

TWO ASTRONOMY GAMES

We are going to play two astronomy games, one that is called “Small and Large”, and another called “Near and Far”.

Read through **FREQUENTLY ASKED QUESTIONS** first to increase your background knowledge.

Small and Large

1. Organize the students into small groups.
2. Make a copy of the set of ‘Small and Large’ pictures (**the set with “BEARS”**) for each group of students.
3. Cut out the individual pictures (the students may do this), but keep them together as a “set”.
4. Give each group of students a set of ‘Small and Large’ pictures.
5. Instruct the students to place the pictures in order from smallest to largest. Allow up to 5 minutes and encourage logical discussion based on current knowledge.

HINTS

You can give one or more hints as needed. The letters below correspond to the letters representing the images.

- A. The distance between the Sun and Earth is 400 times greater than the distance between the Moon and Earth.
 - C. The length of the Space Shuttle is 37 meters (121 feet).
 - G. The diameter of Mars is around half that of Earth.
 - H. The galaxy in this image cannot be our Milky Way because we are able to see the entire galaxy. It is not possible to travel outside of our galaxy to obtain an image like this one.
6. Observe the order that each group has chosen before giving the solution. It is usually best to talk through all answers one at a time, starting from the beginning (don’t reveal all the answers at once). Pause now and then to ask students *why* one object is larger or smaller than another.

Near and Far

7. Make a copy of the set of “Near and Far” pictures (**the set with “AN EAGLE”**) for each group of students.
8. Cut out the individual pictures (the students may do this), but keep them together as a “set”.
9. Give each group of students a set of “Near and Far” pictures.
10. Instruct the students to place the pictures in order from nearest to the surface of Earth to farthest from the surface of Earth. Allow up to 5 minutes and encourage logical discussion based on current knowledge.

HINTS

- A. The distance between the Sun and Earth is 400 times greater than the distance between the Moon and Earth.
 - B. This galaxy cannot be our galaxy (the Milky Way) because we are able to see the entire galaxy. It is not possible to travel outside of our galaxy to obtain an image like this one. If you can see the spiral structure of a galaxy, it is certain to be outside of our own galaxy.
 - C. Auroras are found in the highest regions of the atmosphere.
 - E. Usually, jet airplanes fly in the stratosphere, at more than 10 kilometers (6 miles) above the surface of Earth.
 - F. The Space Shuttle can visit the Hubble telescope to do maintenance or make repairs. The Space Shuttle cannot visit the Moon.
 - H. The stars of the constellations that we can see in the sky are located in our galaxy (the Milky Way).
 - I. Earth orbits the Sun at a distance of 1 AU (Astronomical Unit). Saturn orbits the Sun at a distance of 10 AU.
11. Observe the order that each group has chosen before giving the solution. It is usually best to talk through all answers one at a time, starting from the beginning (don’t reveal all the answers at once). Pause now and then to ask students *why* one object is larger or smaller than another.

SOLUTION “Small and Large”

(smallest to largest)

- F. BEAR
- C. SPACE SHUTTLE
- D. MOON
- G. MARS
- B. EARTH
- J. JUPITER
- A. SUN
- E. THE SOLAR SYSTEM
- H. GALAXY

SOLUTION “Near and Far”

(nearest to farthest)

- G. AN EAGLE
- E. JET AIRPLANE
- C. AURORAS
- F. HUBBLE SPACE TELESCOPE
- D. MOON
- A. SUN
- I. SATURN
- H. STARS OF THE BIG DIPPER
- B. A GALAXY

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 that of the Moon, but the Sun is 400 times farther from Earth than the Moon. That is why you can see a total eclipse of the Sun, during which the Moon blocks the light from the Sun.

What are the differences between a planet and a star?

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

How far from Earth’s surface are auroras?

Auroras are found from 95 to 190 kilometers (about 60-120 miles) above the Earth’s surface.

How far from Earth’s surface is the Hubble telescope?

The Hubble telescope orbits around Earth at a distance of 600 kilometers (373 miles).

How far from Earth is the Moon?

The Moon is about 400,000 kilometers (250,000 miles) from Earth.

How far from Earth is the Sun?

The Sun is 1 Astronomical Unit (AU) = 150,000,000 kilometers (93 million miles) from Earth.

How far from Earth is Saturn?

From 9 AU to 11 AU. It depends on which side of the Sun that Saturn is on, relative to Earth.

How far is the Big Dipper from Earth?

That depends on the star. The brightest stars of this constellation are between 70 and 100 light-years from Earth. A light year is about 10 trillion kilometers (6 trillion miles). 10 trillion = 10,000,000,000,000

How far is the galaxy in the image from Earth?

This galaxy, NGC 4414, is 60 million light years from Earth.

“TWO ASTRONOMY GAMES” was created by Cherilynn Morrow, PhD, of the Space Science Institute. Dr. Morrow’s Powerpoint version of “Two Astronomy Games” (with instructions) is available on the website of the Space Science Institute.

http://www.spacescience.org/education/instructional_materials.html