



Small & Large Card Game

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Summary:

In this simple and engaging activity, learners will sort images according to size and gain a basic understanding for the scale of objects in the universe. We recommend using it in workshops, camp-ins, with school groups, for family events, and on the exhibit floor near the “Powers-of-Ten” display.

Learning Goals:

Learners will come away with an understanding that:

- o There are several different kinds of objects in the Universe
- o These objects are of different sizes
- o These objects can be organized by their sizes in relation to each other

Length: 3-5 min

Ages: 5 & Up (ages 5-9 best with adult facilitation/collaboration)

Materials You Will Need:

- o **Table** (chairs optional)
- o **Picture Cards:** These are included at the end of this document under “Full Size Images for Cards.” Simply print and then cut out. We recommend laminating the picture cards for multiple use. Note that you can also print out the pictures at 4-per-page to make smaller cards if you choose.

Key:

Italicized Text is suggested script

Tips:

This game is an excellent engagement activity for learners to begin thinking about our place in space and the relative sizes of objects in the universe. When facilitating this game, get participants to think. Strive to be “a guide on the side” by encouraging questions, asking your own questions, and offering hints rather than imposing “right and wrong” answers. In this way, the game becomes much more a discovery process for learners and the role of the facilitator is to pose challenging questions and offer hints and clues along the way.

PowerPoint versions available for download on the Space Science Institute web site at www.alieneartths.org and http://www.spacescience.org/education/instructional_materials.html

Thanks to: Preston Dyches for researching the distances between objects and Earth
Michael Zawaski and Preston Dyches for help with formatting the images
Brad McLain for adapting this version

Facilitator Instructions:

Step 1: Start with the cards mixed up each time.

I am going to show you nine images. See if you can put them in order from the smallest to the largest.

Answers:

1. Lions
2. Space Shuttle
3. Moon
4. Mars
5. Earth
6. Jupiter
7. Sun
8. Solar System
9. Galaxy
10. Cluster of galaxies

Step 2: Offer Hints as Needed:

Ask the students to respond to these hints before showing the solution, when offering help. You can give one or more hints as needed.

Space Shuttle Hint: The length of the Space Shuttle is 37 meters (121 feet), about 1/3 of a football field with endzones.

Earth-Mars Hint: Earth's surface is about 70% covered with water. Mars has no oceans, only land area. The land area of Mars is about the same as the land area on Earth.

Jupiter Hint: More than two Earths could fit across Jupiter's Great Red Spot.

Sun Hint: One million (1,000,000) Earths could fit inside our Sun.

Solar System Hint: Our Solar System contains nine planets (10 if you count the discovery of the newest planet in 2005), their moons, and one star – our Sun.

Galaxy Hint: Galaxies contain hundreds of billions of stars.

Consider the diameter of Earth. You can compare it to the other objects in the pictures. For example:

- o The diameter of the Moon is **one-quarter** that of Earth.
- o The diameter of Mars is **half** that of Earth.
- o The diameter of Jupiter (the largest planet in the Solar System) is **ten times** that of Earth.
- o The Sun is the star at the center of our Solar System. The diameter of the Sun is **about one hundred times** that of Earth.

Frequently Asked Questions:

Why do the Sun and the Moon appear to be the same size in the sky? The diameter of the Sun is 400 times greater than the diameter of the Moon. But the Sun is 400 times farther from Earth.

What are the differences between a planet and a star?

- o A star is much bigger and more massive.
- o A star shines with its own light; a planet reflects the light from a star.
- o Planets orbit around stars.

