



## SEE THE CHANGE USA

Physics III

Unit 3.1: Matter III

Lesson 3.1.1: Changes of Matter and the Conservation of Mass

### Station 1: Lighting a Candle

#### Materials:

- Candle
- Matches
- Matchbox
- Beaker of water

#### Instructions:

1. Light a match using the matchbox. Let the match burn for 10-15 seconds and then blow the match out.
2. Light a second match and use it to light the candle.
3. Make observations about the candle for 1 minute and then blow the candle out.
4. Dispose of all used matches by placing them in the beaker of water.

#### Questions:

1. What types of changes occurred when you lit the match and let the wood burn? Justify your answer.
2. What types of changes occurred when you lit the candle and watched the candle burn for one minute? Justify your answer.
3. What are the connections between chemical and physical changes? Use evidence from your observations to support your answer.



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### Station 2: Lava Lamp

#### Materials:

- Beaker filled with 300 mL of water
- 50 mL of vegetable oil
- 2 drops of food coloring
- 1 glow stick
- 1 Alka-Seltzer tab

#### Instructions:

1. Fill your beaker with 300 mL of water.
2. Pour 50 mL of vegetable oil into your beaker.
3. Add two drops of food coloring to the beaker.
4. Crack a glow stick and place it into the beaker.
5. Drop one Alka-Seltzer tab into the beaker.
6. Observe your lava lamp.
7. Before answering the questions, empty the contents of your lava lamp and rinse out the beaker.

#### Questions:

1. Make a list of all of the changes that occurred while building your lava lamp and observing your lava lamp.
2. Classify each of the changes as either a physical change or a chemical change. Justify your classifications for each of the changes.
3. What clues did you use to classify the physical changes in the experiment?
4. What clues did you use to classify the chemical changes in the experiment?



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### Station 3: Water

#### Materials:

- Hot plate
- Beaker
- Ice cubes

#### Instructions:

1. Put 3 ice cubes into your beaker.
2. Place your beaker on the hot plate.
3. Make observations about the water inside the beaker until the water begins boiling.

#### Questions:

1. What happened to the ice as it was heated?
2. Classify the changes you observed as physical changes or chemical changes and justify your answer.
3. Explain how the behavior of the water molecules changed as they were heated.
4. Include a picture that shows the particles of matter at each state.



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### Station 4: Baking Soda and Vinegar

#### Materials:

- Baking Soda
- Vinegar
- Beaker
- Plastic Spoon

#### Instructions:

1. Fill the beaker with 100 mL of vinegar.
2. Use the plastic spoon to scoop one tablespoon of baking soda into the beaker.
3. Observe the beaker.

#### Questions:

1. Explain your observation.
2. Classify the reaction between the baking soda and vinegar as a physical or chemical change and justify your answer.
3. Explain any other changes that occurred based on the reaction. Were these changes physical or chemical?
4. What observations and clues helped you classify the changes in the beaker?



### **Station 5: Chalk**

#### **Materials:**

- Chalk
- 2 clear plastic cups
- Beaker
- Water
- Vinegar

#### **Instructions:**

1. Crush a piece of chalk.
2. Measure out 100 mL of water using the beaker and pour the water into one of the plastic cups.
3. Sprinkle half of the chalk into the water.
4. Measure out 100 ml of vinegar using the beaker. Pour the vinegar into the second plastic cup.
5. Sprinkle the second half of the chalk into the vinegar.
6. Make observations about both of the substances in the plastic cups.

#### **Questions:**

1. Make a list of the changes to matter you saw throughout this activity.
2. Classify each change in matter as a physical change or a chemical change. Justify your answer.
3. What clues helped you differentiate between physical and chemical changes?
4. Can a chemical change occur without causing a physical change? Explain.



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### Station 6: Oobleck

#### Materials:

- Ziploc bag
- 100 mL of cornstarch
- 50 mL of water
- Beaker

#### Instructions:

1. Pour 100 mL of cornstarch into your Ziploc bag.
2. Pour 50 mL of water into your Ziploc bag.
3. Close the bag.
4. Use your hands to work the material together until all the clumps are out. If it doesn't move around the bag freely, add a little bit more water. If it moves around the bag too freely, add more cornstarch.
5. Apply pressure to the substance while inside the bag and make observations about its properties.

#### Questions:

1. What did you observe about the properties of the substance inside the bag?
2. Was creating the oobleck a physical or chemical change? Justify your answer.
3. Could you use separation techniques to separate the cornstarch and water?
4. What clues did you use to help you classify this change?