

# Earth's Orbit

## Grade 5

Authors: Austin Carter, Dale Rucker, Alison Hursey, Sarah Fortner

### References:

- CPS curriculum guide
- Exploratorium

### Benchmarks & Objectives:

ES-2: Explain that Earth is one of several planets to orbit the sun, and that the moon orbits the Earth.

ES-3: Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thick blanket of air, elliptical orbit, tilted axis and spherical planet.

### Key Definitions:

**Gravity:** A force of attraction, or pull, between any object and any other objects around it. This is what holds objects in orbit around other objects.

**Inertia:** The tendency of a moving object to keep moving in a straight line.

**Ellipse:** An oval shaped curve that looks like a circle that has been stretched out.

**Sphere:** A ball-shaped object that is round in three dimensions.

### Materials:

- Tether ball with rope

### Initial Demonstration:

Go over the problem of "What would happen if gravity was turned off?" Draw three options up on the board (Straight line tangent to circle, slowly falling out of orbit in a curved path, quickly falling out of orbit in a curved path). Discuss what the class thinks is the correct option? How do we test this? Do an experiment!

### Procedure:

Go outside and have students spin the tether ball around in a circle. When doing this, emphasize that the ball represents the earth, that it is orbiting the person who represents the Sun, and that the rope holds the two together and represents gravity. Explain that "letting go of the rope" is equivalent to "turning off gravity". What path does the ball take? (straight line) Repeat until everybody is convinced.

Have the students work on the worksheet on page 17 of their Universe Student Journal. This reinforces the ideas discussed in class. Were people's predictions correct?

# Earth's Orbit around the Sun

Name: \_\_\_\_\_

## Key Definitions:

**Gravity:** A force of attraction, or pull, between any object and any other objects around it. This is what holds objects in orbit around other objects.

**Inertia:** The tendency of a moving object to keep moving in a straight line.

**Ellipse:** An oval shaped curve that looks like a circle that has been stretched out.

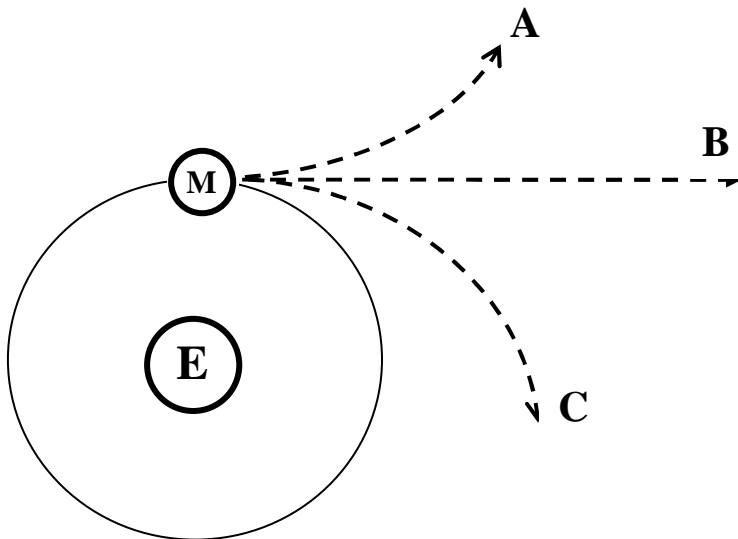
**Sphere:** A ball-shaped object that is round in three dimensions.

1. The Earth revolves around the Sun. The Moon revolves around the Earth. Draw a simple diagram of these two orbits. (Include labels)

2. Are these orbits perfect circles? If not, what are they? \_\_\_\_\_

3. What vocabulary word that we have learned in science class would best describe the shape of most large objects in our solar system? \_\_\_\_\_

4. If the gravity between the Moon and the Earth were to all of a sudden be turned off, which of the paths below would the Moon take? (Remember what we did in class today)



\*Don't worry, this is NOT going to happen.

5. Loki is a 25 pound miniature schnauzer what does he weigh on other planets?

Remember, gravity is the pull toward the center of an object; such as a planet or a moon. When we weigh ourselves, we measure the amount of gravitational attraction exerted on us by Earth. The Moon has a weaker gravitational attraction than Earth. In fact, the Moon's gravity is only 1/6 of Earth's gravity. So, you would weigh less on the Moon. How much would you weigh on the Moon and on the other planets?

<b>Planet</b>	<b>Multiply Loki's Earth weight by:</b>	<b>Loki's "new" weight</b>
Mercury	0.4	
Venus	0.9	
Earth	1	
Moon	0.17	
Mars	0.4	
Jupiter	2.5	
Saturn	1.1	
Uranus	0.8	
Neptune	1.2	
Pluto	0.01	
Sun	28	

*<http://www.exploratorium.edu/ronh/weight/>*