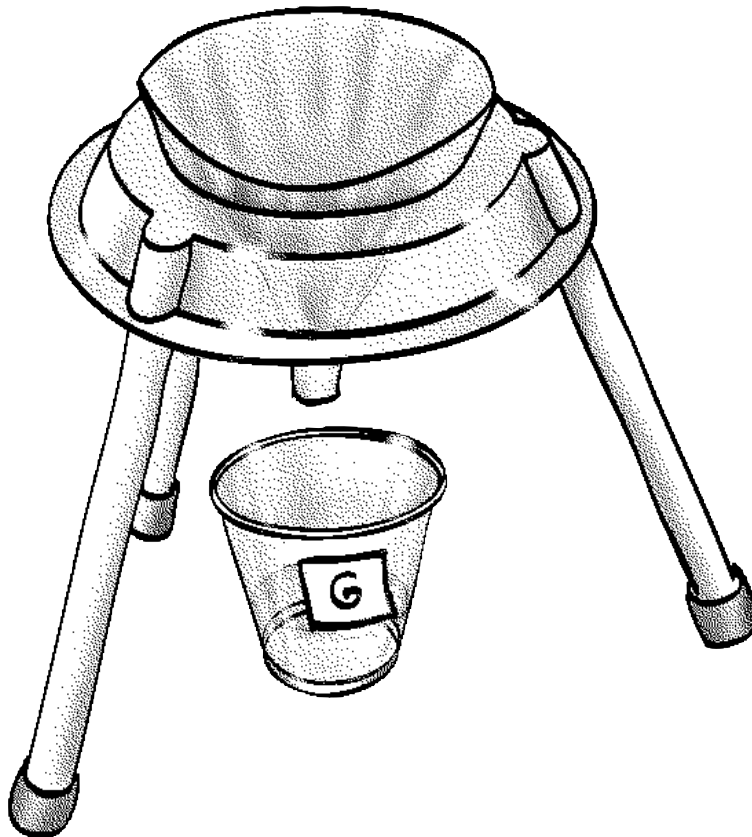


Mixtures and Solutions Journal



Name _____

Science Safety



- ❖ Always follow the safety procedures outlined by your teacher.
- ❖ Never put any materials in your mouth. Do not taste any chemical unless your teacher specifically tells you to.
- ❖ Do not smell any unknown material. If your teacher asks you to smell a material, wave a hand over the material to draw the scent toward your nose.
- ❖ Avoid touching your face, mouth, ears, or eyes while working with chemicals, plants, or animals.
- ❖ Do not mix unknown chemicals just to see what might happen.
- ❖ Always wash your hands immediately after using chemicals.
- ❖ Clean up spills immediately.
- ❖ Clean up your work space after each investigation.
- ❖ Be careful when using sharp or pointed tools. Always make sure that you protect your eyes and those of your neighbors.
- ❖ Report all accidents, even small ones, to your teacher.
- ❖ Follow directions and ask questions if you're unsure of what to do.
- ❖ Behave responsibly during science investigations.

SEPARATING MIXTURES

PART 1. Prepare three cups. Put one level spoon (5-ml spoon) of each solid material in its cup. Observe the three solid materials. Fill in the property chart below.

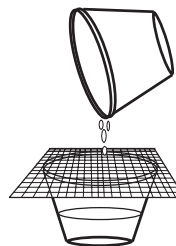
	Color	Texture	Particle shape	Particle size	Other
Gravel					
Powder (diatomaceous earth)					
Salt (sodium chloride)					

PART 2. Add 50 ml of water (one full syringe) to each cup. Stir and observe. Write your observations here.

Gravel and water
Powder and water
Salt and water

PART 3. Separate all three mixtures with filters.

- Place a screen over an empty, labeled cup.
- Stir the mixture thoroughly.
- Pour the mixture through the screen filter.
- If the screen filter doesn't separate the mixture, repeat the process with a filter paper.



Were you able to separate the mixtures? Record your results.

	Screen	Filter paper
Gravel		
Powder		
Salt		

THINKING ABOUT MIXTURES

1. What is a mixture? Give some examples.

2. What is a solution? Give some examples.

3. Is salt and water a mixture? A solution? Is it both a mixture and a solution?

4. How do you know when a solid and a liquid form a solution?

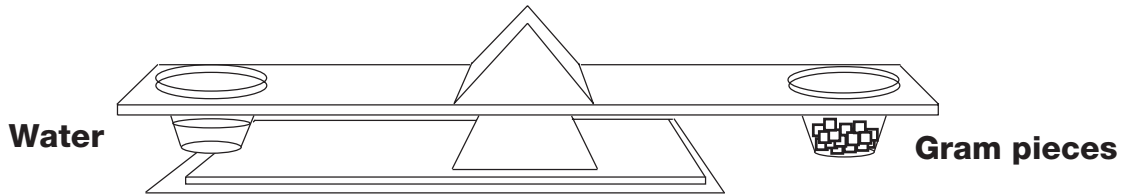
5. How can mixtures be separated?

6. How are screen filters and paper filters alike? How are they different?

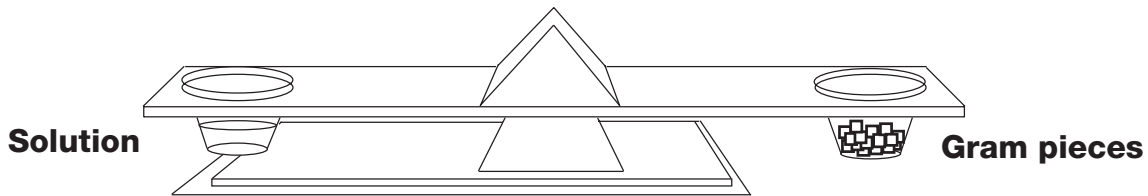
MAKING A SOLUTION

.....

