Magical Mixtures & Sweet Solutions
Teacher Facilitation Notes

In General . . .

- Project the slide deck in edit mode–do not show it as a slideshow.
- Hide the speaker notes before projecting. (View/Show Speaker Notes)
- Hide the toolbar. (Click on the up arrow at the right end of the tool bar.)
- Call on students to read the various content shown on slides.
- For each investigation, assemble the needed materials for each group and place in a central location for ease of distribution.
- Duplicate copies of the data sheets for each student.

Materials Needed Per Group:

Engage: Mixtures, Solutions, or Magic Potions???

Small styrofoam bowl or saucer	Milk, about 15-20 mL
Food coloring	Cotton swabs, 4-5
Dish soap	Condiment container
Small jar or beaker	Paper towels
Crayons or colored pencils	

Explore Lab #1: Mysterious Mixtures

Snack baggie, 1	Mini M&Ms®	Paper plate
Jelly beans	Skittles®	

Explore Lab #2: Defining Dissolving!

Clear, plastic glasses, 6	Water	Powdered drink mix
Cinnamon	Paper clips	Sand, 200 mL
Instant tea or coffee	Vinegar	Marbles
Paper towels	Beaker, 250 mL	Sandwich baggies, 6
Teaspoons, 3-4	Card stock	Craft sticks or stirring sticks, 6
Paper towels	Sharpie™	

Explore Lab #3: Conserving Matter in Solutions

Beaker, 2 (250 mL)	Salt, 10 mL	Water (300 mL)
Graduated cylinder (10 mL)	Paper towels	Milk (100 mL)
Graduated cylinder (100mL)		Stirring stick or straw, 1
Triple beam balance or electronic balance		

Elaborate: Separating Mixtures and Solutions

Beaker, 2 (250 mL)	Coffee filter, 1	Sieve, 1
Funnel, 1	Magnet	Tweezers
Large jar with lid, 1	Water	Salt, about 20 mL
Sand, about 30 mL	Raisins, about 15	Gravel or small stones
Paper plates, 2-3	Paper towels	Paper clips, 5-10
Large beaker (500-1000 mL)		

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Other Materials (Per student)

Student Recording Sheets	Pencils
Student Evaluation Document	Goggles

Other Materials (Per Class)

Masking tape	Sharpie™	Hot plate
Oven mitt		

Engage: Mixtures, Solutions, or Magic Potions???

- Pour some milk (15-20 mL) into a beaker or small jar for each group. Pour a small amount of dish soap into condiment containers. Assemble the remainder of the materials in a central location for ease of distribution. NOTE: This investigation works best with whole milk–not skim.
- Read through and discuss the 2 Engage opening slides with the students.
- Divide the class into groups and have each group get the needed materials.
- Depending on student ability level, read through the steps with the students as they complete the investigation OR let groups work independently.
- Discuss using the following questions:
  - What are some physical properties of the milk, the food coloring, and the dish soap?
  - Did the physical properties of the milk change when the food coloring was added? Did mixing these ingredients make a mixture? Explain.
  - What happened when you dabbed the soap into the milk/food coloring mixture? Why do you think it happened?
  - What physical properties of the mixture changed when the soap was mixed with the milk/food coloring mixture?
- Read and discuss the final two Engage slides. Make sure students understand the likenesses and differences of mixtures and solutions.
- Have students define *mixture* and *solution* in their science notebooks.

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Explore: Identifying, Separating, and Making Mixtures and Solutions!

- Advanced procedures for each lab:
  - Lab #1, Mysterious Mixtures: Place each of the following in a snack baggie for each group:
    - M&Ms®–2 red, 3 orange, 4 yellow, 2 green, 4 blue, 3 brown
    - Jelly beans–3 red, 3 orange, 1 yellow, 3 green, 5 pink
    - Skittles®–3 red, 3 orange, 1 yellow, 2 green, 2 purple
  - Lab #2, Defining Dissolving
    - Fill sandwich baggies with the following materials: powdered drink mix, cinnamon, marbles, sand, and instant tea or coffee. Make sure that the baggies hold enough materials so that each group can get 2-3 teaspoons for their mixtures. Use a Sharpie™ to label each bag's contents.
    - Have a large jar or beaker of vinegar available for group use.
    - Have water available.
    - Print out the station table cards on card stock. Use either the color cards OR the grayscale cards. Fold on the dark, horizontal line between the two cards. Trim the edges so that they are even. Stand the cards up in the area where each station is located.
  - Lab #3, Conserving Matter in Solutions
    - Duplicate the procedures on card stock. Place in sheet protectors.
    - Assemble all of the materials in a central location for ease of distribution.
    - This lab is quite involved and requires a lot of measurement and mathematical calculations. Depending on student ability levels, groups can complete the lab independently or as a class with each group following the procedures as the teacher or a volunteer reads the procedures aloud. Groups may also discuss their measurements and results as the lab progresses rather than at the conclusion.
    - NOTE: The salt may not completely dissolve in the water. This is a supersaturated solution. It just means that there is more salt than the water can hold. Using warm water may help more of the salt dissolve.
- Groups can complete the labs independently and simultaneously or one at a time with everyone doing the same lab at the same time.

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Explain: Magical Mixtures and Sweet Solutions

- Call on volunteers to read each paragraph of the two explanation slides. Discuss as desired.
- Ask the following questions:
  - Lab #1–Mysterious Mixtures
    - What different substances made up the mixture that you separated?
    - For Clue #1, what eight groups did you make? What criteria (physical property) did you use to separate the substances into these eight groups? How many candies were in the largest group? The smallest group?
    - For Clue #2, what three groups did you make? What criteria did you use to separate the substances into these three groups? How many candies were in the middle group? The smallest group?
    - For Clue #3, what two groups did you make? What criteria did you use to separate the substances into these two groups? How many candies were in the larger group? The smaller group?
    - For Clue #4, what two groups did you make? What criteria did you use to separate the substances into these two groups. How many candies were in the larger group? The smaller group?
    - What method did you use to separate this mixture into different groups?
  - Lab #2–Defining Dissolving
    - Which combinations of substances were mixtures only?
    - Which combinations of substances formed special mixtures called solutions?
    - How can you tell if combining substances creates a mixture or a solution?
    - What does the term *dissolve* mean?
  - Lab #3–Conserving Matter in Solutions
    - How did the mass of the salt and water solution compare to the masses of the salt and the water?
    - How did the volume of the milk and water solution compare to the volume of the milk and the water?
- Discuss as desired.

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Elaborate: Separating Mixtures

- Prepare a jar of the "Brew of Knowledge" for each group:
  - Fill the jars about ½ full of water. Add the salt to the water and mix well.
  - If desired, add several drops of yellow or green food coloring to make the "potions" stand out.
  - Put 10-15 raisins, about 30 mL of sand, 10 mL of gravel or small stones and 5-10 paper clips to the water mixture.
  - Use masking tape and a Sharpie™ to label the jars as "Brew of Knowledge".
- Watch the video that discusses the different methods of separating mixtures and solutions.
- Display the slide that shows these methods as the group works to separate their mixture/solution.
- Have all of the groups work together as you question which tools they will use and which separation methods can be used to separate mixtures and solutions.
  - Look carefully at your jar of the Brew of Knowledge. What substances can you easily see in the jar? What other substances might be in the jar that could have dissolved in the water?
  - What are some of the physical properties of the sand? The paper clips? The raisins? The salt? The water?
  - You know there are different methods for separating mixtures and solutions. Look at the tools you have available for doing this. What do you think we should do first? (See example to the left.)
  - What substances remained on the sieve? Why? What substances passed through the sieve? Why?
  - Look at what's left on the sieve. What tool could we use to remove one of these substances? (The magnet and then the tweezers)
  - What is left on the sieve now? (It should only be the gravel and maybe a little bit of sand. If there is some sand left, shake the sieve over a paper plate to get it out.)
  - Look at the solution in the jar. It is made up of yellow food coloring, salt, and water. What method can we use to separate the salt from the water?
  - If desired, do this part of the separation as a group demonstration.
- Discuss the activity being sure to describe how the physical properties affect the method of separation.

