

What is Oobleck?

CAN YOU USE THE SCIENTIFIC METHOD AND YOUR SENSES TO SOLVE THE MYSTERY OF OOBLECK?

Problem

Three liquids are mixed together in a plastic bag. Using your senses (except for taste) can you determine if the substance that is formed is a solid, liquid or gas?

Research

List three properties of solids, liquids and gases.

Solid

Liquid

Gas

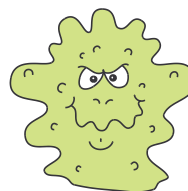
Hypothesis

I think the substance will be a _____ .
(solid, liquid or gas)

Procedure

1. To do this experiment, your team will need:

- A plastic bag
- A clear liquid
- A green liquid
- A white liquid
- All of your senses, **except for taste**



2. Open the plastic bag.

3. Carefully measure two teaspoons of the clear liquid into the plastic bag.

4. Next, add two drops of the green liquid.

5. Carefully add two tablespoons of the white liquid.

6. Close the bag and knead the mixture well for 2 minutes.

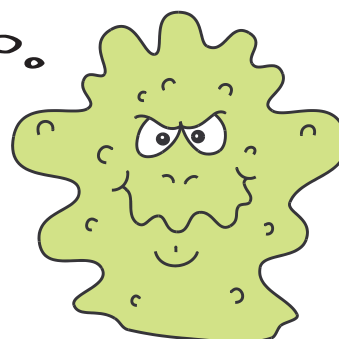
7. Once 2 minutes have passed, take the Oobleck out of the bag and experiment with it.

8. Record your observations about the properties of Oobleck on the **Oobleck Investigation Sheet**.

9. Decide if each observation is a property of a solid, liquid or gas. Circle one or more of the **State of Matter** letters on the right hand side of the **Oobleck Investigation Sheet** to show what you decided.

10. Answer the blob's question.

**What state of matter
is Oobleck???**



Data Collection and Analysis

Oobleck Investigation Sheet

PROPERTY

State of Matter

example: GREEN

(S) (L) G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

S L G

Conclusion

OOBLECK APPEARS TO BE A _____

Oobleck is made by combining:

Which is a:
(solid, liquid or gas)

- | | |
|------------------|----------|
| a. Borax | a. _____ |
| b. Elmer's Glue | b. _____ |
| c. Food coloring | c. _____ |
| d. Water | d. _____ |

I ended up with a _____

Element - any substance that can not be broken up into simpler substances by chemical means

Compound - a substance formed when atoms of two or more elements join together

Mixture - a material consisting of two or more substances that are not chemically bound to each other and can be separated

Do you think Oobleck is an element, compound or mixture? _____

NAME THAT SUBSTANCE!!

Directions: Define the following as either an element, compound or mixture.

nitrogen	
salad dressing	
salt water	
oxygen	
water	
sugar	
chalk	
air	

Reading About Properties and Changes

OOBLECK HAS SPECIFIC PROPERTIES.

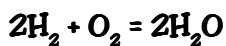
Directions: Read the following passage. Fill in the blanks with words that make sense. Remember to use context clues that come before and after the blanks.

Matter can be described and identified by physical and chemical properties. Physical 1 have to do with appearance. You can observe many physical properties with your senses and by measuring the length, 2, height, mass and density of a substance. 3 properties include color, shape, smell, texture, taste and size. The state of matter (whether its a solid, 4, or gas) and the 5 at which the substance boils, melts or freezes are also physical properties. Magnetic properties are physical properties as well.

6 properties, on the other hand, have more to do with the atomic or molecular composition of matter. Chemical properties deal with how substances react with other 7 such as water, air or fire.

A physical change has occurred when a substance changes color, size, shape, temperature or state. A 8 change has occurred when a substance has changed into something new or 9 so that the original substance is gone. Digestion, combustion and radioactive decay are examples of chemical changes. A chemical change takes place in a 10 to produce electricity when you turn on a flashlight.

Chemical changes are sometimes represented by a chemical formula:



This formula states that two hydrogen gas molecules react with one oxygen gas molecule to produce two molecules of water.

