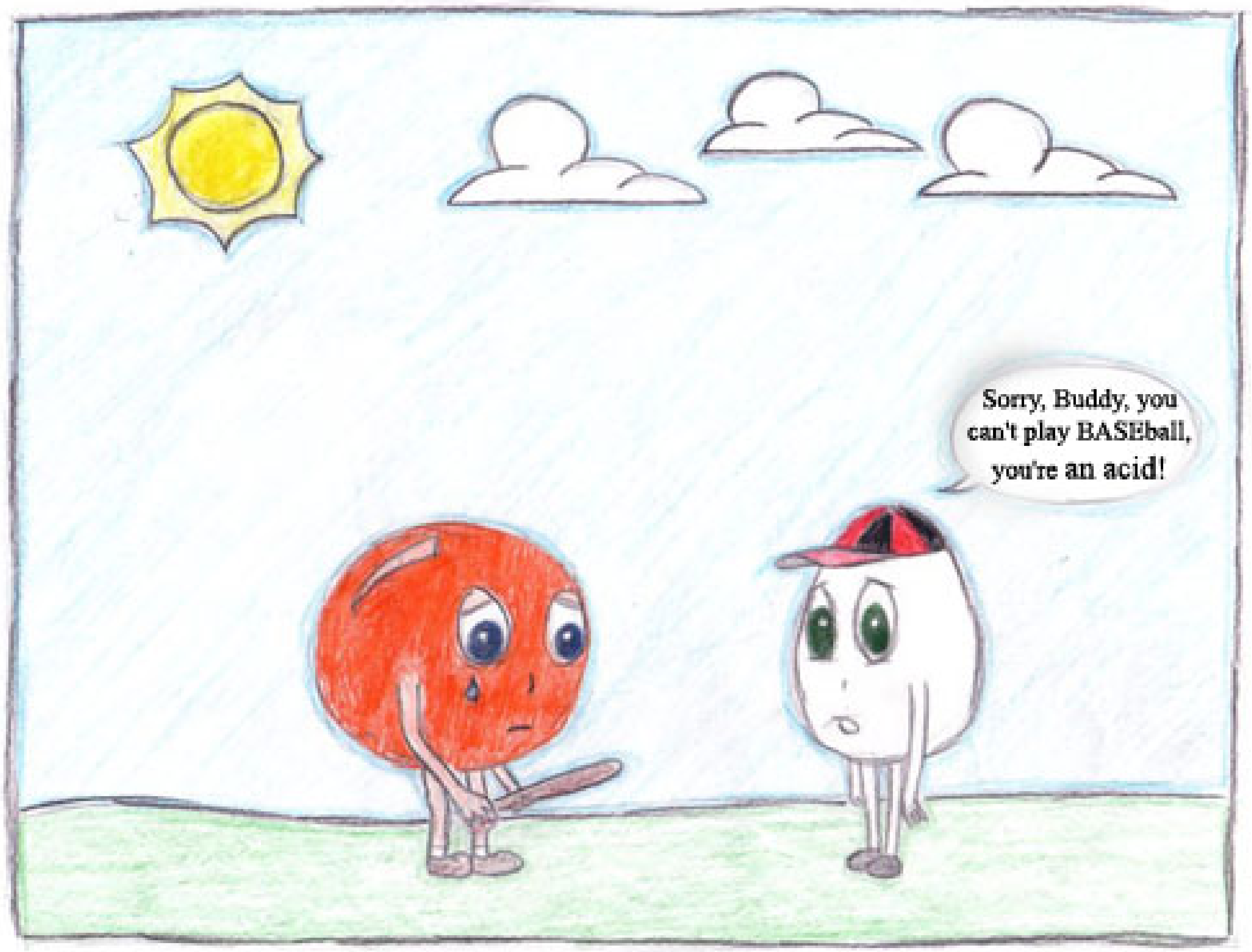
Name ___________________________

ACIDS AND BASES



Introduction to Acids

With the class, view the video “Cheeseburger in Hydrochloric Acid” (http://www.youtube.com/watch?v=NddZ5ftQb0Q).

BEFORE THE VIDEO
What do you know about acids?

DISCUSS

AFTER THE VIDEO	
What do you know about acids?	Explain what part of the video made you think this.

Based on what you saw in the video, why do you think we need acids in our stomachs?

____

____

____

Activity: Which are Acids?

Acids are not only in our stomachs, they also are present in our houses and in our classrooms. With your table, brainstorm what common items you may use every day that could be acids. Explain why you think that.

We think that _______________________________________

____

______________________________ may be acids because

____

____

Work with your table to see if the items supplied are acids. Your table should collect approximately 10 ml samples of each of the liquids from the front of the room. Each table should also collect 7 sheets of blue litmus. Bring your materials back to your lab table.

BLUE LITMUS TURNS RED WHEN IT IS IN AN ACIDIC ENVIRONMENT.

Therefore, if the liquids you're testing are acids, the **BLUE** litmus will turn **RED**.

