**Matter
and Its
Interactions**

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**Overarching Question:** How can we tell there is a change in properties when mixing two or more substances?



How do the properties of the substances change when mixed together?

What are some examples of physical changes?

How do you know a chemical change has occurred?



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**Overarching Question:** How can we tell there is a change in properties when mixing two or more substances?

|  |
| --- |
| **Line of Evidence – Oobleck Experiment** |
| *We completed the Oobleck Experiment and saw examples of physical changes. Physical changes we noticed were changes in color, shape, size, and texture.* |

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| **Line of Evidence – Oobleck Experiment** |
| *We did the Oobleck experiment and observed different substances changing properties when being mixed with other substances.* |

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| **Line of Evidence – Elephant Toothpaste** |
| *A chemical change occurs when two or more substances are mixed together to form something new. This happens when making Elephant Toothpaste. Two main clues that we know a chemical change occurred are: 1.The reaction caused heat to be emitted. 2. There is a formation of gas which can be seen by a fizzing or bubbling.* |

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| --- |
| **Big Aha Thesis Statement** |
| *When two or more substances are mixed together, property changes take place. In the Oobleck experiment, we noted physical changes. When making Elephant Toothpaste, we observed chemical changes like heat being emitted and the formation of a gas by bubbling.*  |

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**Engage - Matter Song**This song will review and connect the student’s prior knowledge to specific details that will be included in lessons and experiments following. As the teacher, this will motivate the students, peak their interest, as well as make connections between what they know already and think about the topic. The students will listen attentively, ask questions, and answer questions after the discussion showing their understanding.
To begin, I would play this song instructing students to listen carefully. A discussion with terms and the catchy phrases that jump out to students will take place after listening and be written on the board and in their notebooks. (Matter, solid, liquid, gas, chemical and physical changes, properties, etc).

<http://www.bing.com/videos/search?q=Have+Fun+Teaching+matter&=&view=detail&mid=0B3A69685A6D864E70CF0B3A69685A6D864E70CF&FORM=VDHSOP&fsscr=0>

Questions such as “What just happened?”, “What are other types of physical and chemical changes you know of?”, and “Where have you observed these changes taking place?” will be asked and discussed as a whole group.

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Questions such as “What just happened?”, “What are other types of physical and chemical changes you know of?”, and “Where have you observed these changes taking place?” will be asked and discussed as a whole group.

 **Explore – Oobleck Experiment**

1. PS1: Matter and Its Interaction

4)Evaluate the results of an experiment to determine whether the mixing of two or more substances result in a change of properties.

Make predictions and form a hypothesis about the outcome of mixing the different substances together. Students will closely examine their substances before and document their properties and characteristics individually. Students will complete the worksheet before, during, and after the experiment is completed.

|  |
| --- |
| Question:What will happen when mixing two or more substances together to make Oobleck? Are there any physical or chemical changes that take place after mixing these substances? |

Form a hypothesis about what you believe will happen when mixing two or more substances together. (In this experiment, we will mix glue, borax, water, and food coloring.)

|  |
| --- |
| Hypothesis: |

Observe and Describe the materials before mixing the substances.

|  |  |
| --- | --- |
| Materials: | Properties:(solid, liquid, gas, physical properties) |
| Glue |  |
| Borax |  |
| Water |  |
| Food Coloring |  |

Virgee, Mrs. (2015, July 28). How to Make Slime. Retrieved March 20, 2017', from http://tinkingtechy.com/how-to-make-slime/

**Conduct this experiment by creating Oobleck/Goo/Slime.**
What You'll Need

Glue / Large Bowl / Borax / Water / Food Coloring / Measuring Cup / Teaspoon

How To Make Slime

• Measure out 1 cup of water and mix in ½ teaspoon of Borax until it is fully dissolved

• In the large bowl, empty out one 5 oz. bottle of clear glue and mix in a ½ cup of water

• Add your food color to the glue and water mixture in the large bowl

• Combine both mixtures in the large bowl

• Use your hands to thoroughly blend the slime to an even consistency

• Remove slime from bowl and have fun!

• When done, place in a resealable baggy for safekeeping



**While creating the Oobleck, examine substances/mixtures and answer the questions below.**

|  |  |
| --- | --- |
| Materials: | Properties:(solid, liquid, gas, physical properties) |
| Mixture of water and borax |  |
| Mixture of glue and water |  |
| \*\*Food Coloring WITH the glue and water mixture |  |
| Entire combination (Oobleck!) |  |

Observe and Describe the materials after mixing the substances.

After completing the table, watch the BrainPop video that goes into detail about Property Changes.
<https://www.brainpop.com/science/matterandchemistry/propertychanges/>

What is an example of a physical change?

Which of these did you observe?

What is an example of a chemical change?

How do you know?

**Explore – Oobleck Experiment**

5.PS1: Matter and Its Interaction

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| Materials: | Properties:(solid, liquid, gas, physical properties) |
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What is an example of a physical change?

Which of these did you observe?

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**Oobleck CER
Claim** (Write a sentence stating a property change you observed when making Oobleck.)