Directions: Choose the word that fits the context of the passage.

- | | | | | |
|-----|----------------|----------------|---------------|---------------|
| 1. | a. chemicals | b. properties | c. substances | d. textures |
| 2. | a. width | b. density | c. height | d. property |
| 3. | a. chemical | b. matter | c. described | d. physical |
| 4. | a. water | b. molecule | c. liquid | d. atom |
| 5. | a. time | b. temperature | c. design | d. cylinder |
| 6. | a. chemical | b. physical | c. substance | d. gaseous |
| 7. | a. properties | b. physicals | c. degrees | d. substances |
| 8. | a. temperature | b. physical | c. chemical | d. color |
| 9. | a. similar | b. different | c. familiar | d. original |
| 10. | a. battery | b. bulb | c. change | d. switch |

Reading About Changes

THE OOBLECK YOU MADE AT JEFFERSON LAB WAS AN EXPERIMENT INVOLVING CHANGE.


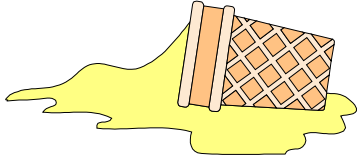

Look at the picture of the candle burning. The wax of a candle burns and changes into ash and smoke. The original materials are changing into something different. Changes that create a new material are called **chemical changes**.



Look at the picture of water boiling and changing into steam. Steam is another form of water. Heating the water did not create a new material. In changing the water from a liquid to a gas, only the state of the water changed. Changes in the shape, size or state of a material are called **physical changes**.



Directions: Study the changes that are occurring in each picture below. Tell what is changing. Then decide if the change is a chemical change or a physical change.

	What is changing?	What kind of change?
 A car wreck		
 Melting ice cream		
 Wood burning		

Challenge! List three changes you observe at home. Tell what is changing and what kind of change is occurring in each. Can some changes be both physical and chemical?

Oobleck is made by combining:

Which is a:
(solid, liquid or gas)

- | | |
|------------------|---|
| a. Borax | a. <u> solid </u> |
| b. Elmer's Glue | b. <u> liquid </u> |
| c. Food coloring | c. <u> liquid </u> |
| d. Water | d. <u> liquid </u> |

I ended up with a **colloidal suspension**

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Compound - a substance formed when atoms of two or more elements join together

Mixture - a material consisting of two or more substances that are not chemically bound to each other and can be separated

Do you think Oobleck is an element, compound or mixture? **mixture**

NAME THAT SUBSTANCE!!

Directions: Define the following as either an element, compound or mixture.

nitrogen	element
salad dressing	mixture
salt water	mixture
oxygen	element
water	compound
sugar	compound
chalk	compound
air	mixture

Reading About Properties and Changes

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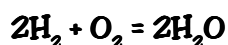
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| 3. | a. chemical | b. matter | c. described | d. physical |
| 4. | a. water | b. molecule | c. liquid | d. atom |
| 5. | a. time | b. temperature | c. design | d. cylinder |
| 6. | a. chemical | b. physical | c. substance | d. gaseous |
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Directions: Study the changes that are occurring in each picture below. Tell what is changing. Then decide if the change is a chemical change or a physical change.

	What is changing?	What kind of change?
 A car wreck	<i>The shape/size of the car</i>	<i>Physical</i>
 Melting ice cream	<i>The shape and state of the ice cream.</i>	<i>Physical</i>
 Wood burning	<i>The wood to ash and smoke</i>	<i>Chemical</i>

Challenge! List three changes you observe at home. Tell what is changing and what kind of change is occurring in each. Can some changes be both physical and chemical?

Recipe for OOBLECK

Want to amaze your friends? Want to be the wonder of the neighborhood? If you do, follow these simple instructions to make Oobleck!! When you create Oobleck, make sure that an adult is around. **Keep it away from small children and pets, and don't taste or eat it!!** Also, it is very important that you measure carefully.

Get permission to do this first!!

Get permission to do this first!!