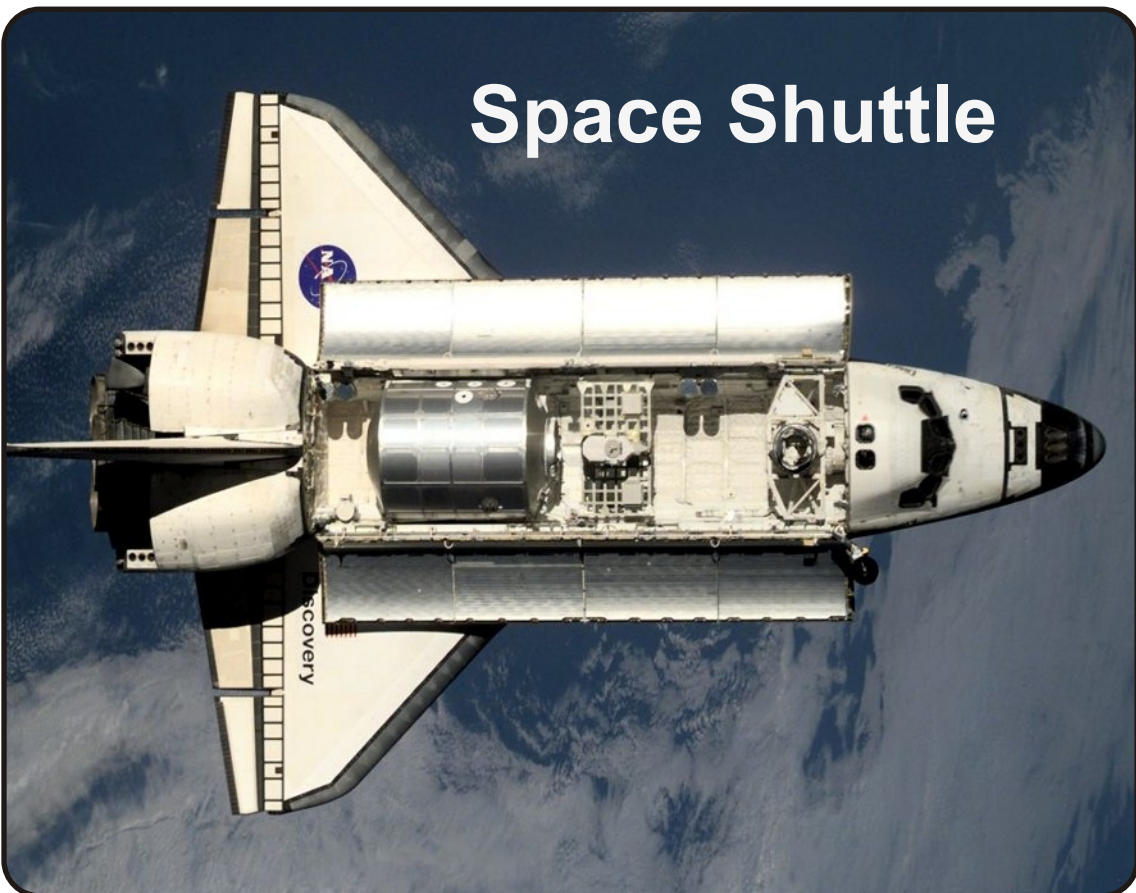
What is the difference between our solar system and a galaxy?

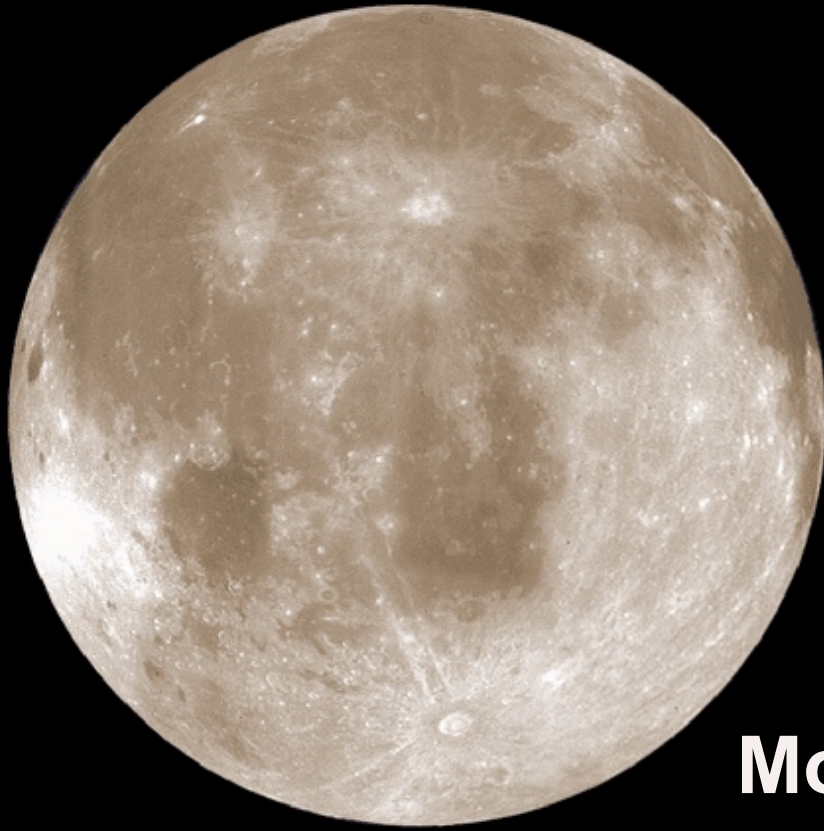
Our Solar System has a star at its center called the Sun. There are nine planets that orbit around the Sun (10 if you count the discovery of the newest planet in 2005). The Sun is the only star in our solar system. On the other hand, there are more than a hundred billion suns (stars) in a galaxy like the one pictured.

