Segment 1

The tree house detectives receive an assignment to create an “out-of-this-world” vacation. With billions of places in the universe to go, the detectives have different ideas about the best destination. They finally agree to divide into teams and research three different “docks-of-call,” the Moon, Mars, and a distant star. They head to Dr. D’s lab to learn a little more about the planets in our solar system and discover that objects in the universe are really far apart. Going some distance herself, Bianca travels to Puerto Rico for an internship at the largest radio telescope in the world, Arecibo Observatory. She promises to do research for the assignment while there, and her first task is to get some help from her cousin’s class at the Antonio Gonzalez Suarez Bilingual School in Añasco, Puerto Rico. Ms. Alice Acevedo’s class shows the tree house detectives how to measure distances in space using parallax. Mentors from the Society of Women Engineers (SWE) also assist the class.
Objectives

The students will

• identify and describe objects in our solar system.
• create a scale model of our solar system using astronomical units.
• understand how astronomers measure distance in space.

Vocabulary

inner planets—the four solid, rocky planets closest to the Sun—Mercury, Venus, Earth, and Mars
light-year—a unit of length in astronomy equal to the distance that light travels in one year or 9,458,000,000,000 kilometers
outer planets—the five planets farthest from the Sun—Jupiter, Saturn, Uranus, Neptune, Pluto
parallax—the apparent shift in position of an object as seen from two different points not on a straight line with the object
planet—a heavenly body other than a comet, asteroid, or satellite that travels in orbit around the Sun; also such a body orbiting another star
solar system—a star with the group of heavenly bodies that revolve around it; especially the Sun with the planets, asteroids, comets, and meteors that orbit it

Video Component

Implementation Strategy

The NASA SCI Files™ is designed to enhance and enrich existing curriculum. Two to three days of class time are suggested for each segment to fully use video, resources, activities, and web site.

Before Viewing

1. Prior to viewing Segment 1 of The Case of the Galactic Vacation, read the program overview (p. 5) to the students. List and discuss questions and preconceptions that students may have about the solar system, stars, and how to measure distances in space.
2. Record a list of issues and questions that the students want answered in the program. Determine why it is important to define the problem before beginning. From this list, guide students to create a class or team list of three issues and four questions that will help them to better understand the problem. The following tools are available in the educator area. To locate them, click on the educator's menu bar, then click on "Tools" and then "Instructional Tools." You will find them listed under the "Problem-Based Learning" tab.

Problem Board—Printable form to create student or class K-W-L chart
Guiding Questions for Problem Solving—Questions for students to use while conducting research
Problem Log & Rubric—Printable log for students with the stages of the problem-solving process
Brainstorming Map—Graphic representation of key concepts and their relationships
The Scientific Method and Flow Chart—Chart that describes the scientific method process
3. Focus Questions—Questions at the beginning of each segment that help students focus on a reason for viewing and can be printed ahead of time from the educator's area of the web site in the “Activities/Worksheet” section under “Worksheets.” Students should copy these questions into their science journals prior to viewing the program. Encourage students to take notes while viewing the program to answer the questions. An icon will appear when the answer is near.

4. What's Up? Questions—Questions at the end of the segment help students predict what actions the tree house detectives should take next in the investigation process and how the information learned will affect the case. These questions can be printed from the educator's area of the web site in the “Activities/Worksheet” section under “Worksheets.”

**View Segment 1 of the Video**

For optimal educational benefit, view The Case of the Galactic Vacation in 15-minute segments and not in its entirety. If you are viewing a taped copy of the program, you may want to stop the video when the Focus Question icon appears to allow students time to answer the question.