If the liquids are not acids, the **BLUE** litmus WILL NOT change color.

Liquids from front of room:

- **Pineapple juice**
- **Coconut water**
- **Tap water**
- **Bottled water**
- **Ginger ale**
- **Windex**
- **Grapefruit juice**

BEFORE TESTING:

Based on your table's idea of what an acid is, which of the items that we'll test do you expect to be acids? List them below.

____

____

Why did you select these items?

____

____

AFTER TESTING:

Which of the liquids are actually acids? List them below.

____

____

Which of the liquids were surprising? Explain why.

____

____

____

____

____

Acids and Bases

Most of the liquids that you see have either acidic of basic properties. We know some information about acids, but **what is a base??** The following readings tell you more information about **acids and bases**. Read each section aloud with your reading partner, one section at a time.

The readings on pages 4 – 8 are from:
Carpi, A. PhD. "Acids and Bases: An Introduction". Visionlearning Vol. CHE-2 (2), 2003.
http://www.visionlearning.com/library/module_viewer.php?mid=58

Read SECTION ONE aloud with a partner and complete the Venn Diagram on page 4 with quotes and information from the reading about acids and bases.

SECTION ONE:

Define **sour**:

Translate or draw example:

For thousands of years people have known that vinegar, lemon juice, and many other foods taste **sour**. However, it was not until a few hundred years ago that it was discovered why these things taste sour – because they are all acids**.** The term acid, in fact, comes from the Latin term *acere*, which means "sour".

Define **corrosive:**

Translate or draw example:

In the seventeenth century, the Irish writer and amateur chemist Robert Boyle first labeled substances as either acids or bases (bases are also called alkaline) according to the following characteristics:
Acids: taste sour, are **corrosive** to metals, turn litmus (a dye extracted from lichens) red, and become less acidic when mixed with bases.
Bases: feel slippery, turn litmus blue, and become less basic when mixed with acids.

Draw a sketch of **dissolve:**

In the 1800s Swedish scientist Svante Arrhenius proposed that water can **dissolve** many compounds by separating them into their individual ions. Arrhenius suggested that acids are compounds that contain hydrogen and can dissolve in water to release hydrogen ions into solution. For example, hydrochloric acid (HCl) dissolves in water as follows:

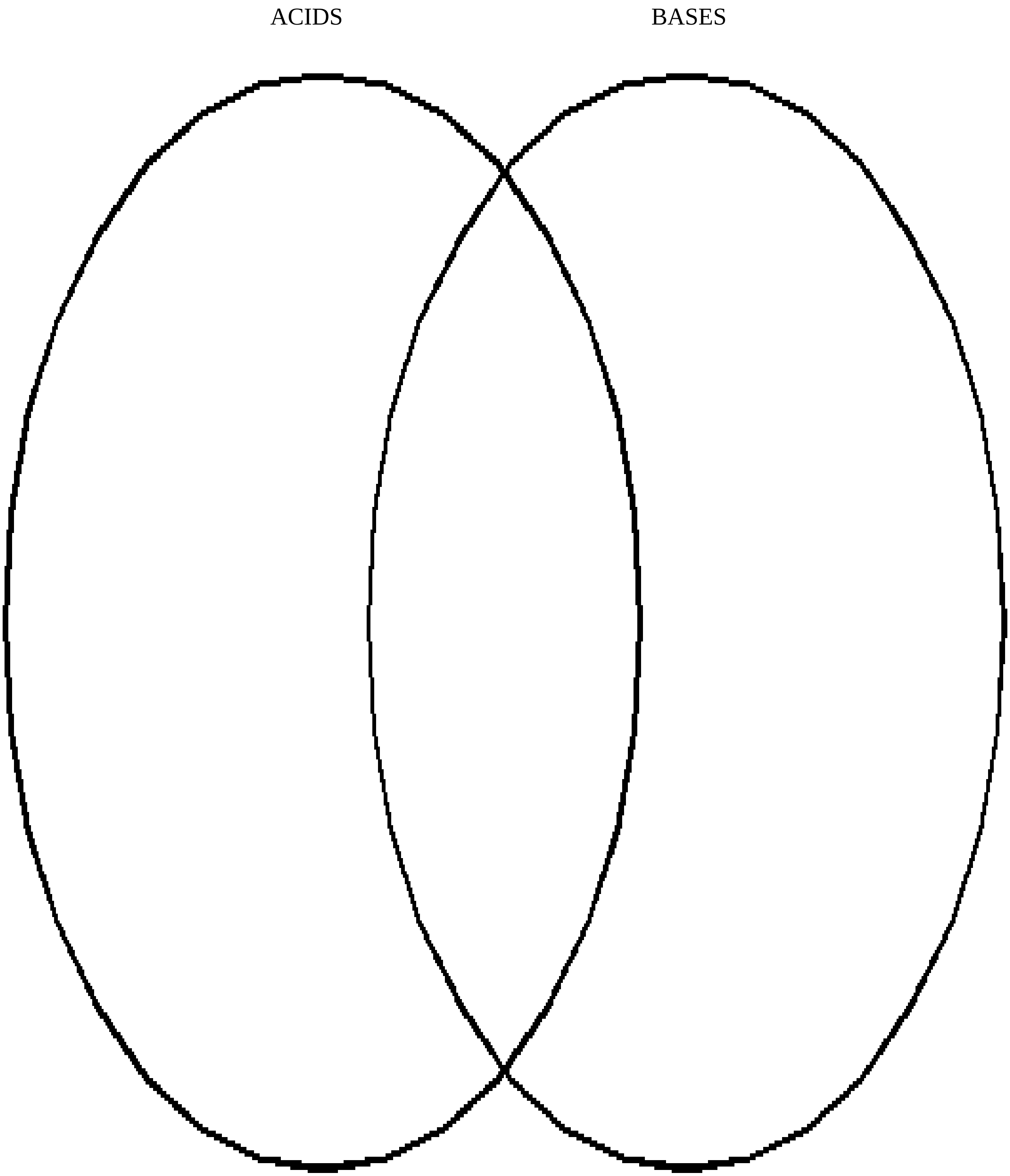
$$HCl \rightarrow H^+ + Cl^-$$

Arrhenius defined bases as substances that dissolve in water to release hydroxide ions (OH-) into solution. For example, a typical base according to the Arrhenius definition is sodium hydroxide (NaOH):

$$NaOH \rightarrow Na^+ + OH^-$$

All acids release H+ ion in solution and all bases release OH- ions in solution.

Complete the Venn Diagram below with quotes and information from SECTION ONE.



After reading SECTION TWO, complete the different stages of what's happening in the neutralization reactions provided. Explain each of the four stages of the neutralization reaction.

SECTION TWO
Neutralization:
As you can see from the equations, acids release H+ into solution and bases release OH-. If we were to mix an acid and base together, the H+ ion would combine with the OH- ion to make the molecule H_2O.

$$H^{+} + OH^{-} \rightarrow H_{2}0$$

A neutralization reaction with an acid and a base will always produce water and a salt, as shown below:

Two examples:

	Acid	Base	Water	Salt
First example:	HCl +	NaOH →	$H_2$0 +	NaCl
Second example:	HBr +	KOH →	$H_2$0 +	KBr

<u>Read the section below for the first neutralization reaction:</u>

<u>Stage 1:</u> HCl + NaOH	<u>Stage 2:</u> HCl + NaOH ↙ ↘ ↙ ↘ H^{+} and Cl^{-} + Na^{+} and OH^{-}	<u>Stage 3:</u> H^{+} and Cl^{-} + Na^{+} and OH^{-}	<u>Stage 4:</u> $H_2$0 + NaCl
<u>Explanation:</u> *HCl and NaOH are combined together. HCl is an acid and NaOH is a base.*	<u>Explanation:</u> *Since HCl is an acid, it releases H+ ion in solution. Cl- is the other ion that HCl <u>dissociates</u> (or breaks) into.* *Since NaOH is a base, it releases OH- ion in solution. Na+ is the other ion that NaOH <u>dissociates</u> (or breaks) into.*	<u>Explanation:</u> *H+ and OH- combine and Na+ and Cl- combine.*	<u>Explanation:</u> *H+ and OH- form H2O. Na+ and Cl- form NaCl. H20 is water and NaCl is a salt. Therefore, the acid and base combined to form a salt and water.*

Complete the stages for the second example of a neutralization reaction.

Stage 1:	Stage 2:	Stage 3:	Stage 4:
HBr + KOH	HBr + KOH ↙ ↘ ↙ ↘ ___ and ___ + ___ and ___	__ and __ + __and __	_________________
Explanation: *____ and _____ are combined together. ____ is an acid and _____ is a base.*	Explanation: *Since ____is an acid, it releases ______ in solution. ____ is the other ion that _____ dissociates (or breaks) into. Since _____ is a base, it releases ______ ion in solution. ______ is the other ion that ______ dissociates (or breaks) into.*	Explanation: *_____ and _____ combine and ______ and _____ combine.*	Explanation: *____ and _____ form ______. ______ and ____ form _____. _____ is water and _____ is a salt. Therefore, the acid and base combined to form ______ and _____.*

After reading SECTION THREE, write a two sentence summary that explains the difference between Arrhenius' and Bronsted-Lowery's theories of acids and bases.

SECTION THREE:

Though Arrhenius helped explain the fundamentals of acid/base chemistry, unfortunately his theories have limits. For example, the Arrhenius definition does not explain why some substances, such as common baking soda (NaHCO3), can act like a base even though they do not contain OH- ions.

In 1923, the Danish scientist Johannes Bronsted and the Englishman Thomas Lowery published independent yet similar papers that refined Arrhenius' theory. They said that acids release H+ ion in solution and that bases take up H+ ion in solution.

