



Matter and Its Interactions Lesson 1: The Solve Student Guide

I. Warm-Up Vocabulary Mind Map

1. Using the materials at your table, cut out your vocabulary cards along the **solid lines**. Note: Do not cut the cards at the dotted lines.

2. Fold the cards at the dotted lines.

3. Write the definition of the term on the inside of the card using the definitions below.

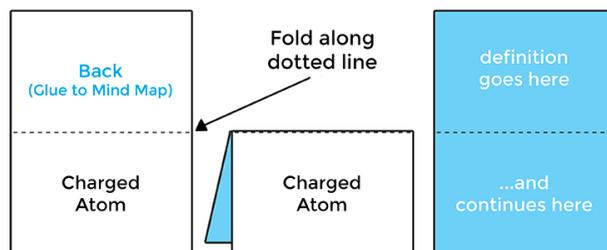
4. Use the clues from the Mind Map images, definitions, and vocabulary terms to place the cards in the correct location on the Mind Map, explaining your thinking to group members as you go.

5. When you're ready to glue or tape, raise your hand so you can check your Mind Map with your teacher.

6. Use glue or double-sided tape to connect the back of the vocabulary card to the correct place on the Mind Map.

7. Use your completed Mind Map to discuss these questions with your group:

- What did Felix and JoJo each think about Ralf and Ralf Snax?
- What kind of chemical change did Felix and JoJo see after Ralf ate his Snax?
- Connect the chemical change you witness in *The Solve* to other chemical changes you have seen before. Give evidence for your examples!





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I. Mind Map

A smaller component that makes up matter

Anything that has mass and takes up space is called

Color or hardness is an example of a

Bubbling or fizzing is an example of a

Salt water is an example of a

Investigation #1

Investigation #2

Investigation #3

BEFORE

AFTER

Baking Soda

Vinegar

Hold balloon up and allow the baking soda to drop into the vinegar inside of the container

