3-26-15

Section 3.2

Does it always take the same amount of solid material to saturate 50mL of water?

Procedure:
- Get materials
- use syringe to get 50 mL of water
- use scoop and funel to pour Epsom salt
- add scoops to solution until saturated
- weigh on scale
- record information in chart

Materials::
- scale
- weights (g)
- Syringe
- cup
- funel
- Salt
- sticky notes
- cups
- Containers with caps
- filter
- paper towels
- scoop
- Epsom salt
- goggles

number of scoops	does it dissolve
1	yes
2	yes
3	yes
4	yes
5	yes
6	yes
7	no

36 grams

-Solubility: How much of a solute (salt) dissolves in a solvent (water)
- Soluble when a lot of solute dissolves
- Insoluble: none of the solute dissolves

Inv. 3.2

Do you think it always takes the same amount of solute to saturate 50 mL of water? During my Investigation I determined that it doesn't require the same amount of solute. For example, it took 13 grams of Kosher Salt to saturate 50 mL of water where as it took about 36 grams to saturate the Epsom Salt solutio Also it shows that Epsom salt is more soluble than Kosher salt. This also means that the Epsom salt has a greater mass than the Kosher Sal I wonder what makes the Epsom salt more solube than the Kosher Salt.

Inv. 3.2 Student Writing

4-8-15
Lesson 3.2

Does it always take the same amount of solid material to saturate 50mL of water?

Material List:
- two plastic bottles with caps
- two plastic cups
- Funel & stand
- plastic container
- syringe
- small scoop
- 2 sticky notes
- Water
- Epsom salt
- two filters

Procedure:
- put 50mL water in each bottle
- scoop salt with scooper until it's saturated and shake
- pour through filter
- put on scale with 50ml of water to find the weight of the salt

# of scoops

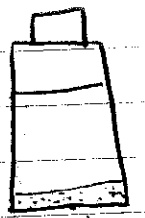
|||| || (7)

Science Group- 32g
Class Average- 30 grams

Before

50mL of Water

After



Saturated solution

3.2 Repeat Lesson

An important property of a solute is how much of it dissolves in a solvent, such as water. The property is solubility. If a lot of solute dissolves in a unit of water, the solute is very soluble. If only a little bit dissolves, the solute is slightly soluble. If none of the solute dissolves it is insoluble.

Solute + Solvent = Solution

Weight of Solute + Weight of Solvent = Weight of Solution

3.2 Writing

We found out that it doesn't always take the same amount of solute to saturate 50 mL of water. For example,

4-14-15

Lesson 3.3

Can you identify (recognize / figure out) the mystery (unknown) substance (pure material) by it's properties (characteristics)?

Procedure:

- Add 50mL of water to bottles & see if mystery substance is soluble then shake
- use funel to continue adding mystery substance until solution is saturated
- use filter to separate the extra mystery substance from the solution
- weigh on scale to find weight of mystery substance
- compare to Materials on solubility chart

Materials:

- 2 containers
- water cup
- mystery substance
- funel
- filter paper
- scale
- gram pieces
- googles
- scoop
- plastic cup

46 grams

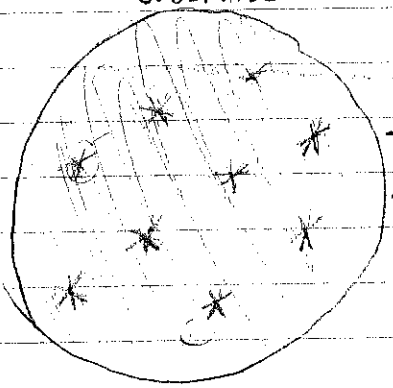
Solubility Table

Material	Appearance	Amount needed to saturate 50 mL of water (g)
Barium bromide	Small white grains	52
Citric acid	Small white grains	67
Epsom salts	Small white grains	40
Salt	Small white grains	17
Sodium acetate	Small white grains	26

Inv. 3.3

Number of Scoops	does it dissolve?
1	yes
2	yes
3	yes
4	yes
5	yes
6	yes
7	yes
8	yes
9	yes
10	yes
11	No

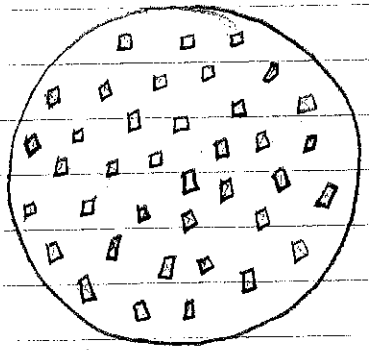
Mystery Substance (Citric ac



-transp

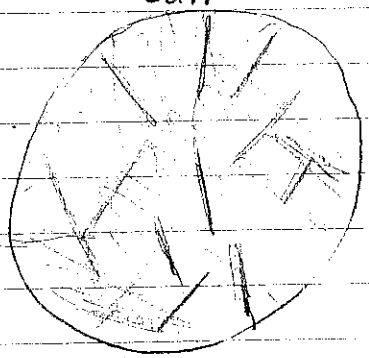
-

Kosher Salt



- transparent
- Square
- have X's on them

Epsom Salt



- White
- long
- nonsymmetrical

3.3

3.3

I identified the mystery substance by it's properties. I identified the mystery substance's appearance, solubility, and crystal formation. I noticed that the substance had small white grains. I also tested the mystery substances solubility and got 4bg. Therefore, I knew the mystery substance was either citric acid or barium bromide. Then we compared the crystals in our evaporation dish to the pictures of citric acid crystals online and determined that the mystery substance was citric acid.