1. Weigh 50 ml of water. Record its mass on line 2 in the box below.



2. Make a solution with one level spoon of salt and 50 ml of water.
3. Carefully weigh the solution. Record its mass on line 1 in the box below.



4. Calculate the number of grams of salt you put in the water to make the solution, by subtracting to find the difference.

- | | | |
|---|-------|----------|
| 1. Mass of salt-and-water solution | _____ | g |
| 2. Mass of 50 ml of water | _____ | g |
| 3. Mass of salt | _____ | g |

How could you separate the salt from the water in the solution?

RESPONSE SHEET—SEPARATING MIXTURES

.....

Kim wrote in his journal,

A solution is not a mixture, it is just a solution.

Is he confused? How would you explain mixtures and solutions to Kim?

SEPARATING A DRY MIXTURE

Challenge: Design a method to separate a mixture of gravel, salt, and powder.

PART 1. Prepare the solid mixture.

- a. Label a plastic cup “dry mixture.”
- b. Put one 5-ml spoon of salt in the cup.
- c. Put one 5-ml spoon of gravel in the cup.
- d. Put one 5-ml spoon of powder in the cup.
- e. Stir the mixture with a stick.

PART 2. Describe your plan for separating the mixture so that the salt is in one cup, the gravel is in a second cup, and the powder is in a third cup.

PART 3. Summarize the results of your plan. Describe how you might improve your separation.

Science Stories



“Mixtures and Solutions”

Pages 1-6

You are going to read an article about mixtures and solutions. This article will help you be able to describe various mixtures and solutions and ways you can separate them. You will also learn about elements and the periodic table. After you read the article, please answer the following questions **using complete sentences**.

1. What are some examples of mixtures (give at least 5 examples)? _____

2. How can mixtures be separated (list all three ways)? _____

3. What is an element? _____

4. What are some examples of solutions (give at least four examples)? _____

5. How is a solution different from a mixture? _____

6. When salt dissolves in water, which is the solute? _____

7. When salt dissolves in water, which is the solvent? _____

8. When liquid detergent dissolves in water, which is the solvent? _____

9. When liquid detergent dissolves in water, which is the solute? _____

10. What is a good way to separate solutes such as salt from solutions? _____

11. What name do we give the tiniest piece of an element? _____

12. What is each element made of? _____

13. How many elements are found naturally on Earth? _____

14. Name 4 elements. _____

THE FIRST 30 ELEMENTS: Look at the sidebar on page 3 and answer the following questions **using complete sentences.**

1. What is the lightest atom on the list? _____

2. What is the heaviest atom on the list? _____

3. Is aluminum heavier or lighter than titanium? _____

4. Is iron heavier or lighter than titanium? _____

5. Is iron heavier or lighter than aluminum? _____

6. The air we breathe is mostly a mixture of oxygen and nitrogen. The amount of nitrogen in the air is four times greater than the amount of oxygen. Which of these two elements is the lighter?

7. Argon, neon, oxygen, fluorine, nitrogen, chlorine, and helium are all gaseous elements. Put these seven gases in order from lightest to heaviest.

8. Iron, aluminum, nickel, titanium, chromium, copper, zinc, and cobalt are all metal elements. Put these eight metals in order from lightest to heaviest.

9. How many atoms does one drop of water contain? _____

10. How long would it take to count the number of atoms in one letter on this page?

11. What element was used to fill the blimp on page 4? _____

“A Salty Story”

Pages 7-10

You are going to read an article about the historical importance of salt to humans and the development of a salt industry. After you read the article, please answer the following questions **using complete sentences**.

1. Why was salt important to people? _____

2. Name two ways salt is obtained. _____

3. Salt is made up of what two elements? _____

4. Who found a way to separate the elements in salt? _____

5. In what ways is salt used today (give at least 3 examples)? _____

6. What do scientists call a substance that is made up of more than one element? _____

7. How are chlorine and sodium used today? _____

SALT AND FOLKLORE: Read the sidebar on page 10 and answer the following questions using complete sentences.

1. What does superstition mean (look it up in the dictionary)? _____

2. How would you know if a statement is true or a superstition? _____

SALT TO THE RESCUE: Read the sidebar on page 8 and answer the following questions using complete sentences.

1. What is a goiter? _____

2. What element helps cure goiters? _____

3. Who suggested that iodine could be added to salt? _____

4. Why does the World Health Organization hope to use iodized salt? _____

MATH EXTENSION—PROBLEM OF THE WEEK**INVESTIGATION 1: SEPARATING MIXTURES**

Andy had a box of animal crackers. He counted them out and found 20 cookies:

- 7 elephants
- 6 tigers
- 5 monkeys
- 2 zebras

If Andy put all the animal crackers back into the box and took one out without looking, what is the probability of his choosing

- a. an elephant? _____
- b. a tiger? _____
- c. a monkey? _____
- d. a zebra? _____

Does the sum of the probabilities a , b , c , and d equal 1?

HOME/SCHOOL CONNECTION

INVESTIGATION 1: SEPARATING MIXTURES

Materials

Make a mixture known as oobleck. You will need

- 1 Mixing bowl
- 1 Spoon
- 1 Measuring cup
- Cornstarch
- Water

1. Put about a cup of cornstarch in the mixing bowl.
2. *Slowly* add water to make a mixture, stirring as you go.
3. When the starch is all wet, it will turn into oobleck.

Explore the properties of oobleck.