Evaluate

- Let students complete the quiz independently.
- Discuss as desired.

Magical Mixtures & Sweet Solutions

Name: KEY

Evaluation

1. A student is performing an experiment. He adds 0.25 grams of powdered drink mix to 5 grams of water and stirs to make a solution. What will be the mass of the water/powdered drink mix solution?

   A 4.75 grams

   B 5.00 grams

   C 5.25 grams

   D 525 grams

2. A student mixes 5 mL each of salt, sand, and iron filings in a paper cup. Which statement best describes what happens to the three substances after they are mixed together?

   F The substances keep their own physical properties.

   G The substances combine to form a solution.

   H Some of the substances dissolve in a glass of water.

   J Each of the three substances are attracted to a magnet.

3. Which of the following are examples of mixtures that are also solutions? Mark all the answers that apply.

   A Salt and pepper

   B Hot coffee

   C Air

   D Popcorn

   E Soda (Dr. Pepper™, Coca-Cola™, etc.)

   F Soil

   G Chocolate milk

4. Which of the following is true about a solution?

   F One substance dissolves in another.

   G The substances in a solution are easy to separate.

   H It is always possible to see every substance in a solution.

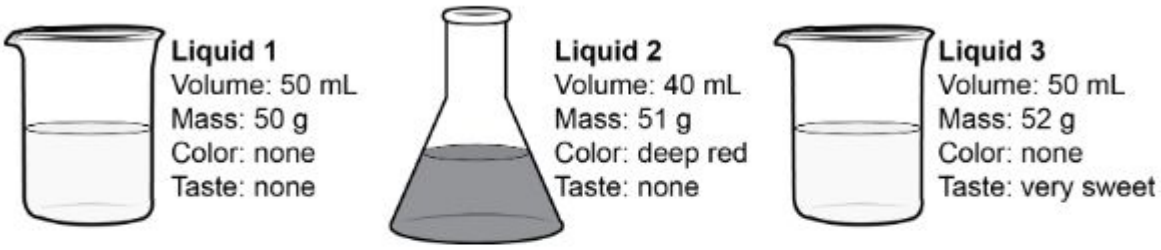
   J Combining substances to form a solution causes a change in state.

Magical Mixtures & Sweet Solutions

Name: KEY

Evaluation

5. The illustration shows the properties of three different liquids.



Students mix the liquids together to form a solution. Which of the following will most likely be properties of the solution? (Mark two answers.)

A A volume of 150 mL

B A mass of 153 grams

C A sweet taste

D A deep blue color

6. Some students were given five different mixtures to separate. What method can student BEST use to separate each mixture into two parts? Write one term on the blank to tell which separation method the student should use. (Each term may be used more than one time.)

Separation Method		
Hand sorting	Using a magnet	Filtering

Sand and water **Filtering**

Pebbles and glass marbles **Filtering OR Hand sorting**

Ground pepper and milk **Filtering**

Iron filings and sand **Using a magnet**

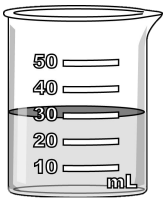
Red grapes and green grapes **Hand sorting**

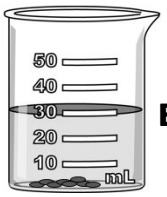
Magical Mixtures & Sweet Solutions

Name: KEY

Evaluation

7. A student measured 30 mL of water into Beaker A and 30 mL of water into Beaker B. He stirred 5 mL of sugar into Beaker and 5 mL of rice into Beaker B. Then he let the beakers sit on the counter for two hours. The picture shows both beakers after two hours.

Beaker A 



Beaker B

Which statement best describes the contents of the two beakers?

A Both beakers contain solutions.

B Neither beaker contains a solution.

C Beaker A contains a mixture, but Beaker B contains a solution.

D Beaker A contains a solution, but Beaker B contains a mixture.

8. A teacher washed some strawberries and put them in a container. Then, she sprinkled the strawberries with sugar, covered the container and put them in the refrigerator. After an hour, the teacher noticed that the strawberries had not changed in appearance, but the sugar seemed to disappear. What most likely happened to the sugar in this mixture?

F The cold air in the refrigerator caused the sugar to evaporate.

G Since the sugar was denser than the strawberries, it sank to the bottom.

H The sugar dissolved in the moisture on the strawberries.

J The thermal energy in the refrigerator caused the sugar to melt.

9. A student added 10 g of salt and 10 g of sand to a jar of water. She put the lid on the jar and shook the mixture for about a minute. Then she set the jar on the table for five minutes. What should the student expect to see after five minutes?

A The sand settled to the bottom, and the salt dissolved in the water.

B The salt settled to the bottom, and the sand dissolved in the water.

C The salt and the sand both sank to the bottom of the jar.

D The salt and the sand both dissolved in the jar of water.

Magical Mixtures & Sweet Solutions

Name: KEY

Evaluation

10. Some science students filled four beakers with equal amounts of lemon juice. The students then added a different substance to each beaker and recorded their observations in the table below.

Substance	Observed Results
Baking soda	Creates a lot of bubbles
Sugar	Seems to disappear
Cinnamon	Floats on top of the lemon juice
Sand	Sinks to the bottom of the beaker

What substance dissolved in the lemon juice?

F Baking soda

G Sugar

H Cinnamon

J Sand

11. A student added 10 grams of salt to a beaker filled with 400 mL of warm water. She stirs the mixture to make a salt water solution. What change most likely occurs to the salt when it is added to the water?

A The salt breaks down to form a new substance in the solution.

B The salt changes the water into a new substance in the solution

C The salt floats on the surface of the water in the solution.

D The salt completely dissolves in the solution.

12. Which physical property of water will change when it is mixed with powdered lemonade mix?

F Its physical state

G Its color

H Its magnetic attraction

J Its temperature

Magical Mixtures & Sweet Solutions

Name: _____

Engage: Mixture, Solution, or Magic Potion???

Questions

What is a mixture? What is a solution?

1. Describe the physical properties of the milk. _____

   _____

2. Does the food coloring mix with the milk? What do you observe?

   _____

   _____

   _____

3. Describe the physical properties of the dish soap. _____

   _____

4. What happened when you dipped the cotton swab into the dish soap and then touched it to the surface of the milk and food coloring mixture? Why do you think this happened?

   _____

   _____

   _____

My Conclusions:

What did I learn about mixtures and solutions from performing this investigation?

