WEEK #3 **NOTE:** You may choose to complete this assignment on MobyMax using a cell phone.

DAY #1 - DIRECTIONS: Read each passage and complete the activities after each.

Pick up an object close to you. How can you describe that object? An example would be a pen. The physical properties of a pen include its colors and texture: black, metallic, and smooth. All matter in the universe can be described in some way. When we describe an object, we tell about its physical properties. Physical properties are things about materials that can be measured or detected by the five senses. Color, texture, and scent are some important physical properties of matter. In physical science, more specific measurements are also used to describe physical properties. These measurements include mass, weight, volume, density, buoyancy, conductivity, and solubility. We will learn more about these measurements as this lesson continues.

Look at the object you just picked up. Use your five senses to list some of its physical properties below. Be sure to identify your object by name in your response.

Object Name: _________________________ List 5 senses:

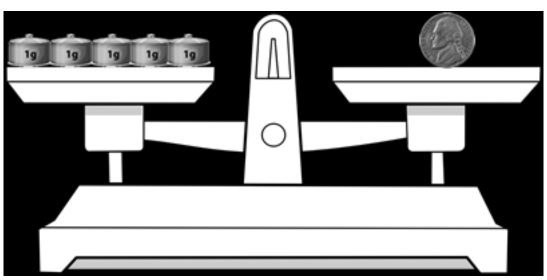
1. ___________________________________
2. ___________________________________
3. ___________________________________
4. ___________________________________
5. ___________________________________

When listing the physical properties of an object, which of the following might you include?

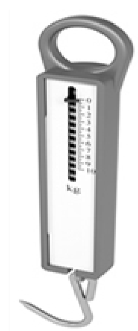
- ☐ the taste of the object
- ☐ the texture of the object
- ☐ the shape of the object
- ☐ any noises the object makes
- ☐ how the object smells
- ☐ the color of the object

Name TWO items that are both spiky and green:

1. ___________________________________
2. ___________________________________



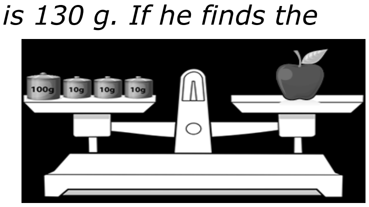
Have you ever had your weight measured on a scale at the doctor's office? Weight is the measure of the pull of gravity on an object. This means that the weight of something changes depending on how much gravity is pulling on it. The pull of gravity is different in different places. It is stronger at the bottom of the sea than at the top of a mountain. Therefore, the same object will weigh more at the bottom of the sea and less at the top of a mountain. The mass of an object is related to its weight, but mass and weight are not the same. Mass (M) is the measure of the amount of matter in an object. Mass is measured in grams (g). Mass is measured on a balance by comparing the object against other objects with known masses. These objects are called balance weights. An object's weight is a measure of the pull that gravity has on the object. An object's mass is a measure of the amount of matter in the object. The mass of an object does not change when gravity changes. However, if you measure two objects in the same place on Earth, the one with the higher weight will also have a higher mass.



The _____________________ of an object depends on the pull of gravity.

The _____________________ of an object depends on how much matter is in the object.

If measured in the same place on Earth, mass and weight will be equal. Therefore we can use grams (g) to measure both weight and mass on Earth. Will's apple will have a mass of 130g and will also weigh 130g. Will uses a balance in his classroom and finds that the mass of this apple is 130 g. If he finds the weight of the same apple using a scale in his classroom, what will the weight of the apple be?



The apple will weigh _________ grams.

If James takes the apple to the top of a mountain, which measurement will change?
- ☐ mass
- ☐ weight

The weight of the apple will change a very small amount at the top of a mountain. This is because slightly less gravity will be pulling on it. An apple will weigh less because the force of gravity will have a weaker pull on the apple.

At the top of the mountain, the apple will weigh (circle) MORE / LESS than at sea level.

If a veterinarian puts a dog, Patch, on a diet. That diet will hopefully help Patch get in better shape, which means losing mass, or some of the material that makes up Patch's body. Even though we often say "losing weight," we really mean "losing mass."