33 writing

[redacted]

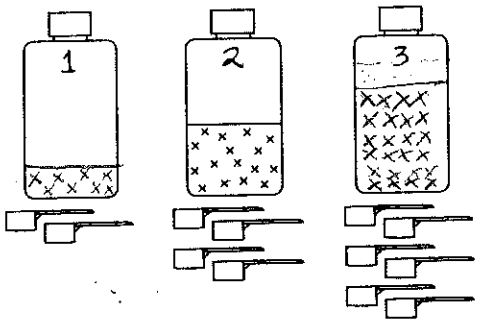
Response Sheet—Investigation 3

A student wrote in his notebook:

Bottle	Spoons of Sugar
1	2
2	4
3	6

I made three solutions of water and sugar. I put the same amount of water in each bottle. I added sugar.

I shook each bottle for 1 minute. When I was done, I knew I had a saturated solution in Bottle 3.



The student's bottles are shown above. In Bottle 2, he drew the liquid level and his idea of where the sugar was in the solution.

a. Draw the liquid level in Bottles 1 and 3.

b. Draw **X**s in Bottles 1 and 3 to show where the sugar is.

c. The student knew he had a saturated solution in Bottle 3. How could he be sure the solution was saturated? By pouring the solution through a funnel.

d. If the student used Epsom salts instead of sugar, would you expect the same results? Why or why not?
no because the Epsom salts and sugar crystals are different sizes and one of them is probably more soluble then the other.

3.3

5/6/15

4.1

(C) - Carbon
(H) - Hydrogen
(O) - oxegyn
(Na) - Sodium
(Ca) - Calcium
(Cl) - chlorine

very soluble
Cicric acid ($C_6H_8O_7$)
baking soda ($NaHCO_3$) - little soluble
Calcium chloride ($CaCl_2$) - soluble

What do you notice when you add water to different combinations of substances?

Solution 1:
- fizzes
- White

Solution 2:
- transparent
- warm

Solution 3:
- fizzes
- transparent

Inv. 4.1

4.1
Writing

I noticed that two different things can happen when you add water to different combinations of substances. It will either cause a chemical reaction or create a solution. For example, in cup 1 we used the reactants calcium chloride and baking soda and it caused a chemical reaction because it was fizzy and transparent. In addition, in cup 3 we used the reactants calcium chloride and citric acid. It also caused a chemical reaction. Cup 3 was transparent and fizzy. On the other hand cup 2 was a solution and it felt warm. It was also transparent and all the substances dissolved. Therefore, I know that a chemical reaction can be created when mixing two reactants. I wonder if baking soda is the reactant that caused the chemical reaction.

Also it was murky & had a white chalky precipitate.

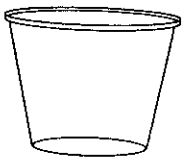
4.1 Writing

[redacted]

WARNING — This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

Two-Substance Mixtures

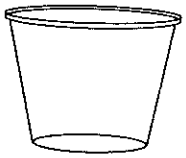
Cup 1: 1 spoon of calcium chloride, 1 spoon of baking soda



- fizzy
- white
- powdery substance on bottom

50 mL of water

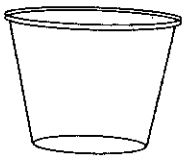
Cup 2: 1 spoon of calcium chloride, 1 spoon of citric acid



- transparent
- warm
- all of the substances dissolved

50 mL of water

Cup 3: 1 spoon of baking soda, 1 spoon of citric acid



- fizzy
- transparent

50 mL of water

1. Which substances reacted to form a gas?
2. Which substances reacted to form a precipitate?

4.1

5-12-15

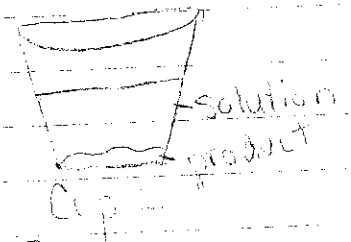
4.2

How can we Separate (take apart, split) and identify (recognize, name) the products of a reaction?

products: new substance created from a reaction

reaction: fizzy

Calcium Carbonate + Vinegar = bubbles, fizzy, white



Vinegar mixed with Chalk creates bubbles & it fizzes

Procedure

- Put filter in funel & place a empty underneath it
- Pour through filter to separate substance from the water
- evaporate water with evaporation

observations:

- substance was white & powdery

Product	Properties
gas	bubbles - fizzy
white powdery substance	powdery, settled on bottom
solution	

Investigation 4.2

We separated and identified the products of a reaction. For example, I poured the solution through the funel to separate the chalky white substance from the rest of the solution. I poured some of the remaining solution into the evaporation dish and let it sit over night. I observed that the crystals had X's on the and were shaped like squares. I also compared them to drawings of crystals in my notebook and identified the as Kosher Salt crystals. Then I tested the powdery white substance by adding vinegar. The solution started fizzing. The same reaction occured when we added vinegar to calcium carbonate (chalk). Therefore, I know that the substance was chalk.

