

HOW BIG AND FAR AWAY ARE OBJECTS IN SPACE?

Name: _____

Date: _____

Objective: I will create a scale model of the Earth, Moon, and Sun to compare their sizes and distances from each other.

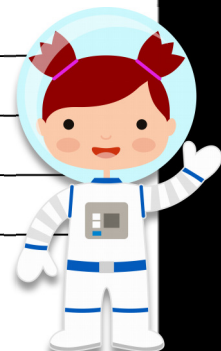
The Size and Distance of Space Objects:

The **universe** is everything that exists, including all of space. The planets, moons, stars, and the Earth are all part of the universe. It is incredibly difficult for us to picture how big the universe is, because it is immensely huge. The Earth is very small compared to some objects in space, yet the Earth seems HUGE to us. It is also difficult for us to imagine how far apart objects in space are from each other, because the distances are much farther than anything we travel on Earth.

Today, we'll focus on comparing the sizes and distances of three space objects that you are probably the most familiar with: The Sun, Moon, and Earth.

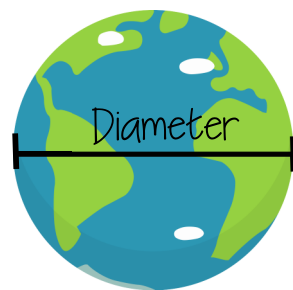
Think about it:

When you are standing on the Earth and look up into the sky, how do the sizes of the Moon and Sun compare? Does one look bigger than the other, or do they look about the same size?



ACTUAL SIZES

The Earth is _____ kilometers (km) wide. The width of a sphere is also called its **diameter**. The Moon has a diameter of _____ km. The Sun has a diameter of _____ km.



DIRECTIONS: Using the information above, put the Earth, Moon, and Sun in order from smallest to largest, and include their diameters in the table:

	Smallest	Middle	Largest
Object			
Diameter (km)			

Is this order (from smallest to largest) what you expected it to be, or are you surprised?

SCALE MODELS

If we want to compare the sizes of the Earth, Moon, and Sun, we cannot draw them in their actual size. They would be WAY too big to draw! These objects are immensely large and far away from each other.

We need to draw a **scale model**. A scale model is either a zoomed in representation of something that is very small, or zoomed out version of something that is very large. To make a scale model you either shrink or enlarge all of the objects by the same amount.

On the next page, we are going to draw a scale model of the size of the Earth, Moon, and Sun.

Scale Model of Size

Draw a scale model of the Moon, Earth, and Sun that shows their sizes compared to each other. If we zoom out to draw these huge objects about six billion times smaller than they actually are, they would be the following sizes:

Earth: 2 mm

Moon: 0.5 mm

Sun: 19.8 cm

Draw a scaled model of the Earth below:

Draw a scaled model of the Moon below:

Draw a scaled model of the Sun below:

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SCALE MODEL OF SIZE AND DISTANCE

We can also create scaled models to represent the distance things are from each other.

The Moon is _____ kilometers away from the Earth.

The Sun is _____ kilometers away from the Earth.

Fill in the blanks: The _____ is much closer to the Earth than the _____.

Create your scaled model

If the Earth and Moon were the sizes from our scale model on page 3, they would be _____ cm apart from each other.

DIRECTIONS:

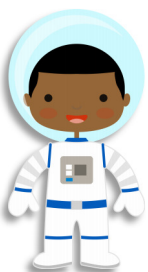
1. Label the 2mm circle on the left side of the page "Earth".
2. Measure 5.5 cm to the right and draw a small dot to represent the 0.5mm scaled Moon. Label it "Moon".



PREDICT: If the Earth and Moon are 5.5cm away from each other in our model, predict how far you think our 19.8cm scaled Sun would be from Earth.

Hint: It will NOT fit on this paper! Use the unit centimeters or meters for your prediction.

My Prediction: _____ Actual Distance: _____



My observations about the distance and size of objects:



Name: _____

Date: _____

ANALYSIS OF SCALE MODELS

1. What do you notice about the distance of the Earth to the Moon, compared to the distance of the Earth to the Sun?

2. If the Sun is actually so much bigger than the Moon, then why do you think they look like they are about the same size from Earth?

3. Are the models we made at a smaller, larger, or same size scale as the actual Moon, Sun, and Earth? How do you know?

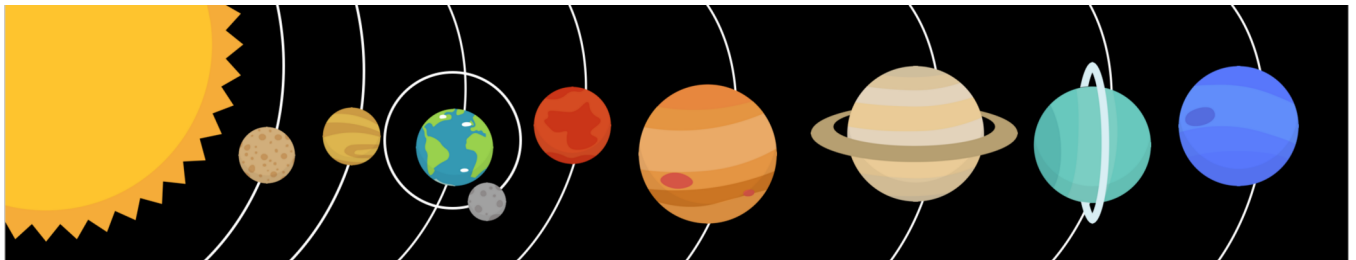
4. Why do scientists use scale models to represent very large or very small objects? _____

Objective: I DID create a scale model of the Earth, Moon, and Sun to compare their sizes and distances from each other.

5. Which is larger, the size of the Sun, or the empty distance between the Sun and Earth?

6. Why do you think we didn't draw a model that included both the correct size AND distance for the Earth, Moon, and Sun on our papers?

7. Based on what we've learned about scale models in this lesson, is the picture of the Solar System below drawn to scale? Why or why not?



Objective: I DID create a scale model of the Earth, Moon, and Sun to compare their sizes and distances from each other.