Name _____ Date _____

ENVES Summer Assignment 2023-2024

Welcome to ENVES class! I am so excited to get to know all of you and to have a fantastic year teaching my TWO favorite subjects! Earth Science AND AP Environmental Science! Both courses have their challenges, but I know you are all up to the task! To get you ready for the upcoming year, your summer assignment is going to get us through some of the basics. You will learn about the scientific method and you also will review some introductory concepts that will be used throughout the year such as; graphing, latitude and longitude and maps, density. Finally, you will also watch a video that will go into the major issues facing the planet today and that will be discussed in our class. **This document will be on the HS website, so you will be able to access the links from there. Please email cwigand@seaford.k12.ny.us with any questions!**

The first thing we need to know is what exactly is Earth Science? Please go to this site to find out!
https://www.youtube.com/channel/UCBOBwExgkuaHOIlY_ffb3MQ

Astronomy _____

How do they study it?_____

_____

Meteorology _____

How do they study it?_____

_____

Geology _____

How do they study it?_____

_____

How do we locate places on Earth?

What is Latitude?

Latitude is defined as a measurement of distance in degrees north and south of the equator. There are 90 degrees of latitude from the equator to each of the north (90°N latitude) and south (90°S latitude) poles. Latitude lines are pictured on the globe to the right. Latitude lines are parallel, that is they are the same distance apart. In fact, they are sometimes called parallels. At 7,926 miles (12, 756 km) in length, the equator is the longest of all lines of latitude. It divides the earth in half and is measured as 0° (zero degrees). Positions on latitude lines above the equator are called “north” and are in the northern hemisphere. Miami, Florida, for example, is nearly twenty-five degrees north of the equator. Its approximate latitude is written as 25°N. Positions on latitude lines below the equator are called “south”. Brisbane Australia, for example, is near the thirty degree latitude line too, but in the southern hemisphere. Its latitude is written as 30°S. **Complete the Following**

a. Lines of latitude are _____ to the equator.

b. There are _____ degrees of latitude north and south of the equator.

c. The equator is _____ degrees.

d. Another name for latitude lines is _____ .

e. The equator divides the earth into _____ equal parts.

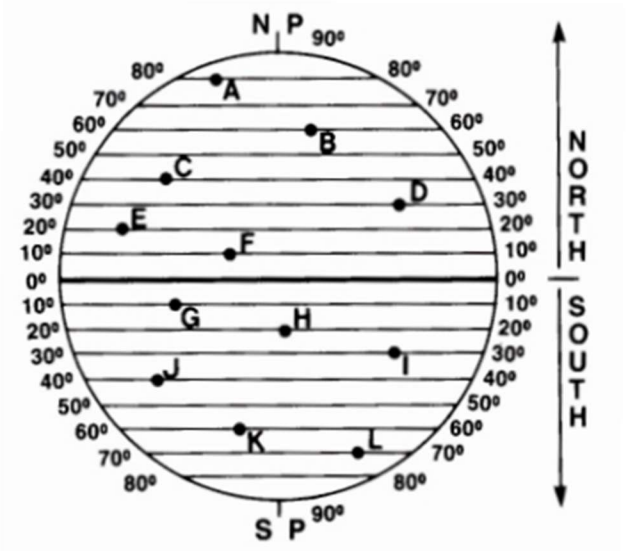
f. Write a definition of latitude.

_____

_____

_____

g. Practice finding the latitudes of a number of places. Place A has been given its latitude to help you get started.



A. 80°N	D.	G.	J.
B.	E.	H.	K.
C.	F.	I.	L.

What is Longitude?

Longitude is defined as measurement of distance in degrees east or west of the prime meridian. The prime meridian divides the earth in half and is referred to as 0° longitude. The prime meridian, as do all other lines of longitude, pass through the north and south pole. This is shown in the diagram to the right. Longitude lines are not parallel. They make the earth look like a peeled orange. There are 180 lines of longitude on the each side of the prime meridian. On the opposite side, the prime meridian is not zero degrees but 180 degrees. Here, it is called the International Date line. Longitude lines to the left of the prime meridian give locations west, in the western hemisphere. Longitude lines to the right of the prime meridian give locations east, in the eastern hemisphere. Miami, Florida, for example, is near the 80° line of longitude. It is west of the prime meridian and is written 80°W.

