C Number of Moons: 30</p>
<p>Uranus Average distance from Sun: 2,875 million km Diameter: 51,118 km Revolution: 84.1 years Rotation: 17 hours 8 minutes Average Temperature: -216°C Number of Moons: 20</p>	<p>Venus Average distance from Sun: 108.2 million km Diameter: 12,104 km Revolution: 225 days Rotation: 243 days Average Temperature: +462°C Number of Moons: 0</p>	<p>The Sun Distance from Earth 150 million km Diameter: 1,392,000 km Rotation: about one month Temperature: 5,500°C Atmosphere: Mostly hydrogen</p>
<p>Comet Types: short-period or long-period Origination: Kuiper Belt or Oort Cloud Contents: Ice, rock, dust, gas</p>	<p>Asteroid Ceres Discovered: January 1, 1801 Distinction: First asteroid discovered Diameter: 1025 km</p>	<p>Meteoroid Contents: metal/stone Orbits: The Sun</p>
<p>Charon Diameter: 1,270 km Orbits: Pluto Distance from Planet: 19,640 km Discovered: 1978</p>	<p>Ariel Diameter: 1,160 km Orbits: Uranus Distance from Planet: 191,240 km Discovered: 1851</p>	<p>Titan Diameter: 5,150 km Orbits: Saturn Distance from Planet: 1,221,850 km Discovered: 1655</p>
<p>Umbriel Diameter: 1,190 km Orbits: Uranus Distance from Planet: 265,970 km Discovered: 1851</p>	<p>Europa Diameter: 3,140 km Orbits: Jupiter Distance from Planet: 670,900 km Discovered: 1610</p>	<p>Io Diameter: 3,630 km Orbits: Jupiter Distance from Planet: 421,600 km Discovered: 1610</p>
<p>Triton Diameter: 2,700 km Orbits: Neptune Distance from Planet: 354,800 km Discovered: 1846</p>	<p>Phobos Diameter: 21 km Orbits: Mars Distance from Planet: 9,830 km Discovered: 1877 Orbital Period: .7.6 hours</p>	<p>Pandora Diameter: 90 km Orbits: Saturn Distance from Planet: 141,700 km Discovered: 1980 Orbital Period: 15 hours</p>
<p>Deimos Diameter: 12 km Orbits: Mars Distance from Planet: 23,460 km Discovered: 1877 Orbital Period: 1 day 6 hours</p>	<p>Earth's Moon Diameter: 3,476 km Orbits: The Earth Distance from Planet: 384,400 km Discovered: ? Orbital Period: 27.3 days</p>	<p>Callisto Diameter: 4,800 km Orbits: Jupiter Distance from Planet: 1,883,000 km Discovered: 1610 Orbital Period: 16.69 days</p>

Solar System Hoppers

If you are a tour guide:

1. You will be creating an itinerary or "travel plan" for you partner who is a space tourist. To create the tour plan, follow the steps below.
2. Beginning at planet Earth, use a pencil and a ruler to connect five additional celestial objects.
3. You cannot cross over any celestial body (planet, asteroid, etc...) without stopping at that object.
4. After you have created the steps of the tour, sit back to back with your partner.
5. A clue should sound like: "The first stop has a diameter of 1,190 kilometers."
6. You cannot repeat a clue, and you may use the same type of clue twice.
7. You will receive points for each correct stop and for ending at the same location.

If you are a traveler:

1. You must sit back to back with your partner.
 2. While your partner is designing your tour, study the Available Destinations sheet.
 3. Listen carefully when your partner gives you a clue, it may not be repeated.
 4. After you receive a clue, check the Available Destinations sheet and try to match it with a planet or moon.
 5. Draw a line connecting the two locations.
 6. Your partner cannot use the same type of clue twice.
 7. You will receive points for each correct stop and for ending at the same location.
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