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# The Earth in Motion

Earth  
Science

2



## Rotating and Revolving



A car may travel 70 miles an hour. An airplane may travel 700 miles an hour. The Earth can travel almost 70,000 miles an hour.

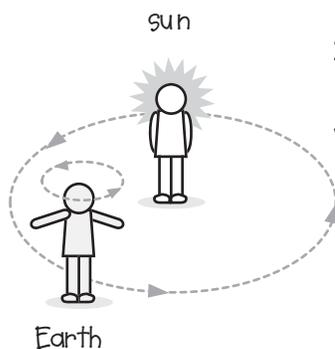
Our Earth has two basic motions. It rotates or spins in place. This **rotation** takes 24 hours and gives us day and night.

The Earth also **revolves** around the sun. This takes 365 days or one year. The path of the Earth around the sun is called an **orbit**.

### Experiment

Get a friend to help you act out the Earth's rotation and revolution.

1. You be the sun. Stand still in an open space.
2. Have your friend stand a few feet away to be the Earth. The Earth is really 93 million miles away from the sun.
3. Your friend should start slowly spinning his or her body. This is the Earth's rotation. While spinning, the friend should move in a circle around you. The circle is the Earth's revolution around the sun.



How long does one Earth rotation take?

How long does it take for the Earth to revolve about the sun?

Find out when the next leap year will be. Write the year below.

\_\_\_\_\_

*The Earth's rotation really takes  $365\frac{1}{4}$  days. That is why we add a day in February every four years. This is called a leap year.*



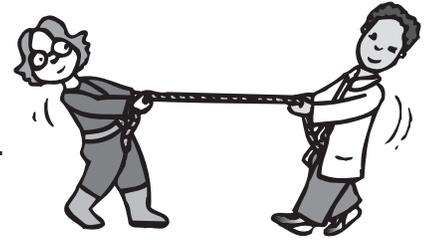
# The Earth in Motion



## Flying into Space

There is no rope holding the Earth to the sun. Why doesn't the Earth leave its orbit around the sun and fly into space?

Suppose you had two people, exactly equal in strength, pulling on a rope. The rope would not move. The same is true of the Earth. The pull of gravity inward is the same as the motion pull outward. Because of these two equal forces, the Earth stays in orbit.



### Experiment

Let's experiment with this idea. Tie three feet of string firmly to a large nail. Shove the nail halfway into a styrofoam™ ball.

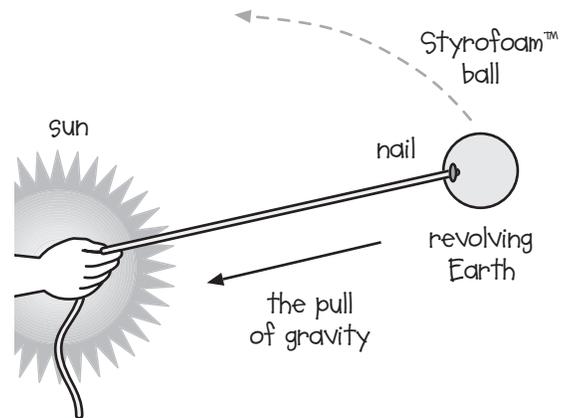
Go outdoors. Think safety. Make sure no one is too close to the experiment.

Rotate the string and ball gently around your head. The string pulling inward acts like the force of gravity. The revolving ball is an outward force. The two forces balance and the ball spins in orbit.

What would happen if the Earth sped up? Would it stay in orbit or fly off into space?

Let's use our ball on a string to find out. Slowly rotate the ball around your head. Then speed up the rotation until the ball leaves the nail.

Repeat this a few times. Watch what the ball does as it flies off. Does the ball continue in a circle? Does it fly off in a straight line?



Let an adult help you with the nail.

# The Earth in Motion



## More Earth Motions

You know the Earth rotates and revolves. The Earth also wobbles. It is a very slow wobble. One wobble can take 23,000 years.

### Experiment

Here is a way to imitate the Earth's wobble.