Complete the Following

h. Longitude lines connect the _____ with the _____.

i. The line of 0° longitude is called the _____ .

j. Longitude lines give directions _____ and _____ of the prime

k. There are _____ degrees of longitude each side of the prime meridian.

l. Longitude lines are not _____ like latitude lines.

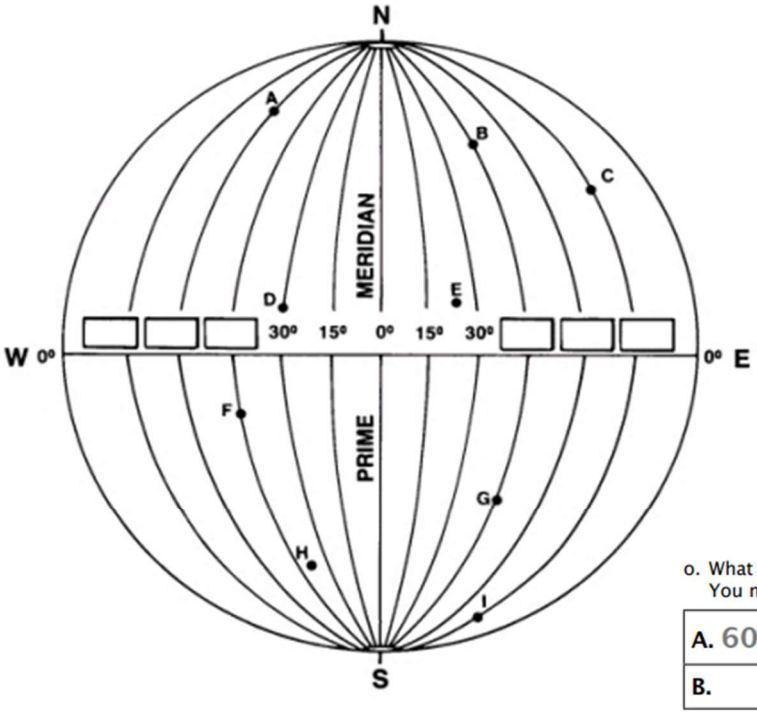
m.Write a definition of longitude.

_____

n. The lines of longitude on the diagram below are 15° apart. Notice that some of the lines are not numbered, that there are blank boxes on those lines. Study the numbers on the other lines, then print the proper numbers in the boxes.

_____

_____



o. What are the longitudes of the following points shown on the map? Remember: You must write E for east, or W for west to properly identify the location.

A. 60°W	C.	E.	G.
B.	D.	F.	H.

Time Zones

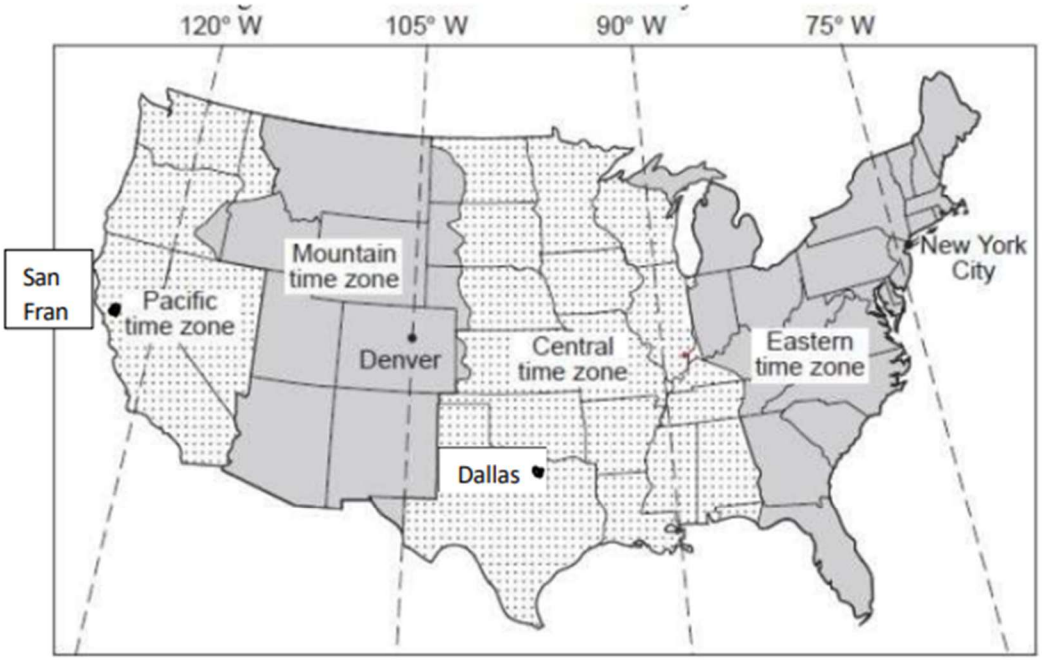
Since the Earth **rotates** (spins on its axis), some parts of the Earth have daylight and some have night. Obviously, this means that different parts of the Earth have different times of the day. For example, if it is 2:00pm in New York City, the time would be 8:00pm in Paris, France. That's a difference of six hours.