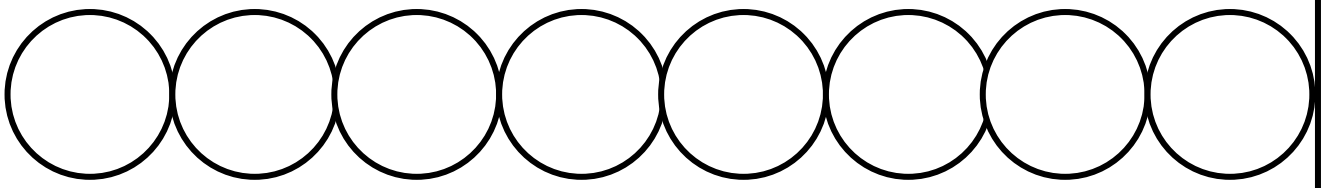
Magical Mixtures & Sweet Solutions

Name: _____

Explore: Lab #1: Mysterious Mixtures

Clue #1

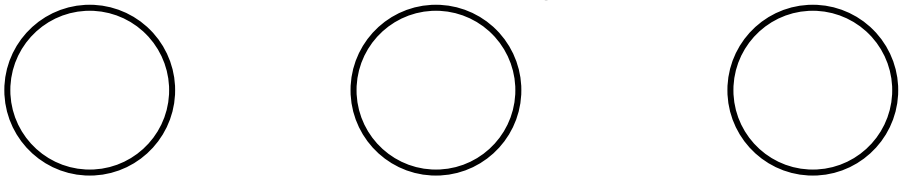
1. Draw a picture of the new mixtures you made.



2. What criteria (physical property) did you use to separate the candies into these groups?

Clue #2:

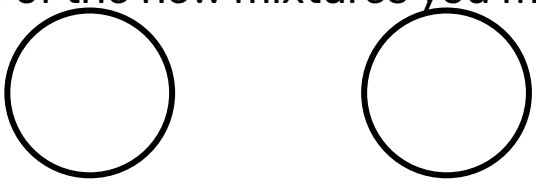
3. Draw a picture of the new mixtures you made.



4. What criteria did (physical property) did you use to separate the candies into these groups?

Clue #3:

5. Draw a picture of the new mixtures you made.



6. What criteria did (physical property) did you use to separate the candies into these groups?

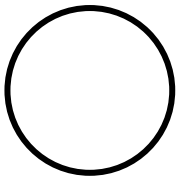
Magical Mixtures & Sweet Solutions

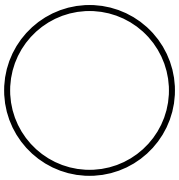
Name: _____

Explore: Lab #1: Identifying, Separating, and Making Mixtures and Solutions

Clue #4

7. Draw a picture of the new mixtures you made.





8. What criteria (physical property) did you use to separate the candies into these groups?

9. Give an example of a mixture. Explain how you know that it is a mixture.

10. If a student mixes water with powdered drink mix, what physical properties of the water stay the same? What physical properties of the water might change?

11. A student mixed some sand with some paper clips. What physical properties of the sand stayed the same? What physical properties of the paper clips stayed the same?

12. Define the term *mixture* in your own words.

Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station A Table Card

Station A

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put one spoonful of the powdered drink mix in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Station A

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put one spoonful of the powdered drink mix in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station B Table Card

Station B

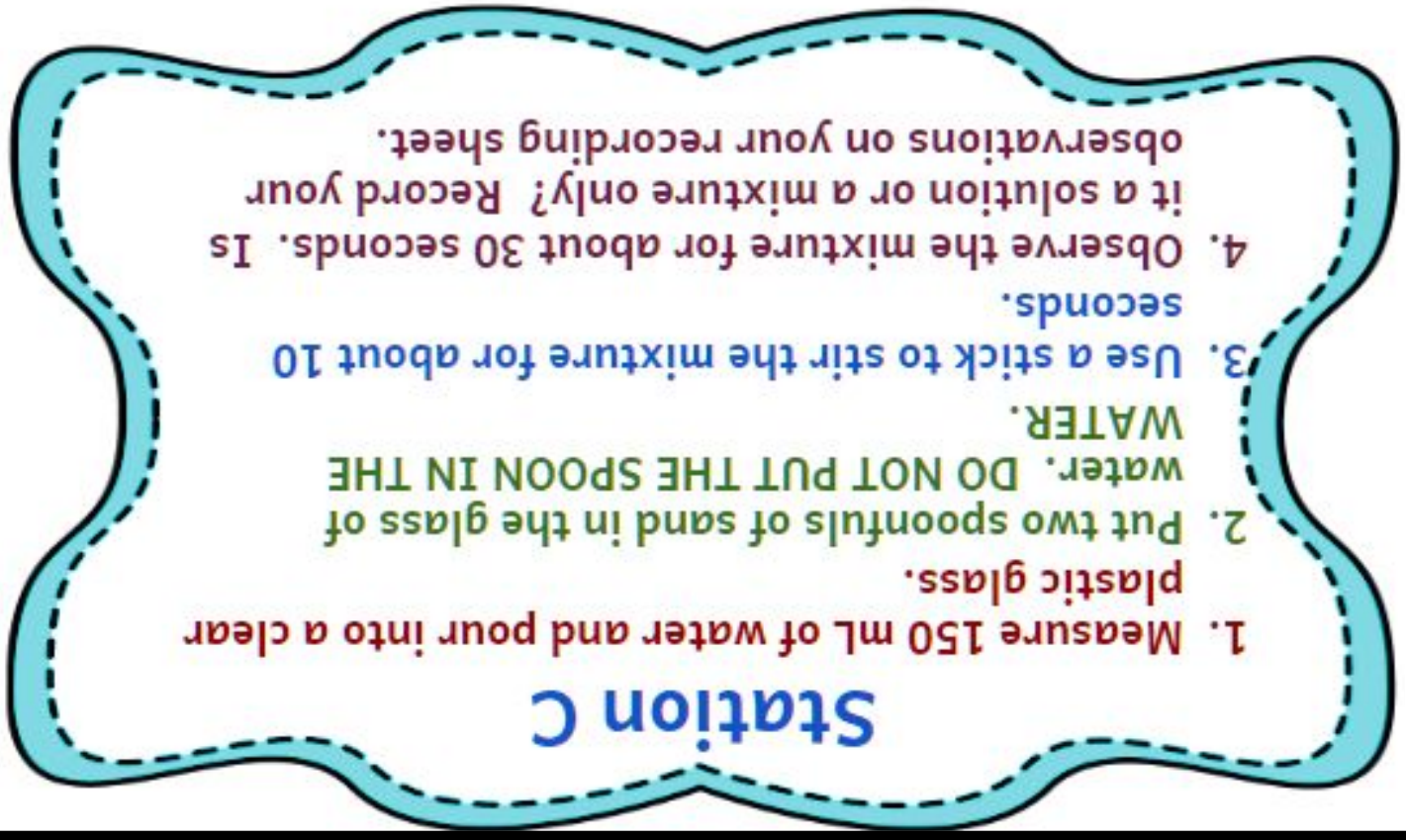
1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put one spoonful of the cinnamon in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