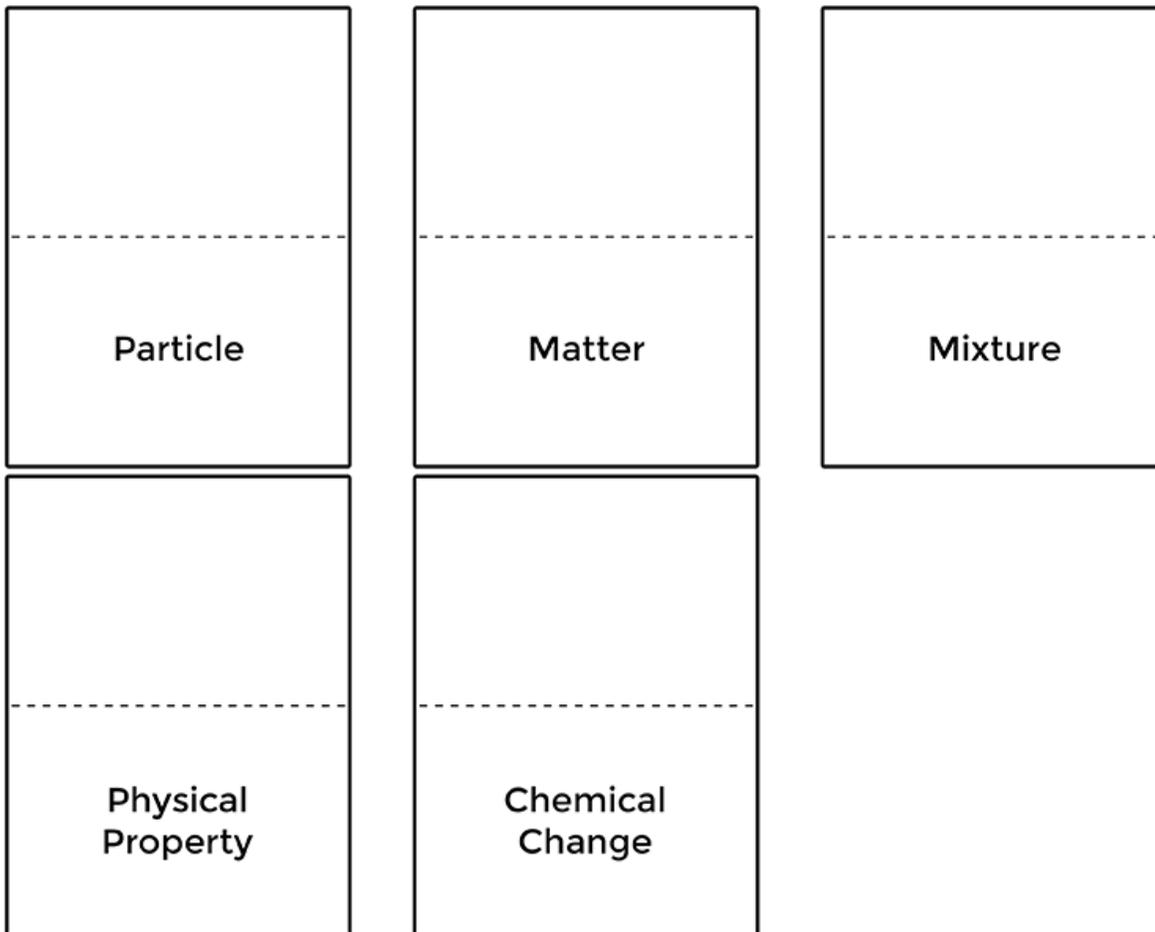
Gas

Fizzing

Bubbling

Salt

Water with Salt



Vocabulary

- Chemical Change: A usually irreversible change involving a change in chemical properties, resulting in the formation of a new substance.
- Physical Property: Any characteristic or quality that is measurable and describes how something is or looks.
- Matter: Anything that has mass and takes up space; matter is made up of smaller particles.
- Particle: A smaller component that makes up matter.
- Mixture: Something made by combining two or more materials (reversible and does not result in a new substance).



II. Watch The Jojo and Felix Mystery

Either on your own, in a small group, or as a class (your teacher will let you know), read or watch Felix and JoJo's mystery on Matter and Its Interactions. Then, fill out the questions below. Include a page number in your answer as evidence of where you found your answer.

Name: _____

Date: _____

Episode Questions

1. What is the initial problem that Felix and JoJo are trying to solve?
2. What is the claim about Ralf?
3. Explain how Felix and JoJo tried to observe physical properties to determine what Ralf Snax was.
4. Why does Felix win Round 1?
5. JoJo thinks that Ralf is making something completely new out of the ingredients in Ralf Snax. Explain how this is related to the Mosa Mack files about un-making breakfast.
6. What did Felix and JoJo figure out?



III. Demonstration: Conservation of Mass in Matter

View the video of the investigation [here](#) if completing this remotely.

The scientists at NASA have discovered a notebook with instructions to create a new substance. It seems that they are making an interesting claim about mass before and after combining the materials. The scientists claim that when substances are combined, the total mass will stay the same. They have asked you to follow the directions and write your observations about what happens!

Directions

1. Read the instructions below.
2. Write your claim based on the instructions.
3. Follow the instructions.
4. Write your evidence and reasoning after following the instructions.
5. Answer the discussion questions in your group.

Let's Investigate:

1.	Measure out 50mL of water and pour into a beaker or cup.
2.	Find the mass of the 50mL of water in the beaker, the alka seltzer tablet and the ziplock plastic bag and record in the table. (mass in grams)
3.	Without spilling the water, place the beaker into the ziplock bag and place the tablet into the bag without getting it wet. Place the tablet as far away from the beaker as you can.
4.	Push the remaining air out of the ziplock and seal the bag.
5.	With the bag closed, carefully move the alka seltzer tablet into the beaker of water. Observe for 90 seconds. While still in the bag, tap the beaker a few times.
6.	After the reaction stops, weigh the bag and beaker again. Record in table.



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Table 1: Mass **Before** Experiment

Item	Mass (in grams) Trial 1	Mass (in grams) Trial 2	Mass (in grams) Trial 1
Water in Beaker			
1 Alka-Seltzer Tablet			
Ziploc Bag			
Total Mass			

Table 2: Mass **After** Experiment

Item	Mass (in grams) Trial 1	Mass (in grams) Trial 2	Mass (in grams) Trial 3
Total Mass			

Observations

<p>Claim: An assertion; a statement believed to be true.</p> <p><i>Make a claim about the mass of the items in this activity before and after combining them.</i></p>	
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<p>Evidence: Scientific data used to support the claim.</p> <p><i>What evidence was presented in the activity to support the claim?</i></p>	
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<p>Reasoning: Connects the evidence to the claim.</p> <p><i>How does the evidence support the claim?</i></p>	
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Discussion Questions

1. Did the mass of your items change between your two measurements (before and after the reaction)? What does that tell you about how chemical change impacts mass?
2. What are some examples where you have seen a chemical change and the mass has stayed the same?



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IV. Quiz: Check for Understanding

Complete the exit ticket below *or* you can take the quiz online!

Name: _____

Date: _____

1. A chemical change occurs when which of the following is true:
 - a. Light is reflected off the material
 - b. Bubbles or fizz occur
 - c. You can separate the materials back to their original state
 - d. A substance is dissolved in water
2. Mixing two or more substances together without producing a new substance is an example of a physical change.
 - a. True
 - b. False
3. When you combine two or more substances and something new is created that is an example of:
 - a. Physical change
 - b. Chemical change
 - c. Physical properties
 - d. Matter
4. Which of the following are examples of a physical property?
 - a. Transparency
 - b. Measurement
 - c. Electrical Conductivity
 - d. Amount
5. You separately weigh a cup of water and a pile of sugar. If you mix the sugar into the cup of water, the overall weight of the cup + water + sugar will be the same as the sum of the individual components.
 - a. True
 - b. False