Time Zone: A location of the Earth that has a particular time based on the the position of the Sun in the sky. For example, if the Sun is at it's highest point in the sky (called the *Zenith or Solar noon*), then it is 12pm noon. Lunch Time!

Each time zone is equal to one hour. For example, if it is 12pm noon now, the next time zone to the East is 1:00pm, and the next time zone too the West is 11:00am. **As you move to the East, the time gets later. As you move to the West, the time gets earlier.**

Each 1-hour time zone is separated by 15° Longitude. That means that ANY locations on the Earth along that longitude are in the same time zone and have the same local time of day.

Longitude Can be Determined Using Time
Travel to the East, the Time gets
Travel to the West, the time gets

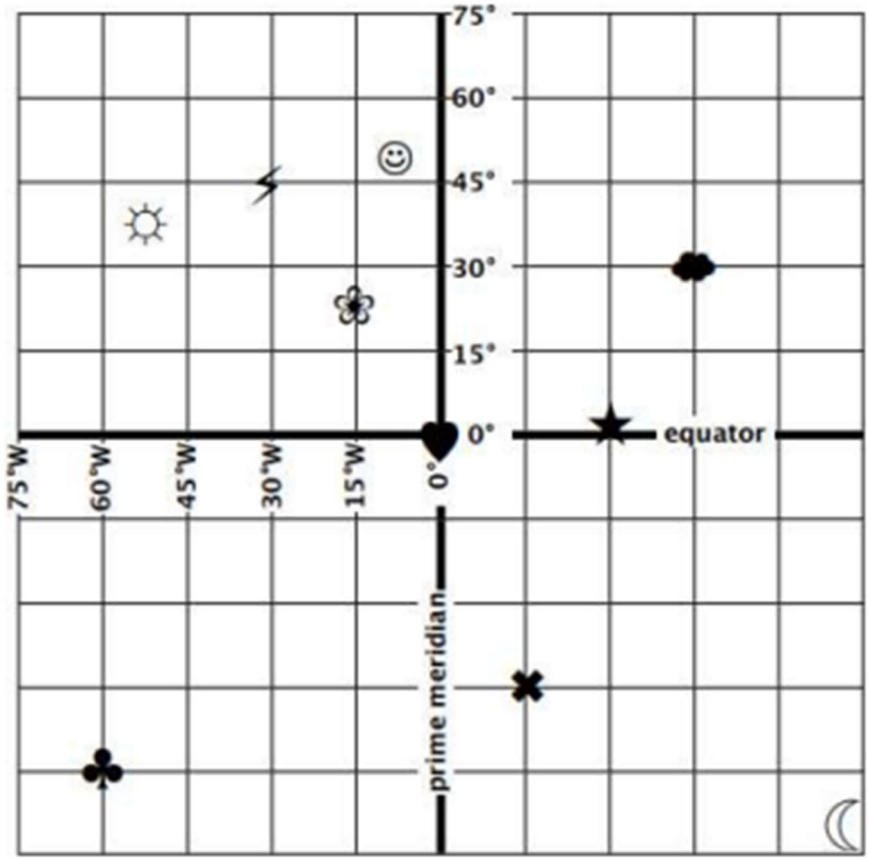


If it is 12:00 at New York City, what time is it in the following cities?