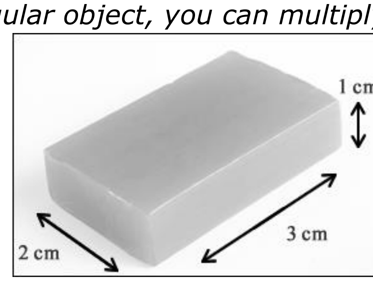
If the vet only wanted Patch to lose weight, how could Robin help this happen?
- ☐ by taking him somewhere with less gravity
- ☐ by taking him somewhere with more gravity
- ☐ by taking him somewhere with the same amount of gravity

To reduce Patch's weight, all Robin must do is take him somewhere with less gravity! Whenever someone talks about losing or gaining weight, he or she usually means losing or gaining mass. When measured in the same place, mass is related to weight. If Patch's mass decreases, so will his weight. This is because gravity will have less of a pull on something with a smaller mass.

If Patch's diet goes well and he loses mass, what will happen to his weight?
- ☐ It will increase.
- ☐ It will also decrease.
- ☐ It will stay the same.

DAY #2 – DIRECTIONS: Read each passage and complete the activities after each.

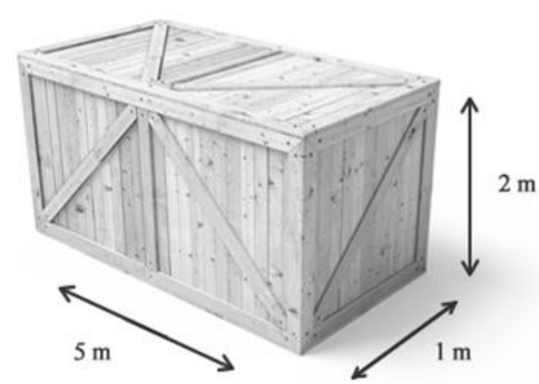
Volume (V) is the measure of the amount of space taken up by an object. Volume is measured in cubic centimeters, which are also called milliliters. To find the volume of a rectangular object, you can multiply its length by its width by its height. This gives you the total amount of space that the object fills up. To find the volume of an object that you cannot easily measure, you can place it in a graduated cylinder filled part way with water. First, you must know how much water is already in the graduated cylinder. Then, you place the object in the water. Next, you record the new level of the water. Finally, you subtract the original amount of water from the final amount. This will give you the volume of the object.



What is the measure of how much space an object takes up? _____________________

For volume you must know the block's length, width, and height. Multiplying these together will help find the block's volume. The volume of larger objects can be measured in meters cubed, or m³.

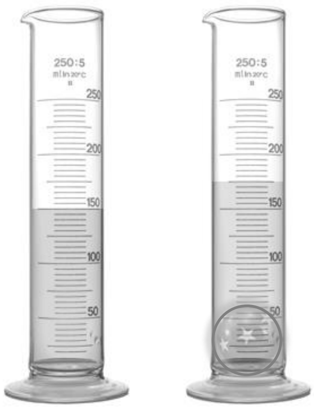
Select the measurements that you need to know in order to find the volume of this crate:



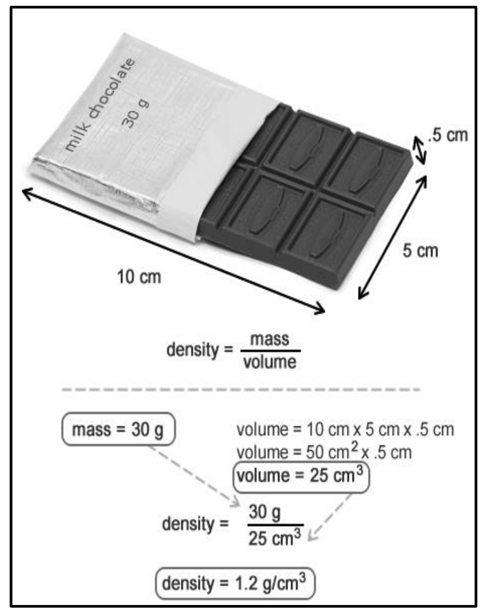
______ X ______ X ______ = _______ m^3

How can we find the volume of this rubber ball?

- ☐ by putting it in a graduated cylinder filled with a known amount of water
- ☐ by putting it in a graduated cylinder that does not have water in it
- ☐ by subtracting its length, width, and height
- ☐ by multiplying its length, width, and height



The length, width, and height of this ball would be very difficult to measure correctly. Therefore, we should place the ball in a graduated cylinder with a known amount of water in it. This will help us figure out how much space the ball takes up. The original amount of water in the graduated cylinder was 150 mL. After we put the ball in, the water rose to 175 mL. Subtracting the original amount of water from the final amount gives us the volume of the rubber ball. The ball has a volume of 25 mL.



