

Kinetic and Potential Energy

Did you know that everything in the world can be organized into two categories or groups? These two groups are **matter** and **energy**. If something is not matter, it's energy! Energy is all around us. We can see it as light, feel it as heat, hear it as sound, and produce it as we do work. Energy can be divided into two groups: **kinetic** and **potential**.



How we experience energy:

*See it as _____

*Feel it as _____

*Hear it as _____

*Produce it as we _____

Everything in the world can be organized into _____ groups.

AND



Kinetic energy is the energy of motion. All moving objects have kinetic energy. When an object is in motion, it changes its **position** by moving in a direction: **up**, **down**, **forward**, or **backward**. This motion can be described by tracing and measuring the object's position over time.

When an object is in motion, it changes its position by moving in a direction.

List the directions an object can move →

In the activity box, write the direction the object moves when it is in motion.

For #5, you write an example of a moving object and which direction it moves.



Object in Motion

Direction

1. A person diving into a pool.

2. A class walking down the hall.

3. A ball thrown in the air.

4. A car going in reverse.

5.

Potential energy is stored energy. Even when an object is sitting still, it has energy stored inside that can be turned into kinetic energy (motion). An excellent example is a baseball pitcher. Right before a pitcher throws the baseball, he stands very still (stored energy). As he winds up and releases the ball, the stored energy is changed into kinetic energy, the energy of motion! But what *caused* the ball to move? Potential energy can also be seen at the top of a waterfall. What does the water at the top have to do?

FILL IN THE BLANKS ABOUT THE DIFFERENT FORMS OF ENERGY!



When an object is sitting still, it has _____ energy.
This energy is called _____ energy.



As an object is released, it changes to _____ energy.

Forms of Energy

Directions: Write either *potential* or *kinetic* in the blanks in each sentence.

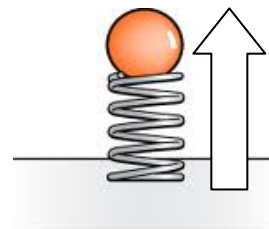
1. A tractor pulling a plow has _____ energy.
2. A rooster sitting atop a fence has _____ energy.
3. The rooster's energy changes to _____ energy when it jumps off the fence.
4. When a horse trots down a trail it has _____ energy.
5. Throwing a ball up in the air gives it _____ energy.

Write either **kinetic energy** or **potential energy** on each line to show the form of energy described in the picture.

A spring pushed down



Release the spring




For an object to move, there must be a **force**. A force is a **push** or **pull** that causes an object to move, change direction, change speed, or stop. Without a force, an object that is moving will continue to move and an object at rest will remain at rest. Some forces are greater than other forces, and **the greater the force, the greater the motion**. Also, **the greater the mass of an object, the greater the force it will take to move it**.

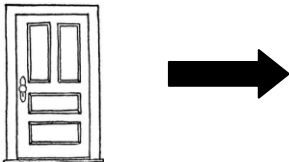
An object can't move unless there is a _____ causing it to move.
A force can be a _____ or a _____.

Below are a football and a door at rest. It will remain at rest until a force is acted upon it.
Draw a picture of what the football will look like if it's **PUSHED**.
Then, draw a picture of what a door looks like when it's **PULLED**.

A football at rest: **Push** the football!



A door at rest: **Pull** the door open!



We can measure how great or small a motion is by measuring the speed of an object. **Speed** tells us how fast something is moving. Speed is a measure of motion. The speed of an object can **increase**, **decrease**, or **remain the same**.



SPEED!
TELL ME AT LEAST TWO FACTS YOU LEARNED ABOUT SPEED:

Not all forces cause motion, however. Some forces, like **gravity** and **friction**, resist or work against movement. **Friction** happens when matter rubs against matter. It slows the speed of a moving object and creates heat. A simple example of friction is when you rub your hands together. As you rub your hands against each other, friction occurs and heat is created.

EXPERIENCE FRICTION!

*Go ahead – try rubbing your hands together to feel friction.

What did you feel? _____

*Can you think of anywhere in the world where we might need friction?

(Think about when we need to STOP movement.)



Identify The Force!

Directions:

Below is a list of everyday activities. Identify the force (*push, pull, gravity, or friction*) being demonstrated in each activity and then explain your answer. Write your answers in the spaces provided.

<u>Activity</u>	<u>Force</u>	<u>Reason</u>
1. Jumping off the diving board		
2. Downhill skiing		
3. Drinking out of a straw		
4. Getting out of a chair		
5. Basketball falling to the ground		
6. Playing tug of war		
7. Sliding into a baseball base		
8. Bike skidding on a road		
9. Shooting a basketball		
10. Opening a door		
11. Write one of your own:		
12. Write another of your own:		