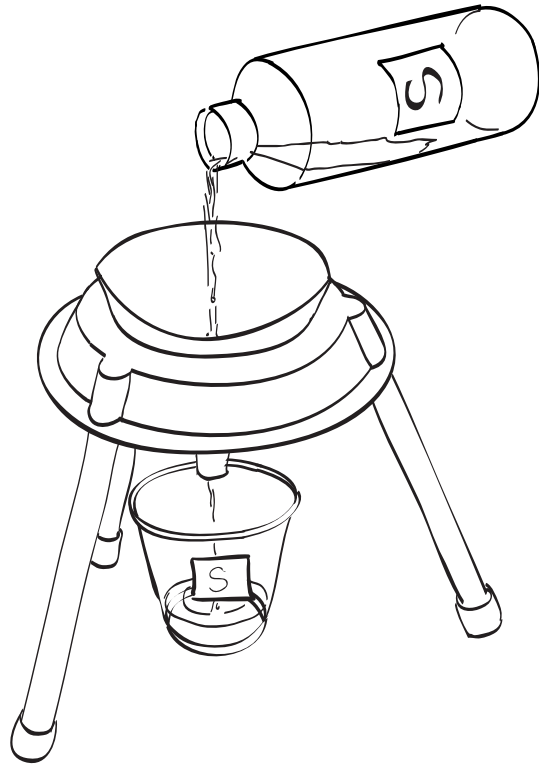
- Is it a solid or a liquid?
- What happens when you place solids, like coins or spoons, on the surface?
- What happens when you try to push your hand gently into the oobleck? When you try to push your hand hard and fast into the oobleck?
- Pick up a handful of oobleck. Can you hold it?
- Can you cut a ribbon of oobleck with scissors?
- What happens to the properties of oobleck when you change the amounts of the two ingredients in the mixture? More water? More cornstarch?

NOTE: If you want to keep oobleck to work with it another day, store it in a covered container in the refrigerator.

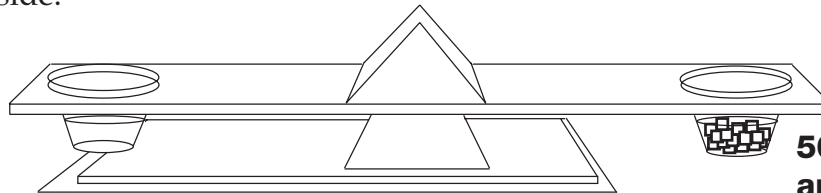
SATURATING A SOLUTION

Steps for determining the amount of solid material required to saturate 50 ml of water.

1. Put a filter paper in the funnel.
Sprinkle it with water.
2. Place the 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 and 50 ml of water on the other side.



Saturated solution



50 ml of water and gram pieces

5. Add gram masses to the water until it balances.
The amount of mass added to the water is equal to the mass of the solid material dissolved in the saturated solution.
6. Record the results in your journal.

RESPONSE SHEET—REACHING SATURATION

Jasmine and Mack were making instant iced tea. In the 1/2-liter glasses, Mack put two spoonfuls of iced-tea powder and Jasmine put four spoonfuls. Both filled their glasses half full with water from the tap. Mack stirred his mixture and it all dissolved. Jasmine stirred hers, and it didn't all dissolve.

"I think you have a saturated solution," said Mack. "Why don't you add more water?"

"I know another way to make it dissolve," said Jasmine.

Would Mack's suggestion to add more water work? Explain your answer.

What could Jasmine do to make the powder dissolve?

CHEMICAL DATA SHEET

.....

Challenge: Can you identify the mystery chemical?

Here is a table of properties for five chemicals.

Chemical name	Appearance	Amount needed to saturate 50 ml of water
Sodium chloride	Small white grains	14 grams
Baking soda	Small white grains	3 grams
Epsom salts	Small white grains	48 grams
Citric acid	Small white grains	60 grams
Alum	Small white grains	6 grams

Record your observations about the mystery chemical.

The mystery chemical is _____

Science Stories



“Decompression Sickness” Pages 11-13

You are going to read an article that will help you learn about how a gas dissolves in a liquid (nitrogen in the bloodstream) and what can happen if gas comes out of a solution too quickly. After you read the story, please answer the following questions **using complete sentences**.

1. What is the gas that causes decompression sickness? _____

2. What happens if the gas comes out of the bloodstream too quickly? _____

3. How is decompression sickness like caisson disease? _____

4. How does decompression sickness affect the body? _____

5. Explain how decompression sickness can happen to pilots. _____

6. What do divers call decompression sickness? _____

“Sour Power” Pages 14-15

You are going to read an article about how citric acid is manufactured and its use as a food additive. After you read the article, please answer the following questions **using complete sentences**.

1. What flavor does citric acid give foods? _____

2. What are some sour foods that you like to eat? _____

3. In what foods is citric acid found naturally? _____

4. To what foods is citric acid added? _____

KARL WILHELM SCHEELE: Read the sidebar on page 15 and answer the following questions **using complete sentences**.

