Pre/Post Assessment
Mixtures and Solutions

Mixtures and Solution
Name: ______________________

1. When a _____________________ forms after two or more materials are mixed, a chemical reaction has occurred.

2. Adam's friend gave him a cup filled with a water solution. Adam did not know what solid material was used to make the solution. He evaporated the water and found crystals in the dish after all of the water was gone.

How will the crystals help him decide what solid material was used to make the solution?

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

3. When you mix two clear liquids, what kinds of observations would tell you that a chemical reaction occurred? Mark an x next to each statement that indicates a chemical reaction has occurred.

_____ A gas is produced.
_____ The solid dissolves.
_____ A precipitate forms.
_____ You can see through the mixture.

3. Which of the following is an example of a chemical reaction?

a. Water boiling
b. A candle burning
c. Wax melting
d. Bubbles escaping from soda
4. A solution is a type of mixture.
   
   a. How is a solution different from other mixtures?
      
      __________________________________________________________
      __________________________________________________________
      __________________________________________________________

   b. Give two examples of solutions.
      
      __________________________________________________________
      __________________________________________________________
      __________________________________________________________

5. Gerry used a screen to separate a mixture of gravel, sand and water.

   Think about the particle size and answer the question: Why did the sand go through the filter, but the gravel didn’t?
   
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

6. Which of the following statements about mixtures and solutions is correct?

   a. All solutions are mixtures, but not all mixtures are solutions.
   b. Some mixtures are solutions, and some solutions are mixtures.
   c. All mixtures are solutions, but not all solutions are mixtures.
   d. All mixtures are solutions, and all solutions are mixtures.
7. A solid dissolved in water can be separated from the water by

a. precipitation  
b. evaporation  
c. filtration  
d. weighing

8. All of the following would be helpful in separating a mixture of sand and salt except

a. A magnet  
b. A glass cup  
c. A filter paper and funnel  
d. Water

9. A student uses a knife to cut a stick of butter on a dish into smaller pieces. The student weighs the dish, knife, wrapper, and butter before and after cutting the butter into pieces.

![Before cutting](image1.png) ![After cutting](image2.png)

Will the dish, knife, wrapper, and butter weigh more, less, or the same when the butter is in small pieces and why?

a. They will weigh more because there are more pieces of butter.  
b. They will weigh less because the butter is in smaller pieces.  
c. They will weigh less because some of the butter disappears when it is cut.  
d. They will weigh the same because the amount of butter has not changed.
10. If a student dissolves 50 grams of sugar in water and then lets the water evaporate, how much sugar will be left?

a. 45 grams because some of the sugar gets destroyed  
b. 65 grams because the sugar crystals are larger  
c. 50 grams because the mass of the sugar stays the same
<table>
<thead>
<tr>
<th></th>
<th>K</th>
<th>W</th>
<th>H</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>K</strong></td>
<td>What do we know about mixtures of solids and liquids?</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td><strong>W</strong></td>
<td>What do we want to know about mixtures of solids and liquids?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>H</strong></td>
<td>How would you propose we investigate your idea?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>What have we learned?</td>
<td></td>
<td></td>
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</tbody>
</table>
Comparing and Contrasting Solids - Venn Diagram

Salt

Gravel

Powder

Comparing and Contrasting Solids - Venn Diagram

Salt

Gravel

Powder
Prediction about What Will Happen If We Add Water to Each Material

Gravel
I think ____________________________

__________________________________

__________________________________

because ___________________________

__________________________________

__________________________________.

Prediction about What Will Happen If We Add Water to Each Material Continued

Powder
I think ____________________________

__________________________________

__________________________________

because ___________________________

__________________________________

__________________________________.

1.3.b
Prediction about What Will Happen If We Add Water to Each Material Continued

Salt

I think ________________________________

__________________________________________________________________

__________________________________________________________________

because______________________________

__________________________________________________________________

__________________________________________________________________

. 
Observations of What Happened When We Added Water to Each Material

<table>
<thead>
<tr>
<th>Material</th>
<th>Gravel and Water</th>
<th>Powder and Water</th>
<th>Salt and Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel and Water</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
### Predictions of Which Mixtures Can Be Separated with a Screen and a Filter