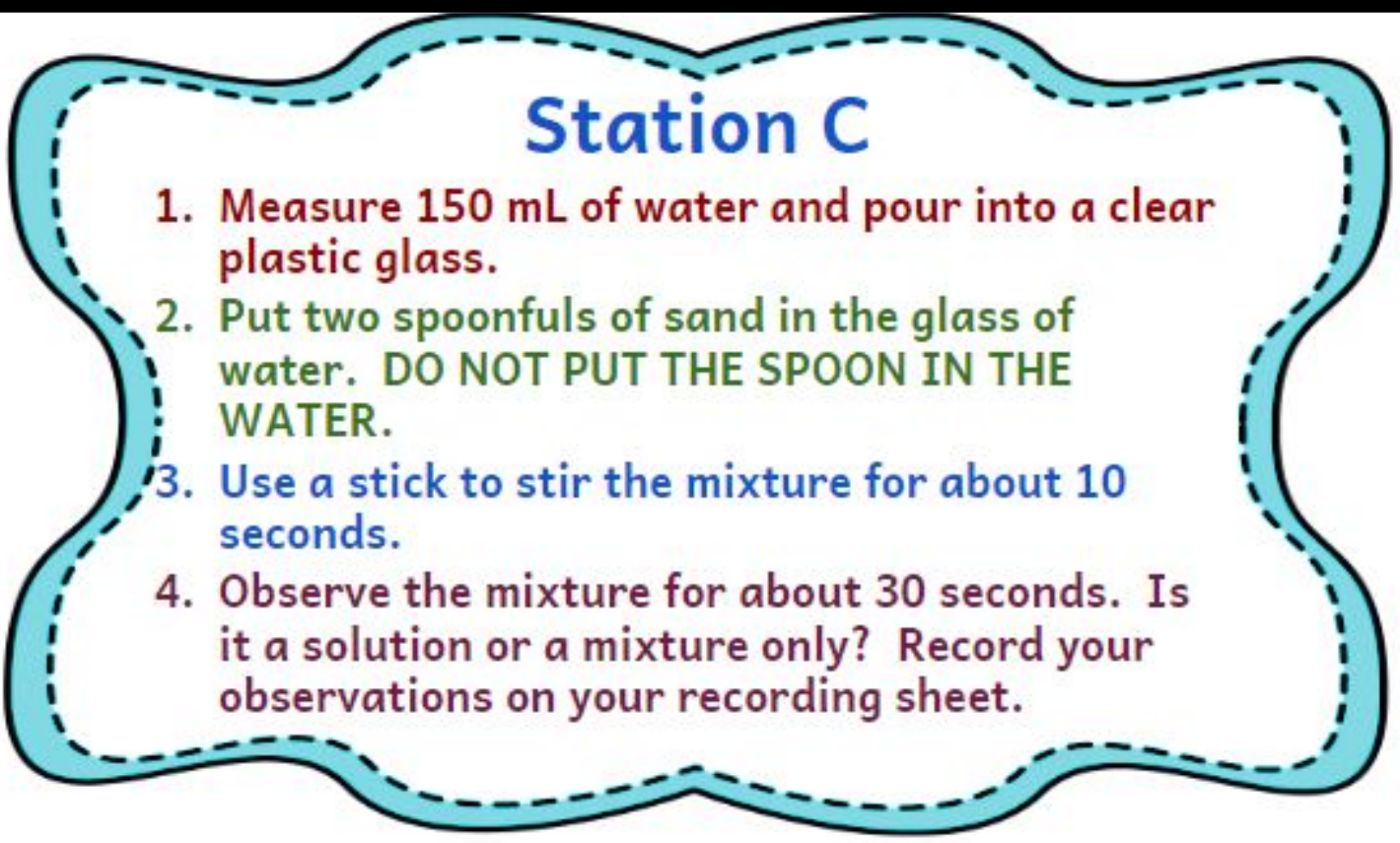
Station B

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put one spoonful of the cinnamon in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station C Table Card





Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station D Table Card

Station D

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put two spoonfuls of in stant tea in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Station D

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put two spoonfuls of in stant tea in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station E Table Card

Station E

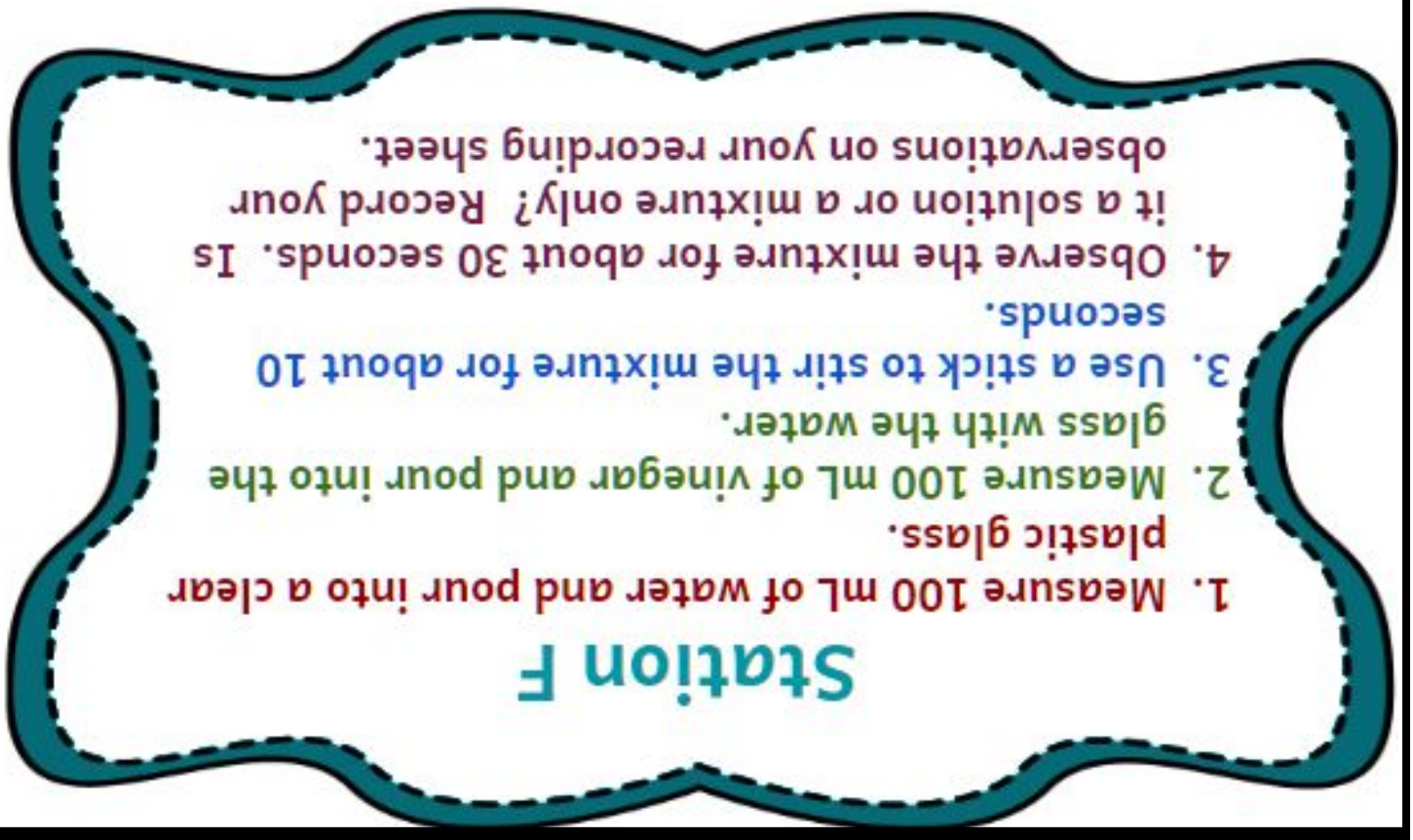
1. Measure 150 mL of sand and pour into a clear plastic glass.
2. Place 10 marbles in the glass with the sand.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