Lions

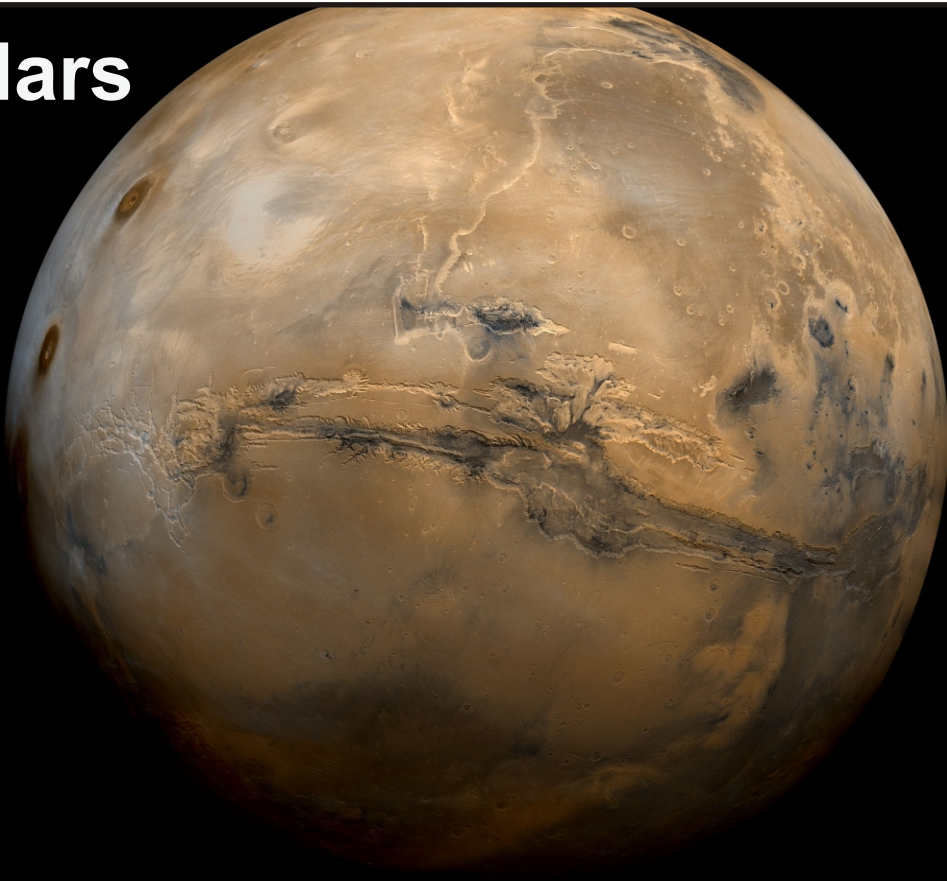


Space Shuttle





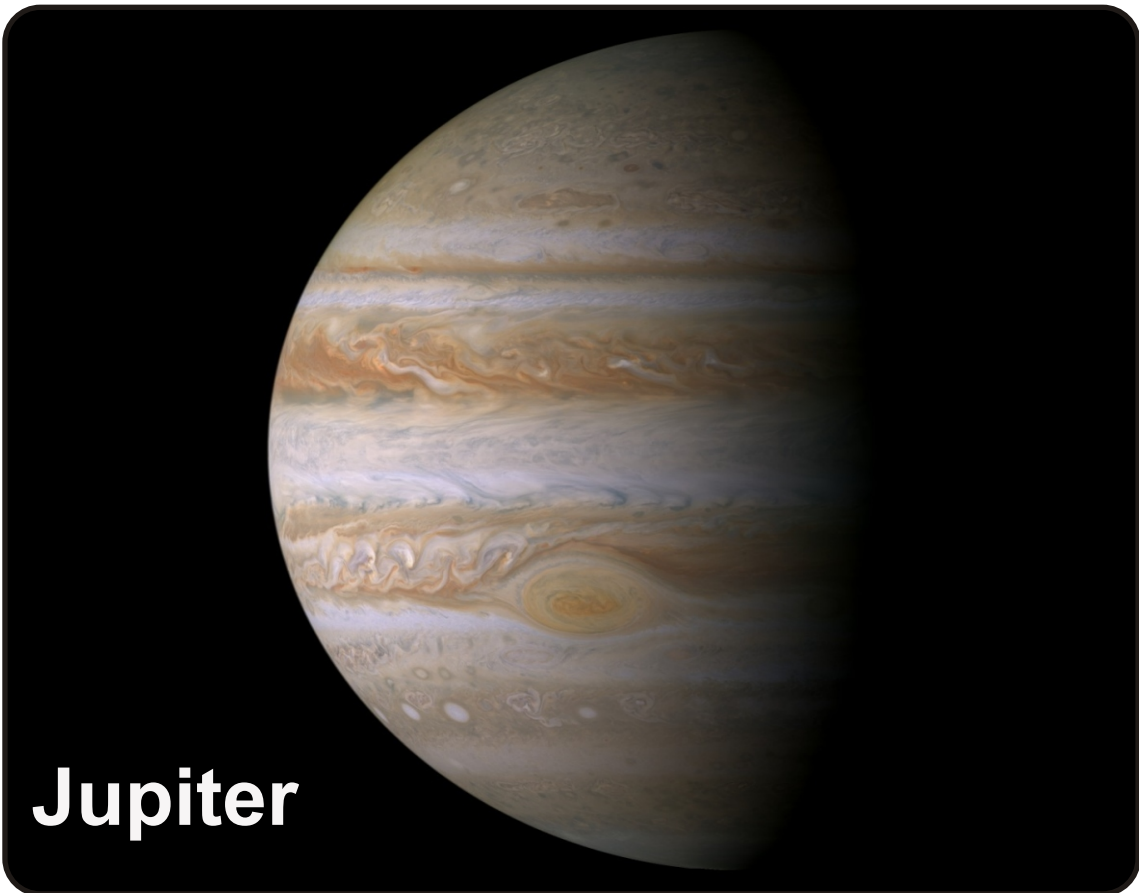
Moon



