sept 16

What is the Independent Variable?

(Location of the stream)

A student wants to see if the salinity of a stream is affected by location of the stream. They do an experiment where they measure the salinity (amount of salt) of a stream in the winter as it passes through a forest, a suburb and the city after the roads were salted. They compare the salinity to the levels for those streams in the summer.

What is the dependent variable?

(Salinity of the stream

What is the control group?

Forest, Suburban and City streams in Summer

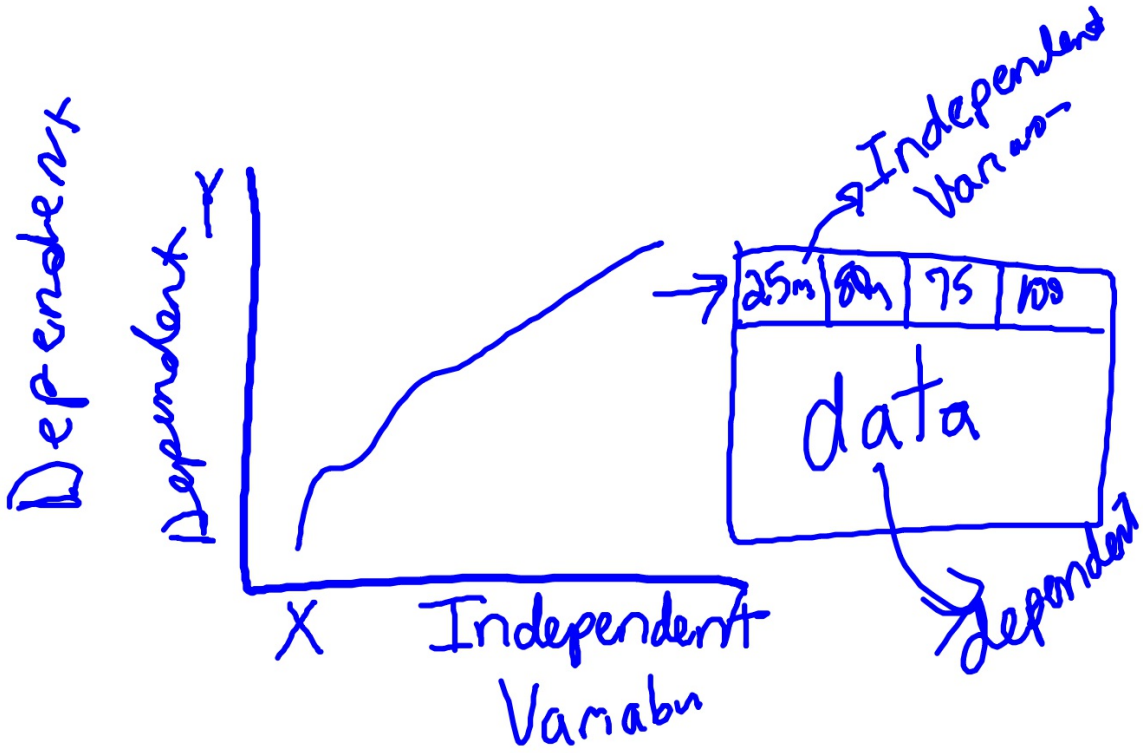
[redacted]

What is the experimental group?

Forest, suburban and city streams in winter

[redacted]

get out Lab (graph and CER)


Dependent
Dependent Y
X
Independent
Variable
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Variable
25m
75
100
data
Dependent

To pick up: Blue Warm Up Sheet (Week of 9/16)
Chromebook- go to weebly

To get out: Ecology Disrupted Packet
Effect of Saline Water on Seed Germination

Agenda: Warm Up
Osmosis and diffusion review
Ecology packet, pgs 6 and 7

Homework: Mymcps miniquiz tuesday 9/17
Test Friday 9/20
Make flashcards if you haven't done it yet