1. What are some of the discoveries Scheele made? _____

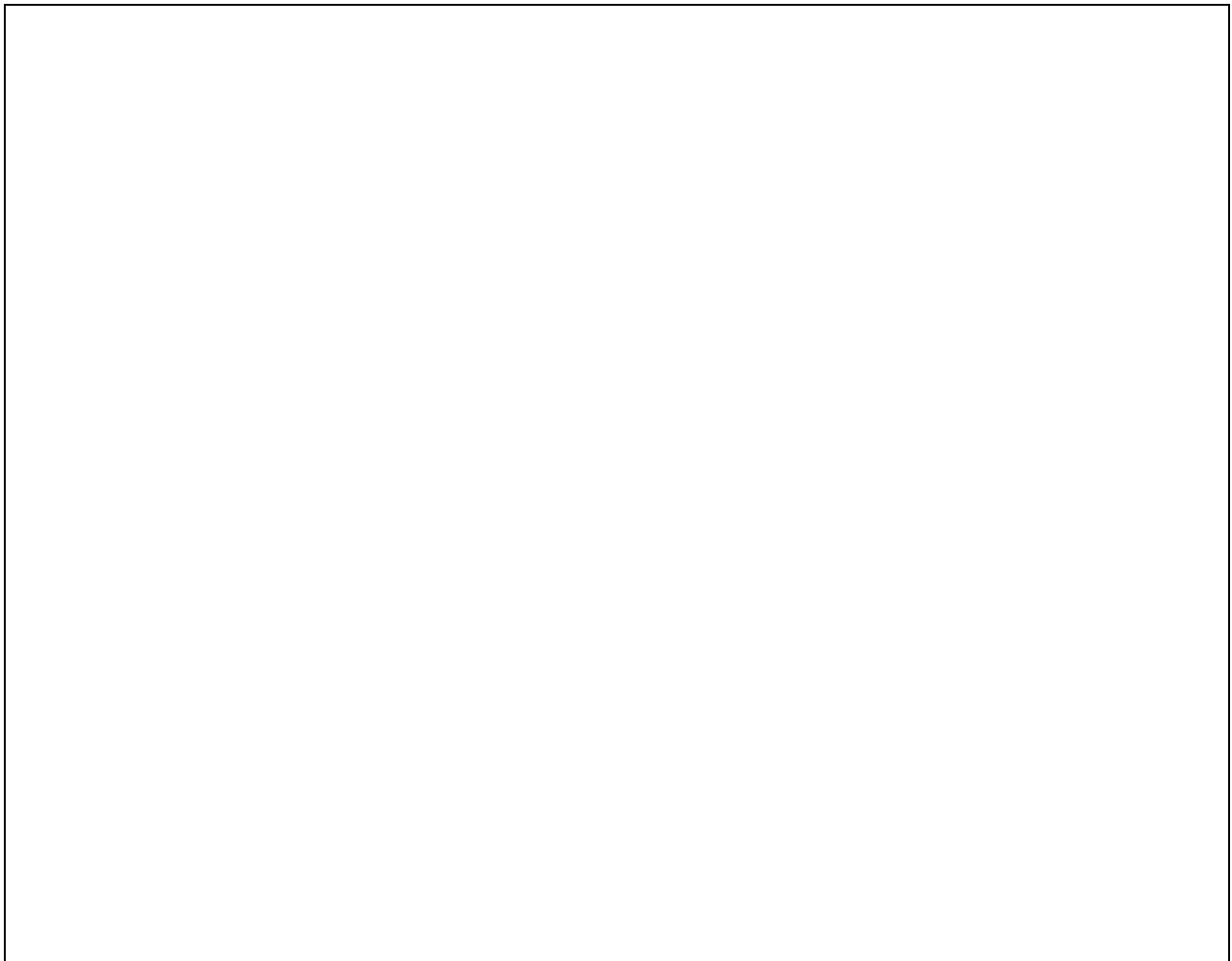
2. When did he live and in what country was he a chemist? _____

3. Do you think it is important for scientists to publish their work as soon as possible? Why or why not? _____

CITRIC ACID AND YOUR TASTE BUDS: Read the sidebar on page 15 and answer the following questions **using complete sentences**.

1. What four tastes do our tongues detect? _____

2. Where on your tongue are taste buds for the four different tastes? Draw a picture in the box below.



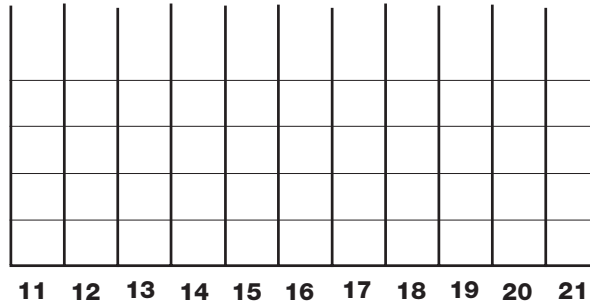
3. How do bitter and sour tastes warn us of possibly harmful foods? _____

MATH EXTENSION—PROBLEM OF THE WEEK

INVESTIGATION 2: REACHING SATURATION

A science class was doing an experiment to determine how much salt it takes to saturate 50 ml of water. Here are the groups' results.

Group 1 — 14 g
 Group 2 — 16 g
 Group 3 — 15 g
 Group 4 — 14 g
 Group 5 — 15 g
 Group 6 — 12 g
 Group 7 — 14 g
 Group 8 — 20 g



Can you make a histogram of the class results?

Review the data and the histogram to determine these numbers.

Mean _____

Median _____

Mode _____

Range _____

DEFINITIONS

Mean is the total divided by the number of groups. Mean is the same as average.

Median is the number that is in the exact middle when the numbers are arranged from smallest to largest.

Mode is the number that occurs most often.

Range is the largest number minus the smallest number.

HOME/SCHOOL CONNECTION

INVESTIGATION 2: REACHING SATURATION

Did you know you can make your own silly putty right at home? Here's what you will need.

Materials

- 20 ml White household glue (Colored glue won't work.)
- 5 ml Saturated borax solution (See Step 1.)
 - Water
- 1 Plastic bag
 - Food coloring
- 2 Plastic cups or small jars (Baby-food jars work great.)

PROCEDURE FOR SILLY PUTTY

1. In a plastic cup mix 15 ml (1 tablespoon) of borax with enough water to dissolve it (about 40-50 ml). This will make a saturated solution.
2. In a separate plastic cup mix 20 ml (4 teaspoons) of white glue with 5 ml (1 teaspoon) of water and a few drops of food coloring.
3. Add 5 ml of the saturated borax solution to the cup of glue.
4. Mix the mixture for a few minutes and watch what happens.
5. Now test your silly putty for stretching, bouncing, newsprint transfers, and so forth. How long will it stretch? How high will it bounce? Record your observations and bring them to class.
6. Place the putty in a plastic bag to preserve it.