**Evidence** (Provide examples and descriptions of the changes you observed to support your claim. Describe the characteristics that you observed to know what type of change you noticed.)

**Reasoning** (Explain how your evidence supports your claim. Describe how when mixing two or more substances the result is a change in properties.)

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**ANSWER KEY Oobleck CER**

**Claim** (Write a sentence stating a property change you observed when making Oobleck.)

*When making Oobleck, a physical change takes place.*

**Evidence** (Provide examples and descriptions of the changes you observed to support your claim. Describe the characteristics that you observed to know what type of change you noticed.)

*We noticed changes in the color of the materials, the texture of the Oobleck was different than the original substances, as well as, the size of the Oobleck and the shape changed when mixing together the different substances.*

**Reasoning** (Explain how your evidence supports your claim. Describe how when mixing two or more substances the result is a change in properties.)

*The changes in color, texture, size, and shape are all characteristics of a physical change. These all happened when creating Oobleck, so we know that a physical change took place.*

**ANSWER** **KEY Oobleck CER**

**Claim** (Write a sentence stating a property change you observed when making Oobleck.)

*When making Oobleck, a physical change takes place.*

**Evidence** (Provide examples and descriptions of the changes you observed to support your claim. Describe the characteristics that you observed to know what type of change you noticed.)

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 **Explain - Notes**5.PS1: Matter and Its Interaction
4)Evaluate the results of an experiment to determine whether the mixing of two or ore substances result in a change of properties.

Matter: Anything that takes up space and has mass.
Mass: the stuff that matter is made of, or the amount of particles in a substance or object.

\*Matter has physical and chemical properties and can undergo physical and chemical changes.

Property: describes how an object looks, feels, or acts. Properties can be physical or chemical.

\*Physical properties: can be observed. Color, weight, volume, shape, density, boiling point, and freezing point.
\*Chemical properties: usually can only be seen when a substance is undergoing a chemical change. (cannot be observed by seeing or touching)
Bubbling, giving off gas, emitting heat.

Physical Change: a substance changing physical forms but keeps its original properties

Chemical change: when 2 substances are mixed together to form something new.
\*4 main clues (outcomes that happen during a chemical change):
1. There is a formation of gas which can be seen by fizzing or bubbling.

1. The reaction will cause heat,light, or color to be emitted.
2. A color change is produced.
3. A solid is formed during the change.

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**Elaborate – Elephant Toothpaste Activity**

|  |
| --- |
| Question:\*What will happen when mixing two or more substances together to make Elephant Toothpaste? What physical or chemical changes take place after mixing these substances?  |

Form a hypothesis about what you believe will happen when mixing two or more substances together. (In this experiment, we will mix water, yeast, hydrogen peroxide,dish soap, and food coloring.) What outcomes will you observe and why?

|  |
| --- |
| Hypothesis: |

Observe and Describe the materials before mixing the substances.

|  |  |
| --- | --- |
| Materials: | Properties:(solid, liquid, gas, physical properties) |
| Hydrogen Peroxide |  |
| Yeast |  |
| Water |  |
| Food Coloring |  |
| Dish Soap |  |

Follow the directions to complete the activity and observe the reaction to answer questions.

Materials needed:

\*an empty plastic bottle (16 or more ounces)
\*1/2 cup of hydrogen peroxide

\*1 package of yeast
\*1/4 cup of warm water
\*dish soap
\*a cup/bowl to mix
\*food coloring

Pour the peroxide into the bottle.

Place a few drops of food coloring into the bottles with the peroxide. Add a squirt of dishsoap and swirl the bottle to mix. In the cup/bowl, mix the water and yeast and stir for a few seconds to combine. Next, pour the yeast into the bottle with peroxide and watch what happens!

Once the reaction has completed, feel the foam and observe the changes that take place.

What did you observe? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What are the clues that a chemical change occurred?

Was your hypothesis correct?

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Sadie. (2016, June 7). 5 Hands-On Experiments to teach Kids about Chemical Reactions. Retrieved March 19, 2017, from https://owlcation.com/stem/hands-on-experiments-to-learn-about-chemistry

Chart and questions were originally created by Brooke Lacy.

**Elaborate-Elephant Toothpaste Answer Key**

|  |
| --- |
| Question:\*What will happen when mixing two or more substances together to make Elephant Toothpaste? What physical or chemical changes take place after mixing these substances?  |

Form a hypothesis about what you believe will happen when mixing two or more substances together. (In this experiment, we will mix water, yeast, hydrogen peroxide,dish soap, and food coloring.) What outcomes will you observe and why?

|  |
| --- |
| Hypothesis:*I believe that when mixing the substances together, they will bubble and explode or pour out of the bottle, maybe even change colors.* |

Observe and Describe the materials before mixing the substances.

|  |  |
| --- | --- |
| Materials: | Properties:(solid, liquid, gas, physical properties) |
| Hydrogen Peroxide | *Liquid-clear* |
| Yeast | *Tiny brown solid in different particles* |
| Water | *Clear liquid* |
| Food Coloring | *Colored liquid (blue)* |
| Dish Soap | *Liquid (blue) \*smells fruity and clean* |

Follow the directions to complete the activity and observe the reaction to answer questions.