**Careers**

- astronomer
- aerospace worker
- mathematician
- physicist
- planetologist

**After Viewing**

1. Have students reflect on the “What's Up?” questions asked at the end of the segment.
2. Discuss the Focus Questions.
3. Students should work in groups or as a class to discuss and list what they know about our solar system, stars, and distances in space. Have the students conduct research on the solar system and brainstorm which planet the tree house detectives should choose as their destination. As a class, reach a consensus on what additional information is needed. Have the students conduct independent research or provide students with the information needed.
4. Have the students complete Action Plans, which can be printed from the educator area or the tree house's “Problem Board” area in the “Problem-Solving Tools” section of the web site for the current online investigation. Students should then conduct independent or group research by using books and internet sites noted in the “Research Rack” section of the “Problem Board” area in the tree house. Educators can also search for resources by topic, episode, and media type under the Educator's main menu option Resources.
5. Choose activities from the educator guide and web site to reinforce concepts discussed in the segment. The variety of activities is designed to enrich and enhance your curriculum. Activities may also be used to help students "solve" the problem along with the tree house detectives.
6. Have the students work individually, in pairs, or in small groups on the Problem-Based Learning (PBL) activity on the NASA SCI Files™ web site. To locate the PBL activity, click on the tree house and then the “Problem Board.” Choose the “2002-2003 Season” and click on Suspicious Sickness.
   - To begin the PBL activity, read the scenario (Here's the Situation) to the students.
   - Read and discuss the various roles involved in the investigation.
   - Print the criteria for the investigation and distribute.
   - Have students use the “Research Rack” and the “Problem-Solving Tools” located on the bottom menu bar for the PBL activity. The “Research Rack” is also located in the tree house.
7. Having students reflect in their journals what they have learned from this segment and from their own experimentation and research is one way to assess the students. In the beginning, students may have difficulty reflecting. To help students, give them specific questions to reflect upon that are related to the concepts.
8. Have students complete a Reflection Journal, which can be found in the Problem-Solving Tools section of the online PBL investigation or in the Instructional Tools section of the Educator's area.
9. The NASA SCI Files™ web site provides educators with general and specific evaluation tools for cooperative learning, scientific investigation, and the problem-solving process.
## Resources

(Additional resources located on web site)

### Books

<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Publisher, Year</th>
<th>ISBN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cole, Joanna</td>
<td>The Magic School Bus Lost in the Solar System</td>
<td>Scholastic Trade, 1992</td>
<td>0590414291</td>
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<td>Egan, John</td>
<td>Solar System</td>
<td>Golden Books Family Entertainment, 1999</td>
<td>0307204073</td>
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<td>Leedy, Loreen</td>
<td>Postcards from Pluto: A Tour of the Solar System</td>
<td>Holiday House, 1996</td>
<td>0823412377</td>
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<td>Simon, Seymour</td>
<td>Our Solar System</td>
<td>William Morrow &amp; Company, 1992</td>
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<td>Simon, Seymour</td>
<td>Stars</td>
<td>Mulberry Books, 1989</td>
<td>0688092373</td>
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<tr>
<td>Simon, Seymour</td>
<td>The Sun</td>
<td>Mulberry Books, 1989</td>
<td>0688092365</td>
</tr>
</tbody>
</table>

### Video

Eyewitness— Planets (1997), ASIN: 0789421488

### Web Sites

**NASA Spacelink—Where to Find Information on the Solar System and Universe**

With all the resources available at NASA, finding specific information related to the solar system can be a daunting task. You know that you won’t find information on an asteroid in the same place you’ll find the diameter of Jupiter. So where’s the best place to look? The answer is NASA Spacelink! Spacelink has categorized the different areas of space science to make information easier to locate.

http://spacelink.nasa.gov/focus/Articles/010_Solar_System/

**Our Solar System**

Come along and explore our amazing solar system. Here, students will journey far into space to learn interesting facts about planets, objects in our solar system, and even how to become an astronaut!

http://www.montana.edu/4teachers/instcomp/hunts/science/Solar/SpaceHunt.html

**Kids Astronomy**

Great web site created for both the student and the educator. Learn how big the universe is by clicking your way through the universe in powers of ten.

