5th Grade Science
EOG Review Mini Lessons

Crash course in exactly what you need to know to be successful on the 5th grade Science EOG.

5.P.1.1 and 4

Force and Motion

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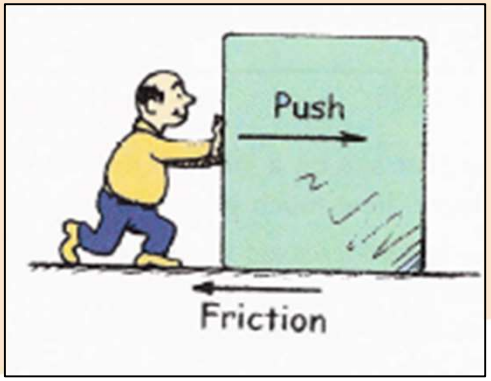
Newton’s Laws of Motion and Predicting Motion

Forces.

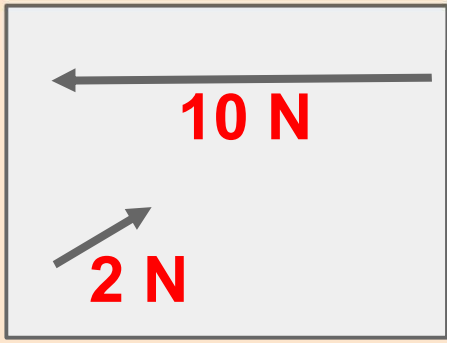
- a force is a **push** or **pull**.
- measured in **Newtons**
- symbolized with arrows to show their **strength** and **direction**.



The Newton

Force is a quantity that is measured using the standard metric unit known as the Newton. A Newton is abbreviated by an "N." To say "10.0 N" means 10.0 Newton of force. One Newton is the amount of force required to give a 1-kg mass an acceleration of 1 m/s/s. Thus, the following unit equivalency can be stated:

$1\ \text{Newton} = 1\ \text{kg} \bullet \text{m/s}^2$



Balanced Forces

- Balanced forces *don't change motion*
  - Cancel each other out

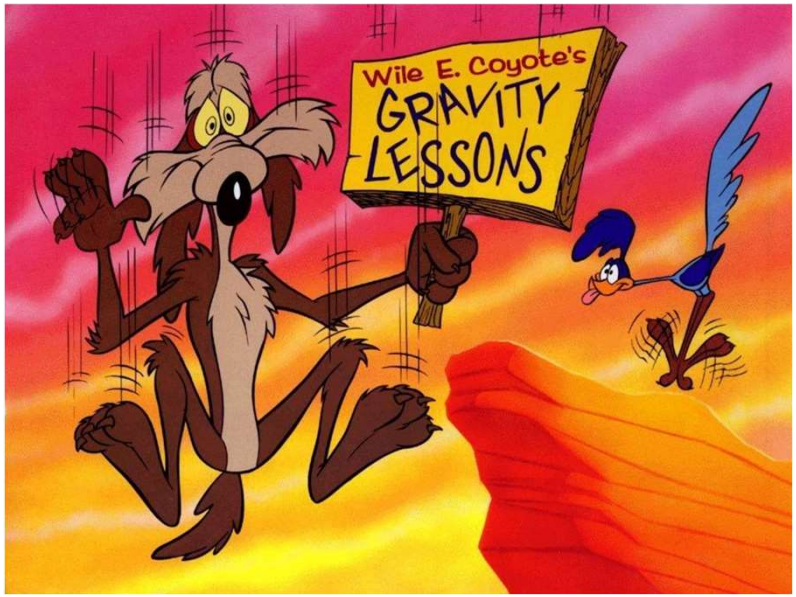
Unbalanced Forces

- Forces that don't have the same strength don't cancel each other out, and change motion
  - Objects accelerate in direction of stronger force

- MASS = the amount of matter in an object
- WEIGHT = the force of gravity acting on an object, will change if the force of gravity changes (ex. Walking on the moon).

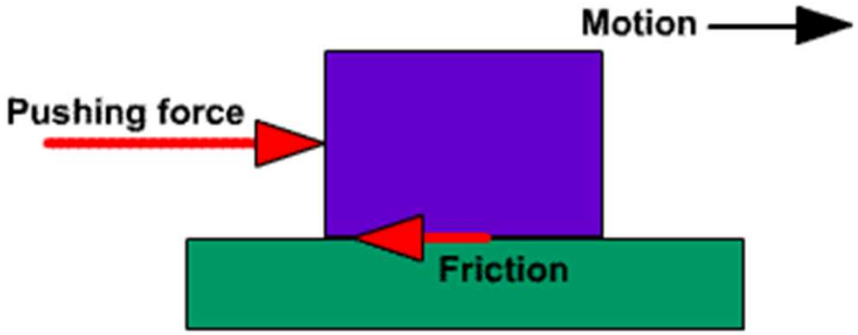
Gravity

- Reason why things fall to the ground
  - Gravity acts even when the objects don't touch
- Pulls objects downward



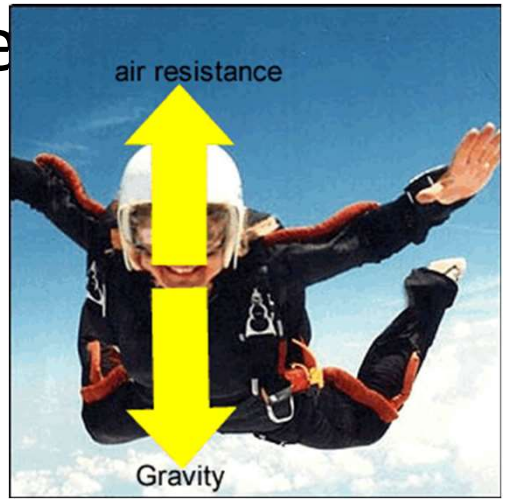
Friction

- Friction
  - A force that acts in the opposite direction of the motion of the object (slows object down)



Air Resistance

- Interaction between the surface of a moving object and air molecules
  - Type of friction
- Size, shape of object and spe
  - Larger objects
  - Faster moving objects
    - More air resistance



Newton's 1st Law

- An object in motion will stay in motion and an object at rest will stay at rest UNLESS acted upon by an unbalanced force.