Name _____ Date _____ Period _____

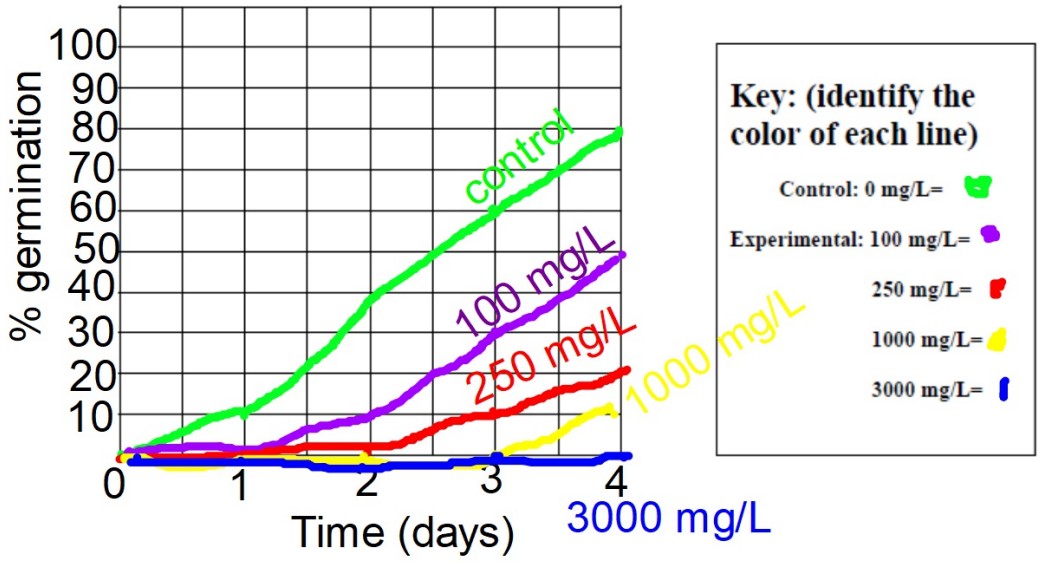
If you need help on the lab come at lunch

Effect of Saline Water on Seed Germination

Data Analysis- Graph the percent of seeds germinating each day at each concentration. This is a line graph with each concentration being a different colored line. You will be graphing 5 different colored lines. One line for each concentration.

X Axis= Time in days Y Axis= % Germination

Title: Effect of Salt water on Seed Germination



(you are graphing the class data!!!)

Use your graph to answer the analysis questions

Analysis:

1) Compare the slopes of the lines that you see on your graph. The steeper the slope the higher the rate of germination at that concentration. In which concentration of salt did the greatest percent of seeds germinate the fastest?

2) Which concentration of salt caused the lowest % of seeds to germinate?

3) Between which two concentrations of salt do you see the biggest impact on the germination rate of the seeds?

4) How does salt affect seed germination rates?

5) What happens in the cells of the seeds when they are exposed to high levels of salt?

Name _____ Date _____ Period _____

Soil salinity causes severe problems in agriculture worldwide. Detrimental effects of high salinity on crops affect plants in a variety of ways and as a result, plant growth, development and survival are reduced. Additionally, natural vegetation of salt-affected areas is destroyed or damaged when salt concentration is too high resulting in major changes to landscape and biodiversity. Areas impacted by high salt concentrations include remaining natural habitat in many agricultural areas and developed areas such as parks in Montgomery County, and the fragmentation of many wildlife corridors.

Ecosystems around your home and school are impacted by salt runoff from winter-time road treatments every year. **Make a claim about how repeatedly using road salts to melt ice on the roads will affect these ecosystems over time.**

Claim A claim is a statement about what happened	

Use evidence (from the lab you just completed, as well as online sources) and reasoning to support your claim.

Evidence Evidence uses **NUMBERS with UNITS** from your graph to support your claim	
Reasoning Reasoning uses **science** to explain **WHY it happened.**	

This is IMPORTANT

Read this

Make a claim about how repeatedly using road salt to melt ice on roads will affect these ecosystems over time

Use data (numbers) from your lab to support your claim.

Use science concepts and vocab to explain what is happening to plants at the cell level.

Make flashcards for homework if you haven't done so already

Make flash cards of vocabulary:

Front of card	Back of card
Independent Variable	What is changed by the experimentor in the experimental group
Dependent Variable	What is measured in the experimental and control group
Control Group	A group that is tested as a comparison to the experimental group.

Make flash cards of vocabulary:

Front of card	Back of card
Experimental Group	Group that is tested to see the affect of the independent variable.
Constants/ Controlled Variables	What you keep the same in all trials
Solute	What is being dissolved

Make flash cards of vocabulary:

Front of card	Back of card
Solvent	What is doing the the dissolving (ex: water)
Solution	Mixture made when a solute dissolves in a solvent
Osmosis	Movement of water through a membrane from high to low concentration

What is diffusion?

Diffusion is defined as the movement of molecules from an area of high concentration to an area of low concentration.

What is osmosis?

The diffusion of water molecules through a selectively permeable membrane is known as Osmosis.