Name _____ Date _____

SOFT-DRINK RECIPES

SOLUTION 1. 1 spoon of powder in 1000 ml of water	
SOLUTION 2. 3 spoons of powder in 1000 ml of water	

List all the ways that the solutions are the same.

List all the ways that the solutions are different.

SOLUTION A. 2 spoons of powder in 1000 ml of water	
SOLUTION B. 2 spoons of powder in 500 ml of water	

List all the ways that the solutions are the same.

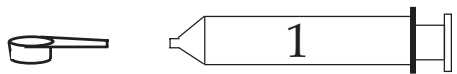
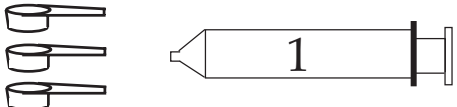
List all the ways that the solutions are different.

My recommended recipe for soft drink is _____

SALT CONCENTRATION

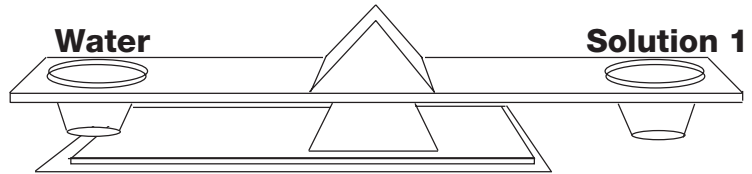
PART 1. Make salt solutions 1 and 2.

- Label two cups "Solution 1" and "Solution 2."
- Use the 5-ml spoon to measure salt for solutions 1 and 2.
- Use the syringe to measure the water.
- Stir with a stirring stick.

Solution 1	1 spoon of salt	
	50 ml of water	
Solution 2	3 spoons of salt	
	50 ml of water	

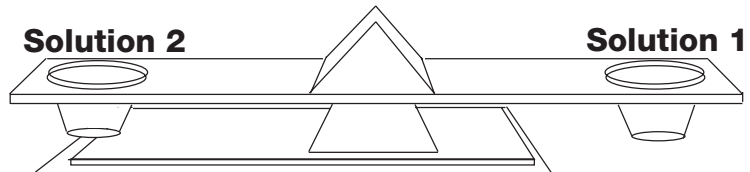
PART 2. Use the balance to make the comparisons described below.

Compare 50 ml of water
and 50 ml of solution 1.



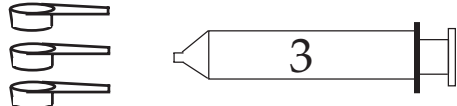
Circle the solution that is heavier.

Compare 50 ml of solution 2
and 50 ml of solution 1.



Circle the solution that is heavier.

PART 3. Make a third salt solution in a third labeled cup.

Solution 3	3 spoons of salt	
	150 ml of water	

Discuss in your group which solution is more concentrated, solution 2 or solution 3. Write your prediction here. _____

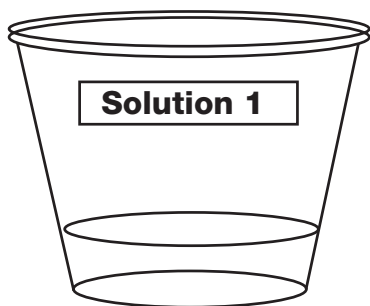
PART 4. Use the balance to compare solution 2 and solution 3.

Time out! Discuss your plan with your group before using the balance.

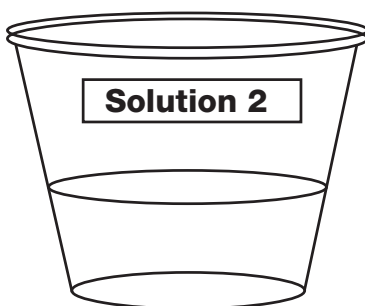
Which solution proved to be more concentrated? _____

RESPONSE SHEET—CONCENTRATION

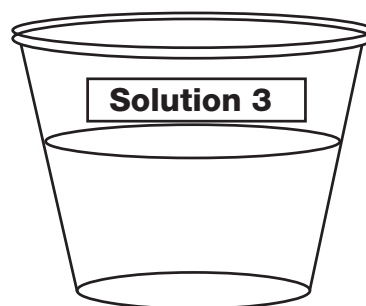
In comparing three solutions Julie wrote in her journal that solution 3 was the most concentrated because it had the most water and the most salt. What can you tell Julie about concentration?



