1/20/15

Lesson 1.1

3

What do you notice about the three solid materials when they are mixed with water and separated again?

senses: touch, smell, see, taste, hear

observe: eyes

H_2O

take apart / pull apart

Solid Materials

- Gravel - tiny rocks
- Salt - Ocean, Kitchen, streets, crystals
- Diatomaceous Earth - Crushed Sea shells

Vocabulary

- Solution: solid material that is mixed with water, the solid material dissolves and the solution is transparent (clear) and it can't be separated by a filter.

a solution is made of 2 parts:

- solvent - liquid
- solute - solid material that dissolves

- mixture: when you put 2 or more material together

Mixtures + Solutions Sample Notebook Gr5

	Gravel	Salt	Diatomaceous Earth
texture	- rough - bumpy	- rough	- soft - smooth
size	- large	- medium	- small
weight			
color	- gray - brown - black	- white	- white
odor			
shape	- pointy	- flat - uneven	

1/21/15

Lesson 1.1

observations when water is added

Gravel	- you can still see gravel - gravel doesn't float
Salt	- most of the salt dissolved - barely any salt left
Diatomaceous Earth	- white - murky - you can only see powder on the bottom of the cup

observations when mixtures are separated

	Screen	filter
Gravel	y	y
Salt	n	n
Diatomaceous Earth	n	y

1/22/15

Lesson 1.1

I noticed that the salt changed when it mixed with water. When I poured water in with the salt the salt dissolved. Also when the salt and water mixed it created a solution because the salt is a solute which is a solid material that dissolves and the water was a liquid or solvent. I tried separating the salt and water with a screen and a filter, but the solution went through both times. I also put water with gravel and Diatomaceous Earth. The salt and water was a solution where as the Diatomaceous Earth and water and the gravel and water was a mixture. When I used the filter it separated both the gravel and the Diatomaceous Earth from the water. I wonder why the separated the Diatomaceous Earth and the gravel from the water, but not the salt. Therefore, I noticed that solid materials can change when they're mixed with water.

1/23/15

esson 1.2

Where does a solid material (salt) go when a solution is made?

solvent
solute

materials list:
- salt
- water
- scale
- cups
- weights (g)

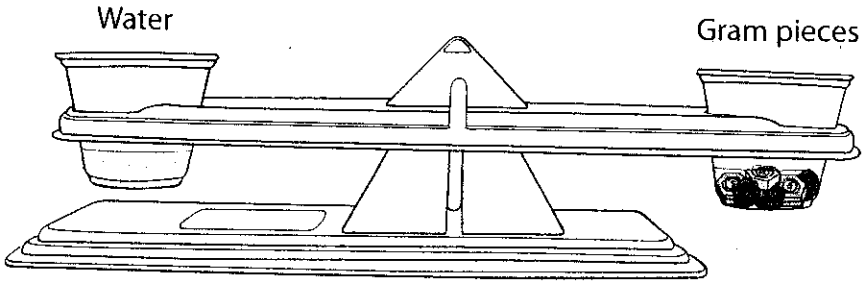
- Weigh water alone
- weigh salt alone
- Weigh salt water alone

Salt

Shape	- cube - oblong
size	- larger than before
weight	
texture	- rough edges - some were still moist
odor	
color	- transparent - white
other	- crystals - have x shape in middle.

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.

Making a Solution



Procedure

1. Weigh 50 mL of water. Record its mass on line 2.
2. Add 1 level spoon of salt to make a solution.
3. Weigh the solution carefully. Record its mass on line 1.

1. Mass of salt solution	53	**g**
2. Mass of 50 mL of water	50	**g**
3. Mass of salt	3	**g**

1.2

January 29, 2015

Response Sheet—Investigation 1

A friend made a solution. She used 100 mL of water and several spoons of salt. All the salt dissolved. After making this solution, she realized she needed to know how many grams of salt she had used so that she could make another solution just like the first one.

a. How could she find out the mass (grams) of the salt she used to make the solution?

b. Explain why your plan would work.