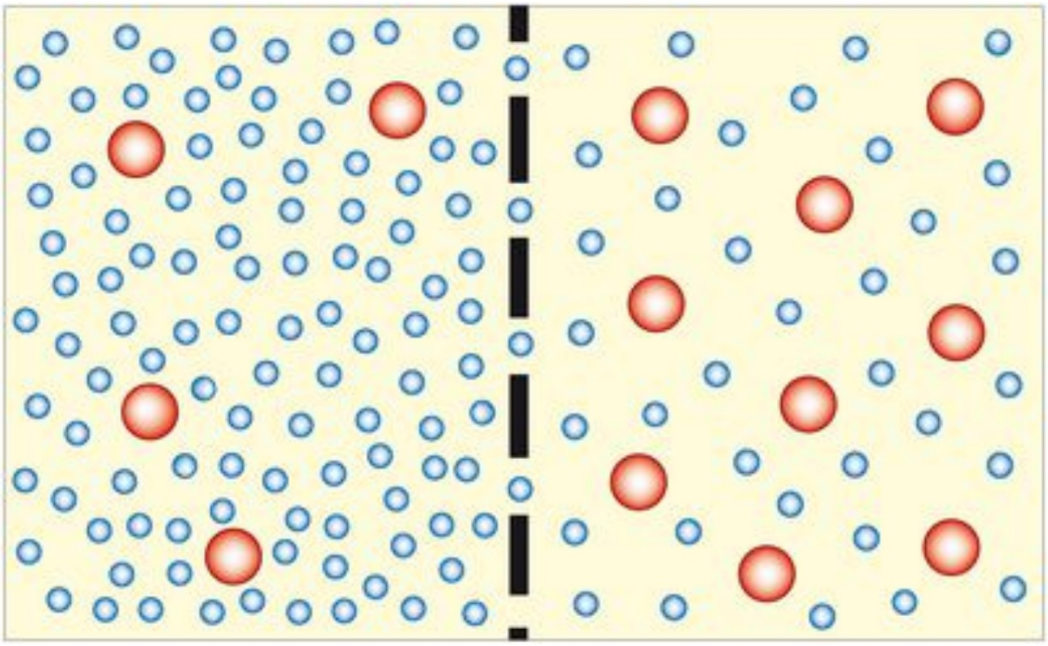
What does permeable mean?

Allowing liquids or gases to pass through.

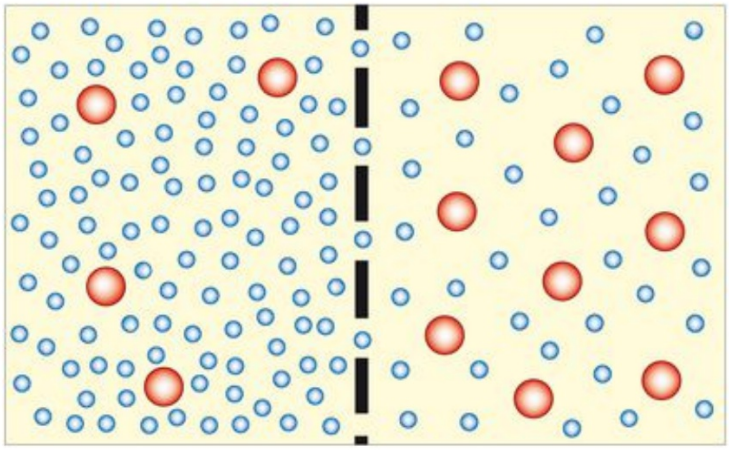
What does selectively permeable mean?

Only certain materials can pass through.

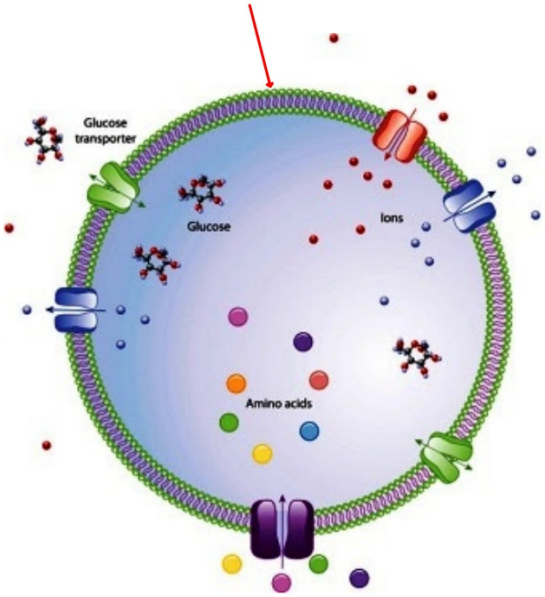
Concentration =
The relative amount of a given substance.