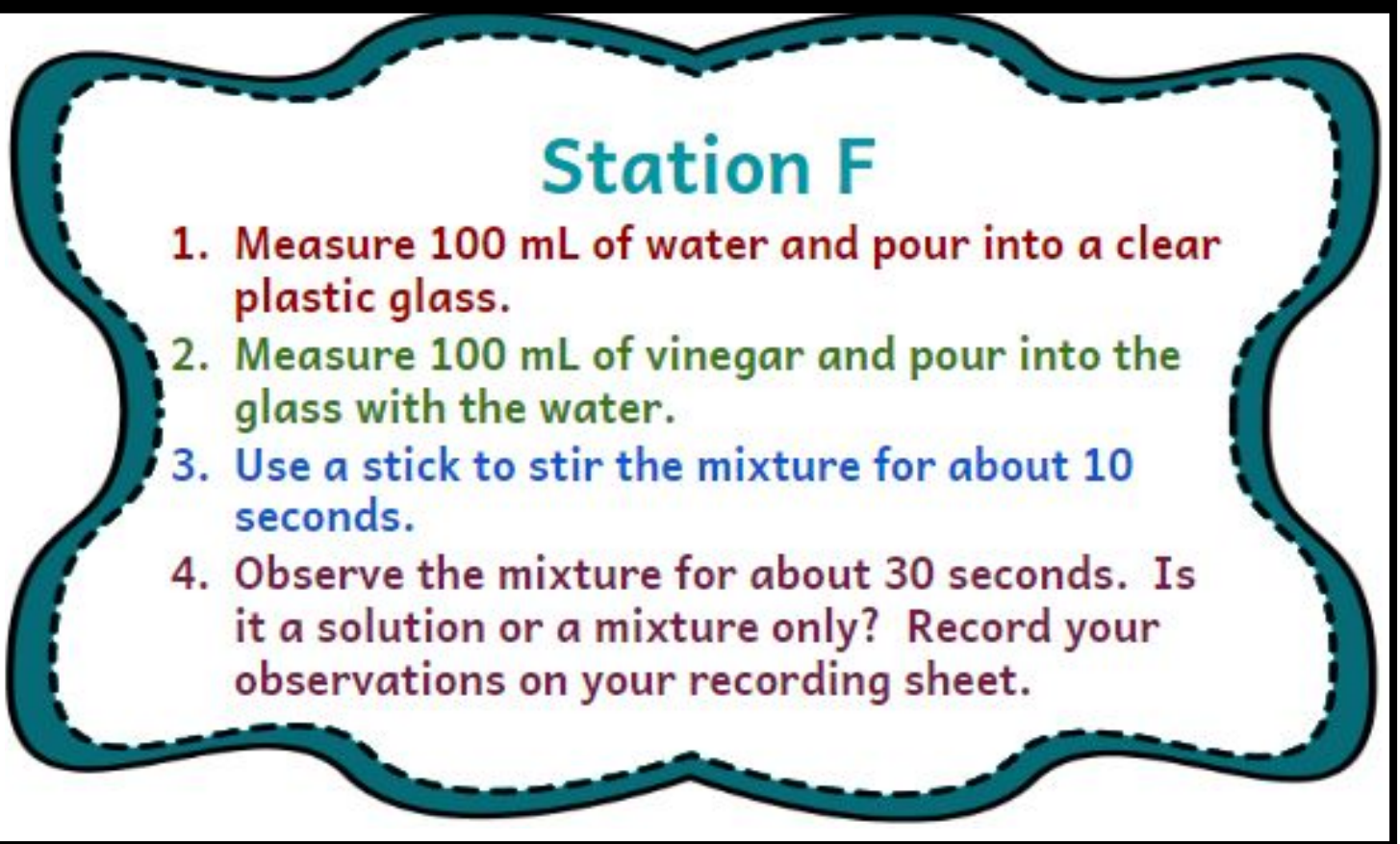
Station E

1. Measure 150 mL of sand and pour into a clear plastic glass.
2. Place 10 marbles in the glass with the sand.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station F Table Card





Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station A Table Card

Station A

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put one spoonful of the powdered drink mix in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Station A

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put one spoonful of the powdered drink mix in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station B Table Card

Station B

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put one spoonful of the cinnamon in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Station B

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put one spoonful of the cinnamon in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station C Table Card

Station C

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put two spoonfuls of sand in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Station C

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put two spoonfuls of sand in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station D Table Card

Station D

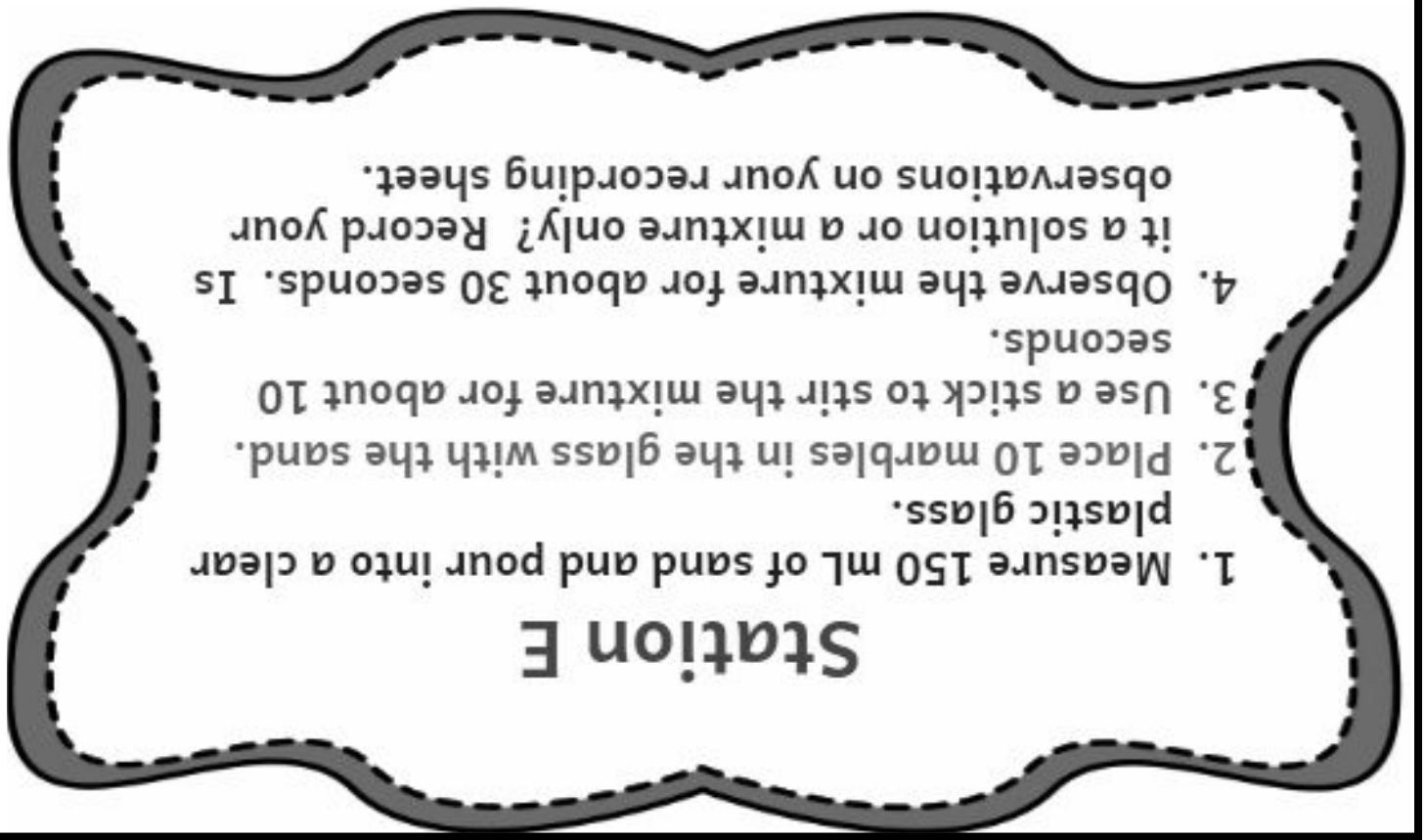
1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put two spoonfuls of in stant tea in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