- Plane flying through air?
- Hockey puck on ice?

Newton's 1st Law

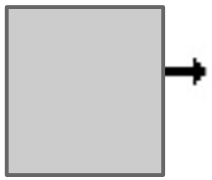
- This is sometimes called the **Law of Inertia**.

- INERTIA = the tendency of an object to resist a change in motion.

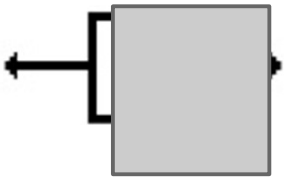
Newton's 1st Law of Motion

"An object at **rest stays at rest** and an object in **motion stays in motion** with the same speed and in the same direction **unless acted upon by an unbalanced force**."

unbalanced force = **change** in motion



balanced force = ***no*** **change** in motion



*Thought Questions

1. You're driving and you brake suddenly.

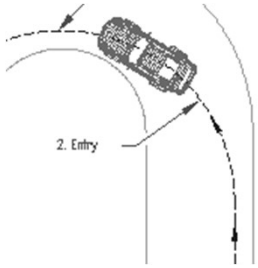
What happens to your body?

2. You speed up suddenly.

What happens?

3. You turn left.

What happens?



crash dummy test

+write: explain how Newton's 1st Law applies

Newton's 2nd Law

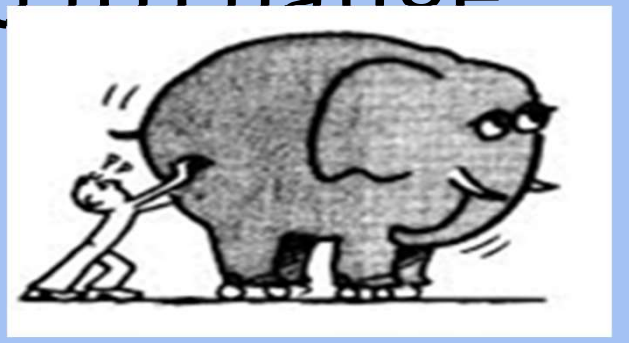
- Describes the relationship between **force**, **acceleration**, and **mass**.

- Which would you have to apply more force to in order to slide it across the room?: a box of 30 lbs. of textbooks or a box with 60 lbs. of textbooks?

- Which would slide a further distance if you pushed with the same amount of force?: a box of 30 lbs. of

In official terms...

The more **MASS** an object has, the greater the **FORCE** required to change its motion!

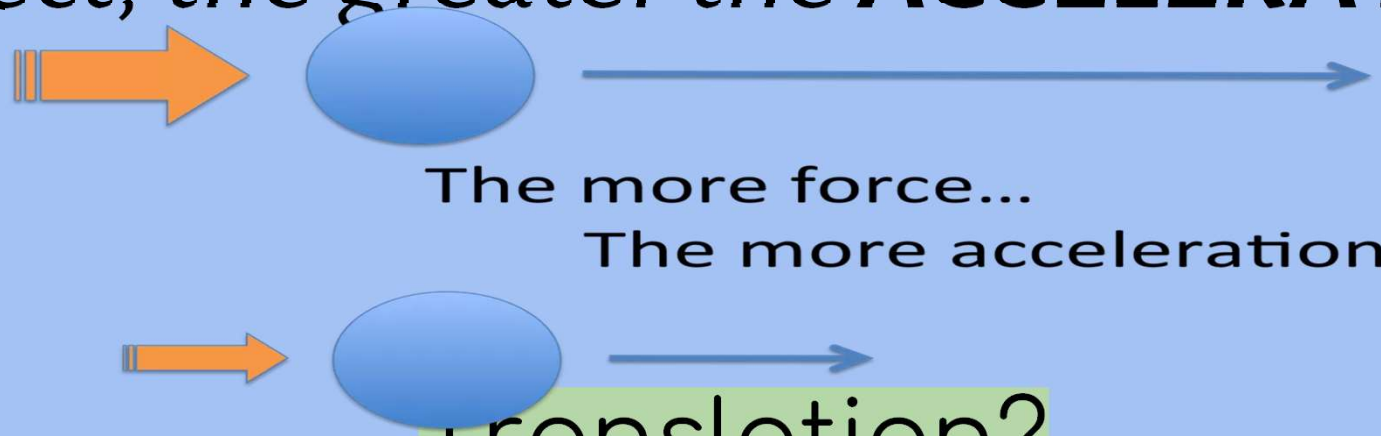


Translation?

(Heavier objects are harder to move than light objects. Duh!)

In official terms...

The greater the **FORCE** applied to an object, the greater the **ACCELERATION**!



Translation?

(The harder you push something, the farther it will go. Duh!)

Newton's Third Law

- Forces always exist in **pairs**.

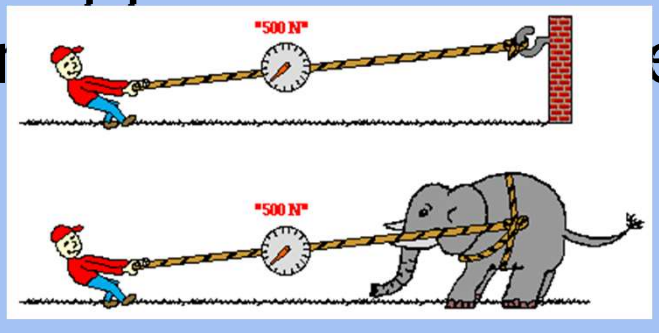
- If you get mad and punch the wall, you are applying a force to the wall.

- Why does this hurt your hand?

Newton's Third Law

- Whenever one object exerts a force on a second object, the second object exerts an **equal and opposite force** on the first object.

- Your hand supplied the action force. The wall returned an equal reaction force. Ouch!



5.P.1.2

Force and Motion

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Calculating Speed

Formula for Calculating Speed

$$\text{Speed} = \text{distance} \div \text{time}$$

Speed= how fast object is moving

Distance= how far object has moved

Time= how long it traveled

-Diagrams-

Describe each car's motion. *Explain*.

(Vocabulary: ***constant speed, acceleration****).*

A.

B.

Examples

If a person moves 30 meters in 2 seconds, what is its speed?

It takes a car 4 hours to travel 160 miles. How fast was it traveling?

Position Diagrams

A. 