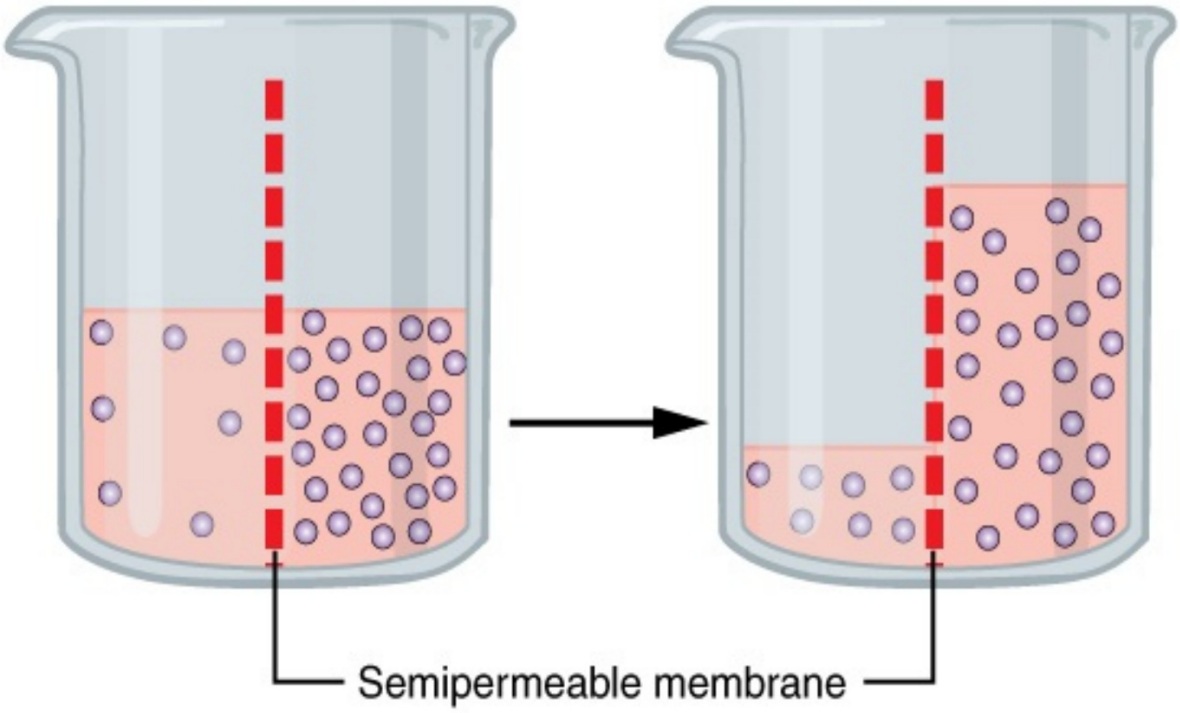
Which side has a higher concentration of blue?
Red?