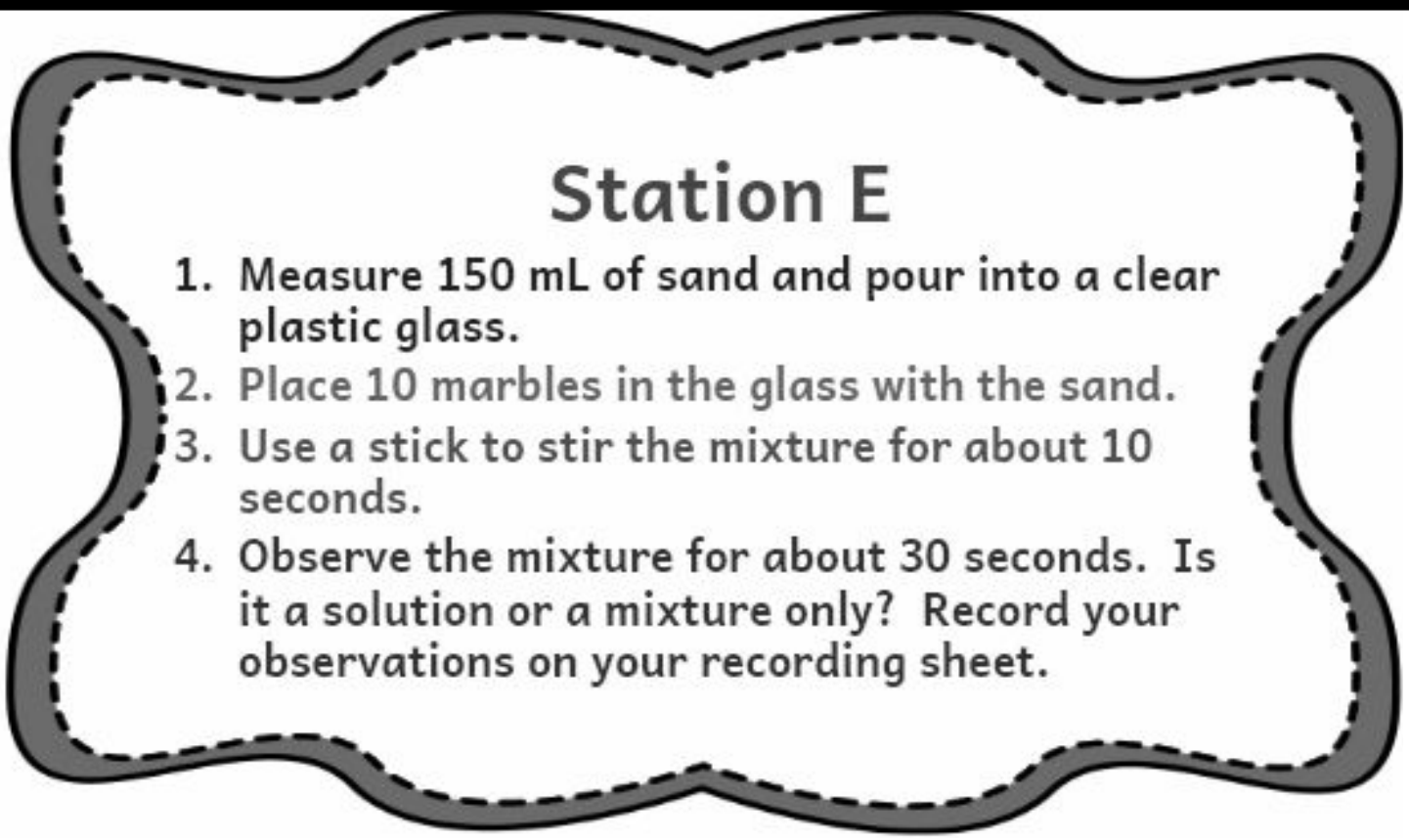
Station D

1. Measure 150 mL of water and pour into a clear plastic glass.
2. Put two spoonfuls of in stant tea in the glass of water. DO NOT PUT THE SPOON IN THE WATER.
3. Use a stick to stir the mixture for about 10 seconds.
4. Observe the mixture for about 30 seconds. Is it a solution or a mixture only? Record your observations on your recording sheet.

Magical Mixtures & Sweet Solutions

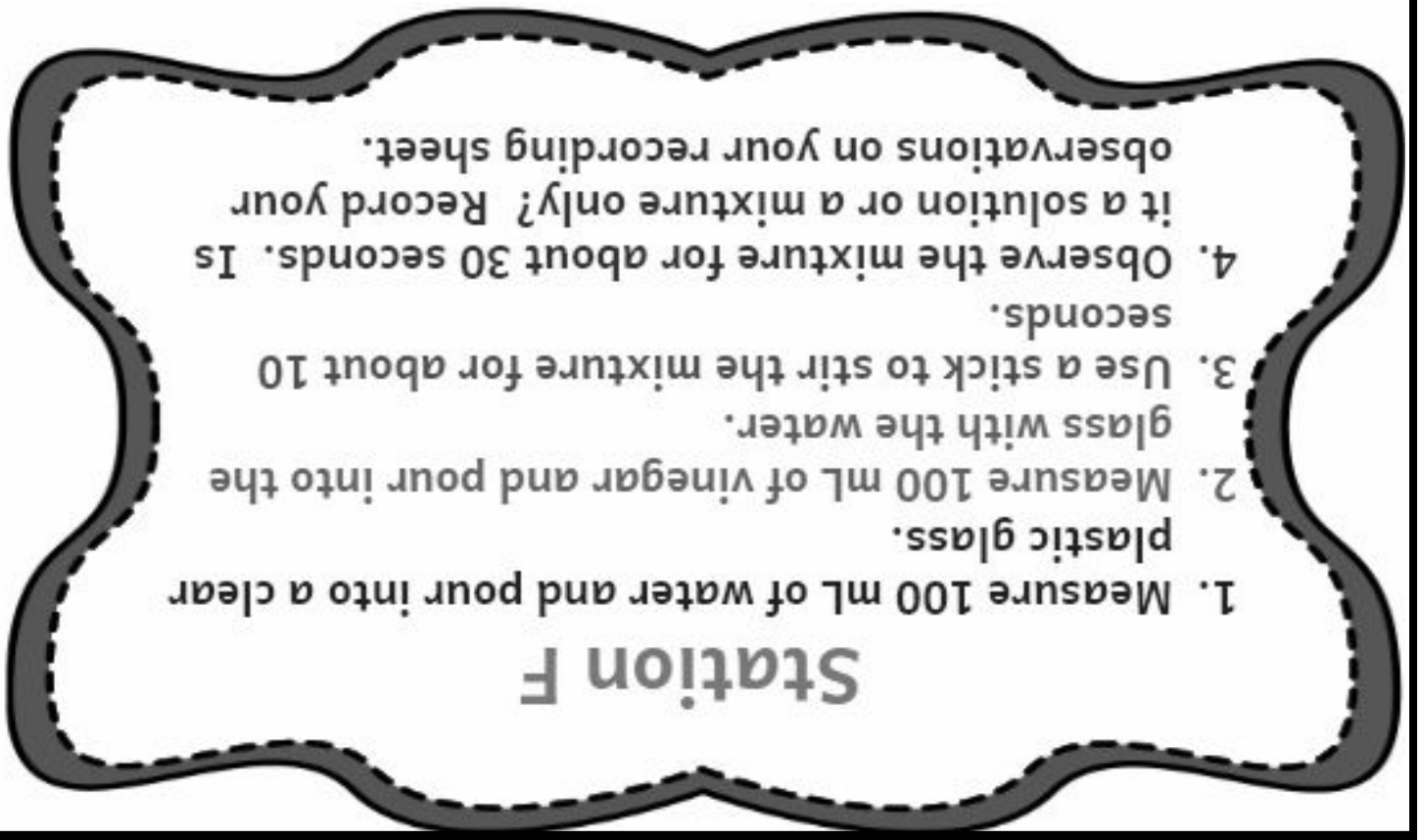
Explore Lab #2: Defining Dissolving, Station E Table Card