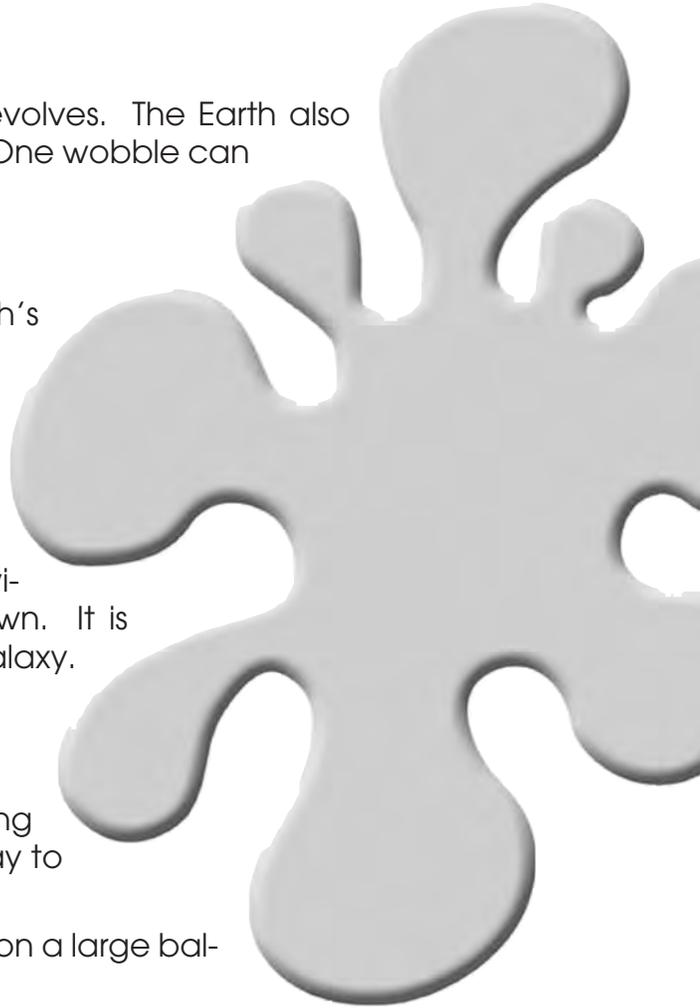
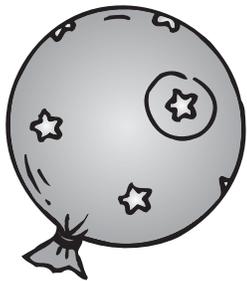
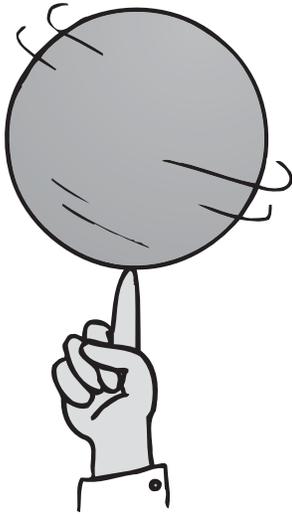
1. Find a large ball.
2. Rotate it on one finger as shown in the sketch. As the ball rotates it will also wobble.

The Earth is tied to the sun by gravity. The sun has a motion of its own. It is moving as part of the Milky Way galaxy. The Earth must move with the sun.

### Experiment

Scientists think every star is moving away from the others. Here is a way to demonstrate this idea.

1. Use a pen to draw 10 small stars on a large balloon.
2. Place a circle around one of the stars. That will be our sun.
3. Blow up the balloon to about the size of your face.
4. Did the stars get farther apart? All the stars in the universe seem to be moving away from each other in a similar way.



# The Earth in Motion

## Big Idea Review

Here are six sentences to help you review the big ideas of this chapter. Unscramble the key words.

1. The Earth \_\_\_\_\_ around the sun.

**VOLVERES**

2. \_\_\_\_\_ helps keep the Earth in place.

**TIYVARG**

3. The Earth \_\_\_\_\_ once in 23,000 years.

**BOWLEBS**

4. The Earth's path around the sun is called an \_\_\_\_\_.

**BROTI**

5. The Earth \_\_\_\_\_ in 24 hours.

**TROSEAT**

6. Our sun is part of the Milky Way \_\_\_\_\_.

**LAXGAY**