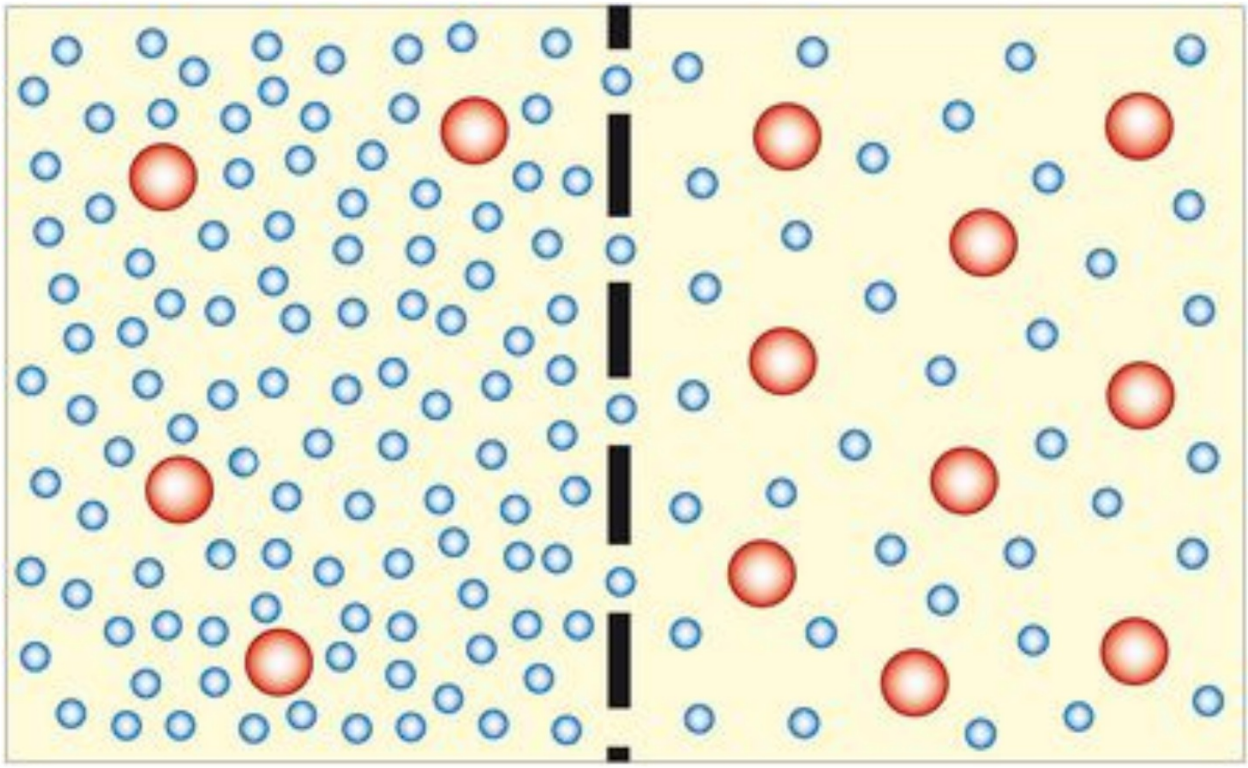
Cells have a protective outer membrane.



Membrane =
a thin sheet acting as a boundary, lining, or partition in an organism.

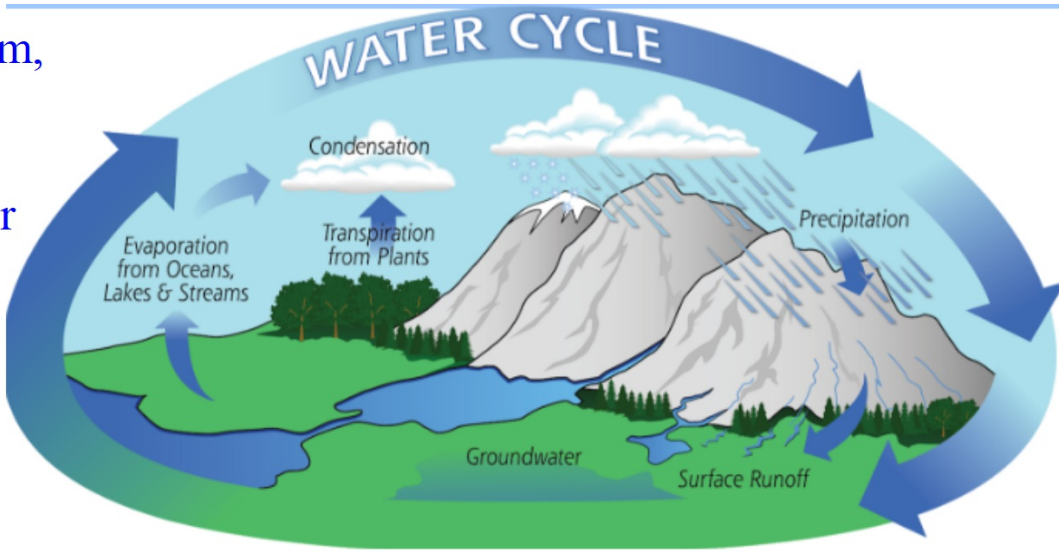


Why does the water move instead of the purple spheres?
(solvent) (solute)



In which direction will the molecules move?
Why?

Look at a diagram, think about the questions, discuss with your neighbor.



In what ways do you use water in your home?

Where and when do you see water outside?

What are the differences between outdoor and indoor water sources?

What happens to the rain and snow? Where does it go?

Where does the water in your home come from? How does it get there?

Pg 6: Water in our daily lives PINK PACKET PG 6

Watch the two video clips about the sources of water in Montgomery County. Take Notes as you listen.