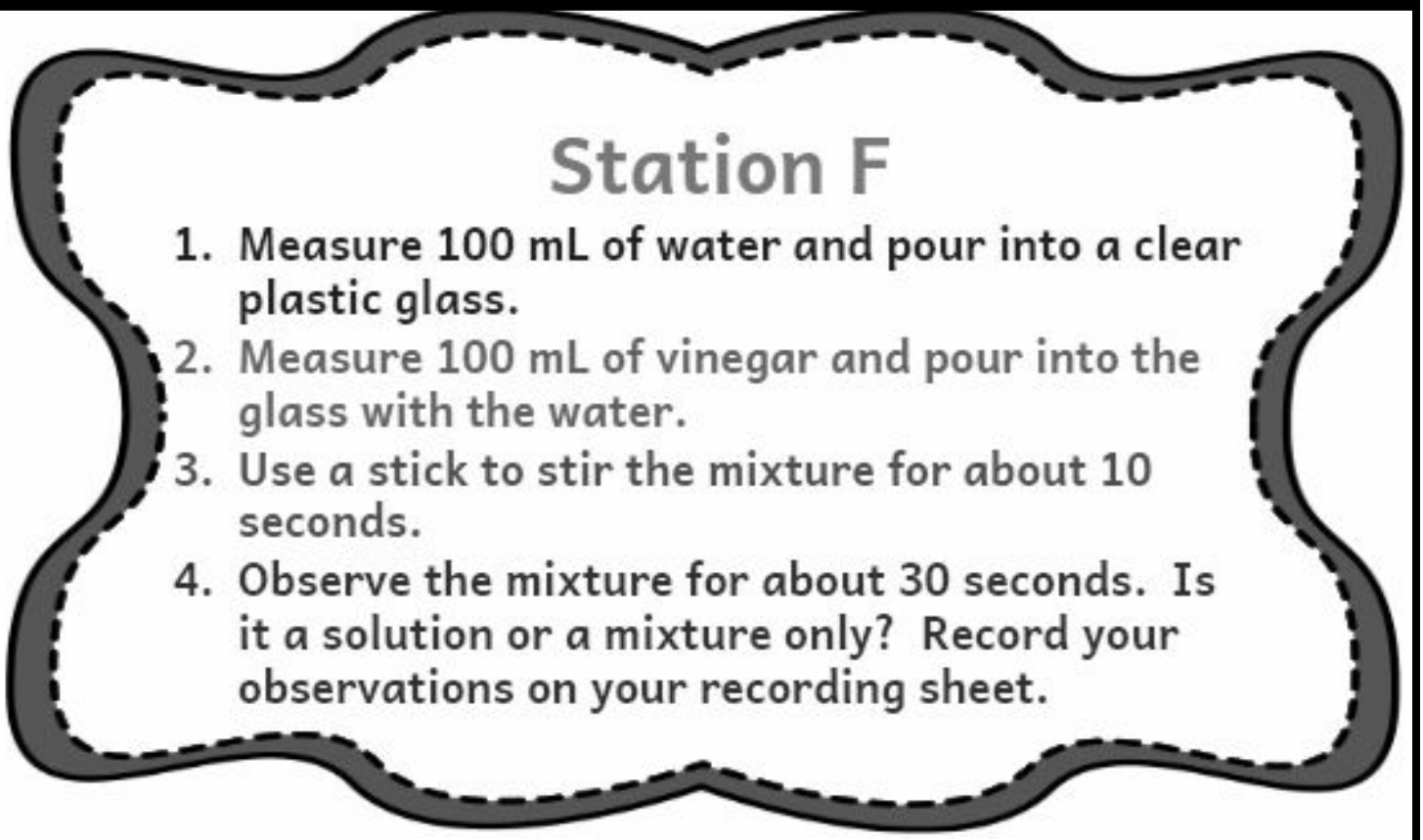




Magical Mixtures & Sweet Solutions

Explore Lab #2: Defining Dissolving, Station F Table Card





Magical Mixtures & Sweet Solutions

Name: _____

Explore Lab #2: Defining Dissolving, Recording Sheet

Directions: As you mix the substances at each station, make observations of the contents of the glasses. Decide whether the substances form a mixture, a solution, or both. Put a check mark in the correct box. Explain the reason(s) for your decision.

Substances	Mixture (✔)	Solution (✔)	Reason
Station A Water Powdered drink mix			
Station B Water Cinnamon			
Station C Water Sand			
Station D Water Instant tea			
Station E Marbles Sand			
Station F Water Vinegar			

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Explore Lab #3: Conserving Matter in Solutions Procedures

Part 1: Is matter conserved when a solid and a liquid form a solution?

1. In this part of the investigation, you will be finding the mass of salt and water by themselves. Then you will determine the mass of the solution that forms when the salt and the water are mixed.
2. Find the mass of an empty beaker and record it on your data sheet.
3. Use the graduated cylinder to measure 10 mL of salt. Pour the salt into the empty beaker. What is the mass of the beaker and the salt? (Record this measurement on your data sheet.)
4. Record the mass of the salt on your data sheet. (HINT: Subtract the mass of the beaker from the total mass.)
5. Find the mass of the graduated cylinder and record it on your data sheet.
6. Measure 200 mL of water in the second beaker and find the total mass of the water and the beaker. (Record!)
7. Record the mass of the water on your data sheet. (HINT: Subtract!)
8. Pour the water into the beaker of salt. Stir for 10-15 seconds.
9. Find and record the total mass of the salt/water solution and the beaker. Then, calculate the mass of the solution by itself.