B. 

C. 

Which car is moving at a **constant speed**?

Which car is **decelerating**/slowing down?

Which car is **accelerating**/getting faster?

5.P.1.3

Force and Motion

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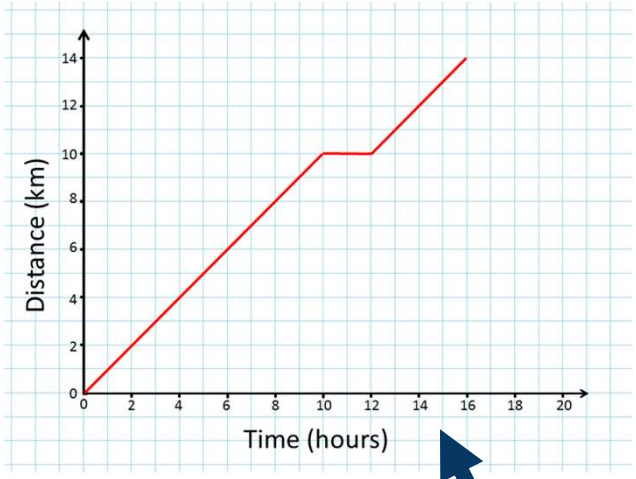
Distance/Time Graphs

DISTANCE-TIME GRAPHS

- A **distance-time graph** shows an object's motion

Y-axis



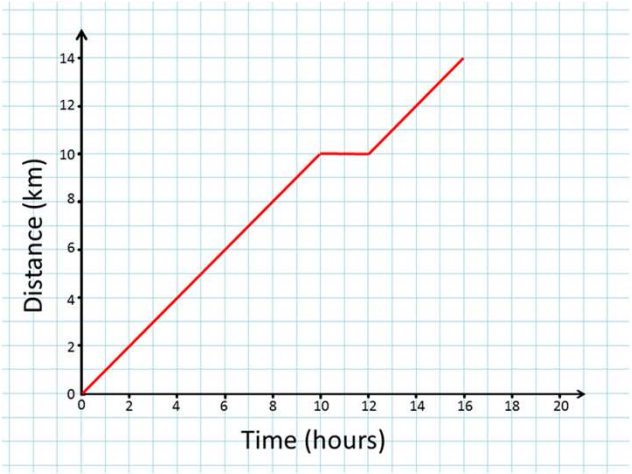
X-axis

It shows how long it takes an object to travel a certain distance!

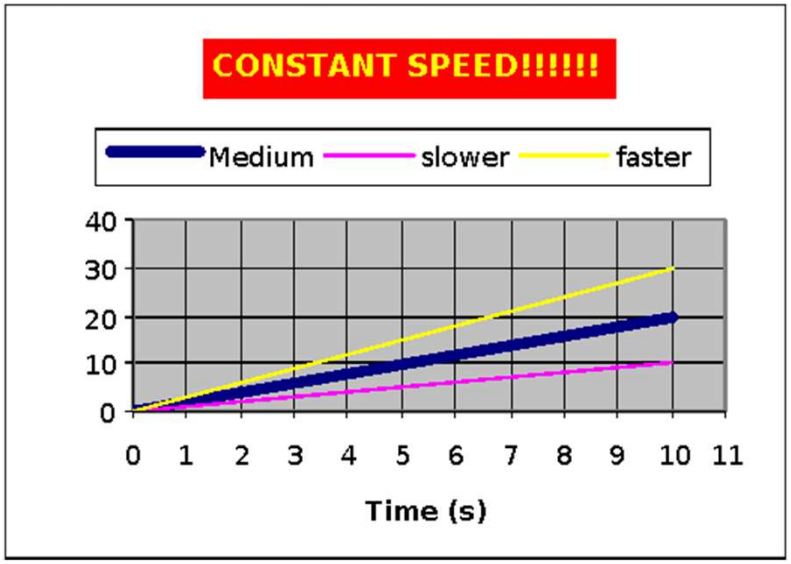
DISTANCE-TIME GRAPHS

What can you calculate using distance and time?

SPEED!