<table>
<thead>
<tr>
<th></th>
<th>Do you predict that this mixture can be separated with a screen?</th>
<th>Do you predict that this mixture can be separated with a filter?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel &amp; Water</td>
<td>Yes/No Why:</td>
<td>Yes/No Why:</td>
</tr>
<tr>
<td>Powder &amp; Water</td>
<td>Yes/No Why:</td>
<td>Yes/No Why:</td>
</tr>
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</tr>
</tbody>
</table>
Observations of Which Mixtures Can Be Separated with a Screen and a Filter

<table>
<thead>
<tr>
<th></th>
<th>Was this mixture separated with a screen?</th>
<th>Was this mixture separated with a filter?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel &amp; Water</td>
<td>Yes/No</td>
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</tbody>
</table>
# Observations of Which Mixtures Can Be Separated Class Data Table

<table>
<thead>
<tr>
<th></th>
<th>Was this mixture separated with a screen?</th>
<th>Was this mixture separated with a filter?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gravel &amp; Water</strong></td>
<td>Group 1:Yes/No</td>
<td>Group 1:Yes/No</td>
</tr>
<tr>
<td></td>
<td>Group 2:Yes/No</td>
<td>Group 2:Yes/No</td>
</tr>
<tr>
<td></td>
<td>Group 3:Yes/No</td>
<td>Group 3:Yes/No</td>
</tr>
<tr>
<td></td>
<td>Group 4:Yes/No</td>
<td>Group 4:Yes/No</td>
</tr>
<tr>
<td></td>
<td>Group 5:Yes/No</td>
<td>Group 5:Yes/No</td>
</tr>
<tr>
<td><strong>Powder &amp; Water</strong></td>
<td>Group 1:Yes/No</td>
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</tr>
<tr>
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<td></td>
<td>Group 5:Yes/No</td>
<td>Group 5:Yes/No</td>
</tr>
</tbody>
</table>
Observations of Evaporated Salt and Water Solution

Draw what you observe in your evaporating dish.

Answer the following questions:

What happened when the saltwater solution evaporated?

What is the material in the dish?

What happened to the water that was in the mixture?

How does the salt look compared to the way it looked originally?
## Properties and Separating Mixtures

<table>
<thead>
<tr>
<th>Substance</th>
<th>Properties</th>
<th>How it can be separated from a mixture with water</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Particle size</td>
<td>Dissolves in water?</td>
</tr>
<tr>
<td>Gravel</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Salt</td>
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</tr>
<tr>
<td>Salt</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Making a Dry Mixture

1. Get one of the empty cups. Label the cup “dry mixture”

2. Put one 5-ml spoon of each of the three dry materials in the cup:
   a. gravel
   b. powder
   c. salt.

3. Stir the dry mixture
<table>
<thead>
<tr>
<th>Substance</th>
<th>Particle size</th>
<th>Dissolves in water</th>
<th>Attracted to magnet</th>
<th>Floats in water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron filings</td>
<td>small</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Sawdust</td>
<td>small</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Sugar</td>
<td>small</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Plastic beads</td>
<td>large</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
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**Substance**

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Predictions of How the Mass of Each Substance in a Mixture Will Compare Before We Mix Them and After We Separate Them

<table>
<thead>
<tr>
<th>Substance</th>
<th>Mass added to mixture at beginning</th>
<th>Predicted mass of substance after being separated</th>
<th>Why:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel</td>
<td>Mass ______</td>
<td>Predicted mass ______</td>
<td>Why:</td>
</tr>
<tr>
<td>Powder</td>
<td>Mass ______</td>
<td>Predicted mass ______</td>
<td>Why:</td>
</tr>
<tr>
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<td>Predicted mass ______</td>
<td>Why:</td>
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<td>Predicted mass ______</td>
<td>Why:</td>
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<td>Powder</td>
<td>Mass ______</td>
<td>Predicted mass ______</td>
<td>Why:</td>
</tr>
<tr>
<td>Salt</td>
<td>Mass ______</td>
<td>Predicted mass ______</td>
<td>Why:</td>
</tr>
</tbody>
</table>
## Data Table: Mass of Each Substance in a Mixture Before We Mixed Them and After We Separated Them