A. She could find the mass by letting the water evaporate and then use a scale to figure out how much it weighs.

B. My plan would work because when the water evaporates all the salt will be left in the cup. After that you would put the cup on the scale and then keep adding the weights (grams) until both sides are even

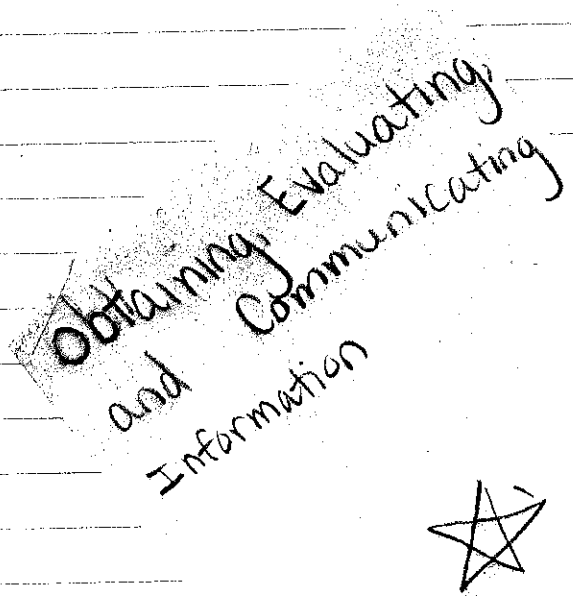
1/30/15

Lesson 1.3

What procedure (steps) could you use to separate a dry mixture? (take apart)

Dry mixture: 1
- 1 scoop of gravel
- 1 scoop of salt
- 1 scoop of Diatomaceous Earth

Procedure:
- use screen to separate gravel from mixter
- add water to Salt and Diatomaceous Earth then separate
- pour in funel so then 1 chemical is left
- use magnet to separte mystery chemical



2/6/15

I noticed that I had to use a magnet to separate the dry mixture. I figured that the mystery material was magnetic because the magnet was a new tool. I Knew that the mystery material had to be magnetic because it was one of the materials from the inventory check. I also didn't notice anything in the salt or diatomaceous earth. Another reason is that I didn't notice any black colored pebbles in the gravel during previous lessons. Therefore, I noticed that the new material has to be magnetite.

Planning + Carrying out Investigations

1.3 Student Writing

LESSON 2.1

2/11/15

observe
- senses

What do you notice about our four different solutions?

solvent — solute

not the same

	1	2	A	B
Solvent	1000 mL of water	1000 mL of water	1000 mL of water	500 mL of water
Solute	3 scoops of powder	1 scoop of powder	2 scoops of powder	2 scoops of powder
See	- dark orange - transparent	- light orange - transparent	- light orange - transparent	- dark orange - transparent
Taste	- sweet - strong	- water - kinda sweet	- sweet	- really sweet - strong

2.1 Mixtures + Solutions

Soft-Drink Recipes

Solution 1. 3 spoons of powder and 1000 mL of water
Solution 2. 1 spoon of powder and 1000 mL of water

Similarities

- transparent
- see light through it
- has a solvent and solute
- 1000mL water

Differences

Solution 1	Solution 2
- dark orange - Sweet - 3 scoops powder	- light orange - Kinda watery - 1 scoop powder

Solution A. 2 spoons of powder and 1000 mL of water
Solution B. 2 spoons of powder and 500 mL of water

Similarities

- 2 scoops powder
- transparent
- has a solvent and solute
- see light through it

Differences

Solution A	Solution B
- 1000mL - Sweet - transparent - light orange	- 500 mL - really sweet - strong - dark orange

2/12/15

1. I noticed the more concentrated the solution, the sweeter it was.
- My evidence is that solution B only had 500 ml of water with 2 scoops of powder while solution A had 1000 mL of water with 2 scoops of powder.

2. I noticed that solution 2 had the lightest color.
- My evidence is that solution 2 had 1000 ml of and only 1 scoop of powder. Therefore, there was mostly water and a little bit of powder so the color appeared to be lighter.

3. I noticed that solution B was the darkest.
- My evidence is that solution B had 2 scoops of powder and 500 ml of water. Therefore, solution B didn't have as much water so the solution appeared to be the darkest.

4. I noticed that even though solutions A and B both had 2 scoops, solution B had less water.
- My evidence is that

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Salt Solutions 1 and 2

Solution 1. 1 spoon of salt and 50 mL of water
Solution 2. 3 spoons of salt and 50 mL of water

Similarities

- 50 mL water

Differences

Solution 1	Solution 2
- 1 spoon of salt - more diluted	- 3 spoons of salt - more concentrated

Mass and volume of Solutions 1 and 2

Solution	**Mass** (g)	**Volume** (mL)
1	52 g	50 mL
2	60 g	50 mL

2.2

2/18/15

Lesson 2.2

- explain your thinking
- figure out
- water (solvent)
- salt (solute)

How can you determine which salt solution is more concentrated.

more solute → more color

Comparing Salt Solutions

Compare Equal Volumes

If you compare the mass of 50 mL of Solution 1 with the mass of 50 mL of Solution 2, what will you observe?