Activities and Worksheets

In the Guide  Scaling the Solar System
Create a model demonstrating the scale distance of the solar system by using Astronomical Units (AU). ..........................................................18

Planning the Planets
Use the Planetary Data Chart to learn more about the planets and create a Venn Diagram. .................................................................19

A Long Walk in the Dark
Calculate the time it will take you to walk, drive, and fly to the Moon and planets. .................................................................21

What a Parallax!
Activity to learn how astronomers measure the distance to stars. .......................22

Answer Key
.................................................................................23

On the Web  Planet to Planet
Create a model of the solar system to learn the order of the planets from the Sun.

Solar System 3-D Puzzle
Create an eight-cube paper puzzle of the solar system
Scaling the Solar System

**Purpose**
To understand an astronomical unit
Create a model demonstrating the scale distances of the solar system by using astronomical units

**Teacher's Note**
It is important to realize that the sizes of the planets are not to scale. Jupiter's diameter is about 63 times that of Pluto, and the Sun's diameter is about 10 times that of Jupiter. On the scale of 1 AU = 10 cm, the Sun would only be 1 mm in diameter, and the planets would be mere dots.

**Background**
Astronomers have chosen a unit to measure distances in space called the astronomical unit (AU). The length of an astronomical unit is the average distance of the Earth from the Sun. The distance is about 93,000,000 miles (mi) or 150,000,000 kilometers (km). Using the 150,000,000 km as one astronomical unit, create a model solar system.

**Procedure**
1. Determine the color bead to represent each planet and the asteroid belt and record in chart below. Save a yellow bead to represent the Sun.
2. Complete the chart to determine each planet's astronomical unit.
3. Using the scale of 1 AU = 10 centimeters (cm), determine the distance in cm and complete the chart. Multiply the AU by 10 cm.
4. Attach the Sun bead on one end of the string and secure with a knot.
5. Use a meter stick and measure the distance from the Sun determined in the chart for Mercury and mark.
6. Slide the bead onto the string to the mark and secure with a knot.
7. Repeat for each of the other planets and the asteroid belt.

**Extension**
1. Create a solar system in the classroom and/or on the playground by using a different scale for the AU of each planet.
2. Conduct research to learn more about asteroids and how they differ from planets.

**Conclusion**
1. Why do astronomers need astronomical units to measure distances in space?
2. Which planets are the inner planets? Outer planets?
3. What separates the inner planets from the outer planets?
4. Explain a scale model and why it was useful.

**Materials**
- 4.5-m string
- meter sticks
- beads of 11 different colors
- small cup to hold beads
- marker

**AU Chart**

<table>
<thead>
<tr>
<th>Planet</th>
<th>Bead Color</th>
<th>Distance in million of km (Average)</th>
<th>Relative Distance (AU)</th>
<th>Rounded to the nearest tenth</th>
<th>Distance in cm (AU) x 10 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td></td>
<td>57</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venus</td>
<td></td>
<td>108</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth</td>
<td></td>
<td>150</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mars</td>
<td></td>
<td>228</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asteroid Belt</td>
<td></td>
<td>420</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jupiter</td>
<td></td>
<td>778</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturn</td>
<td></td>
<td>1,427</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uranus</td>
<td></td>
<td>2,280</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neptune</td>
<td></td>
<td>4,497</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pluto</td>
<td></td>
<td>5,900</td>
<td>+ 150</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Planning the Planets**