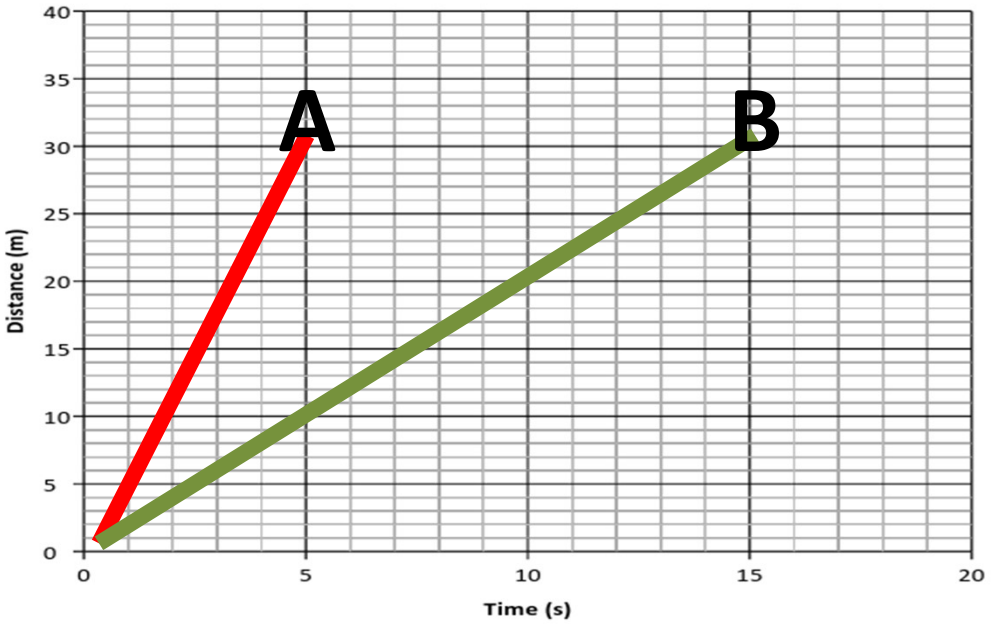


DISTANCE-TIME GRAPHS



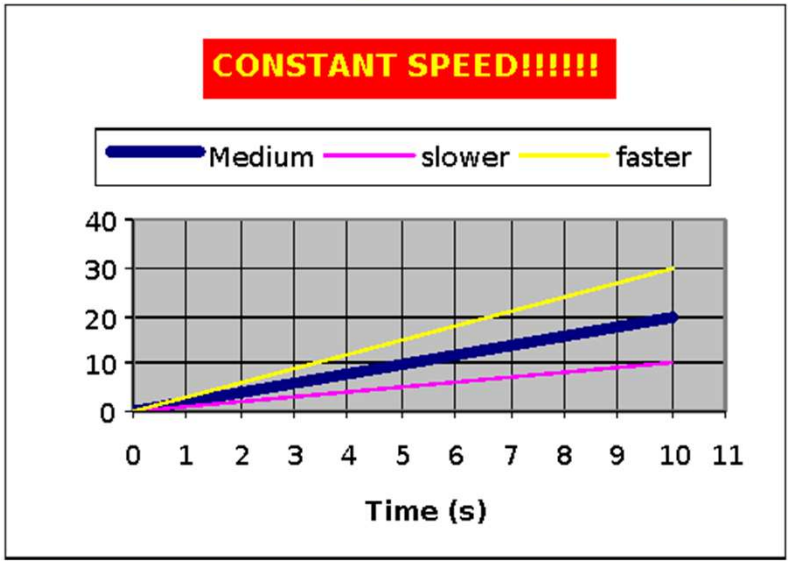
- A **straight line** shows an object moving at a **constant** speed
- The **steeper** the line, the **faster** the object is moving

Which object is faster?



DISTANCE-TIME GRAPHS

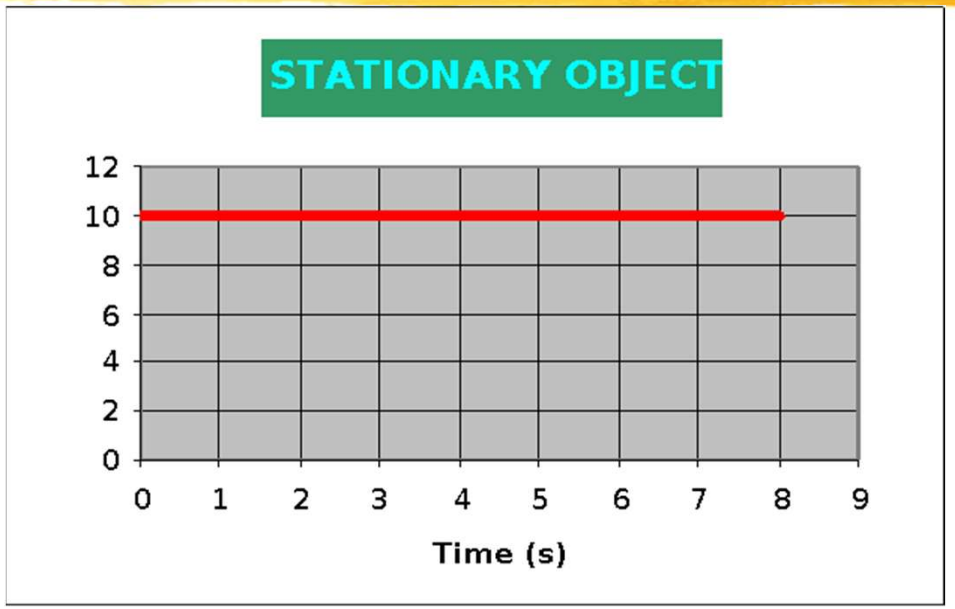
Work out the speed for each object shown in the graph!



Remember:

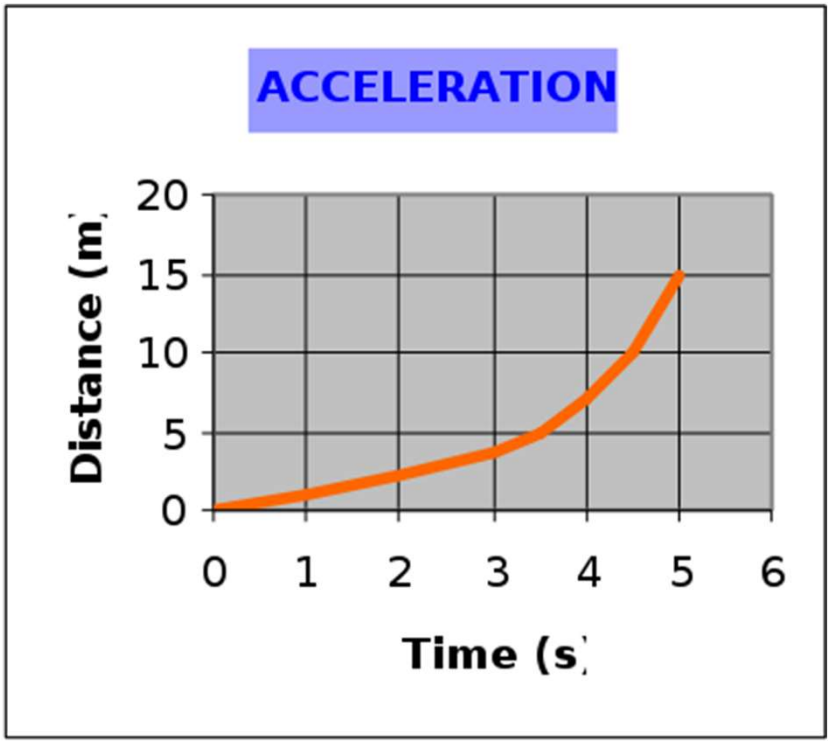
speed = distance ÷ time

STATIONARY OBJECTS!