Prediction

Measured mass:
Solution 1 _____ Solution 2 _____

Solution 3: 52g

Salt Solution 3: 3 spoons of salt and 150 mL of water

Is Solution 3 more concentrated, less concentrated, or the same concentration as Solution 2? Explain your answer.

Focus Question

How can you determine which salt solution is more concentrated?

The more mass the solution has the more concentrated it is.

Inv. 2.2 Mixtures + Solutions

1/26/15

Lesson 2.2

When equal volumes have equal mass their concentration is equal. For example, solution 1 and solution 3 both weigh 52 grams in mass and they have equal volume. Therefore, they have equal concentration, so the ratio for solutions 1 and 3 would be 1:50. However, when they don't have equal mass their concentration isn't equal. For example, solution 1 and 2 don't have equal mass. Solution 1 has 1 scoop of salt and 50 ml of water and solution 2 has 3 scoops of salt and 50ml of water. This means that the salt (solute) is the variable and the water (solvent) is the equal volume. Also solution 2 weighs 56 grams in mass so it's more concentrated than solution 1 and solution 1 weighs 53 grams in mass so it is more dilute than solution 2. Therefore, you can determine which solution is more concentrated by figuring out their mass and volume.

2.2 Student Writing

3/2/15

Lesson 2.3

define
figure out
unsolved
unknown
solvent
solute

How can you determine if the mystery solution has different concentrations?

not the same — more contaminated more mass — ratio of solute to solvent

Solution 1- red

Solution 2- green

Solution 3- blue

Procedure

- use syringe to get 50mL of solution 1 and pour it into the graduated cylander
- use syringe to pour solution 1 into a smaller and weigh on the balance scale
- put weights (grams) in the empty cup to figure out the mass
- repeat steps for solutions 2+3

	Solution 1	solution 2	Solution 3
Mass	50g	53g	49g
Equal Volume	50mL	50 mL	50 mL

3/5/15

density = m/V

Lesson 2.3

You can determine which solution is most concentrated by measuring the mass. Solution 2 had the most mass (55g), therefore it was the most concentrated. Solution 3 was the most diluted so it had the least amount of mass (41g). Another way to determine which solution is the most concentrated is to measure the density. For exam solution 2 had a density of 1.06 so it was the most dense while solution 3 had a density of .98 which made it the least dense. Therefor you can determine the concentration of solutions b measuring their weight or their density.

2.3 Student Writing

3/6/15

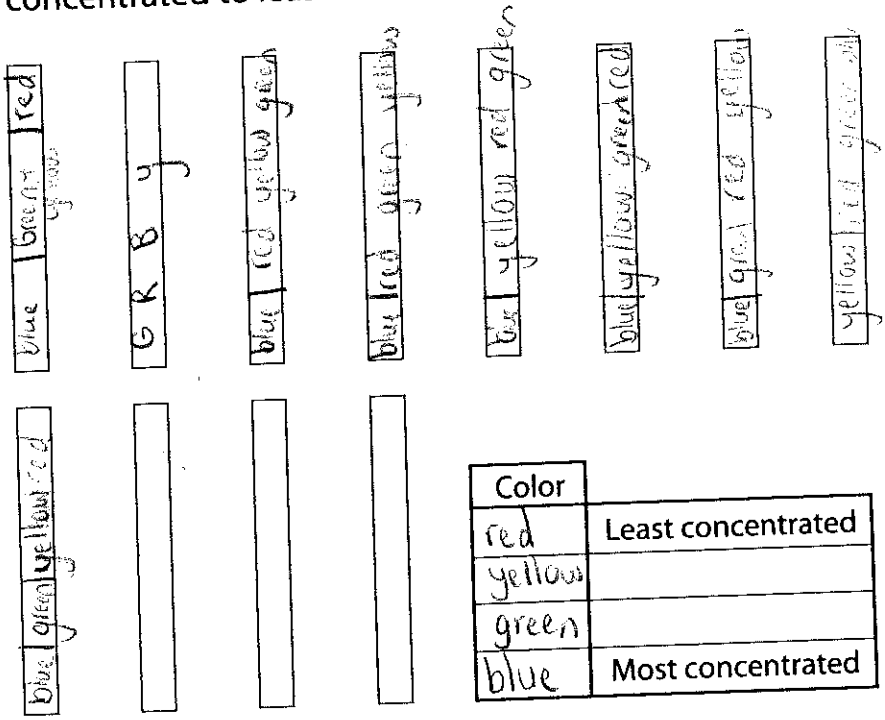
Lesson 2.4

How can we determine which solution is most concentrated?
- What is the order from most dense to least dense?