Video 1: Where does WSSC Water Come from	Video 2: How Stormwater destroys our streams
Our water comes from the Potomac river. WSSC treats 112 million gallons of water/day	-More roads/buildings/concrete= more runoff from storms. More runoff = more water moving through streams which causes erosion

Read the following in your packet

Surface Water and Groundwater

Twenty one percent of the freshwater used in the United States comes from the ground. Some water seeps underground when it falls as rain, snow or sleet. The gravel or sand underground act like a sponge to absorb and hold the water, just like when you are digging at the beach and discover water when you dig down deep. In order to access stored underground water, people use well pumps to bring stored water to the surface. An area that holds a lot of water, which can be pumped up with a well, is called an aquifer. Wells pump groundwater from the aquifer and then pipes deliver the water to cities, houses in the country, or to crops.

Wrapping It All Together

1. What is the main way that salt enters our watershed (rivers and streams)?

2. How do storms contribute to water pollution?

3. How can we reduce the amount of pollutants that reach the waterways?

Part 4: Investigating and Graphing Salinity Data

"Water is the reflection of all the bad water quality things we do on land"
- Dr. Sujay Kaushal

Think-Pair-Share: Discuss this quote with the person next to you and write down what you think it means.

_____

_____

Predict & Plan: -

You will be analyzing sets of data from Dr. Kaushal's study. Where do you expect to find the saltiest water? Urban, Suburban or Forested? Why?

_____

In Groups of 4 Distribute Data taken in Winter, Spring, Summer and Fall from 2001 to 2010

Data 1: Annual Average Salt Levels in Baltimore County Streams from 1999-2009

Data 2: Seasonal Average Salt Levels in a **Forested Area** Baltimore County Stream

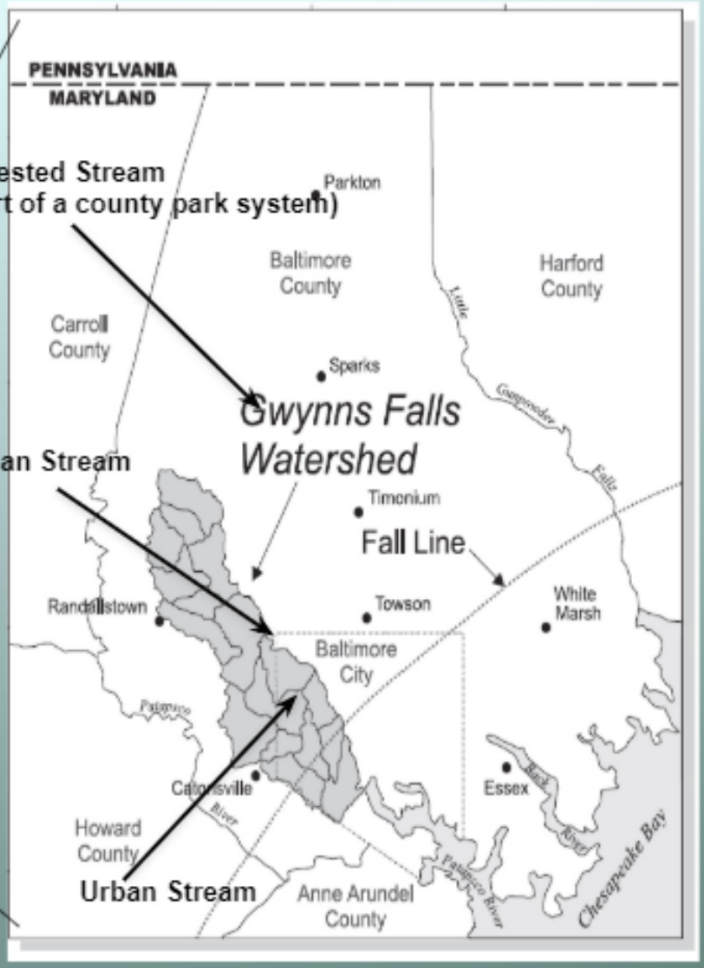
Data 3: Seasonal Average Salt Levels in a **Suburban Area** Baltimore County Stream

Data 4: Seasonal Average Salt Levels in an **Urban Area** Baltimore County Streams

Forested Area	Suburban Area	Urban Area
Population Density 0 people/mile2	Population Density 3000 people/mile2	Population Density 8050 people/mile2
		

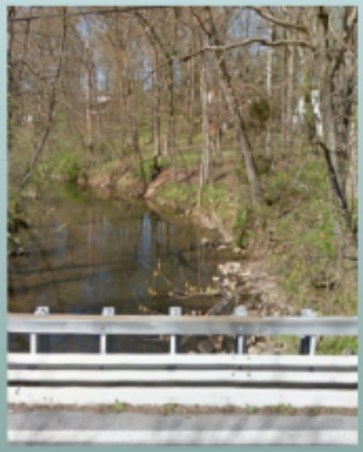
Look at the group's data. What are your first impressions of the data?