Dallas _____

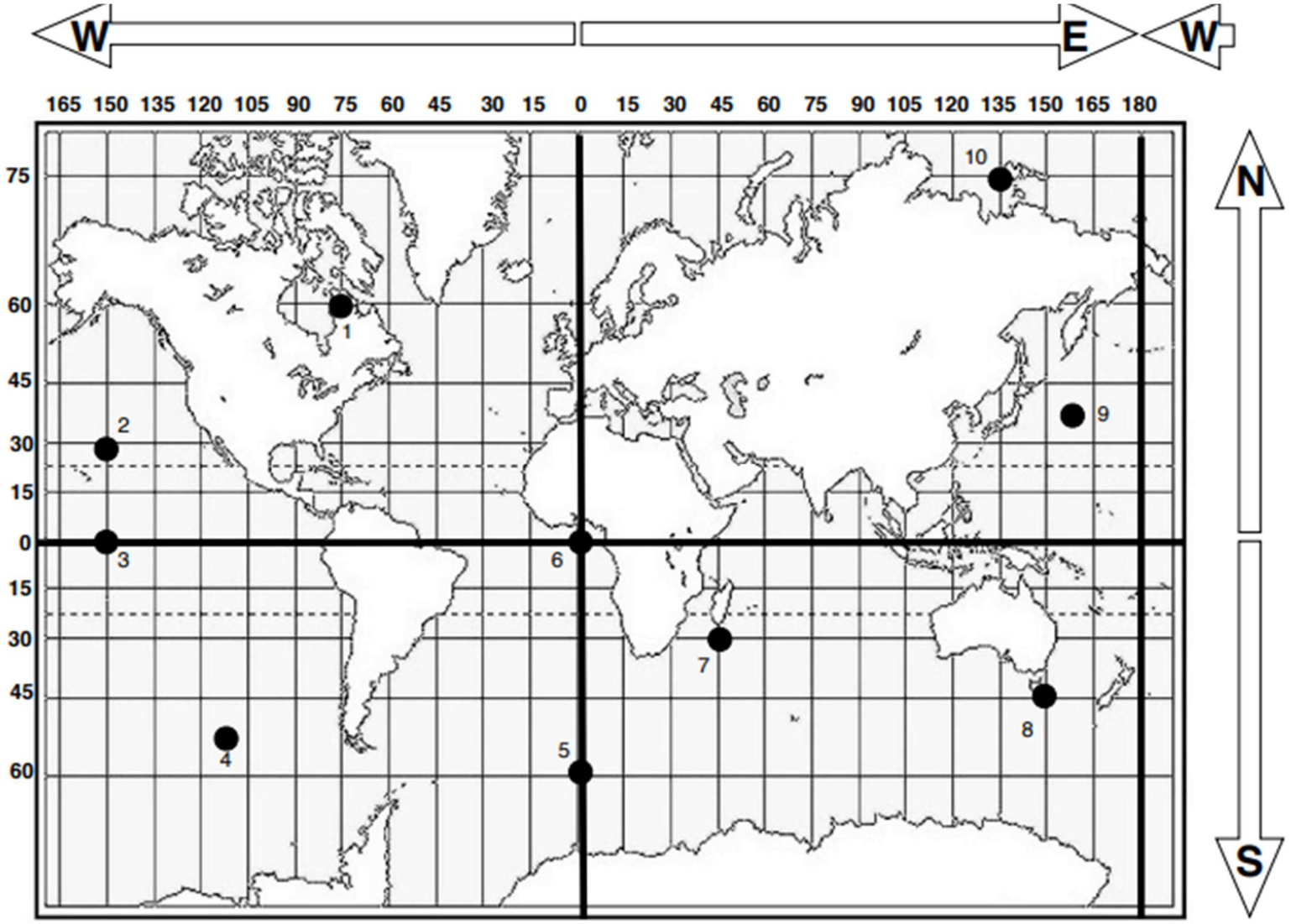
Denver_____

San Francisco _____



Write the approximate coordinates of the following symbols:

⚡		✖	
❀		☁	
☾		☺	
☼		★	
♥		♣	



What is the latitude and longitude of the following points?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