Density (D) is the amount of mass a specific volume of an object has. To find the density, you must know the mass and volume of an object. Then, you divide the mass by the volume to get the density. Density is usually measured in grams per cubic centimeter (g/cm3) or grams per milliliter (g/mL).

The density of an object does not change depending on how much of it you measure. This is because the mass and volume of an object do change if the amount of the object you are measuring changes. However, when you divide the mass by the volume, it will always equal the same amount. Density equals the amount of matter within an object (mass) divided by the space it takes up (volume).

This stick of butter has a mass of _____ grams.

This stick of butter has a volume of _____ cm3.

If we want to find the density of this stick of butter, which equation should we use?

☐ D = 113 g ÷ 54 cm^3 ☐ D = 54 cm^3 ÷ 113 g

☐ D = 113 g x 54 cm^3 ☐ D = 54 cm^3 x 113 g

To find the density of an object, divide its mass by its volume. The density of this butter is about 2.09 g/cm3. This rock has a mass of 240 grams and a volume of 80 cm3.

What is the density of the rock? __________

To find the density of an object, divide its mass by its volume.

The density of the tomato will not change if it is cut in half. The mass will change, and the volume will change, but dividing the new measurements will still equal the same density measurement. For example, if the volume of the whole tomato is 20 cm3, and the mass of the whole tomato is 200g, the density will equal 10 g/cm3. Cut in half, the volume of the tomato will be 10 cm3, the mass is 100g, and the density will still equal 10 g/cm3.

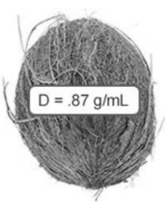
What will happen if this tomato is cut in half?

- ☐ Its mass will stay the same.
- ☐ Its volume will decrease by half.
- ☐ Its volume will stay the same.
- ☐ Its mass will decrease by half.
- ☐ Its density will stay the same.
- ☐ Its density will decrease by half.

DAY #3 – DIRECTIONS: Read each passage and complete the activities after each.

Buoyancy describes whether an object sinks or floats in another substance. Matter that floats in a liquid is more buoyant than the liquid. This is because the matter has a lower density, or is less dense, than the liquid. Matter that sinks in a liquid is less buoyant than the liquid. Sinking matter has a higher density, or is denser, than the liquid. Whether an object sinks or floats in another material is called its buoyancy. The density of an object compared to the density of the material it is in determines the object's buoyancy.

_____________________ tells us whether or not an object will float. When an object is more buoyant, it is ________________ dense.



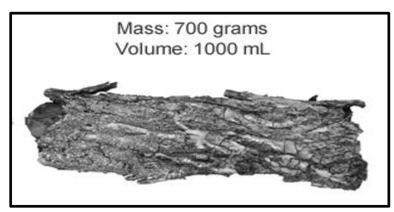
An object will float if its density is less than the density of the material it is in. The helium must be less dense than the air it is in. This causes the balloon to float. The density of all pure water is 1 g/mL.

Which of these objects would sink in a tub of water?

____

Wendell has figured out the volume and mass of this log. Use his measurements to calculate the density of the log.

The density of the log is ______ g/mL



Will the log be buoyant in pure water? YES / NO

The log's density is 0.7 g/mL, which is less than 1 g/mL. Therefore, it will be buoyant, which means it will float in water.

Some materials are very good for moving, or conducting, energy. Conductivity measures the ability of a material to move energy. Most metals are good conductors. That is why wires made out of metals, like copper, are used to help electricity flow from an outlet to a light bulb. Most metals are also good at carrying heat energy. That is why many pots and pans are made of metal. Water can also be a conductor. That is why it is dangerous to go swimming in a thunderstorm.

Some materials have very low conductivity, like rubber and silicone. These materials are used in objects that insulate conductors, so they are called insulators. For example, metal wires are wrapped in rubber tubes to keep electricity inside the wire so that people do not shock themselves or start a fire from a spark. People often use silicone for cooking utensils so that the utensils do not melt when touching a hot pan.

Conductivity measures the ability of a material to _____________ ________________

Materials with high conductivity move energy easily. Metal wires and water both have high conductivity. This means that they move energy quickly and easily.

Select the materials with high conductivity:

A woman's body passed the electrical charge to the doorknob, so her body was acting as a conductor in this situation. The human body is over 60% water, and water is a good conductor. Therefore, the human body can become a conductor.