50 ml of water
2 spoons of salt



100 ml of water
4 spoons of salt



150 ml of water
5 spoons of salt

Science Stories



“Grow Your Own Crystals” Pages 16-17

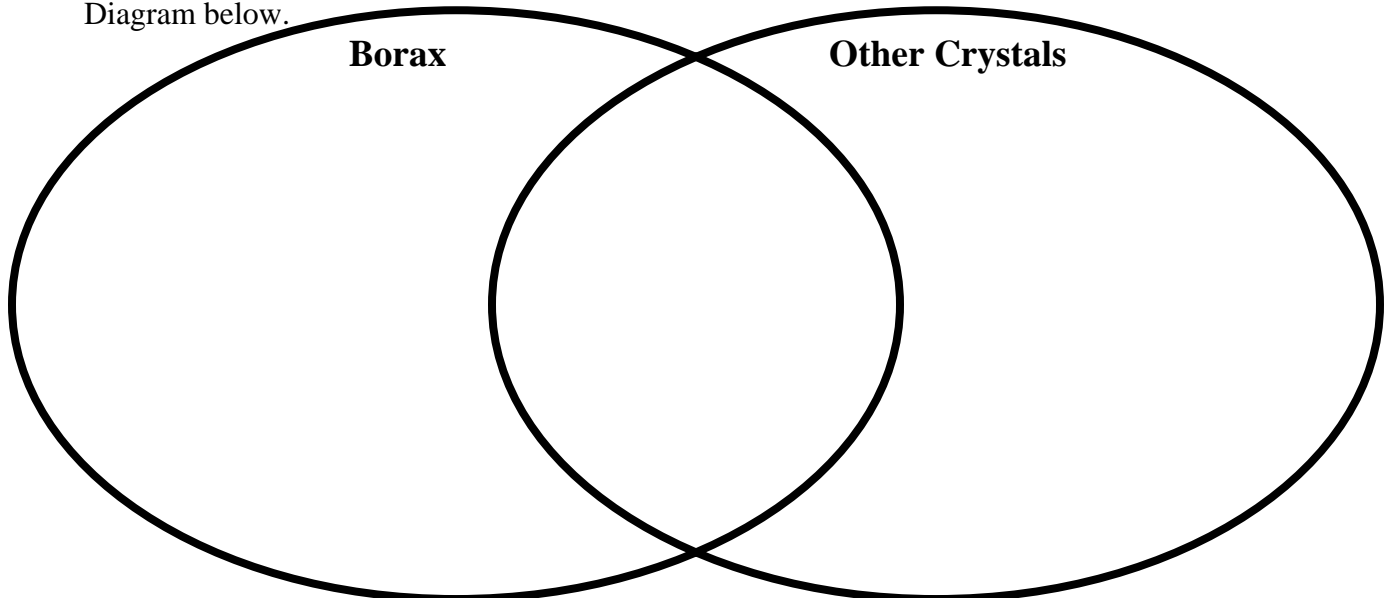
You are going to read and follow a step-by-step process to grow a new crystal. You will be using a new substance (borax). After you read the step-by-step process, please answer the following questions **using complete sentences**.

1. What is borax?

2. How is it used?

After growing your crystals, examine them with a hand lens and record the shapes below:

Compare your borax crystals to other crystals you have created so far by filling in the Venn Diagram below.



“The Air You Breathe”

Pages 18-20

You are going to read an article is about a solution that is all around you – the air. After you read the article, please answer the following questions **using complete sentences**.

1. What is air and what is it made of? _____

2. What is the solvent and what are the solutes in air? _____

3. What is the concentration of nitrogen in air? _____

4. What is the concentration of oxygen in air? _____

5. What are some of the other gases found in small concentrations in air? _____

6. The article states that water vapor is found in air and that there is more water vapor when the air is warmer. How does this fact relate to what you know about adding a solute to heated water (or other liquid)? _____

7. What is pollution? _____

8. What is global warming? _____

9. What might cause global warming? _____

THE AIR ASTRONAUTS BREATHE: Read the sidebar on page 19 and answer the following questions **using complete sentences.**

1. Describe how air is managed in spacecraft. _____

AMAZING AIR FACTS: Read the sidebar on page 20 and answer the following questions **using complete sentences.**

1. Is it possible to live on Mars without a space suit? Why or why not? _____

2. How do you think your body can keep from being crushed by air pressure? _____

MATH EXTENSION—PROBLEM OF THE WEEK

INVESTIGATION 3: CONCENTRATION

Students in Mrs. Lorenzo's class decided to sell fruit drinks after school to raise money for a field trip. In order to know what flavors to sell, they surveyed the fifth grade to find out what flavors were their favorites. Here are the results.

Flavor	Cherry	Grape	Orange	Berry
Room 14				
Boys	4	3	2	8
Girls	7	2	1	3
Room 15				
Boys	3	2	2	7
Girls	6	3	0	5
Room 16				
Boys	6	3	0	7
Girls	6	2	2	5

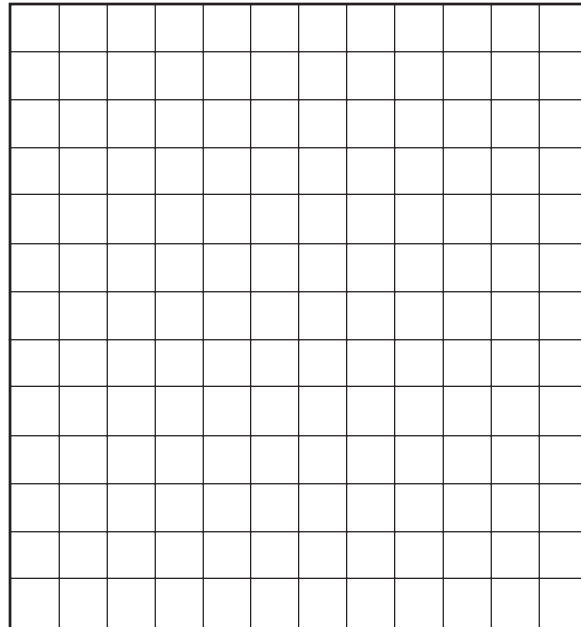
Graph the results and answer the questions.

- Which flavor did the fifth grade prefer?

- Which flavor did the girls prefer?

- Which flavor did the boys prefer?

- Which flavors would you recommend selling after school? What are your reasons?



Bonus question: What percentage of the class preferred each flavor?

Cherry _____ % Grape _____ % Orange _____ % Berry _____ %

HOME/SCHOOL CONNECTION

INVESTIGATION 3: CONCENTRATION

You can grow some crystals in your home laboratory. Choose one of the approaches described below. Use safe laboratory procedures when working with chemicals.

ALUM OR EPSOM SALTS CRYSTALS

1. Evaporate an alum solution and save the crystals (see Step 3).
2. Prepare a supersaturated alum solution by dissolving alum in very hot water (close to boiling) until no more will dissolve. Cool the solution. Pour it into a jar.
3. Tie one alum crystal to the end of a thread. This is the seed crystal.
4. Hang the seed crystal in the jar of supersaturated alum solution and wait several days for the crystal to grow.
5. Remove the crystal, make another supersaturated alum solution, cool it, pour it into the jar, and put the crystal into the solution. Repeat this process for bigger and bigger crystals.