Inv. 4.2 Writing

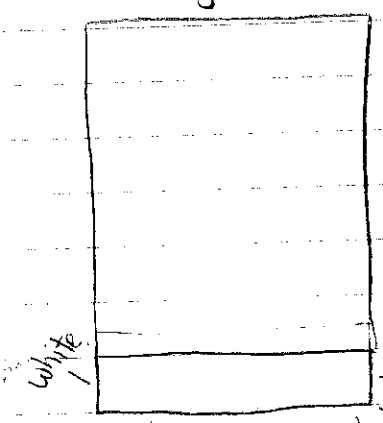
5-20-15
Lesson 4.3

What happens when chemical reactions occur inside a zipped bag?

- occurs
- reactants
- product
- precipitate
- inside = in bag
- zipped bag = closed space
- chemical reactions occur = happening

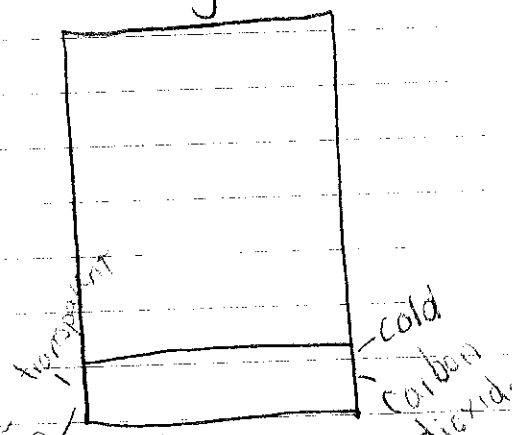
materials:
- reactants: baking soda, calcium chloride, citric acid (solute)
- bag (2)
- goggles
- water (solvent)
- syringe
- scoop

Bag 1



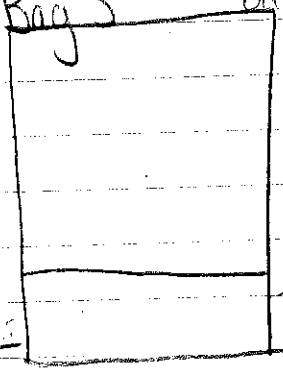
- calcium chloride
- Baking soda

Bag 2



fizzy - citric acid
- baking soda

Bag 3



Inv. 4.3

4.3

Different things can occur when you create a chemical reaction. For example, inside a zipped bag bag 1 I used the reactants baking soda and calcium chloride because I know from pre lessons that it creates a chemical reaction. Also in bag 2 I used the reactants citric acid and baking soda. Then we la a third bag to test would happen when we mixed all 3 reactants. Bag 1 created a gas called Carbon dioxide (CO_2) w caused the bag to expand a little bit. However bags 2 & expanded a lot and all solutions fizzed. At the bottom o the bag there was a white precipate called Calcium Citr The solution in bag 1 was white. However, bag 2's solu was transparent. Also bag 3 started of white, but then it settled and changed to transparent because it's a mix o the 2 bags. Therefore, Zipped bags fill with gas and expa when chemical reactions occur inside of them.

4.3 Writing

Response Sheet—Investigation 4

My neighbor wanted to make a model volcano. His aunt told him that a mixture of vinegar, baking soda, and soap would make good "lava." He made the mixture to see what would happen. Here are his observations.

First, I mixed the soap and baking soda. Nothing happened. Then I added vinegar. The mixture bubbled and spilled over the edge of the cup! After the bubbling stopped, the liquid was clear. There was no precipitate.

My neighbor said,

I think I made a mixture, a solution, and a reaction.

Do you think he made a mixture? Explain.

Do you think he made a solution? Explain.

Do you think he made a reaction? Explain.

1. I think he made a mixture because when he mi the baking soda with the soap nothing dissolved or fizzed. Also the defintion of a mixture is when you pu 2 or more materials together.

2. I think he made a solution because I know that baking soda dissolves in baking soda.

3. I think he made a reaction because I know that baking soda & vinegar makes a reaction.

5-27-15
Lesson 4.4

What evidence can you gather about your water sample to tell us what is in it?

Water test day- June 2

Materials:
- Screen
- filter paper
- funel
- Syringe
- evaporation dish
- Cups

[redacted] Sample 1 (Pool water)	[redacted] Sample 2 (Stream water)
- fill container with water	- collect water
- put in cup & separate with the filter/funel system	- use screen to separate rocks if any
- pour in evaporation dish & observe	- Separate using the filter system
- weigh on scale 38g	- evaporate & observe
	- weigh on scale

Investigation 4.4