A few other skills you need are Metric System Review/Dimensional Analysis

Objectives:

- Review the metric system units and be able to convert from one unit to another
- Review/learn the dimensional analysis method of conversion for any units
- Practice using dimensional analysis to solve conversion problems

King

Henry

Died by

Drinking

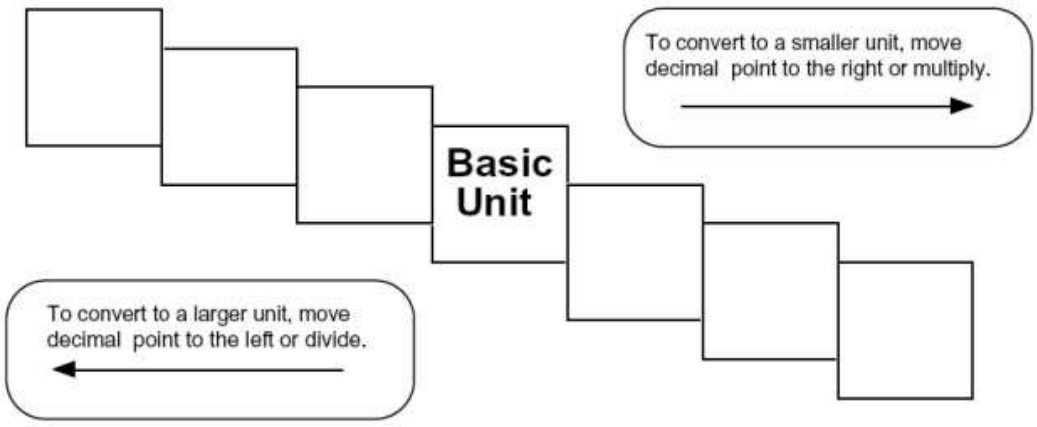
Chocolate

Milk

Rather than write out the full metric names, *i.e.*, liters, centimeters, millime etc., we use abbreviations. Below is the list of abbreviations for each level each measurement (meters, grams, liters).

LENGTH:			**Abbreviation Used:**
K: 1 Kilometer	=	1000 Meters	km
H: 1 Hectometer	=	100 Meters	hm
D: 1 Decameter	=	10 Meters	dam
U:	1 Meter		m
D: 1 Decimeter	=	0.1 Meter	dm
C: 1 Centimeter	=	0.01 Meter	cm
M: 1 Millimeter	=	0.001 Meter	mm
MASS/WEIGHT:			
K: 1 Kilogram	=	1000 Grams	kg
H: 1 Hectogram	=	100 Grams	hg
D: 1 Decagram	=	10 Grams	dag
U:	1 Gram		g
D: 1 Decigram	=	0.1 Gram	dg
C: 1 Centigram	=	0.01 Gram	cg
M: 1 Milligram	=	0.001 Gram	mg
VOLUME:			
K: 1 Kiloliter	=	1000 Liters	kl
H: 1 Hectoliter	=	100 Liters	hl
D: 1 Decaliter	=	10 Liters	dal
U:	1 Liter		l
D: 1 Deciliter	=	0.1 Liter	dl
C: 1 Centiliter	=	0.01 Liter	cl
M: 1 Milliliter	=	0.001 Liter	ml

Fill in the boxes in the stair step diagram.



Practice:

1123 mg =	g	109 g =	kg	2.3 cm =	mm
14 km =	m	160 cm =	mm	873 mL =	L
1.2 L =	mL	0.2 kg =	mg	6 mm =	m

Practice Problem: Rounding Round the following number as indicated:

4.5329

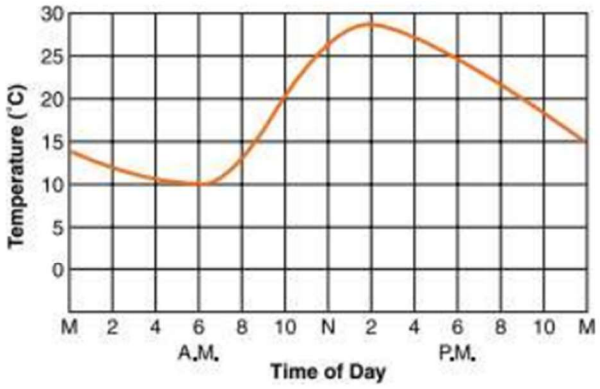
Nearest Whole #	Nearest tenth	Nearest hundredth	Nearest thousandth