Baltimore
Data Collection Sites



Data from three sites…

Forested



Suburban

Urban

Where would you expect to find the saltiest water?

Forested

population density:
0 people
per square mile

Suburban

population density:
3000 people
per square mile

Urban

population density:
8050 people
per square mile

Where would you expect to find the *least* salty water?

Forested

population density:
0 people
per square mile

Suburban

population density:
3000 people
per square mile

Urban

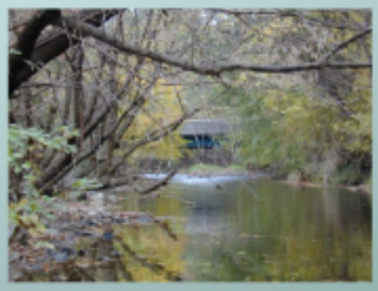
population density:
8050 people
per square mile

How would you test these predictions?

Look at your dataset for guidance.

Dr. Sujay Kaushal's Research

- Dr. Kaushal analyzed data from streams near Baltimore considered to be urban, suburban, and forested.
- He analyzed samples during each season to determine how salt levels changed.
- He was lucky. The dataset was enormous, going back over 30 years. You are only looking at a subset of the data he and colleagues analyzed.

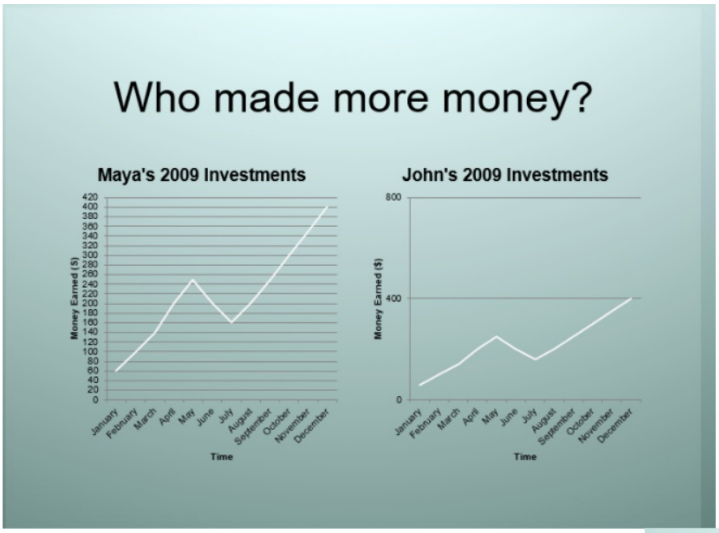


Baltimore area stream

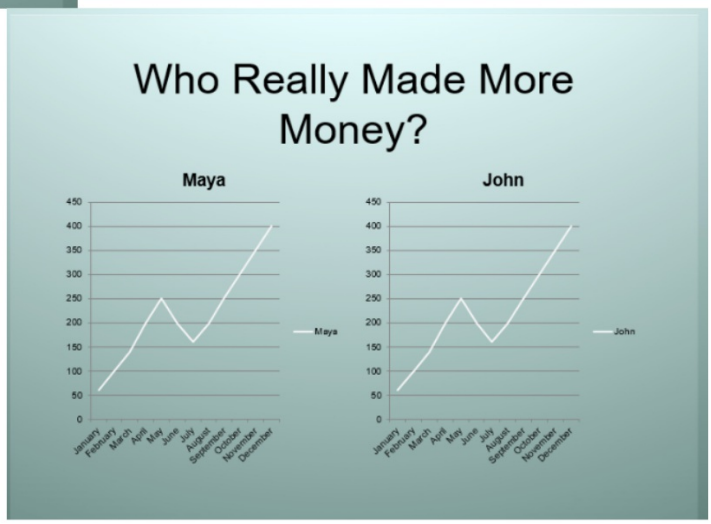
Salt near storm drain

What is the best way to represent the data in order to compare the different data sets?

Why is it important
to choose
an appropriate scale
for your data?



Units and Scale.
Why are they important?