Under the Bronsted-Lowery definition, both acids and bases are related to the concentration of hydrogen ions present. Acids increase the concentration of hydrogen ions, while bases decrease the concentration of hydrogen ions (by accepting them).

Acid **Base** **Salt**

HCl + NaHCO3 → H2CO3 + NaCl

Two sentence explanation of differences in Arrhenius' and Bronsted-Lowery's acid/base theories:

____

____

Based on the reading, where did Arrhenius' theory fall short?

Answer		Quote from reading that let you know this
	I know this because	

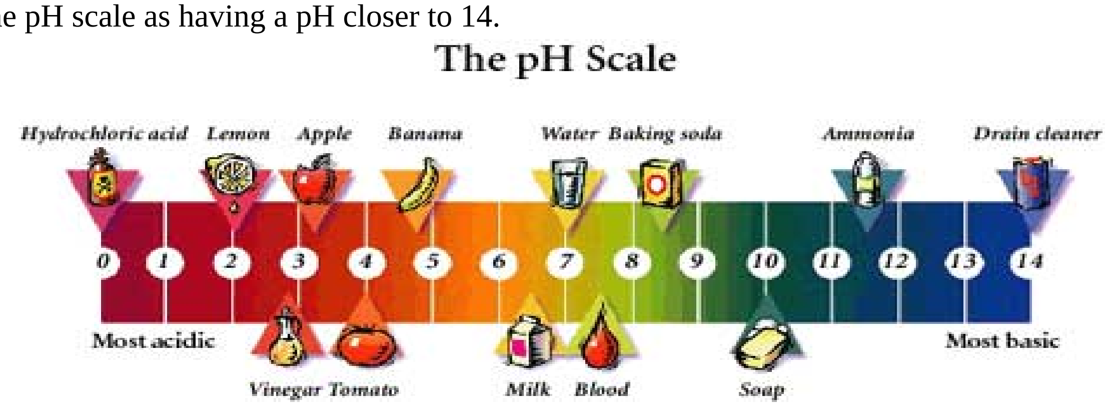
Read SECTION FOUR. Think of what this means about the substances that you tested in the beginning activity of this packet. What are the pH values of the substances that we tested in our first activity?

SECTION FOUR:

pH

In 1909 the pH scale was invented. The pH scale measures the concentration of hydrogen ion in the solution. The pH scale ranges from 0 to 14. Substances with a pH between 0 and less than 7 are acids. Substances with a pH greater than 7 and up to 14 are bases. Right in the middle, at pH = 7, are neutral substances, for example, pure water.

Strong acids are measured on the pH scale as having a pH closer to 0. Strong bases are measured on the pH scale as having a pH closer to 14.



ACIDS	BASES

Therefore, what is the range of pH levels for the liquids that we tested in the beginning activity of this packet?

____

____

Go back to reading SECTION FOUR and underline the phrase(s) that let you know that.

Create a flash card for each of the following words that were used in the readings.

On the front of the flash card write the word and draw a picture.
On the back of the flash card, write the definition and the quote from the reading where the word was explained.

- **Acid *(noun)***
- **Base *(noun)***
- **Neutral *(noun)***
- **Neutralization Reaction *(noun)***
- **pH Scale *(noun)***

Work with your reading partner to quiz each other with your flash cards.

Lab: Testing common liquids to classify as acids or bases

Question: Which is the strongest acid and which is the strongest base from the following items?

Pepsi
Dish soap
Hand soap
Vinegar
Apple Juice
Orange Juice

Introduction: Various household items that we use and come into contact with everyday are different levels on the pH scale. We use acids and bases every day. As you already know, the pH scale is a way to measure how acidic or alkaline a substance is. In the lab, pH paper tells us the pH of a liquid. All we need to do is hold the pH paper in the liquid for 15 second and it changes color. We use the color code that the teacher will hand out to let us know what pH the liquid is based on the color of the pH paper.

Hypothesis:
Make sure that your hypothesis is written in an "If…then…" format.

For example:
If I test the given items to see which is the strongest acid and which is the strongest base, then _____ will be the strongest acid and ______ will be the strongest base.

If ____ ____ __________ then ________________ will be the strongest acid and ____________________ will be the strongest base.

Why?
Go back to our reading on pages 4 – 8 and justify your hypothesis below.

I think this is true because of the information from ___________________________ that says ______________________________ ____ ___________________________. That makes me think that __________ ____ ____.

Materials:
Small cups, pH paper, paper towels, pH paper strips

Procedure:
1. Obtain a small cup with each of the liquids to be tested from the front of the room for your table.
2. Get one piece of pH paper for each liquid to be tested.
3. Dip the pH paper in the liquid and hold it there for 15 seconds.
4. Take the pH paper out of the liquid after 15 seconds.
5. Use the key on the pH label to record the pH in your data chart.