### Planetary Data Chart

<table>
<thead>
<tr>
<th>Planet</th>
<th>Distance from the Earth in millions of km (avg)</th>
<th>Distance from the Sun in millions of km</th>
<th>Diameter</th>
<th>Mass Ratio with Earth</th>
<th>Temperature</th>
<th>Gravity</th>
<th>Length of Day</th>
<th>Length of Year</th>
<th>Satellites</th>
<th>Tilt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>91.7 km</td>
<td>57.9 km</td>
<td>4,880 km</td>
<td>0.055</td>
<td>-170° - 350 °C</td>
<td>0.39</td>
<td>59 days</td>
<td>88 days</td>
<td>0</td>
<td>0°</td>
</tr>
<tr>
<td>Venus</td>
<td>41.4 km</td>
<td>108.2 km</td>
<td>12,104 km</td>
<td>0.815</td>
<td>465° C surface</td>
<td>0.91</td>
<td>243 days</td>
<td>225 days</td>
<td>0</td>
<td>177.3°</td>
</tr>
<tr>
<td>Earth</td>
<td>0</td>
<td>149.6 km</td>
<td>12,576 km</td>
<td>1.0</td>
<td>15° C avg. surface</td>
<td>1</td>
<td>23 hrs, 56 min</td>
<td>365 days</td>
<td>1</td>
<td>23.5°</td>
</tr>
<tr>
<td>Mars</td>
<td>78.3 km</td>
<td>227.9 km</td>
<td>6,787 km</td>
<td>0.11</td>
<td>-23° C avg. surface</td>
<td>0.38</td>
<td>24 hrs, 37 min</td>
<td>687 days</td>
<td>2</td>
<td>24°</td>
</tr>
<tr>
<td>Jupiter</td>
<td>628.7 km</td>
<td>778.3 km</td>
<td>142,800 km</td>
<td>318</td>
<td>-150° C at cloud tops</td>
<td>2.60</td>
<td>9 hrs, 55 min</td>
<td>11.9 years</td>
<td>28</td>
<td>3.1°</td>
</tr>
<tr>
<td>Saturn</td>
<td>1,277 km</td>
<td>1,427 km</td>
<td>120,600 km</td>
<td>95.2</td>
<td>-180° C at cloud tops</td>
<td>1.07</td>
<td>10 hrs, 42 min</td>
<td>29.5 years</td>
<td>30</td>
<td>26.7°</td>
</tr>
<tr>
<td>Uranus</td>
<td>2,721 km</td>
<td>2,870 km</td>
<td>51,300 km</td>
<td>15</td>
<td>-210° C at cloud tops</td>
<td>0.90</td>
<td>17 hrs, 12 min</td>
<td>84 years</td>
<td>21</td>
<td>97.9°</td>
</tr>
<tr>
<td>Neptune</td>
<td>4,347 km</td>
<td>4,497 km</td>
<td>49,100 km</td>
<td>17</td>
<td>-220° C at cloud tops</td>
<td>1.15</td>
<td>16 hrs, 6 min</td>
<td>165 years</td>
<td>8</td>
<td>29.6°</td>
</tr>
<tr>
<td>Pluto</td>
<td>5,750 km</td>
<td>5,900 km</td>
<td>2,200 km</td>
<td>0.002</td>
<td>-220° C avg. surface</td>
<td>0.03</td>
<td>6 days, 9 hrs</td>
<td>248 years</td>
<td>1</td>
<td>118°</td>
</tr>
</tbody>
</table>

Using the Planetary Data Chart, create bar graphs in your science journal showing:

- the number of satellites each planet has.
- the diameter of each planet.
- your choice.
Planning the Planets (concluded)

Venn Diagram

Use the Planetary Data Chart to complete the Venn diagram.

- Tilt is less than 30°
- Has Satellites
- Larger than Earth
- Gravity is greater than 1

Has Satellites
A Long Walk in the Dark

Purpose
To determine the length of time it takes to walk, drive, and fly to the Moon and planets.

Procedure
1. Using the average distance from Earth, calculate the number of hours it will take you to walk, drive, and fly to the Moon and the other planets.
2. Convert the number of hours into years by using 24 hours in a solar day and complete the chart below. The first one is done for you.

**Moon Example**: 
\[ 384,000 \text{ km} \div 3.6 \text{ km/h} = 106,667 \text{ hours} \]
\[ 365 \text{ days} \times 24 \text{ hours} = 8,760 \text{ hours per year} \]
\[ 106,667 \text{ hours} \div 8,760 \text{ hours per year} = 12.17 \text{ years} \]
Round to the nearest year = 12 years

3. Calculate the age you will be if you left today and flew to the Moon and each planet. Your current age + the number of years = future age