- A flat, **horizontal** line shows a **stationary object**
- This means the object is NOT moving.
- Time keeps moving, distance stays the same

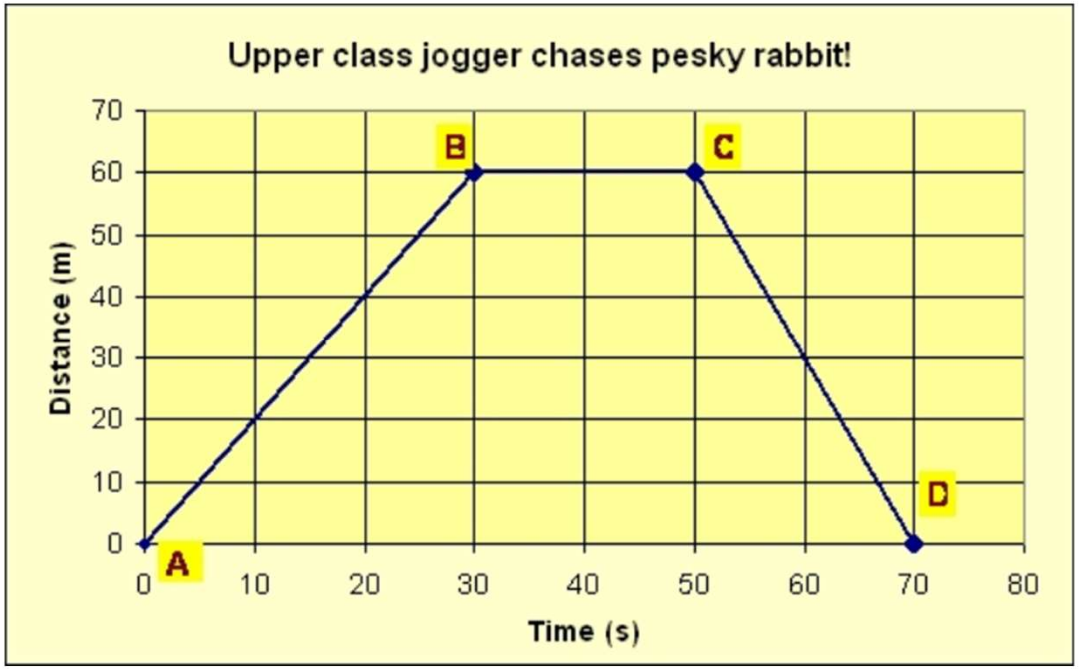
ACCELERATING OBJECTS



- **Curved** lines show if an object is accelerating or **decelerating**!
- The **steeper** the line gets the **faster** the object is moving!

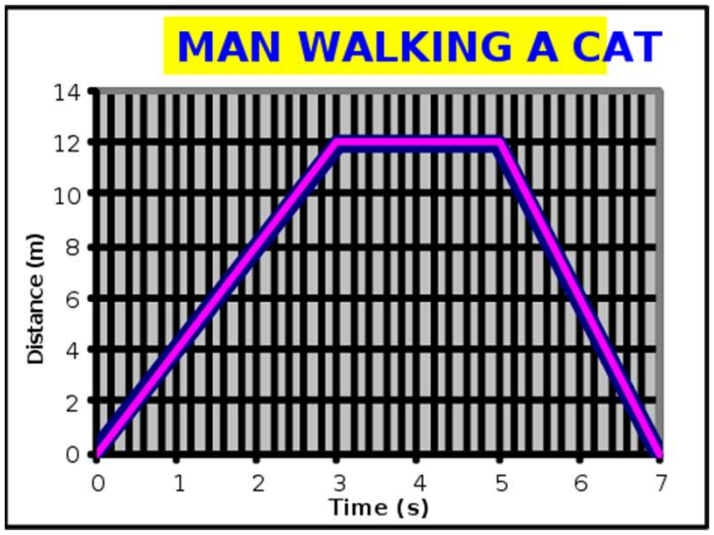
Changing Direction

What is happening between C and D?

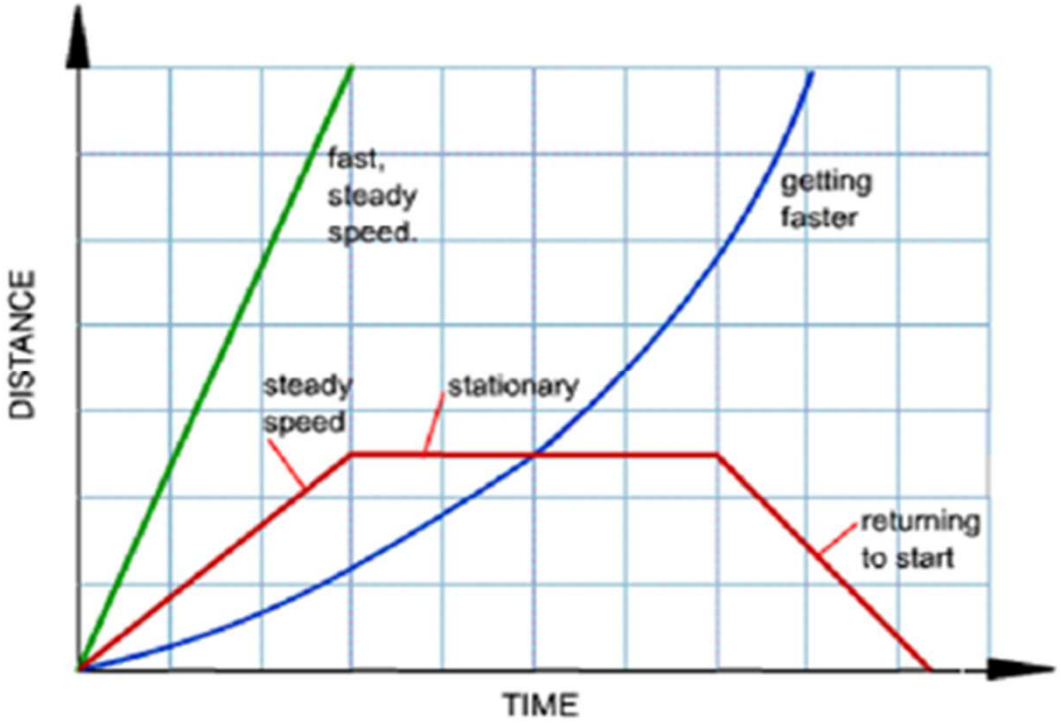


The line is sloping DOWN.
This means that the objects **changed direction** and it is heading back to the starting point.

GRAPH QUESTIONS



- 1. What is the **speed** of the man during the first **three** seconds?
- 2. What is the man doing **between 3 and 5** seconds?
- 3. Calculate the **speed** of the man between 5 and 7 seconds.
- 4. What is the **total distance** that he has moved?