<table>
<thead>
<tr>
<th>Substance</th>
<th>Mass added to mixture at beginning</th>
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<th>Observed mass after separation</th>
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</tr>
<tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
**Class Data Table**

Mass of substances added to the mixture in the beginning = 20 g

<table>
<thead>
<tr>
<th>Group</th>
<th>Gravel</th>
<th>Powder</th>
<th>Salt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Group 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average = = = =

Estimated Error = = = =

Mass gravel before mixing – Ave. mass gravel after separation =

\[ \text{Mass gravel before mixing} - \text{Ave. mass gravel after separation} = \]

Mass powder before mixing – Ave. mass powder after separation =

\[ \text{Mass powder before mixing} - \text{Ave. mass powder after separation} = \]

Mass salt before mixing – Ave. mass salt after separation =

\[ \text{Mass salt before mixing} - \text{Ave. mass salt after separation} = \]
Cookie Crumbles

Imagine that you have a whole cookie in front of you. You break the cookie into small pieces and crumbs. You measure the mass of all the pieces and crumbs. How do you think the mass of the whole cookie compares to the total mass of all the pieces and crumbs? Circle the best answer.

A. The whole cookie has a mass more than all the cookie crumbs.

B. All the cookie crumbs have more mass than the whole cookie.

C. The mass of the whole cookie and the mass of all the cookie crumbs is the same.

Provide an explanation for your answer. Use scientific vocabulary to support your answer.
Conservation of Mass Reflection

A fifth grade class decided to dissolve some salt in 50 ml water inside a clear two liter bottle. They closed the lid on the bottle tightly and measured its mass. The mass of the bottle, lid and salt and water solution was 190 grams. They placed the sealed bottle in the sun. A few hours later, there were some dry crystals on the bottom of the bottle, but the students could not see any water.

What do you think happened to the water?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Conservation of Mass Reflection Continued

What do you think the mass of the sealed bottle would be when they made this observation?

________________________________________________________________________

Explain your reasoning.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
<table>
<thead>
<tr>
<th>Chemical Mixture</th>
<th>Soluble</th>
<th>Not Soluble</th>
<th>Other Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baking Soda</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium Chloride</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citric Acid</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

Draw your observations and describe what you see.
Cup 1: 1 spoon calcium chloride, 1 spoon baking soda, 50 mL water

[Diagram of a cup]

Did Cup 1 create fizz? __________________________

What do you think fizz is? ______________________

Fizz Quiz Observations Continued

Draw your observations and describe what you see.
Cup 2: 1 spoon calcium chloride, 1 spoon citric acid, 50 mL water

[Diagram of a cup]

Did Cup 2 create fizz? __________________________

What do you think fizz is? ______________________
Fizz Quiz Observations Continued

Draw your observations and describe what you see.

**Cup 3**: 1 spoon baking soda, 1 spoon citric acid, 50 mL water

Did Cup 3 create fizz? ______________________

What do you think fizz is? __________________
<table>
<thead>
<tr>
<th>Claims</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>I claim that ....</td>
<td>I claim this because...</td>
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</table>
Fizz Quiz Reflection

1. How do you know when a solution occurs when you mix a chemical and water?
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

2. How do you know when a chemical reaction occurs?
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

3. Describe the differences between dissolving and a chemical reaction.
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

Fizz Quiz Reflection

1. How do you know when a solution occurs when you mix a chemical and water?
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

2. How do you know when a chemical reaction occurs?
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

3. Describe the differences between dissolving and a chemical reaction.
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
Review Chemical Reactions

Taren wrote in his science notebook:

*After I mixed the sodium chloride and 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 chemical reaction took place.*

Julie wrote in her science notebook:

*After I mixed the calcium chloride and baking soda and citric acid together in water, it dissolved.*

Review Chemical Reactions Continued

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

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

2. How can you change the observation to make it better?

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
Visual Representation of Filtering and Evaporating Cup 1 Contents
Draw and label chemicals and materials.

Explain how you filtered and evaporated the contents of cup 1.

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
Fizz Quiz Evaporation Observations

Draw the crystals below.