<table>
<thead>
<tr>
<th>Heavenly Body</th>
<th>Average Distance</th>
<th>Walking 3.6 km/h</th>
<th>Walking Years</th>
<th>Driving 80 km/h</th>
<th>Driving Years</th>
<th>Flying 1,436 km/h</th>
<th>Flying Years</th>
<th>My Future Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moon</td>
<td>384,000 km</td>
<td>106,667 hours</td>
<td>12 years</td>
<td>4,800 hours</td>
<td>0.5 years</td>
<td>267 hours</td>
<td>0.03 years</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Venus</td>
<td>41,000,000 km</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mars</td>
<td>78,000,000 km</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Jupiter</td>
<td>629,000,000 km</td>
<td></td>
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<tr>
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<td></td>
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<tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pluto</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusion
1. With the distances between planets being so great, will it be possible to travel to them in the future? Why or why not?
2. Which planet would you like to visit? Why?
What a Parallax!

**Purpose**
To understand how astronomers measure the distance to stars

**Teacher Prep**
If necessary, work with students to familiarize them with how to use a protractor.

**Procedure**
1. Using the red marker, color one end of the rope approximately 5 cm. This will be end “A.”
2. Using the blue marker, color the opposite end of the rope approximately 5 cm. This will be end “B.”
3. In a large open area, lay the rope in a straight line. This will be your baseline.
4. Place a large object, such as a chair, some distance away from the rope. A tree, flagpole, or shrub may also be used, but the object must not be more than 25 m from the baseline (rope).
5. Stand at position “A” and hold the protractor so that it is parallel to the baseline.
6. Place your pencil on the inside of the protractor and move it along the curve until it lines up with the object. See diagram 1.
7. Being very careful not to move your pencil, have your partner read and record the angle measurement.
8. Have your partner repeat steps 5-7 at position “B.”
9. On a sheet of graph paper along the very bottom, draw a line 10 cm long to represent your baseline. NOTE: For this exercise, let the scale be 1 m = 1 cm.
10. Mark one end of the drawn line as “A” and the other end as “B.”
11. At point “A” measure an angle that is the same number of degrees as the angle outside for point “A.” Mark and draw the angle.
12. At point “B” measure an angle that is the same number of degrees as the angle outside for point “B.” Mark and draw the angle. See diagram 2.
13. The two lines should intersect. Mark the point of intersection as point “C.”
14. Draw a line perpendicular from point “C” to the baseline.
15. Measure the distance of this perpendicular line.
16. Using the scale 1 m = 1 cm, determine the distance the object was from the baseline.

**Conclusion**
1. Why do astronomers use parallax to determine the distance to stars?
2. Name several situations when you might want to use parallax on Earth.

**Extension**
Use a different scale and determine distances of points farther away.

**Materials**
- protractor
- notebook paper
- red marker
- blue marker
- 10-m rope
- pencil
- large outside area
- large object
- metric ruler
- graph paper
- science journal
**Answer Key**

**Scaling the Solar System**

<table>
<thead>
<tr>
<th>Planet</th>
<th>Bead Color</th>
<th>Distance in millions of km</th>
<th>Distance (AU)</th>
<th>Rounded to the nearest tenth</th>
<th>Distance in cm (AU) x 10 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td></td>
<td>57</td>
<td>0.38</td>
<td>0.4</td>
<td>4 cm</td>
</tr>
<tr>
<td>Venus</td>
<td></td>
<td>108</td>
<td>0.72</td>
<td>0.7</td>
<td>7 cm</td>
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<tr>
<td>Earth</td>
<td></td>
<td>150</td>
<td>1</td>
<td>1.0</td>
<td>10 cm</td>
</tr>
<tr>
<td>Mars</td>
<td></td>
<td>228</td>
<td>1.52</td>
<td>1.5</td>
<td>15 cm</td>
</tr>
<tr>
<td>Asteroid Belt</td>
<td></td>
<td>420</td>
<td>2.8</td>
<td>2.8</td>
<td>28 cm</td>
</tr>
<tr>
<td>Jupiter</td>
<td></td>
<td>778</td>
<td>5.18</td>
<td>5.2</td>
<td>52 cm</td>
</tr>
<tr>
<td>Saturn</td>
<td></td>
<td>1,427</td>
<td>9.51</td>
<td>9.5</td>
<td>95 cm</td>
</tr>
<tr>
<td>Uranus</td>
<td></td>
<td>2,280</td>
<td>19.13</td>
<td>19.1</td>
<td>191 cm</td>
</tr>
<tr>
<td>Neptune</td>
<td></td>
<td>4,497</td>
<td>29.98</td>
<td>30.0</td>
<td>300 cm</td>
</tr>
<tr>
<td>Pluto</td>
<td></td>
<td>5,900</td>
<td>39.33</td>
<td>39.3</td>
<td>393 cm</td>
</tr>
</tbody>
</table>