Graphing

***Directions**: Fill in the blanks using your prior knowledge of science, and the reading passage below . As you fill in the blanks, answer the practice problems associated with each key concept.*

A graph is a visual way to organize and present data. Instead of reading paragraphs of information or studying columns of figures, a graph make comparisons between variables easier. Unlike a data table, a graph enables the reader to visualize changes in data, to understand relationships between variables within the data, and to picture trends or patterns.

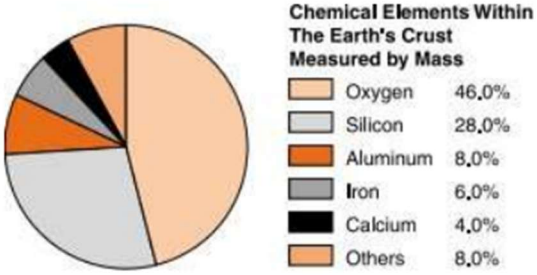
A line graph shows how a measured quantity changes with respect to time, distance, or some other variable. Line graphs are constructed by plotting data on a coordinate system, a grid in which each location has a unique designation defined by the intersection of two lines. A coordinate system is set up on vertical and horizontal axes. The horizontal (x) axis is usually used for the independent variable. It usually indicates a uniform change, such as hours, years, or centimeters. Normally, the regular change expected in the independent variable is well understood. The vertical (y) axis is used for the dependent variable. It usually indicates the amount of the measured quantity being studied, such as temperature, height, or population. The values of the dependent variable are what you are trying to find. The graph shows how the dependent variable changes with respect to the independent variable.



The rise or fall of the line in graph on the right shows the increase or decrease in temperature during a typical summer day in central New York State. When the line on the graph moves upward and to the right, it represents a continuous increase. When the line on the graph moves downward and to the right, it indicates a continuous decrease. A horizontal line on the graph represents no change. The steeper the line segment rises to the right, the greater the slope of the segment, and the greater the increase in temperature. Likewise, the steeper the line segment falls to the right, the greater the decrease in temperature. Not all graphs are curved lines. Some line graphs are straight lines.

Pie and Bar Graphs

Sometimes, a line graph is not the best kind of graph to use when organizing and presenting data. In Earth science, bar and pie graphs are often used. The bar graph is useful in comparing similar measurements at different times or in different places.
The pie graph is used to show how a certain quantity has been divided into several parts as well as to show the comparisons among these parts.



Pie Graphs

- Always total _____%

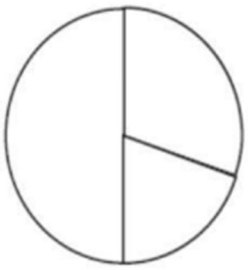
Practice Problem: Using the data below, color code the key and the parts of the graph to match.

Incoming Solar Radiation

30% reflected by atmosphere ☐

20% absorbed by atmosphere ☐

50% absorbed by Earth's surface ☐



Bar Graphs

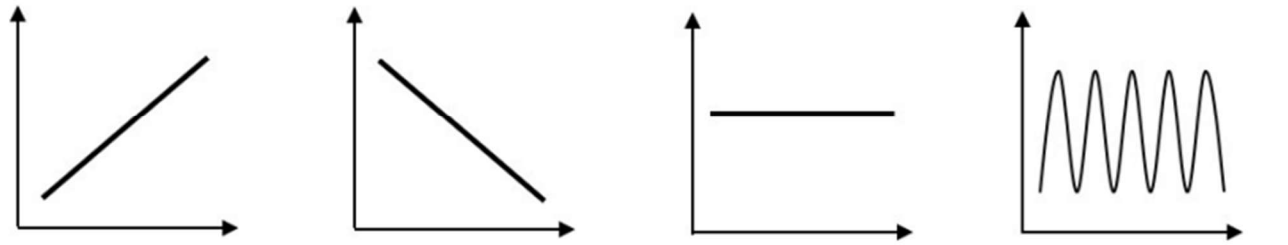
- Used to show a comparison between groups or categories.