- **STRAIGHT LINE** = CONSTANT SPEED
  - *THE STEEPER THE LINE, THE FASTER THE MOTION!!!*
- **FLAT LINE** = STOPPED/STATIONARY/NOT MOVING
- **CURVED LINE** = ACCELERATING/CHANGING SPEED
- **SLOPED DOWN**=GOING BACK TO START (CHANGING DIRECTION)

5.P.2.1

Matter

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Water Cycle

The Water Cycle (also known as the hydrologic cycle) is the journey water takes as it circulates from the land to the sky and back again.

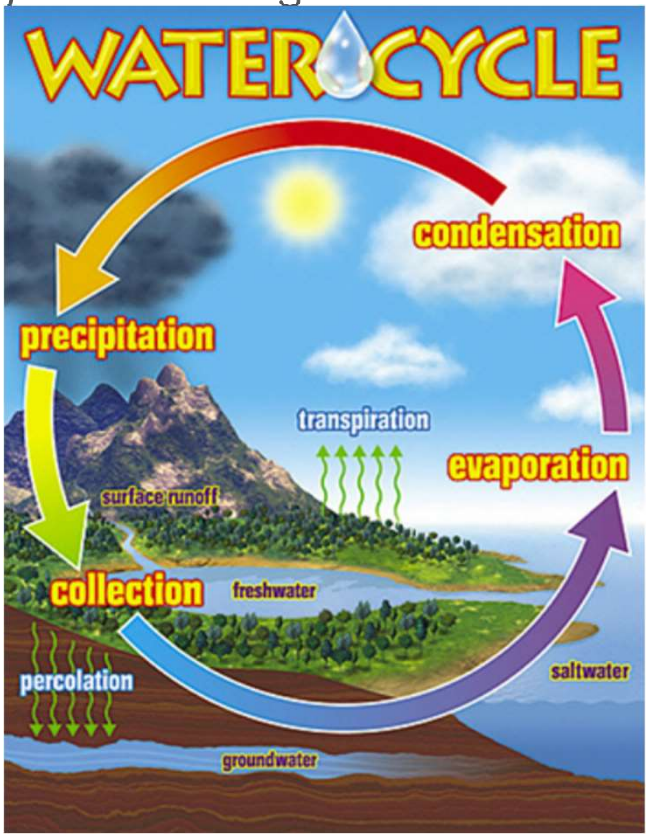
These are the stages of the water cycle:

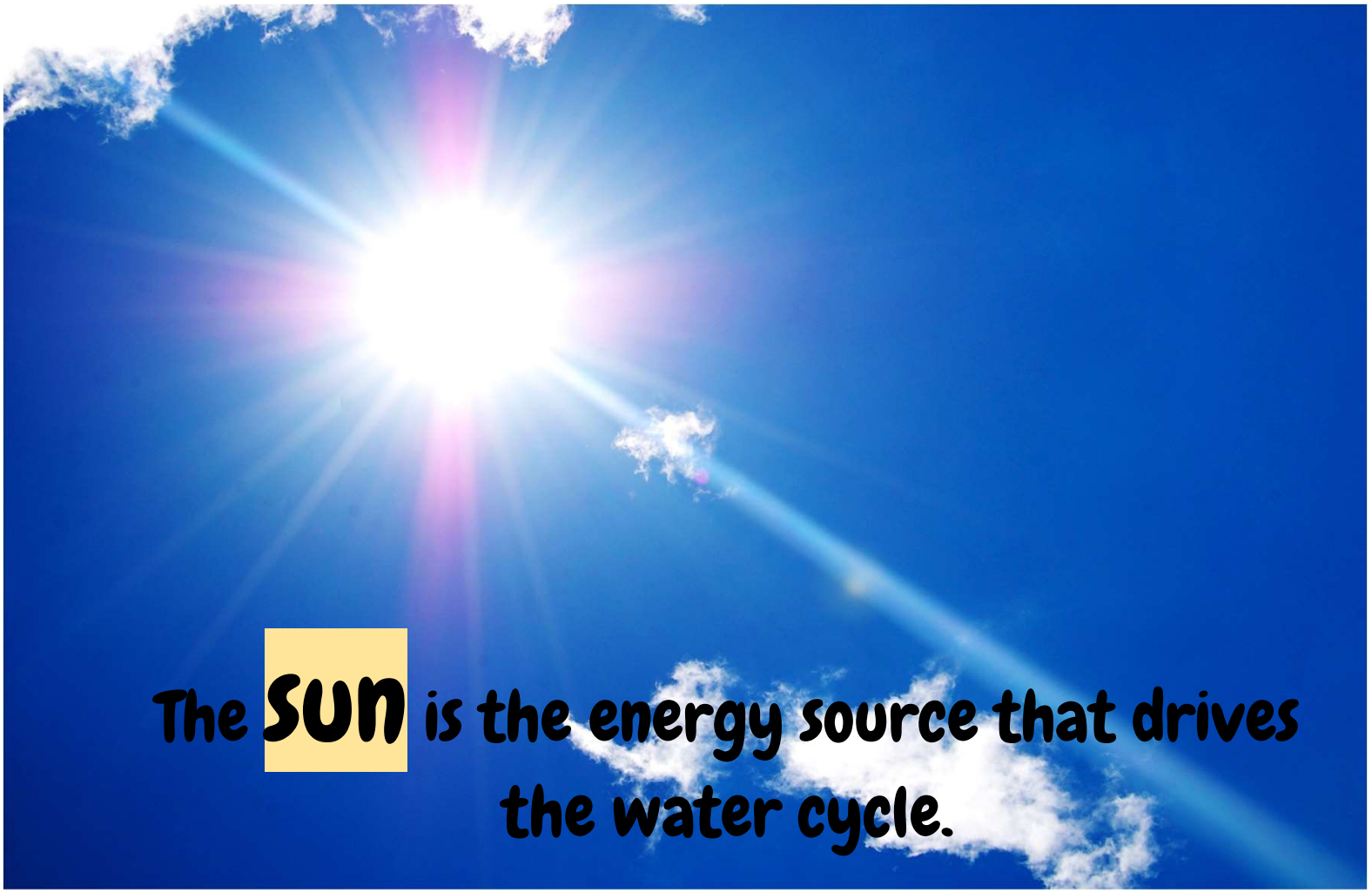
Evaporation and Transpiration

Condensation

Precipitation

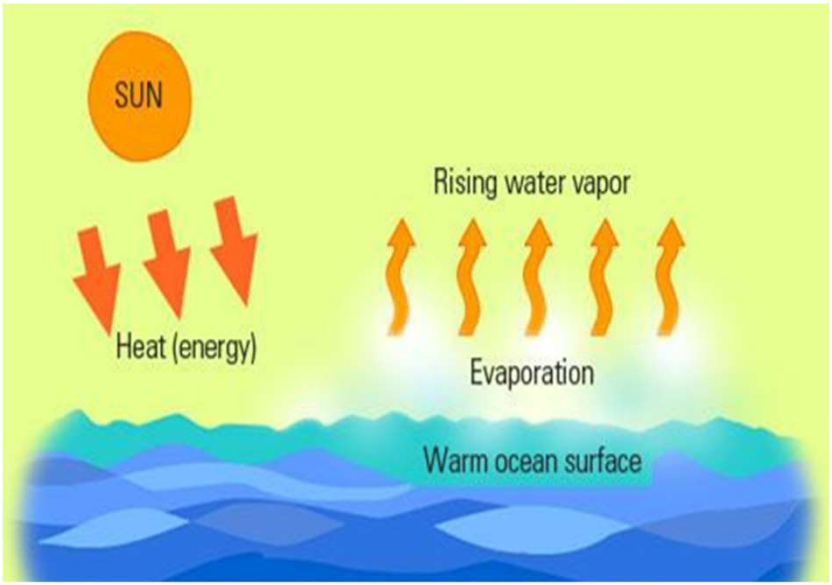
Collection




The sun is the energy source that drives
the water cycle.

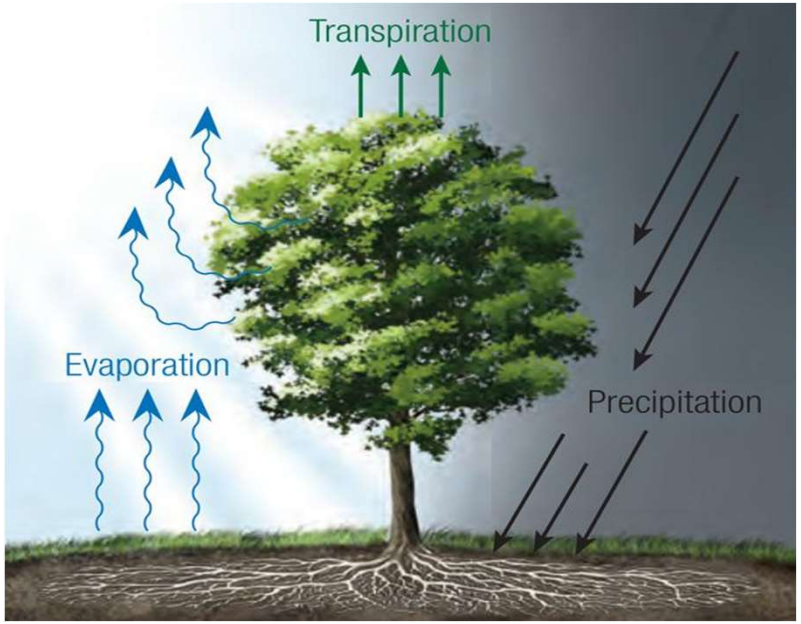
Evaporation

when the sun heats up a collection of water, it turns into vapor or steam as it rises into the air.



Transpiration

the evaporation of water from plants.



Just as water evaporates from collections of water, it can also evaporate off of the leaves of trees and plants.

Condensation

water vapor in the air gets cold and changes back into liquid water droplets in the air. This is how clouds are formed.

Watch this video clip to further your understanding.

Precipitation

a form of water that falls to the Earth's surface when so much water has condensed that the drops become heavier than the surrounding air.

Rain

Hail

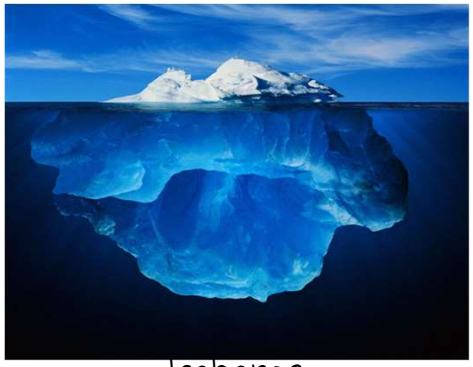
Snow

Collection

when water falls to the earth as precipitation, it collects in oceans, lakes, icebergs, puddles, rivers and streams.