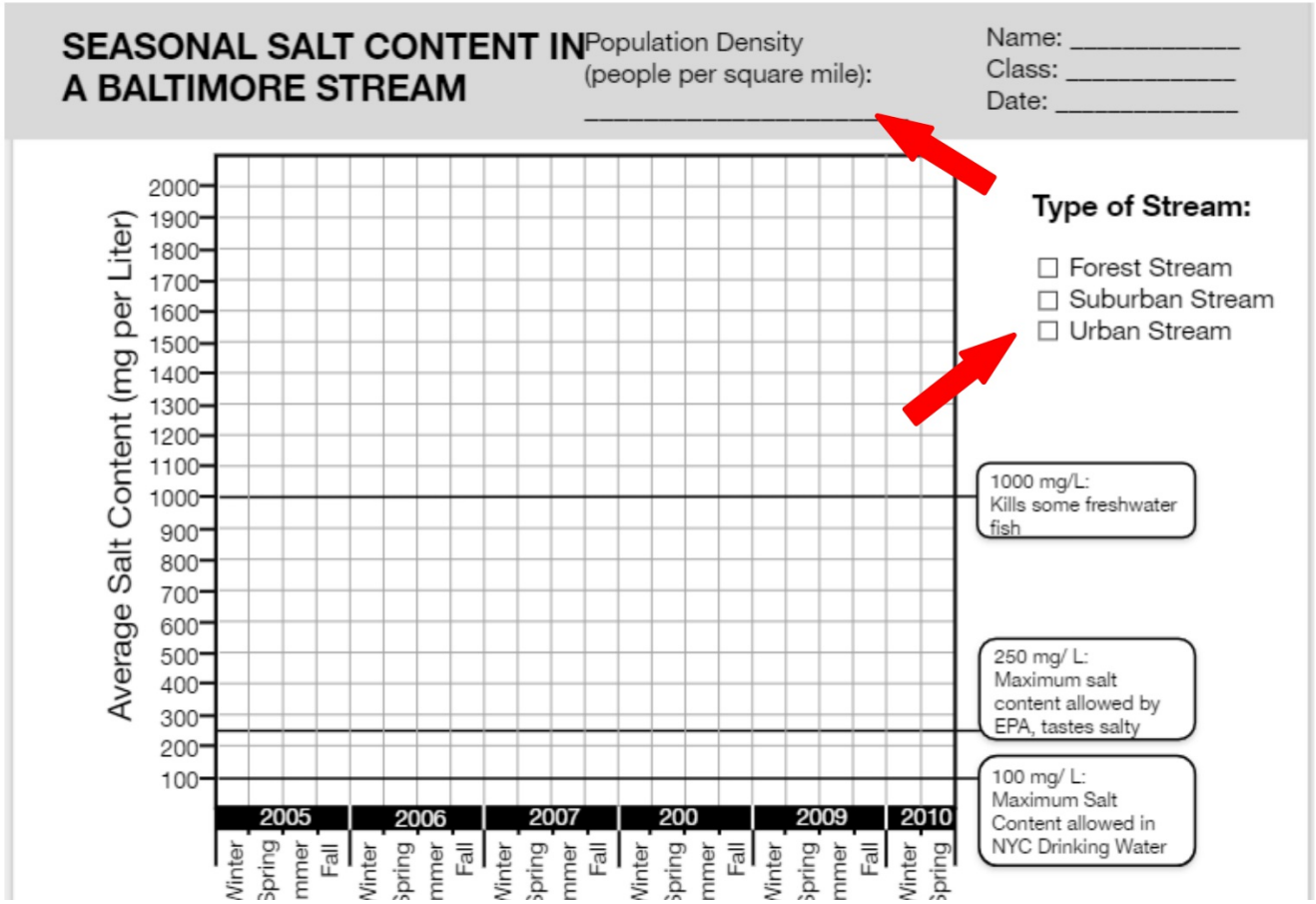
After reviewing the data sets you will be graphing, identify which data will go on the x-axis and which will go on the y-axis. Complete the table below to plan your graphing strategy.

Data Set To Graph: Circle One: Urban, Suburban, Forested, Annual

Graph Style: You will be making a **line** graph.

Axis	Horizontal or Vertical axis?	Data description and Units	Scale (From _____ to ____)	Independent or Dependent variable?
X				
Y				

Graph your data- Your group you must decide if you all are doing bar graphs or line graphs.



One Person will be doing <u>Annual Average Salt</u>

This person will be graphing data from all 3 areas

Use 3 Different colors (1 for each area)
Identify your colors in the Key