Line Graphs

- X axis is the _____variable
- Y axis is the _____variable
- May have more than one line on a graph
- Relationships are direct, indirect, cyclic, or constant (static)

Practice Problem: *Label* the graphs below as either **direct, indirect, cyclic, or constant**. Then, *write* the graphing **relationships** below each example below.

1. _____ 2. _____ 3. _____ 4. _____



As x increases, y _____

As x increases, y _____

As x increases, y _____

As x increases, y _____

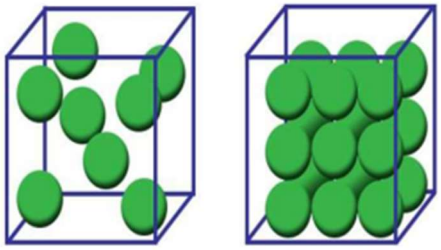
Density

Density is a concept that will be discussed over and over again in Earth and Space Science. Differences in density causes the ocean currents to move, plate tectonics to occur and the wind to blow. Density is a measure of how tightly packed the molecules are. A substance is MORE DENSE when the molecules are close together and LESS DENSE when the particles are spread apart. Read the following passages to help you answer the following questions. HOW IS DENSITY DETERMINED? Density is the concentration of matter, or the ratio of mass to volume. Substances such as lead or gold that are very dense are heavy for their size. Materials that we consider light, such as air or Styrofoam, are relatively low in density. Objects made of the same solid material usually have about the same density. (Density does change with temperature as a substance expands or contracts.)

Density is generally expressed in units of mass divided by units of volume. Note that the units are carried through the calculation, yielding the proper unit of density: grams per cubic centimeter (g/cm3). Water, with a density of 1 g/cm3, is often used as a standard of density. Therefore, the process of flotation can be used to estimate density. If an object is less dense than water, the object will float in water. If the object is more dense than water, the object will sink. Most wood floats in water because it is less dense than water. Iron, glass, and most rocks sink because they are more dense than water. The idea of density will come up many times in Earth science and it will be discussed as it is applied in later chapters. The instrument shown is called a Galileo thermometer. It is named for the Italian scientist who invented it. This thermometer is based on the principle that the density of water changes slightly with changes in temperature. As the water in the column becomes warmer and less dense, more of the glass spheres inside the tube sink to the bottom. Therefore, the number of weighted spheres that float depends on the temperature of the water. Reading the number attached to the lowest sphere that floats gives the temperature



Which box is more densely filled with particles?
(Circle the box)



***Directions**: Using the reading above, fill in the blanks using the key term box provided below. Some words may be used more than once. As you fill in the blanks, answer the practice problems associated with each key concept.*

Key Terms:			
decreases	does not	floats	matter
same	increases	expands	indirect
direct	less	space	liquid
density differences			

EQUATION

- Density is the amount of _____packed into a certain _____.
- The same substance has _____density regardless of shape or size
- Cutting an object into smaller pieces _____change its density
- As pressure increases, density _____(_____relationship)
- As temperature increases, density _____(_____relationship)

A rock has a mass of 210 grams and occupies a volume of 70 cm^3. What is its density?

Step 1: Write the Equation Step 2: Substitute with units Step 3: Solve with units to nearest 0.1

An unknown liquid occupies a volume of 5 ml and has a mass of 40 grams. Find its density.

Step 1: Write the Equation Step 2: Substitute with units Step 3: Solve with units to nearest 0.1

For each of the following, write out the chemical name that goes with the symbol-

CO_2	CO
$C_6H_{12}O_6$	CH_4
H_2	N_2
NO_2	NO_3
NH_3	NH_4^+
O_2	O_3
P	PO_4^{3-}
S	SO_2
SO_3	H_2SO_4
NaCl	Pb
U	Rn
Hg	Cl
H_2O	

Answer the following questions

A clam farmer has been keep recording concerning the water temperature and the number of clams developing fertilized eggs. The data is recorded below.

A) What is the dependent variable?

B) What is the independent variable?

C) What is the optimum (best) temperature for clam development?

What is the average temperature for clam development?

Water Temperature in°C	Number of developing clams
15	75
20	90
25	120
30	140
35	75
40	40
45	15
50	0