When Lane rubs her feet against the carpet, static electricity builds up. If she touches the doorknob on her bedroom door, her touch creates a small shock.

Which of the following must be true?

☐ Humans cannot be conductors.
☐ Humans can be conductors.
☐ Lane is made of metal.

The rubber around Jessica's computer cord is split open. Explain one reason why it is unsafe for Anita to continue using the broken cord.

The rubber insulates the cord, which carries electricity. Without the insulation, the electricity in the wire could shock Jessica, or it might spark and start a fire.

Some matter dissolves, or mixes completely, when stirred into another substance. Solubility is the measure of how much of one substance can dissolve in another. Higher solubility means that a larger amount of a substance can dissolve in another. However, even highly soluble materials have a limit. For example, a teaspoon of sugar will dissolve in a cup of tea, but if you keep pouring sugar into the tea, eventually the water in the tea would not be able to dissolve any more sugar. In that case, you would be able to see the sugar crystals at the bottom of the teacup.

Solubility measures how much one substance will dissolve in another. Solubility is a physical property that can help identify substances because only certain matter dissolves in certain substances. For example, salt will dissolve in water, but it will not dissolve in alcohol.

Solubility is the measure of how much one substance can:

☐ Dissolve in another
☐ Melt in another
☐ Dissolve in itself

A good example of solubility comes from our oceans. The salt is soluble in the water because it is dissolved. The sand does not dissolve in the ocean water, so it is not soluble.

Ellie's aunt uses powdered laundry detergent. The powder is a substance that dissolves in water. One day, Ellie decides to help her aunt with the laundry. However, when she pulls her clothes out of the washer, they have some white powder on them. It smells fresh and clean, and Ellie realizes that the powder is laundry detergent.

What has happened?

- ☐ Some of the detergent was not soluble due to the amount of water in the washer.
- ☐ Ellie did not put enough laundry detergent in the washer.
- ☐ All of the detergent was soluble due to the amount of water in the washer.
- ☐ Ellie put too much laundry detergent in the washer.

Ellie must have put too much detergent in the washer. The solubility of that amount of detergent was too low compared to the amount of water in the washer. Therefore, not all of the detergent in Ellie's laundry dissolved in the water.

Baking soda and honey both have high solubility in water. Both substances dissolve, or mix completely, when they are stirred into water.

Name two substances that are soluble in water that were not named in this lesson. Explain how you know that the substances are soluble.

1. ___________________ ____
2. ___________________ ____

DAY #4 DIRECTIONS: Review Days 1-3 by marking all the correct answers.

What is a physical property?

- ☐ the measure of the amount of matter in an object
- ☐ the measure of the amount of matter in a given volume of an object
- ☐ the measure of the pull of gravity on an object
- ☐ something about a material that can be measured or detected by the senses

Weight is ___________.

- ☐ the measure of the amount of matter in an object
- ☐ whether an object sinks or floats
- ☐ the measure of the pull of gravity on an object
- ☐ the measure of the amount of space taken up by an object

What is mass?

- ☐ the ability of a material to carry energy
- ☐ whether an object sinks or floats
- ☐ the measure of the amount of matter in an object
- ☐ the measure of the amount of space taken up by an object

What is volume?

- ☐ the measure of the height of an object
- ☐ the measure of the amount of energy in a material
- ☐ the measure of how much of one substance can dissolve in another
- ☐ the measure of the amount of space taken up by an object

Density is ___________.

- ☐ the measure of the width and length of an object
- ☐ the measure of how much of one substance can dissolve in another
- ☐ the measure of the amount of energy in a material
- ☐ the measure of the amount of matter in a given volume of an object

What is buoyancy?

- ☐ the ability of a material to carry energy
- ☐ whether an object shrinks or grows
- ☐ whether an object sinks of floats
- ☐ the measure of how much of one substance can dissolve in another

Conductivity is ___________.

- ☐ the measure of how much energy is an a material
- ☐ the measure of how much of one substance can dissolve in another
- ☐ the ability of a material to carry energy
- ☐ the ability of a material to carry water

What is solubility?

- ☐ the measure of how much of one substance can dissolve in another
- ☐ the ability of a substance to melt completely when heated
- ☐ the measure of how much energy it takes to melt a substance
- ☐ the ability of a substance to turn into water vapor

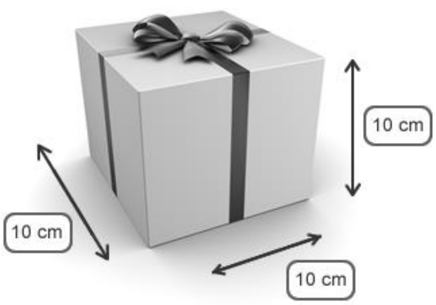
DAY #5 - DIRECTIONS: Review and complete the activities after each.