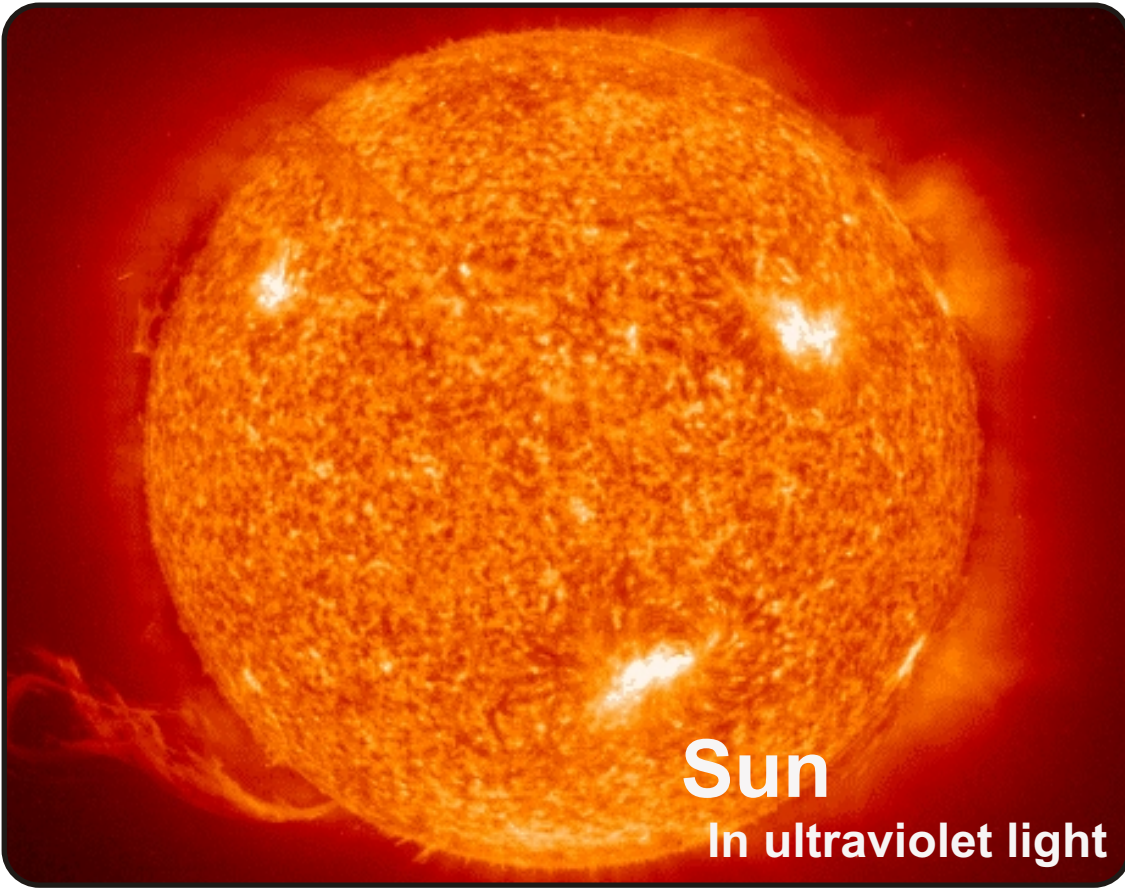
Mars



Earth



Jupiter



Sun
In ultraviolet light



Solar System



Andromeda Galaxy



Cluster of Galaxies