Liquid Layers

Use the straws to record the colors of the salt solutions you tried to layer.

When you succeed in layering all four solutions, put them in order in the table below, from most concentrated to least concentrated.



Color	
red	Least concentrated
yellow	
green	
blue	Most concentrated

Which solution is most dense? Which is least dense?

Why do you think so?

3/16/15

Carbon Dioxide Concentration in the Air

CO_2 = Carbon dioxide

Gist: The gist of this article is that Charles Keeling studied the carbon dioxide in the air. Based on his studies he learned that the CO_2 concentration was lowest in the late afternoon and highest in the early morning. He discovered that it meant plants were taking in CO_2 during the day and giving it off during the night. His most important discovery was that the amount of CO_2 went up every year and it was mostly from human activities.

Vocabulary:

- CO_2
- concentration
- average
- climate
- fossil fuels
- petroleum
- greenhouse gas
- global

Important Details:

- The pattern of the carbon dioxide is known as the Keeling Curve

2.4 Reading

3/17/15

What's more Concentrated Milk or Juice

Procedure:
- use cylinder to get equal volume
- pour in cups then weigh on scale with g
- compare their weights

Materials:
- scale
- goggles
- cups
- cylinder
- weights (g)

	Weight	Equal Volume
Juice	26 g	25 mL
Milk	27 g	25 mL

Mixtures + Solutions

Extension: Student Inquiry:

3-24-15

Lesson 3.1

Is there a limit (stopping point) to the amount of salt (solute) that will dissolve in 50 mL (measurement) of water (solvent)?

Procedure:

- use syringe to get 50 mL of water and pour in each bottle
- use salt scooper to pour salt into the water with funel
- continue to add salt to water until it doesn't dissolve in the water anymore.

# of scoops	Before	After
III		
5 scoops	- Clear water - no salt	- salt particles on bottom & side of cup - 5 scoops

Grams - 13

10-15g of salt to saturate 50mL of water

Class Demonstration

10g

Class Average - 13

Saturated solution:

- solute doesn't dissolve
- solution is heavier

Inv 3.1

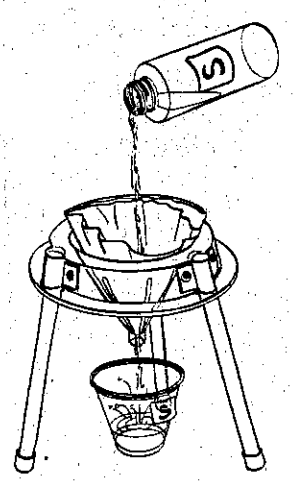
WARNING — This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

Saturating a Solution

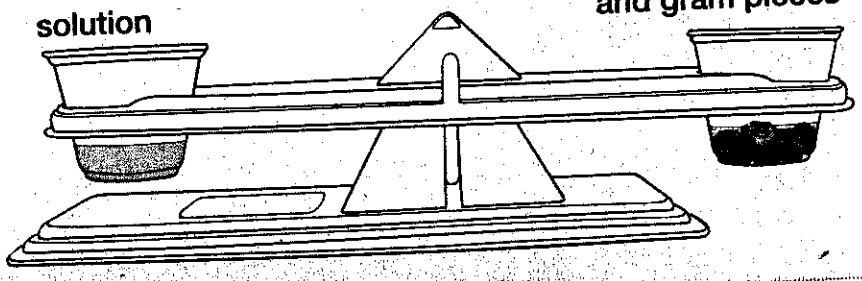
Determine the amount of solid material required to saturate 50 mL of water.

Procedure

1. Put a filter paper in the funnel. Wet the paper to soak it.
2. Place a labeled cup under the funnel.
3. Pour the saturated solution from the bottle into the wet filter.
4. Place the saturated solution on one side of the balance. Put a cup with 50 mL of water on the other side.
5. Add gram pieces to the water until the system is balanced.



13 grams



Do you think there is a limit to the amount of salt that dissolves in 50 mL of water? During our investigation I determined that there is a limit. I figured out that the limit is about 5 or 6 scoops of salt or 13 grams. I got 13 grams by separating the salt solution from the extra salt in the container using the funnel and by putting the salt solution in one end of the balance scale and the water on the other. Then I added the gram pieces and got 13 g. There was extra salt on the sides of the container and across the bottom. I know this is a saturated solution because the salt stopped dissolving and it sank to the bottom. Therefore, there is a limit to the amount of salt that dissolves in a solution.

Inv 3.1 Student Writing