Data:

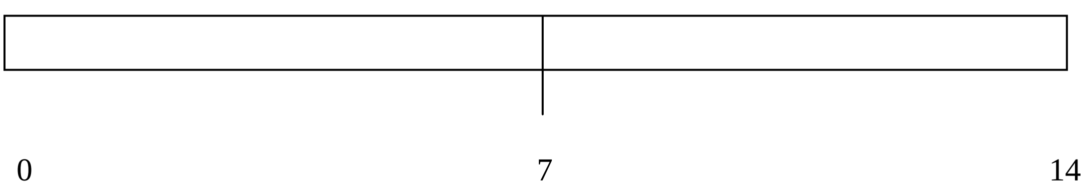
Liquid	pH

Conclusion:

1. Was your hypothesis supported? Explain why or why not.

   According to the data collected, my hypothesis ____________ supported because my hypothesis said that __________________ ____.
   The data collected suggest that ________________________________ ____ ____.
   I know this because ____ ____.

2. Create a pH scale below and put the liquids where they belong on the scale.



Solutions:

Acids and bases are often found in a solution with water. Water is the solvent and the acid or base is the solute. Together, a **solute** and **solvent** make a solution. The **solute** is the substance that is being dissolved and the **solvent** is the liquid that is dissolving the solute.

Use the paragraph above to draw your own example of a solution.
Label the <u>SOLUTE</u> and the <u>SOLVENT.</u>

Underline the phrases in the paragraph above that told you the information you needed to know about the solute and solvent in a solution.

<u>Think</u>:

What **solutions** have you seen at home? Write them below and tell why you think each is a solution. Also tell what you think the solutes and solvents are.

At home, I've seen the following solutions: ______________________

____

________________. I believe that they're solutions because _________

____.

I believe that the solvents are___________________________________

___________________________ and that the solutes are____________

____.

Share your thought bubble with your table. Listen to your table's thoughts.
What new solutions did you hear of from your table? Write them below and tell whether you agree or disagree with them and why.

Examples of solutions I heard from my table	I agree/disagree because…
1.	I _______ because _______________________________ ____.
2.	I _______ because _______________________________ ____.
3.	I _______ because _______________________________ ____.

Understanding Concentration of Solutions

Activity 1

In this activity you will create different solutions of salt water.

_________ IS YOUR **SOLUTE** AND ______ IS THE **SOLVENT.**

What will happen to the solution when you double and triple the amount of solute?

Work with your activity partner to sketch what you think the solution will look at after adding the first10 ml of salt, after adding another 10 ml of salt, and after adding a third 10 ml of salt.

Solution of 100 ml of water and 10 ml of salt	Solution of 100 ml of water and 20 ml of salt	Solution of 100 ml of water and 30 ml of salt
Explain	**Explain**	**Explain**

Materials:
Salt, water, small beaker, large beaker

Procedure:
1. Get a small and large beaker and bring them to your lab station.
2. Fill the large beaker with 100 ml of water
3. Measure 10 ml of salt with your small beaker
4. Pour it and mix it into your large beaker with the water.
5. Fill in your observation chart in the data section.
6. Measure another 10 ml of salt with your beaker.
7. Pour it and mix it into your large beaker with the salt water.
8. Fill in your observation chart in the data section.

Data:

	Qualitative observations (*sketch the solution and explain what you see*)	Quantitative observations *(what is the resulting volume?)*
After 10 ml of salt		
After another 10 ml of salt (20 ml of salt total)		
After another 10 ml of salt (30 ml of salt total)		

Activity 2

In this activity you and your partner will use food coloring to create different concentrations of solutions.

What is the solute in this activity? ___________________________

Why do you think that? ____

____

What is the solvent in this activity? ___________________________

Why do you think that? ____

____

What do you think will happen as you add more food coloring to the water?

____

____

____

____

<u>Materials:</u>

Food coloring, water, small beaker

<u>Procedure:</u>

1. Get a small beaker and bring them to your lab station.
2. Fill the large beaker with 10 ml of water
3. Add five drops of food coloring into the water. Stir.
4. Observe and write your observations in the data table.
5. Add another five drops of food coloring into the water. Stir.
6. Observe and write your observations in the data table.
7. Add another five drops of food coloring into the water. Stir.
8. Observe and write your observations in the data table.

Data:

10 ml of water and 5 drops of coloring	**10 ml of water and 10 drops of coloring**	**10 ml of water and 15 drops of coloring**
Sketch what you saw	*Sketch what you saw*	*Sketch what you saw*
Explain what you saw	*Explain what you saw*	*Explain what you saw*

Conclusions:

1. **Concentration**
    a. Define:
    ____
    ____
    b. Translate into native language:
    ____
    c. Use the word **concentration** to write a sentence explaining what happened in this lab.
    ____
    ____
    ____

2. What salt solution was the most concentrated?

   What qualitative and quantitative observations let you know that was true? Write them below.