Part 2: Is matter conserved when two liquids form a solution?

10. In this part of the investigation, you will be combining 100 mL of water with 100 mL of milk. You will then combine the volume of the milk/water solution to the volumes of each substance before they were mixed.
11. Measure 100 mL of water in a beaker. Record on your data sheet.
12. Use a graduated cylinder to measure 100 mL of milk.
13. Determine and record the volume of the milk/water solution.
14. Answer the questions on your data sheet.

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Explore Lab #3: Conserving Matter in Solutions

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1. Mass of the beaker by itself 106 g

   Mass of the beaker with 10 mL of salt 118 g

   Mass of the salt by itself 12 g

   Mass of the empty beaker 106 g

   Mass of the beaker with water 306 g

   Mass of the water by itself 200 g

   Mass of the beaker with water and salt 318 g

   Mass of the water and salt 212 g

2. How does the mass of the salt water solution compare to the combined masses of the water and salt that were mixed together? Explain.

3. Volume of water in the beaker _____

   Volume of milk in the graduated cylinder _____

   Volume of the milk/water solution _____

4. How does the volume of the solution in the beaker compare to the combined volumes of the water and milk that was added to it? Explain.

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Explore Lab #3: Conserving Matter in Solutions

1. Mass of the beaker by itself _____

   Mass of the beaker with 10 mL of salt _____

   Mass of the salt by itself _____

   Mass of the empty beaker _____

   Mass of the beaker with water _____

   Mass of the water by itself _____

   Mass of the beaker with water and salt _____

   Mass of the water and salt _____

2. How does the mass of the salt water solution compare to the combined masses of the water and salt that were mixed together? Explain.

   _____

   _____

   _____

3. Volume of water in the beaker _____

   Volume of milk in the graduated cylinder _____

   Volume of the milk/water solution _____

4. How does the volume of the solution in the beaker compare to the combined volumes of the water and milk that was added to it? Explain.

   _____

   _____

   _____

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Evaluation

1. A student is performing an experiment. He adds 0.25 grams of powdered drink mix to 5 grams of water and stirs to make a solution. What will be the mass of the water/powdered drink mix solution?

   A 4.75 grams

   B 5.00 grams

   C 5.25 grams

   D 525 grams

2. A student mixes 5 mL each of salt, sand, and iron filings in a paper cup. Which statement best describes what happens to the three substances after they are mixed together?

   F The substances keep their own physical properties.

   G The substances combine to form a solution.

   H Some of the substances dissolve in a glass of water.

   J Each of the three substances are attracted to a magnet.

3. Which of the following are examples of mixtures that are also solutions? Mark all the answers that apply.

   A Salt and pepper

   B Hot coffee

   C Air

   D Popcorn

   E Soda (Dr. Pepper™, Coca-Cola™, etc.)

   F Soil

   G Chocolate milk

4. Which of the following is true about a solution?

   F One substance dissolves in another.

   G The substances in a solution are easy to separate.

   H It is always possible to see every substance in a solution.

   J Combining substances to form a solution causes a change in state.

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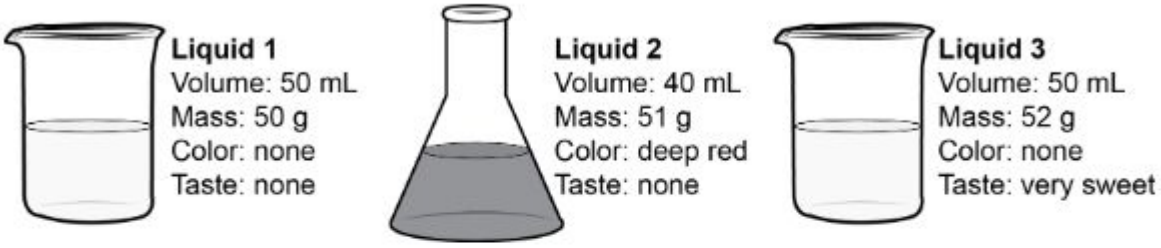
Evaluation

5. The illustration shows the properties of three different liquids.



Students mix the liquids together to form a solution. Which of the following will most likely be properties of the solution? (Mark two answers.)

A A volume of 150 mL

B A mass of 153 grams

C A sweet taste

D A deep blue color

6. Some students were given five different mixtures to separate. What method can student BEST use to separate each mixture into two parts? Write one term on the blank to tell which separation method the student should use. (Each term may be used more than one time.)

Separation Method		
Hand sorting	Magnetism	Filtering

Sand and water _____

Pebbles and glass marbles _____

Ground pepper and milk _____

Iron filings and sand _____

Red grapes and green grapes _____

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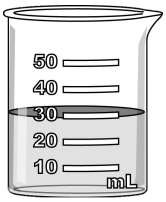
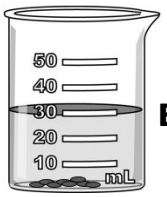
Evaluation

7. A student measured 30 mL of water into Beaker A and 30 mL of water into Beaker B. He stirred 5 mL of sugar into Beaker and 5 mL of rice into Beaker B. Then he let the beakers sit on the counter for two hours. The picture shows both beakers after two hours.

Beaker A





Beaker B

Which statement best describes the contents of the two beakers?

A Both beakers contain solutions.

B Neither beaker contains a solution.

C Beaker A contains a mixture, but Beaker B contains a solution.

D Beaker A contains a solution, but Beaker B contains a mixture.

8. A teacher washed some strawberries and put them in a container. Then, she sprinkled the strawberries with sugar, covered the container and put them in the refrigerator. After an hour, the teacher noticed that the strawberries had not changed in appearance, but the sugar seemed to disappear. What most likely happened to the sugar in this mixture?

A The cold air in the refrigerator caused the sugar to evaporate.

B Since the sugar was denser than the strawberries, it sank to the bottom.

C The sugar dissolved in the moisture on the strawberries.

D The thermal energy in the refrigerator caused the sugar to melt.

9. A student added 10 g of salt and 10 g of sand to a jar of water. She put the lid on the jar and shook the mixture for about a minute. Then she set the jar on the table for five minutes. What should the student expect to see after five minutes?

A The sand settled to the bottom, and the salt dissolved in the water.

B The salt settled to the bottom, and the sand dissolved in the water.

C The salt and the sand both sank to the bottom of the jar.

D The salt and the sand both dissolved in the jar of water.

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Evaluation

10. Some science students filled four beakers with equal amounts of lemon juice. The students then added a different substance to each beaker and recorded their observations in the table below.

Substance	Observed Results
Baking soda	Creates a lot of bubbles
Sugar	Seems to disappear
Cinnamon	Floats on top of the lemon juice
Sand	Sinks to the bottom of the beaker

What substance dissolved in the lemon juice?

F Baking soda

G Sugar

H Cinnamon

J Sand

11. A student added 10 grams of salt to a beaker filled with 400 mL of warm water. She stirs the mixture to make a salt water solution. What change most likely occurs to the salt when it is added to the water?

A The salt breaks down to form a new substance in the solution.

B The salt changes the water into a new substance in the solution

C The salt floats on the surface of the water in the solution.

D The salt completely dissolves in the solution.

12. Which physical property of water will change when it is mixed with powdered lemonade mix?

F Its physical state

G Its color

H Its magnetic attraction

J Its temperature