

Comparing Planet Sizes

Target Standard Measurement

- Recognize the attributes of length, volume, weight, area, and time
- Compare and order objects according to these attributes
- Understand how to measure using nonstandard and standard units
- Measure with multiple copies of units of the same size, such as paper clips laid end to end
- Use tools to measure
- Develop common referents for measure to make comparisons and estimates

Related Standard Problem Solving

- Build new mathematical knowledge through problem solving
- Solve problems that arise in mathematics and in other contexts

Prior Knowledge

- K: understand how to measure using nonstandard units
- 1st grade and 2nd grade: understand how to measure using nonstandard and standard units, comparison of size in relation to planets, estimation

Teaching Plan

Implementation

Kindergarten

Discuss and model how to measure the diameter of a circle. Give each the students one of a number of pre-cut circles in different sizes. These will be unnamed planets! Let the children select a name for their planet, color their planet and then measure the length using a variety of nonstandard units such as; Unifix cubes, paper clips etc. Have students record their length measurements on their planet and help them label their planet's name if needed. After measuring is finished, have the students lay their planets out in order from the smallest to the largest.

Teacher Questions:

1. Why did you choose the name for your planet?
2. How did you know the length of your planet?
3. Which planet is the longest?
4. Which planet is the shortest?
5. Are any planets the same length?
6. Can you find something in the room that is the same length as your planet?

1st and 2nd Grade

Tell the students that today they will do comparisons of different sizes of planets and moons. Show them the page that shows the Earth and Moon.

Teacher Questions:

1. What should I use to measure? How many Moons go across the Earth, or how many Earths go across the Moon?
2. Why do you think I have to measure from the dot on the left side to the dot on the right side of the paper?
3. Have them guess (estimate) how many Moons it would take to go across the Earth from dot to dot. Write these on the board.

Pass out copies of the **Earth/Moon** activity sheet, and have them cut out the Moon and Earth and measure the diameter of the Earth using the Moon as the measurement unit. Once they have completed this, ask them "How many Moons across is Earth?" Next, have them estimate (once again, writing

answers on the board) and measure the diameter (from dot to dot) in inches using a standard ruler. Pass out the additional sheets **one at a time** and have the students use them to estimate, measure and compare sizes of planets and moons. As they determine their estimations and measurements, they will fill in the **Planet Size Data Sheet** with the planet diameter measurements.

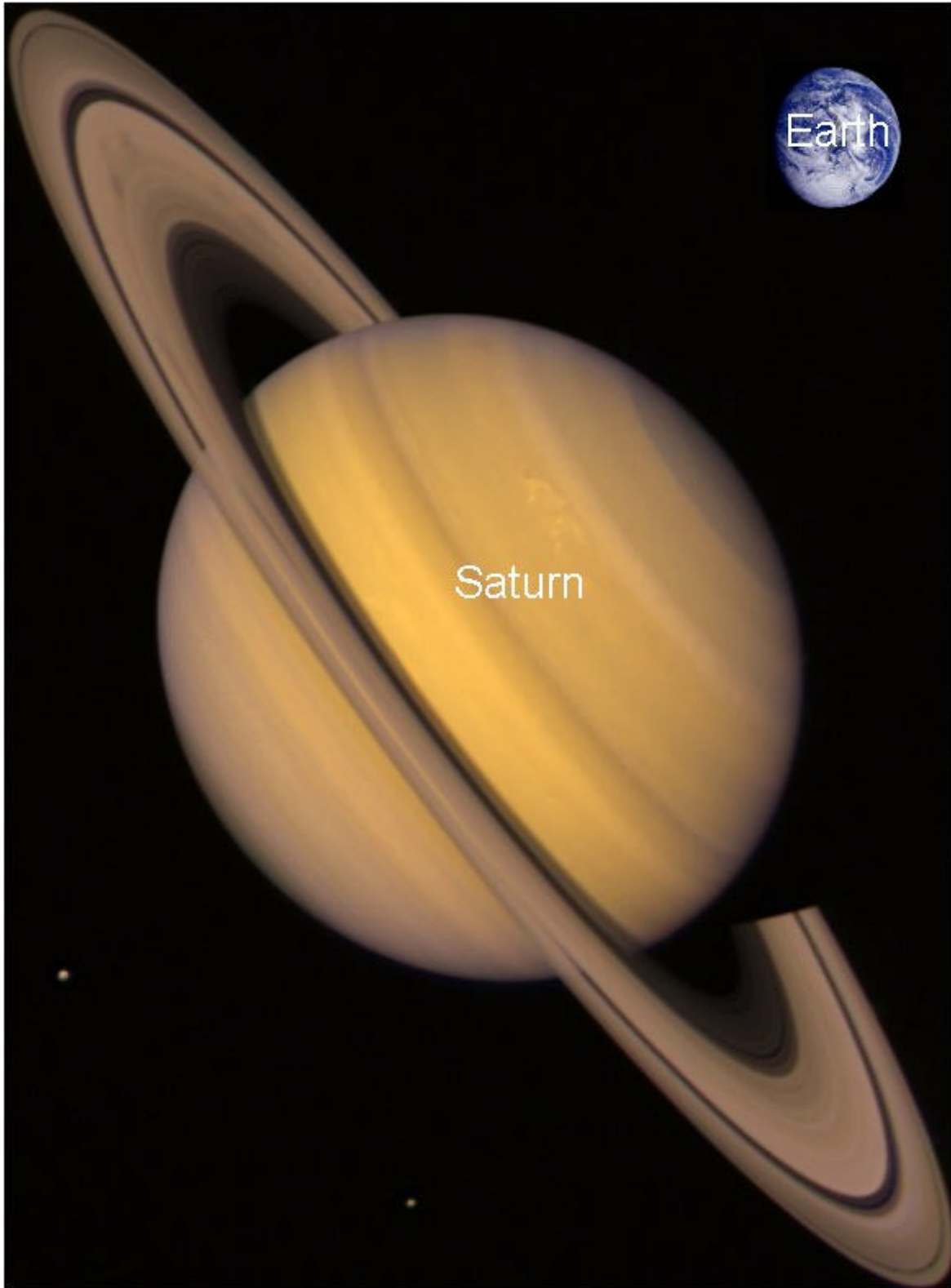
Teacher Questions:

