Sixth Grade

Learning About Science

This Year in 6th Grade You Will Learn About:

- 1. Changing Appearance of the Moon
- 2. Earth's Tilt Creates Seasons
- 3. Relationship of Objects in the Solar System
- 4. Distance and Motion of Objects in the Universe
- 5. Microorganism—Harmful and Helpful
- 6. Heat, Light, and Sound

What is Science?



Science is the study of the natural world.









Scientists do many things

- Observe
- Ask questions
- Design tests or experiment
- Classify
- Build models
- Make Conclusions
- Share their ideas

Scientists observe the natural world.



What can you observe about this night sky?

What questions might you ask about this planet?



In science, we test our questions.



What are the rings made of?

How could you find out?



Scientists find out by exploring the natural world.



Scientists develop theories that help explain the natural world:



Let's Do a Planet Activity

One concept you will learn about space is that a scale is used to find the distances between objects in space. The real numbers are so big that they are hard to understand. Using a scale helps us understand distance better.

- If you have ever noticed on a picture of the Solar System, all the planets are just about the same distance from each other. This is not how they are really distanced in space.
- Today, we are going to use a formula to see how far the planets are from each other by using a percentage scale.

Here is a picture we normally see of the Solar System.



Notice how they all look the same distance apart.

- Make the names of the planets (including Pluto) and the sun on separate, small pieces of paper (about an inch long and ¼ in wide).
- You are going to need a calculator.
- The length of your desk is the Solar System space.
- Put the name of the sun at one edge of your desk and put the name of Pluto on at the other end of your desk.

Below are rounded off distances of the planets from the sun.

- Mercury 35, 980,000 miles
- Venus 67, 230,000 miles
- Earth 92, 969,000 miles
- Mars 141,000,000 miles
- Jupiter 483,600,000 miles
- Saturn 888,200,000 miles

1,786,400,000 miles

2,798,800,000 miles

- Uranus
- Neptune

• Pluto 3,666,200,000 miles

Finding the Scale for the Distance of the Planets of the Solar System Here is other information you will need to know:

0.75 equals 3/4
0.67 equals 2/3
0.50 equals 1/2
0.33 equals 1/3
0.25 equals 1/4

Calculating the Distance:

If we divide the distance of a smaller number by a larger number, it will give us a percentage of the value of the smaller number compared to the larger number. For example, if I want to run 12 miles and I have already run 8 miles I can find the percentage of how far I have run by dividing 8 by 12. The answer is 0.67 which means I have run 2/3 of the way. The same way works if I divide a smaller distance by a larger distance of the planets.

Divide these numbers and write the closest percentage. (The answers are on the next page.)

1. Neptune 2,798,800,000 miles by Pluto 3,666,200,000 miles =

- 2. Uranus 1,786,400,000 miles by Neptune 2,798,800,000 miles =
- 3. Saturn 888,200,000 miles by Uranus 1,786,400,000 miles =
- 4. Jupiter 483,600,000 miles by Saturn 888,200,000 miles =
- 5. Mars 141,000,000 miles by Jupiter 483,600,000 miles=
- 6. Earth 92, 969,000 miles by Mars 141,000,000 miles=
- 7. Venus 67, 230,000 miles by Earth 92, 969,000 miles=
- 8. Mercury 35, 980,000 miles by Venus 67, 230,000 miles=

Here are the answers. How did you do?

Now put the nearest fraction of what the percentage means by each percentage. The answers are on the next page.

- 1. Neptune 2,798,800,000 miles by Pluto 3,666,200,000 miles = 76%
- 2. Uranus 1,786,400,000 miles by Neptune 2,798,800,000 miles = 63%
- 3. Saturn 888,200,000 miles by Uranus 1,786,400,000 miles = 49%
- 4. Jupiter 483,600,000 miles by Saturn 888,200,000 miles = 54%
- 5. Mars 141,000,000 miles by Jupiter 483,600,000 miles= 30%
- 6. Earth 92, 969,000 miles by Mars 141,000,000 miles= 66%
- 7. Venus 67, 230,000 miles by Earth 92, 969,000 miles= 72%
- 8. Mercury 35, 980,000 miles by Venus 67, 230,000 miles= 53%

Here are the answers. How did you do? Now, what does this all mean?

- 1. Neptune 2,798,800,000 miles by Pluto 3,666,200,000 miles = 76% = 3/4
- 2. Uranus 1,786,400,000 miles by Neptune 2,798,800,000 miles = 63% = 2/3
- 3. Saturn 888,200,000 miles by Uranus 1,786,400,000 miles = 49% = 1/2
- 4. Jupiter 483,600,000 miles by Saturn 888,200,000 miles = 54% = 1/2
- 5. Mars 141,000,000 miles by Jupiter 483,600,000 miles= 30% = 1/3
- 6. Earth 92, 969,000 miles by Mars 141,000,000 miles= 66% = 2/3
- 7. Venus 67, 230,000 miles by Earth 92, 969,000 miles= 72% = 3/4
- 8. Mercury 35, 980,000 miles by Venus 67, 230,000 miles= 53% = 1/2

Now, what does this all mean? We can now put the planets in the place where they belong to the percentage distance it tells us.

- Neptune 2,798,800,000 miles by Pluto 3,666,200,000 miles = 76% = 3/4 This means the Neptune is 3/4 the way to Pluto. Put Neptune 3/4 the way to Pluto.
- Uranus 1,786,400,000 miles by Neptune 2,798,800,000 miles = 63% = 2/3 This means that Uranus is 2/3 the way to Neptune. Put Uranus 2/3 the way to Neptune.
- Saturn 888,200,000 miles by Uranus 1,786,400,000 miles = 49% = 1/2 This means that Saturn is 1/2 the way to Uranus. Put Saturn 1/2 the way to Uranus.
- Jupiter 483,600,000 miles by Saturn 888,200,000 miles = 54% = 1/2 This means that Jupiter is 1/2 the way to Saturn. Put Jupiter 1/2 the way to Saturn.

 Mars 141,000,000 miles by Jupiter 483,600,000 miles= 30% = 1/3 This means that Mars is 1/3 the way to Jupiter. Put Mars 1/3 the way to Jupiter.
 Earth 92, 969,000 miles by Mars 141,000,000 miles= 66% = 2/3 This means that Earth is 2/3 the way to Mars. Put Earth 2/3 the way to Mars.
 Venus 67, 230,000 miles by Earth 92, 969,000 miles= 72% = ³/₄ This means that Venus is 3/4 the way to Earth. Put Venus 3/4 the way to Earth.
 Mercury 35, 980,000 miles by Venus 67, 230,000 miles= 53% = 1/2 This means that Mercury is 1/2 the way to Venus. Put Mercury 3/4 the way to Mercury.

It doesn't matter what amount of space you have to do place the planets in their proper distance. It could be on a desk or on a football field. By following these percentages you can always place the planets to scale where they should be.

The Scale of the Distance of the Planets in the Solar System \geq Neptune is about 3/4 the way to Pluto. \succ Uranus is about 2/3 the way to Neptune. > Saturn is about 1/2 the way to Uranus. \geq Jupiter is about 1/2 the way to Saturn. \succ Mars is about 1/3 the way to Jupiter. \succ Earth is about 2/3 the way to Mars. > Venus is about3/4 the way to Earth. \geq Mercury is about 1/2 the way to Venus.

We are going to be learning about space for the next few months. Here are some things that you will know when you are done.

- I can identify the planets in the solar system by name and relative location from the sun.
- I can use references to compare the physical properties of the planets (e.g., size, solid or gaseous).
- I can research and report on the use of manmade satellites orbiting Earth and various planets.