Materials needed:

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Pour the peroxide into the bottle.

Place a few drops of food coloring into the bottles with the peroxide. Add a squirt of dishsoap and swirl the bottle to mix. In the cup/bowl, mix the water and yeast and stir for a few seconds to combine. Next, pour the yeast into the bottle with peroxide and watch what happens!

Once the reaction has completed, feel the foam and observe and document the changes that take place.

What did you observe?

*I observed that when mixing the substances, a chemical change happened. The substances changed properties and it overflowed (bubbled) from the bottle and put off heat.*

What are the clues that a chemical change occurred?

*There was a chemical reaction because the new product gave off heat, which you could feel when touching the bottle and the foam. Also, a gas was produced when the foam was overflowing and bubbling over the bottle. This is how I know a chemical change occured.*

Was your hypothesis correct?

 *Some of my hypothesis was correct. I thought that a chemical change would occur and that it would overflow/bubbled over which is an outcome showing a chemical change occured. I did not mention in my hypothesis that heat would be given off, but heat was emitted in the final mixture for elephant toothpaste.*

**Elaborate – Elephant Toothpaste Activity**

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**Elephant Toothpaste CER
Claim** (Write a sentence stating what changes take place when mixing two or more substances to create Elephant Toothpaste.)

**Evidence** (Provide evidence from the lab to support your claim. Describe the characteristics you observed to know a chemical change has occurred.)

**Reasoning** (Explain how your evidence supports your claim. Describe Elephant toothpaste and the property changes you observe.)

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 **ANSWER KEY Elephant Toothpaste CER**

**Claim** (Write a sentence stating what changes take place when mixing two or more substances to create Elephant Toothpaste.)

*When mixing together water, dishsoap, peroxide, food coloring, and yeast, a chemical change occurs.*

**Evidence** (Provide evidence from the lab to support your claim. Describe the characteristics you observed to know a chemical change has occurred.)

*Mixing together two or more substances (water, dishsoap, peroxide, food coloring, and yeast), results in Elephant toothpaste. The materials mixed together create an outcome that forms a gas (by bubbling) and the reaction also causes heat to be emitted. With these two clues of bubbling and heat being emitted, we know that a chemical change has occurred.*

**Reasoning** (Explain how your evidence supports your claim. Describe Elephant toothpaste and the property changes you observe.)

*The formation of gas which can be seen by fizzing or bubbling, the reaction causing heat, light, or odor to be emitted, a color change being produced, and a solid forming during a change with two liquids, are four main clues /outcomes that take place when a chemical reaction occurs. With our activity, heat was put off when touching and observing the final product of elephant toothpaste, as well as a gas produced when the mixture bubbled over the plastic bottle. This shows us that mixing together two or more substances results in a chemical change.*

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**Evaluate- Matter and Its Interactions**

5.PS1: Matter and Its Interaction

4)Evaluate the results of an experiment to determine whether the mixing of two or more substances result in a change of properties.

Follow the Link to print and use worksheet for an assessment. Answer key is attached.
<http://www.mayfieldschools.org/Downloads/Phys%20and%20Chem%20Properties%20and%20Changes%20and%20KEY.pdf>

Mayfield. (n.d.). Physical and Chemical Properties and Changes. Retrieved May 20, 2017, from http://www.mayfieldschools.org/Downloads/Phys%20and%20Chem%20Properties%20and%20Changes%20and%20KEY.pdf

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**Big Ah-Ha Thesis**

 The purpose of this unit was to understand whether mixing two or more substances results in a change of properties. We completed an experiment to make Oobleck and created Elephant toothpaste to gather lines of evidence.

 We mixed together different substances such as glue, water, Borax, and food coloring to make Oobleck. This experiment gave us the chance to observe physical changes taking place. We recognized that color, size, texture, and shape all changed when mixing these substances together, which are all physical properties.

 The Elephant Toothpaste activity was a fun activity to observe chemical changes taking place. We mixed a variety of substances and could see bubbling, fizzing, and were able to feel the heat being emitted from our new creation. These were all characteristics to show that a chemical change happened.

 Both of our learning activities were lines of evidence. They helped us explain that when mixing two or more substances, there is a change in properties. We must pay close attention to details when creating new substances to know whether a physical or chemical change takes place.

**Big Ah-Ha Thesis**

 The purpose of this unit was to understand whether mixing two or more substances results in a change of properties. We completed an experiment to make Oobleck and created Elephant toothpaste to gather lines of evidence.

 We mixed together different substances such as glue, water, Borax, and food coloring to make Oobleck. This experiment gave us the chance to observe physical changes taking place. We recognized that color, size, texture, and shape all changed when mixing these substances together, which are all physical properties.

 The Elephant Toothpaste activity was a fun activity to observe chemical changes taking place. We mixed a variety of substances and could see bubbling, fizzing, and were able to feel the heat being emitted from our new creation. These were all characteristics to show that a chemical change happened.

 Both of our learning activities were lines of evidence. They helped us explain that when mixing two or more substances, there is a change in properties. We must pay close attention to details when creating new substances to know whether a physical or chemical change takes place.