BLUING CRYSTALS

Materials

- | | | | |
|---------------|-----------------------------|---|---|
| 1/4 cup | Water | 1 | Plastic cup or jar |
| 2 tablespoons | Bluing | • | Food coloring |
| 2 tablespoons | Salt | 1 | Small lump of clay (if you use pipe cleaners) |
| 2 tablespoons | Ammonia (without detergent) | • | Pipe cleaners, charcoal, sponges, or a paper-towel tube |

1. Make a solution with the water, liquid bluing, salt, and ammonia.
2. Place a lump of clay on the bottom of the clear plastic cup or jar. Push three or four pipe cleaners into the clay. Put drops of food coloring on the tips of the pipe cleaners.
3. Pour the solution into the cup so that it covers the clay and all but 1 cm of the pipe cleaners.
4. Set the cup where it will not be bumped or disturbed. Crystals will start to form in a few hours.

NOTE: The solution may be poured over broken charcoal, sponges, or sections of cardboard paper-towel tubes instead of clay and pipe cleaners. Whichever material you use, part of it must extend above the surface of the liquid.

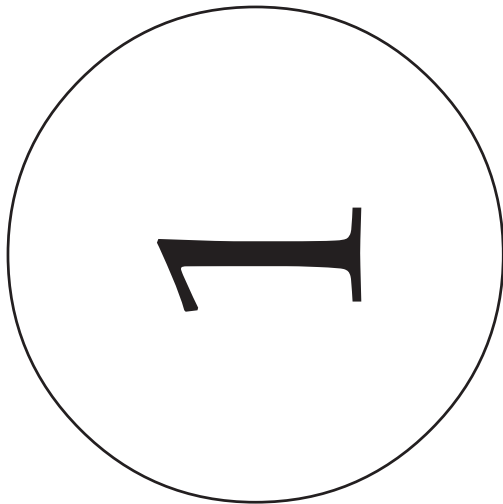
OBSERVATIONS

Draw and write about the crystals.

FIZZ-QUIZ PLACE MAT

Name _____

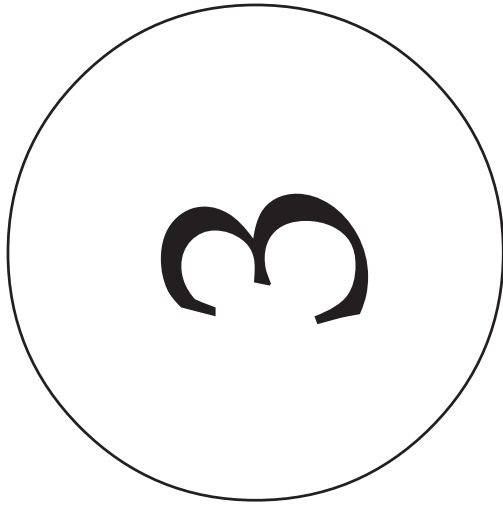
Date _____



1 spoon of calcium chloride
and 1 spoon of baking soda
in 50 ml of water



1 spoon of calcium chloride
and 1 spoon of citric acid
in 50 ml of water



1 spoon of baking soda
and 1 spoon of citric acid
in 50 ml of water

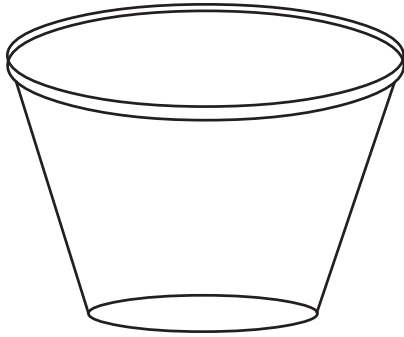
DIRECTIONS

1. Number three cups and place them on the numbered circles.
2. Put the solid materials in cup 1 (one spoon of calcium chloride and one spoon of baking soda).
3. Carefully add 50 ml of water to cup 1.
4. Observe the results and record observations on the *Fizz-Quiz Observations* sheet.
5. Repeat the procedure for cups 2 and 3. (Take turns putting the chemicals into cups.)

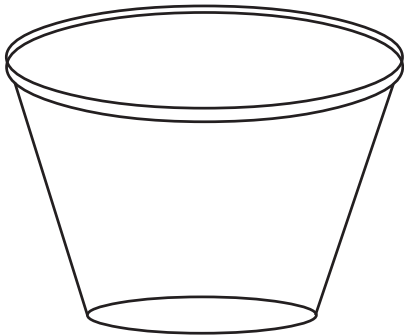
FIZZ-QUIZ OBSERVATIONS

Follow the *Fizz-Quiz Place Mat* directions to make the mixtures. Record the results. Draw and describe what you observed.

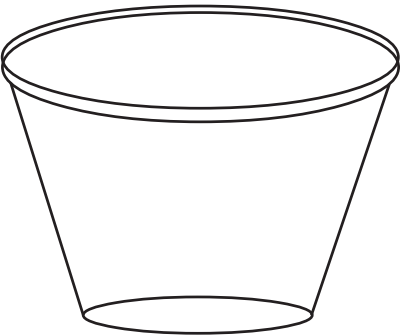
Cup 1 1 spoon of calcium chloride, 1 spoon of baking soda, and 50 ml of water



Cup 2 1 spoon of calcium chloride, 1 spoon of citric acid, and 50 ml of water



Cup 3 1 spoon of baking soda, 1 spoon of citric acid, and 50 ml of water



Which chemicals reacted to form a gas? _____

Which chemicals reacted to form a precipitate? _____

RESPONSE SHEET—FIZZ QUIZ

.....