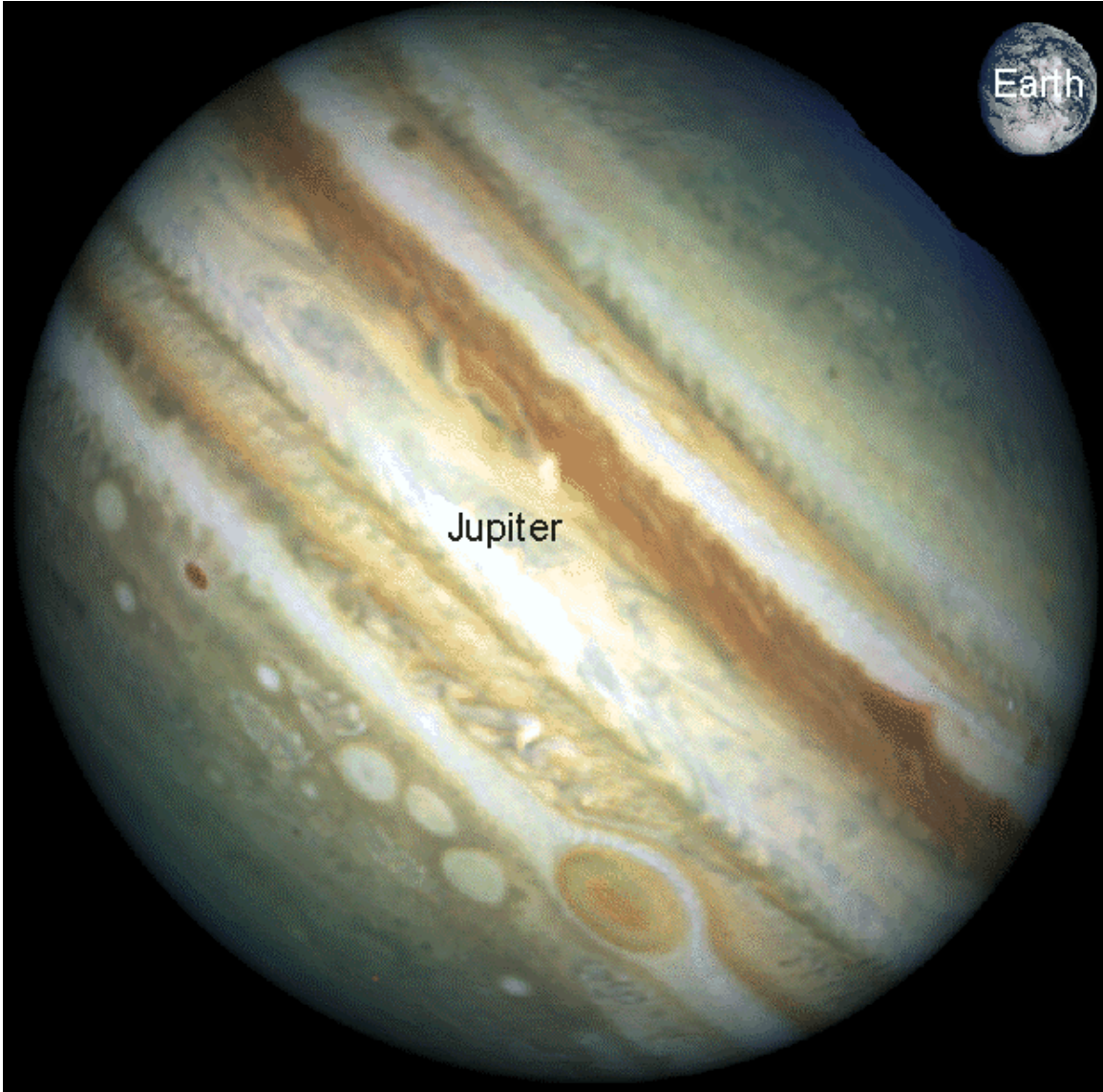
1. Were your estimates higher or lower than your actual measurements?
2. What did you discover about the sizes of the planets and moons?
3. Looking at the size of all the planets, would it be more appropriate to measure the size of Earth in Jupiters or in Mercurys? Explain your answer.