3. Complete the sentence:
   The final solution of food coloring, with 15 drops of coloring, was _________ times more concentrated than the first solution with only 5 drops of food coloring. I know this because

____

____

The second solution of food coloring, with 10 drops of coloring, was _______ times more concentrated than the first solution with only 5 drops of food coloring. I know this because

____

____

Concentration of Acids and Bases:

MOLARITY is a measure of concentration used for acids and bases. When scientists talk about concentration of an acid or base, they use the value of MOLARITY.

Molarity tells you the concentration of a **solute** in a **solvent**.

$$\textbf{Molarity (M)} = \frac{\textbf{moles of solute}}{\textbf{liters of solvent}}$$

Think back to our previous work before this packet.

What is a mole? ____

____

Draw a representation of a mole:

What is a liter? ____

____

Draw a representation of a liter:

Create a flash card for each of the following words that were used in the previous sections.

On the front of the flash card write the word.

On the back of the flash card, write the definition and the quote from the reading where the word was explained.

- **Solute *(noun)***
- **Solvent *(noun)***
- **Solution *(noun)***
- **Molarity *(noun)***
- **Mole (*noun)***
- **Liter (*noun)***

Work with your activity partner to quiz each other with your flash cards. Use your first flash cards, too.

Examples using the value of Molarity:

1. There is a solution of HCl.
   a. What is the solute in this example? How do you know that?
   b. What is the solvent in this example? How do you know that?
   c. What is the molarity of the HCl solution if there are 2 moles of HCl and 10 liters of water?
2. There is a solution of NaOH.
   a. What is the solute? How do you know?
   b. What is the solvent? How do you know?
   c. What is the molarity of the basic NaOH solution if there are 4 moles of NaOH dissolved in 25 liters of water?

3. What is the molarity of an acidic solution of HF if there are 2 moles of HF dissolved in 50 liters of water?

4. How is concentration related to molarity?

If you had two salt water solutions and you didn't know which one was more concentrated, how could you test it?

If you had an acid or base solution that you didn't know the molarity of it, how could you test it? Scientists use a lab procedure called a **TITRATION** to find the molarity of acids and bases that they don't know.

Why may it be important to know the concentration of an acid or base in a science lab?

Reading: Acid-Base Titrations

The reading was taken from:

"Acid-Base Titrations". Retrieved on October 2, 2011 from http://www.mpcfaculty.net/mark_bishop/titration.pdf

As you read, circle key words. Only circle the words that you **need** to retell the important information from the reading. You will reconstruct the information from this text after reading it.

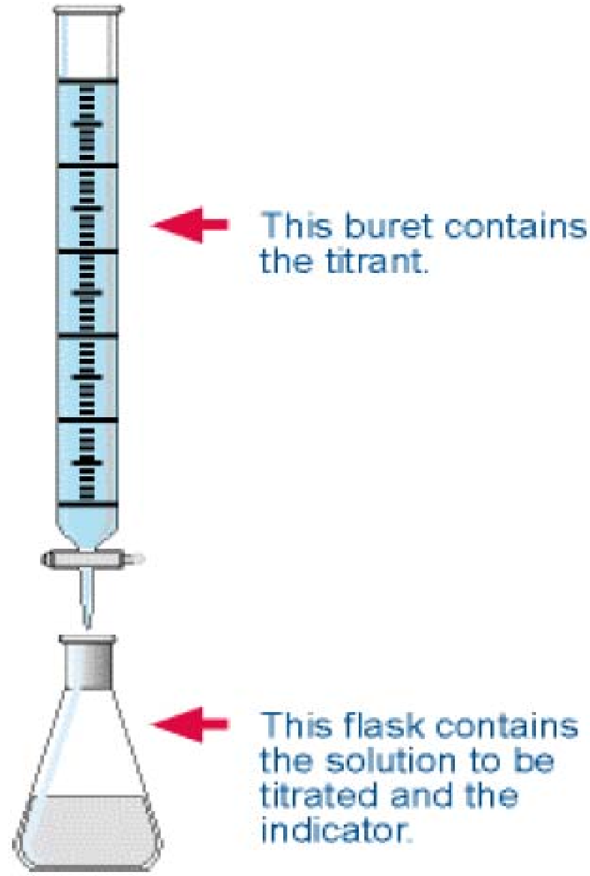
Acid-Base Titrations

Molarities of acidic and basic solutions can be used to convert back and forth between moles of solutes and volumes of their solutions, but how are the molarities of these solutions determined? This section describes a procedure called titration, which can be used to find the molarity of a solution of an acid or a base.

In **titration**, one solution (solution #1) is added to another solution (solution #2) until a chemical reaction between the components in the solutions has run to completion. Solution #1 is called the **titrant**, and we say that it is used to **titrate** solution #2. The completion of reaction is usually shown by a change of color caused by a substance called an **indicator**.

A typical titration proceeds in the following way. A specific volume of the solution to be titrated (solution #2) is poured into an Erlenmeyer flask (see figure below). For example, 25.00 mL of a nitric acid solution of unknown concentration might be added to a 250 mL Erlenmeyer flask.