1. Astronomers need astronomical units (AU) to measure distances in space because the distances are so great. If miles or kilometers were used, they would be huge numbers and difficult to work with. Astronomical units help to simplify the measurements. The AU, comes from early times when astronomers could only measure distances to planets relative to the AU, and they didn’t know the size of the AU.

2. The inner planets are Mercury, Venus, Earth, and Mars. The outer planets are Jupiter, Saturn, Uranus, and Pluto.

3. A large space with an asteroid belt separates the inner planets from the outer planets.

4. Scientists use models everyday. Models can be conceptual, mathematical, and scale. The solar system is so large we must use a scale to better understand the relationship between the Sun and the planets and to better understand the great distances in space.
### Answer Key (concluded)

#### A Long Walk in the Dark

<table>
<thead>
<tr>
<th>Heavenly Body</th>
<th>Average Distance</th>
<th>Walking 3.6 km/h</th>
<th>Walking Years</th>
<th>Driving 80 km/h</th>
<th>Driving Years</th>
<th>Flying 1,436 km/h</th>
<th>Flying Years</th>
<th>My Future Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moon</td>
<td>384,000 km</td>
<td>25,555,555 hours</td>
<td>1,150,000</td>
<td>131 years</td>
<td>64,067 hours</td>
<td>0.03 years</td>
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<td></td>
</tr>
<tr>
<td>Mercury</td>
<td>92,000,000 km</td>
<td>11,388,888 hours</td>
<td>512,500</td>
<td>59 years</td>
<td>28,551 hours</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Venus</td>
<td>41,000,000 km</td>
<td>2,473 hours</td>
<td>975,000</td>
<td>111 years</td>
<td>54,318 years</td>
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</tr>
<tr>
<td>Mars</td>
<td>78,000,000 km</td>
<td>1,300 hours</td>
<td>512,500</td>
<td>59 years</td>
<td>28,551 years</td>
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<tr>
<td>Jupiter</td>
<td>629,000,000 km</td>
<td>19,945 hours</td>
<td>7,862,500</td>
<td>898 years</td>
<td>438,022 years</td>
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<tr>
<td>Saturn</td>
<td>1,227,000,000 km</td>
<td>38,908 hours</td>
<td>15,337,500</td>
<td>1,751 years</td>
<td>854,456 years</td>
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<tr>
<td>Uranus</td>
<td>2,721,000,000 km</td>
<td>86,282 hours</td>
<td>34,012,500</td>
<td>3,883 years</td>
<td>854,456 years</td>
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<tr>
<td>Neptune</td>
<td>4,347,000,000 km</td>
<td>137,843 hours</td>
<td>54,337,500</td>
<td>6,203 years</td>
<td>3,027,159 years</td>
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<tr>
<td>Pluto</td>
<td>5,750,000,000 km</td>
<td>182,331 hours</td>
<td>71,873,500</td>
<td>8,205 years</td>
<td>4,004,178 years</td>
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<td></td>
</tr>
</tbody>
</table>

What a Parallax!
1. Currently there is no physical way to measure the distance to nearby stars. The apparent shift in the position of an object when viewed from two different positions offers an observer an easy way to measure the distance.
2. Answers will vary but might include a distant building, tree, or mountain.