1. Where have you seen similar crystals before?
   ____________________________________________

2. Where did the crystals come from? How did the crystals get into the cup?
   ____________________________________________
   ____________________________________________
   ____________________________________________

Fizz Quiz Evaporation Observations

Draw the crystals below.

1. Where have you seen similar crystals before?
   ____________________________________________

2. Where did the crystals come from? How did the crystals get into the cup?
   ____________________________________________
   ____________________________________________
   ____________________________________________
Fizz Quiz Reflection

1. Write a complete list of all the chemicals that went into the chemical reaction in cup 1.

________________________________________________

________________________________________________

________________________________________________

2. Write a complete list of all the chemicals that came out of the chemical reaction in cup 1.

________________________________________________

________________________________________________

________________________________________________

3. Explain how you know a chemical reaction occurred in cup 1.

________________________________________________

________________________________________________

________________________________________________
Zip Bag Data & Observations 1

a. Mass of zip bag + one level scoop of calcium chloride and one level spoon of baking soda: __________ NO AIR

b. Mass of empty syringe: __________

c. Mass of syringe with 50 mL water: __________

d. Mass of 50 mL water (c-b): __________

e. Mass of a + d before reaction: __________

f. Mass of zip bag after reaction: __________

1. Did the mass of the bag and its contents change at all during the experiment?
________________________________________________________________________

2. What happened to the bag?
________________________________________________________________________

3. Describe what happened to the chemicals in the bag.
________________________________________________________________________
________________________________________________________________________

Zip Bag Data & Observations 1 Continued

5. Where did the gas come from?
________________________________________________________________________

6. Why did we use a bag instead of a cup?
________________________________________________________________________
________________________________________________________________________

Write and draw observations of the bag below. Label your drawing.
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

________________________________________________________________________
Zip Bag Data & Observations 2

a. Mass of zip bag + one level scoop of citric acid and one level spoon of baking soda: ________ NO AIR

b. Mass of empty syringe: ________

c. Mass of syringe with 50 mL water: ________

d. Mass of 50 mL water (c-b): ________

e. Mass of a + d before reaction: ________

f. Mass of zip bag after reaction: ________

1. Did the mass of the bag and its contents change at all during the experiment?

_____________________________________________________________________________

2. What happened to the bag?

_____________________________________________________________________________

3. Describe what happened to the chemicals in the bag.

_____________________________________________________________________________

Zip Bag Data & Observations 2 Continued

5. Where did the gas come from?

_____________________________________________________________________________

6. Why did we use a bag instead of a cup?

_____________________________________________________________________________

Write and draw observations of the bag below. Label your drawing.
3 Chemicals Zip Bag Observation
Draw below what you see in the bag after 5 minutes.

Draw below what you see in the bag after 30 minutes.

Draw below what you see in the bag after 60 minutes.

Is a chemical reaction taking place within the bag? ______

How do you know? ________________________________

_______________________________

_______________________________

What do you think is in the bag after 60 minutes?

_______________________________

_______________________________
1. Describe what you see in the cup.
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

2. How do you know a chemical reaction is taking place?
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

1. Describe what you see in the cup.
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

2. How do you know a chemical reaction is taking place?
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
3 Chemical Bag Precipitate + Vinegar Observation
Draw below what you see in the bag.

1. Describe what you see in the bag.
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

2. How do you know a chemical reaction is taking place?
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
**Chemical Reaction Reflection**

Some students decided to mix together iron filings, sugar and water. They used filter paper to remove the iron filings from the water. Then they set the filter paper and iron filings aside to dry. Then they put the sugar and water solution in an evaporating dish. After several days, they observed the following.

- The water in the evaporating dish had evaporated, and there were white crystals in the dish.
- On the filter paper, instead of black iron filings, there was some brownish-orange powder. They tested the brownish-orange powder with a magnet, and it did not stick to the magnet.

**Chemical Reaction Reflection Continued**

Did a chemical reaction occur?

_________________________________

Justify your answer with evidence.

_________________________________

_________________________________

_________________________________

_________________________________

_________________________________

**Fill in the table below.**

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<tr>
<th>Starting Substances</th>
<th>Properties</th>
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