A solution of a substance that reacts with the solute in solution #2 is added to a buret. (A **buret** is a laboratory instrument used to add measured volumes of solutions to other containers.) This solution in the buret, which has a known concentration, is the titrant. The buret is set up over the Erlenmeyer flask so the titrant can be added in a controlled manner to the solution to be titrated. For example, a 0.115 M NaOH solution might be added to a buret, which is set up over the Erlenmeyer flask containing the nitric acid solution.



Setup for a Typical Titration In a typical titration, the titrant in the buret is added to the solution in the Erlenmeyer flask until the indicator changes color to show that the reaction is complete.

The titrant is slowly added to the solution being titrated until the indicator changes color, showing that the reaction is complete. This stage in the procedure is called the **endpoint**. In our example, the NaOH solution is slowly added from the buret until the mixture in the Erlenmeyer flask changes from colorless to red. The OH^- ions in the NaOH solution react with the H_3O^+ ions in the HNO_3 solution.

$$H_3O^+(aq) + OH^-(aq) \rightarrow 2H_2O(l)$$

Glossary

- ***Titration:*** The addition of one solution (solution #1) to another solution (solution #2) until a chemical reaction between the components in the solutions is complete.
- ***Titrant:*** The solution added in a titration.
- ***Indicator:*** The substance added in a titration to show (by a change of color) when the reaction is complete.
- ***Buret:*** A volume-measuring instrument used to add measured volumes of the titrant in a titration.
- ***Endpoint:*** The stage in a titration where enough of the titrant has been added to react completely with the substance being titrated.

Add the vocabulary words above to your flash cards. Draw a picture of each on the back of the flash card. Work with your reading partner to quiz each other on your flash card.

1. Share the words that you circled with your partner. Work together to select a total of 20 words from the reading that are the key words. Go back to the reading and highlight those words with a highlighter.

2. Work with your partner to reconstruct the meaning from the text above by using only the 20 words that you selected. Draw arrows, symbols, and pictures to help explain the information.

3. Write two of the most important facts that you learned from the article above. Next to each fact, write the quote from the reading that supports the fact. Go back to the reading and underline the quote as well.

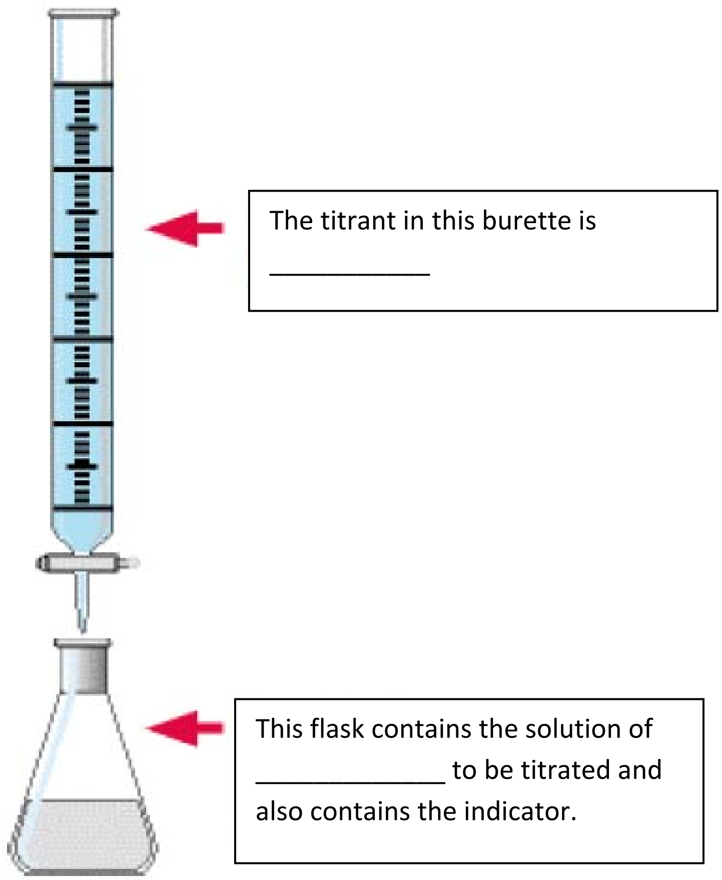
Facts:	**Quotes:**

Lab: Acid-Base Titration
In this lab activity, you're going to work with your lab partner and use a TITRATION to find out the Molarity of an HCl solution that has an unknown Molarity.

Question for this lab: What is the Molarity of the unknown HCl solution provided to you?

Introduction:
In this lab, we're going to use a titration in order to find out the concentration of an unknown HCl solution. We will use NaOH to titrate our HCl solution.

In the diagram below, label where the HCl and NaOH will be. Remember that the HCl is the unknown concentration.



The indicator that we will use in this lab is phenolphthalein. It will turn pink when the HCl solution in the flask becomes the slightest bit basic. The HCl will become basic because we're adding NaOH slowly from the burette.