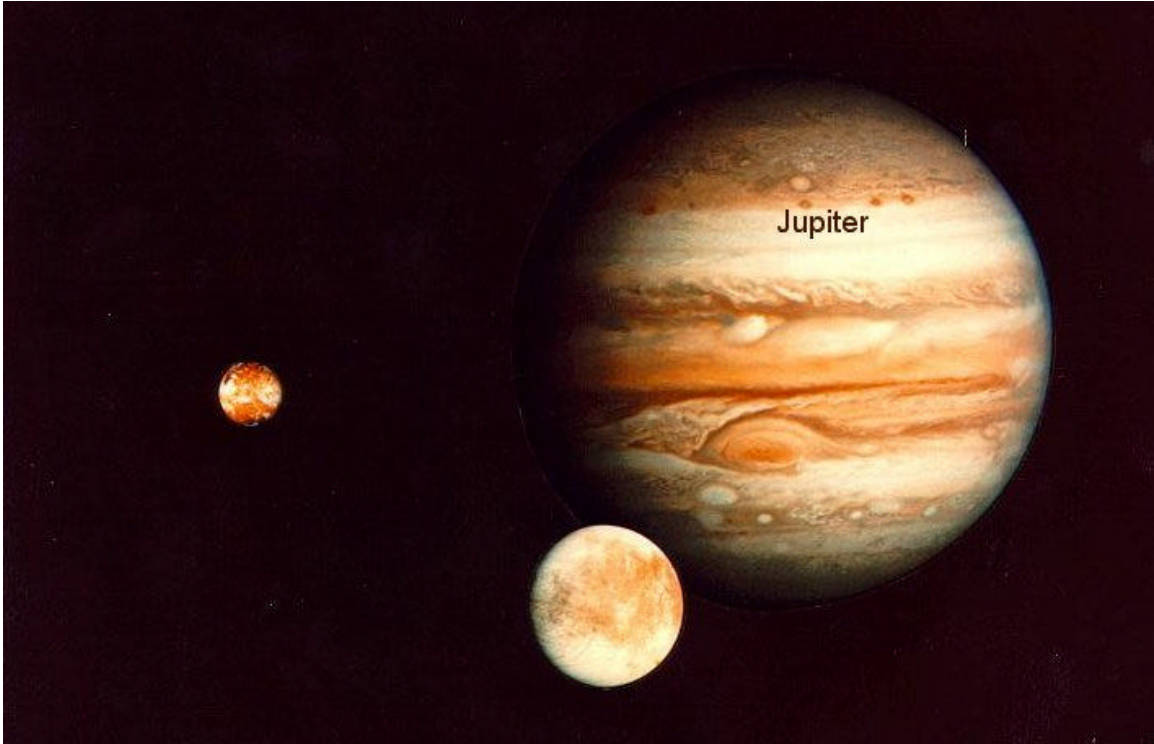
Teacher Resources

<http://spacelink.nasa.gov/products/Solar.System.Lithograph.Set/Our.Solar.System/System.Lithograph.pdf>









Name:

Planet Size Data Sheet

1. **Earth** is how many **Moons** across?

My estimation is _____ moons. It measured _____ moons.

My estimation is _____ inches. It measured _____ inches

2. **Jupiter** is how many **Earths** across?

My estimation is _____ Earths. It measured _____ Earths.

My estimation is _____ inches. It measured _____ inches

3. **Saturn** is how many **Earths** across?

My estimation is _____ Earths. It measured _____ Earths.

My estimation is _____ inches. It measured _____ inches

4. **Jupiter** is how many **little Jupiter Moons** across?

My estimation is _____ Moons. It measured _____ Moons.

My estimation is _____ inches. It measured _____ inches

5. **Jupiter** is how many **big Jupiter Moons** across?

My estimation is _____ Moons. It measured _____ Moons.

My estimation is _____ inches. It measured _____ inches