Oceans

Lakes

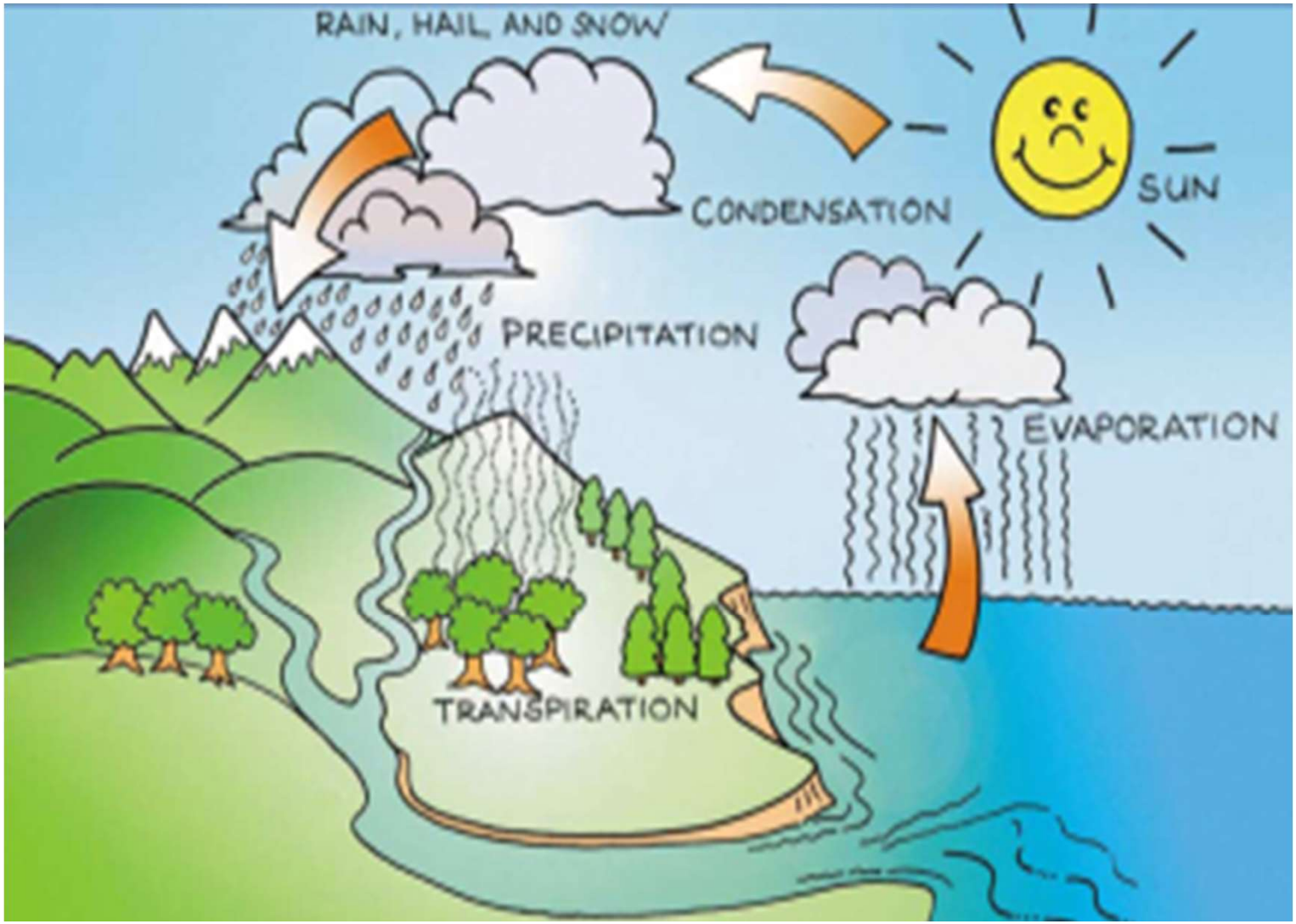


Icebergs

Puddles

Rivers

Streams


RAIN, HAIL, AND SNOW
CONDENSATION
SUN
PRECIPITATION
EVAPORATION
TRANSPIRATION

5.P.2.2

Matter

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Law of Conservation of Mass

Law of Conservation of Matter/Mass

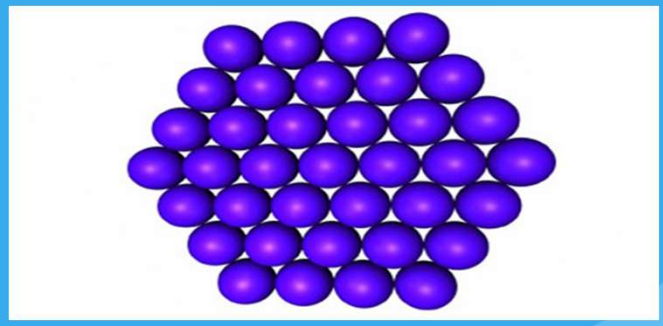
Matter cannot be CREATED or DESTROYED...only changed.

States of Matter
SOLIDS

A SOLID is matter that has a defined shape and will not lose its shape.

FIXED VOLUME AND FIXED SHAPE

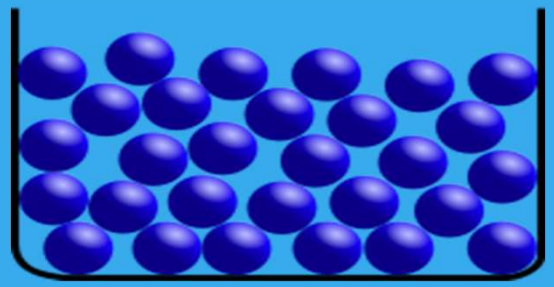
Examples of solids:
1. Chair
2. Table
3. Golf Ball
4. Hockey Puck
5. Glass Jar



States of Matter
LIQUIDS

A LIQUID is matter that will take the shape of any container it is placed in put has a fixed volume.

Examples of LIQUIDS:
1. Water
2. Soda
3. Milk
4. Juice
5. Tomato Sauce

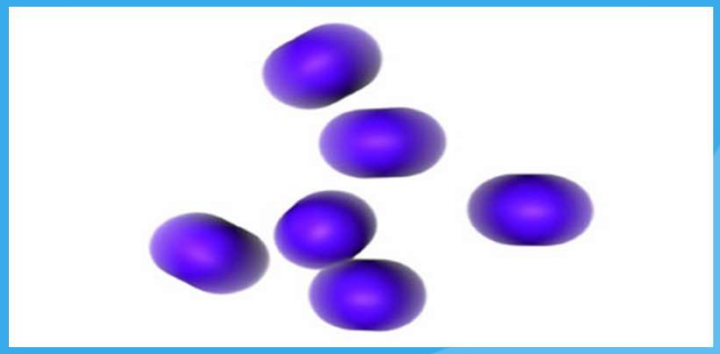


States of Matter
GASES

A GAS is matter that does NOT have a fixed shape or volume, but will completely take up all the space in a container.

MOST GASES ARE INVISIBLE!!!!

Examples of GASSES:
1. Oxygen
2. Helium
3. Carbon Dioxide
4. Nitrogen
5. Carbon Monoxide



WEIGHT

THE WEIGHT OF AN OBJECT

=

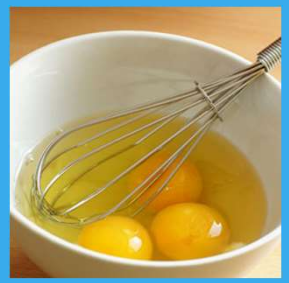
THE SUM OF THE WEIGHT OF ITS PARTS

WEIGHT

WEIGHT

14 OZ

32 OZ



8 OZ

20 OZ

20 OZ

Discussion

Eight ounces of water is poured into an ice cube tray and frozen.

Determine the weight of the new object, what type of change occurred, and what state the object is in after the change.