Remember that an acid and a base make salt and water when they're added together. That means that the HCl in the flask and the NaOH in the burette make NaCl and H2O when they meet in the flask. As this is happening, the phenolphthalein is still clear in the flask.

However, once you add a drop of base more than the HCl in the flask, the flask becomes basic. Then, the flask turns pink because phenolphthalein turns pink when it's in a basic solution.

Summarize the information above in two sentences and retell it to your lab partner.

____
____
____
____
____
____

After sharing

What information did your lab partner write that you didn't include but is important?

____
____
____
____

You will use the following formula to solve for the Molarity of the unknown HCl solution.

M_A = Unknown Molarity of the acid
V_A = Volume of the acid that was added to the flask
M_B = Known Molarity of the base
V_B = Volume of the base that was added from the burette to the flask

$$M_A \times V_A = M_B \times V_B$$

When solved for the missing quantity it reads:

$$M_A = \frac{M_B \times V_B}{V_A}$$

Watch your teacher perform the sample titration. After watching her, work with your lab partner to explain why each step is important.

Step	Draw a picture of what this means	Why is this important?
Check that there are no bubbles trapped in the opening of the burette before you begin the titration.		
Swirl the flask as you add the NaOH from the burette.		
Add the NaOH very slowly from the burette. Stop once the flask is very slightly pink.		

Write a balanced equation for the neutralization of hydrochloric acid by sodium hydroxide.

Materials:

Erlenmeyer flask, ring stand, burette, NaOH, HCl, phenolphthalein, water, graduated cylinder, beaker

Safety:
During this lab you <u>must</u> wear gloves and goggles at all times! If you spill HCl or NaOH anywhere, notify your teacher immediately. If you get any acid or base on your gloves, immediately wash your gloves to rinse the acid off – then throw the gloves away and continue washing your hands for 30 seconds.

Roll all long-sleeves up and tie back long hair.

Procedure:

Get NaOH solution into your burette:

1. Measure 40 ml of NaOH into a beaker carefully.
2. Take a funnel and the beaker with NaOH back to your lab station.
3. Lower the burette down to eyelevel. Have a partner hold the burette to make sure it is secured in the holder.
4. Use the funnel to transfer the NaOH into the burette.
5. Run the NaOH out into the beaker until it's at the 20 ml mark on the burette – which means that there are 30 ml of NaOH in the burette.
6. Put the burette back to titration height.

Get a solution of HCl and water into your Erlenmeyer flask:

1. Measure 20 ml of H_2O into a graduated cylinder carefully.
2. Transfer the 20 ml of H_2O into an Erlenmeyer flask.
3. Measure 20 ml of HCl from the burette in the front of the room into a beaker.
4. Transfer the 20 ml of HCl into the Erlenmeyer flask that holds the water.
5. Place the Erlenmeyer flask in a safe location on your table.

Add indicator:

1. Add three drops of phenylalanine into the Erlenmeyer flask with the acid and water.

Titration background:

1. Place a white index card under the Erlenmeyer flask. This will help you see when you reach the endpoint.

Titration:

1. Add the NaOH into the HCl slowly while swirling the Erlenmeyer flask.
2. Your endpoint is when a pink color persists in the Erlenmeyer flask for 15 seconds.
3. You do not want to over-titrate the solution. If you have a deep pink color that is permanent, then you over-titrated.

Cleaning up lab station:

Put your waste into the beakers labeled "acid waste" and "base waste". Do not dump your solutions down the drain.

To get the base waste from your burette, empty it into the beaker that you used to fill the burette.

Data:

	Your data	Class Average
Volume of HCl used	**_________ ml**	**_________ ml**
Initial NaOH burette reading	_________ ml	
Ending NaOH burette reading	_________ ml	
Volume of NaOH added	**_________ ml**	**_________ ml**
Molarity of NaOH	**0.1 M**	**0.1 M**

Calculations:

Find the Molarity of HCl based on the class average and the formula in your introduction section.

Questions:

1. What is the **molar mass** of HCl? Explain in words how you know. *(Go back to the previous packet if you need to remind yourself what molar mass is).*

2. How many moles of HCl were in the 20 ml of HCl that we used? Explain in words how you know.

3. Your stomach acid contains 0.1 M HCl. Why do you think this may be?

Research: Why is a human's stomach acidic?
Website citation:

How do you know this is a reliable website?

Based on the website, why do humans have an acidic environment in their stomachs?	What quotes from the reading tell you that? Write them below.

Round Robin:
Share your answers with your table. Go around and everyone at your table should share their **novel ideas**.
What new information did you hear from your table partners? Write them below.

____
____
____
____

Vocabulary Mobile:

Go back through this packet and select two more important vocabulary words to create flashcards for.

Include the word and a picture on the front and the definition and sentence from this packet where the word is used on the back.

With your table, select different flashcards from what you have and create a vocabulary mobile out of popsicle sticks, wooden skewers, and string.

Hang your mobile where your table can view the words.