Use your five senses to describe at least three physical properties of this marshmallow.

_______________ ________________ _____________

This car has a mass of 1360 kg and weighs 1360 kg. If taken onto the Moon, where the force of gravity is less, what will happen to the car?

- ☐ Its mass will increase.
- ☐ Its mass will decrease.
- ☐ Its weight will increase.
- ☐ Its weight will decrease.



What is the volume of this box? (hint: L x W x H = V)

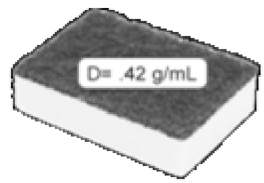
____

CIRCLE the things that you would need in order to calculate the volume of a golf ball.

Roberto has two shoeboxes that are exactly the same size. One shoebox contains his rock collection. The other shoebox is empty. Which of the shoeboxes has a higher density?

- ☐ the empty shoebox
- ☐ the shoebox full of rocks

Which of these items would be buoyant in this water? Which would not? Move the items to the correct place above or below the wa ter.



Label the insulator and label the conductor in this picture:

The pot is a conductor because it moves heat from the flame to the food. The potholder is an insulator because it keeps heat from moving to the cook's hand.

Dana is making hot chocolate from her favorite hot chocolate powder. She stirs the powder into warm milk. Most of the powder dissolves, but some of it does not. Which of the following statements are true?

- ☐ The powder is soluble in the milk, but there was not enough milk to dissolve all of the powder.
- ☐ The powder is soluble in the milk, but there was not enough powder to dissolve all of the milk.
- ☐ The milk is soluble in the powder, but there was not enough powder to dissolve all of the milk.
- ☐ The powder was not soluble in the milk.

Which of the following are physical properties of this rocking chair?

- ☐ smooth
- ☐ wooden
- ☐ brown
- ☐ all the above

Which of the following statements accurately describe the differences between weight and mass? Check all that are true.

- ☐ Mass changes at the top of a mountain.
- ☐ Weight only changes when mass changes.
- ☐ Weight and mass are the same thing.
- ☐ Weight changes depending on gravity.
- ☐ Mass stays the same everywhere in the universe.

What does David need to do in order to find the volume of a box?

- ☐ measure the length
- ☐ measure the width
- ☐ measure the height
- ☐ add the measurements together
- ☐ multiply the measurements together

What does Tasha need to do in order to find the volume of this comb? Check all that are true.

- ☐ Fill a graduated cylinder with a known amount of water.
- ☐ Record the level of water after the comb is placed in the graduated cylinder.
- ☐ Find the difference between the amount of water after the comb is added to the graduated cylinder and the original amount of water.
- ☐ Measure and divide the length, width, and height of the comb.

Quinton knows that the volume of his video game controller is 39 mL. What does he need to do to find the density of the controller? Check all that are true.

- ☐ He needs to use a balance to find the mass of the controller.
- ☐ He needs to use a scale to find the weight of the controller.
- ☐ He needs to divide the mass by the volume of the controller.
- ☐ He needs to divide the weight by the volume of the controller.

Petunia has a marble with a density of 2.76 g/mL. The density of pure water is 1 g/mL. Which of the following are true about the marble?
Check all that are true.

- ☐ It will float because it is more dense than water.
- ☐ The marble will be buoyant in the water.
- ☐ The marble will not be buoyant in the water.
- ☐ It will sink because it is more dense than water.

A power line was ripped in half during a storm in Kylie's neighborhood. There are metal wires poking out of the black rubber tube that covers the power lines. Firefighters are coming to clear the power lines away. Which part of the power line should the firefighters NOT touch when moving the power line?

- ☐ the metal wires poking out, because they insulate electricity
- ☐ the black rubber tube, because it conducts electricity
- ☐ the black rubber tube, because it insulates electricity
- ☐ the metal wires poking out, because they conduct electricity

Rhonda likes to take baths. She has bath salts and bath oils that she likes to add to the hot water. The salts dissolve completely in the water, but the oil swirls around on the surface, never mixing with the water. Which substance is soluble in water?

- ☐ the oil
- ☐ the salt
- ☐ the water
- ☐ none of the above