Tarren wrote in his journal,

After I mixed calcium chloride, baking soda, and citric acid together in water, I saw bubbles and lots of fizzing. A short time later I saw a new white material on the bottom of the cup. A reaction took place.

After the same experiment Julie wrote,

After I mixed calcium chloride, baking soda, citric acid, and water, it dissolved.

Who wrote the better observation? Why do you think so?

Who has the better conclusion? Why do you think so?

Describe the differences between dissolving and reacting.

Science Stories



“What a Reaction!”

Pages 21-22

You are going to read an article that will help you understand chemical reactions and the difference between slow and fast reactions. After you read the article, please answer the following questions **using complete sentences**.

1. What is a chemical change? _____

2. What are two examples of chemical reactions at different speeds? _____

3. What can affect the speeds of chemical reactions? _____

4. When sodium and chlorine react, what is the product? _____

5. When hydrogen and oxygen react, what is the product? _____

6. When iron and oxygen react, what is the product? _____

“Ask a Chemist” and “The Periodic Table” Pages 23-30

You are going to read an interview between a student and a chemist. You are also going to read more about elements and the periodic table. After you read these stories, please answer the following questions **using complete sentences**.

1. What is your favorite question that was asked? Why? _____

2. What does the chemist like best about her work? _____

3. What are some of the things chemists can do besides work in a laboratory? _____

4. What kind of person is this chemist? _____

THE PERIODIC TABLE: Read and answer the following questions **using complete sentences**.

1. Who was the first person to identify elements? _____

2. What does the word period mean on the table? _____

3. How many elements were known when Mendeleev's periodic table was published? _____

4. How many natural elements are known today? _____

5. How have the charts (tables) changed over time? _____

“The History of Rubber”

Pages 31-33

You are going to read an article to find out how people learned to make and use rubber. After you read the story, please answer the following questions **using complete sentences**.

1. What are the two kinds of rubber? _____

2. What is natural rubber and where does it come from? _____

3. How is synthetic rubber like natural rubber? What is it made from? _____

4. What mixture did Goodyear discover that made rubber usable? What did the mixture do? _____

5. Why is rubber an important product today? _____

MATH EXTENSION—PROBLEM OF THE WEEK**INVESTIGATION 4: FIZZ QUIZ**

Rachel was interested in the reactions that produce carbon-dioxide gas. She wondered if there was some way to predict how much gas a reaction would produce. She did the series of seven experiments recorded below and measured the amount of carbon dioxide released by each one.

Baking soda	Calcium chloride	Carbon dioxide
1 spoon	1 spoon	800 ml
1 spoon	2 spoons	1600 ml
1 spoon	3 spoons	1600 ml
2 spoons	1 spoon	800 ml
2 spoons	2 spoons	1600 ml
2 spoons	3 spoons	2400 ml
3 spoons	1 spoon	800 ml

Based on Rachel's experimental results, answer the questions.

1. How many milliliters of gas would be produced if 3 spoons of baking soda reacted with 3 spoons of calcium chloride?
2. How many milliliters of gas would be produced if 2 spoons of baking soda reacted with 1.5 spoons of calcium chloride?
3. Rachel wanted to produce exactly 2000 ml of carbon dioxide. How much baking soda and calcium chloride should she use?

PROJECT IDEAS

- Look in *FOSS Science Stories* or books in the library for ideas about projects you might like to present to the class.
- Find out if each mixture makes a solution with water: flour, baking soda, alum, cooking oil, rubbing alcohol, or any other material you'd like to test.
- Research diatomaceous earth. Where does it come from? How is it used?
- Research sodium chloride. How does salt get to the table? Why are some people on low-salt diets?
- Find citric acid. It's in many of the foods we eat. Read product labels and list products that contain citric acid.
- Research citric acid. What citrus fruits is it found in? How is it important in our diets?
- What effect does temperature have on saturation? Try experimenting with different temperatures of water—hot, iced, and so forth.
- Try dissolving a second material in a saturated salt solution. Will it dissolve? Will a third material?
- Investigate baking powder. What are the ingredients in baking powder? How does it react in water? How are baking powder and baking soda the same and how are they different?
- Investigate drinks. Many liquid products (for example, soft drinks) are complex solutions made of several materials dissolved in water. The order in which the ingredients appear on the label corresponds to their relative amount in the product. The substance listed first is the most concentrated, the second the next concentrated, and so forth. Bring the product to class and report on its contents in terms of concentration.
- Investigate limiting chemicals. Is the baking soda all used up in the reaction between calcium chloride and baking soda? Design an experiment to find out.
- Design a new filtering system for separating mixtures.
- Mix up a new mixture or solution and take it apart.
- Design a crystal mobile. Use the crystal formula in the home / school connection or research a new one using table salt, rock salt, sugar, Epsom salts, or borax.
- How do they get the fizz in soda? (See the resource *Soda Science: Designing and Testing Soft Drinks*.)
- Investigate rock candy. How is it made?
- Design an experiment that results in a new precipitate.

NOTE: You may collect and analyze information for your project using sound recorders, computer research, and cameras.

PROJECT PROPOSAL

.....

1. What is the question or the project that you are proposing?

2. What materials or references will you need to complete the project?

3. What steps will you follow to complete the project?

PRESENTATION GUIDELINES

You will have exactly 3 minutes to present your project to the class. In those 3 minutes you should answer these questions.

- What were you trying to find out (your question)?
- What materials or references did you need to do your project?
- What procedure did you follow to complete your project?
- What did you learn from doing your project?

When you begin speaking, you will see the *green card* held up for 2 1/2 minutes. When you see the *yellow card*, you have 30 seconds left. When you see the *red card*, it means you can finish your sentence, but you must stop within the next few seconds.

Practice your presentation so you will be sure it is at least 2 1/2 minutes long, but not more than 3 minutes long. Be sure you have included all of the information asked for above.

Name _____

Date _____

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