Directions

1. Mix the Borax and the water in one bowl, making sure that the Borax dissolves completely.
2. Mix the glue and the water in the second bowl.
3. Put 10 ml of Borax solution in the plastic bag.
4. Add one or two drops of food coloring.
5. Add 30 ml of the glue mixture.
6. Close the bag and mix thoroughly for 2 minutes.
7. When not being used to gross out friends, the Oobleck should be kept in the plastic bag!

Materials

Borax solution [15 ml Borax dissolved in 250 ml of

- warm water]
- Elmer's glue mixture [30 ml of glue mixed with 30 ml water]
- Zipper-lock plastic bag (small)
- 2 bowls
- Measuring spoons and cup
- Green food coloring

250 ml = 250 milliliters ≈ 1 cup

15 ml = 15 milliliters = 1 Tablespoon

5 ml = 5 milliliters = 1 Teaspoon

DISPOSE OF MATERIALS PROPERLY!

DO NOT EAT OR DRINK!!

Oobleck

This is an activity in which students explore the properties of a strange substance.

Objectives:

In this activity students will:

- work in groups
- follow a recipe to make Oobleck
- measure the proper amounts of each ingredient
- use all of their senses, except taste, to discover as many properties of Oobleck as they can
- record their observations on the **Oobleck Investigation Sheet**
- classify each property they find as being a property shared by solids, liquids or gases
- determine Oobleck's state of matter

Questions to Ask:

1. What are some properties of solids, liquids and gases?
2. What are some physical properties of Oobleck?
3. What types of changes took place when you made Oobleck?

Travel Book Activities:

- Reading About Properties and Changes - p.57
- Reading About Changes - p.58
- Writing About Physical Properties - p.59

Virginia State Standards of Learning

English 6.1 Oral Language

- by oral participation in small group activities

English 6.7 Writing

- by describing the properties they discover

Science 6.1 Plan and Conduct Investigations

- by making observations involving fine discrimination between similar objects
- by developing a multiple attributes classification system
- by identifying differences in descriptions and the construction of working definitions
- by devising methods to test the validity of predictions and inferences
- by collecting, recording and analyzing data using appropriate metric measures

Science 6.6 Matter

- by investigating and understanding how to classify materials as elements, compounds or mixtures

Science 6.7 Matter

- by investigating physical and chemical properties of matter and understanding the changes it can undergo

LS.1 Plan and Conduct Investigations

- by establishing criteria for evaluating a prediction
- by evaluating and defending interpretations from the same set of data
- by constructing models to illustrate and explain phenomena

PS.1 Plan and Conduct Investigations

- by making valid conclusions after analyzing data

Oobleck

Teacher Overview and Materials List

Background:

The term “Oobleck” is derived from the book *Bartholomew and the Oobleck*, by Dr. Seuss. Experimenting with Oobleck is much more than having fun with a weird substance. As students participate in this activity, they will develop important skills in scientific observation. Scientists at Jefferson Lab use a similar process to investigate quarks in the nucleus of the atom.

Minimum Materials Needed for Each Student Group:

- A Ziploc sandwich bag
- A tablespoon
- A teaspoon
- 30 milliliters (2 tablespoons) of a glue-water solution
- 10 milliliters (2 teaspoons) of a borax-water solution
- 2 drops of food coloring

Optional Materials:

- Newspapers to cover the desks
- Small bowls to hold the two solutions
- Containers to save extra solution

Pre-Activity Preparations:

The Glue-Water Solution

1. Empty a bottle of Elmer's School Glue into a small container.
2. Add an equal volume of water.
3. Mix thoroughly.

The Borax-Water Solution

1. Place 1 liter of water in a small container.
2. Add 60 milliliters of dry Borax powder to the water.
3. Mix thoroughly.

Notes:

- It is not uncommon for some of the Borax to remain undissolved.
- Elmer's Glue-All works just as well as Elmer's School Glue. In addition, we have been able to buy Elmer's Glue-All in gallon containers from home improvement centers.
- If kept in sealed containers, the two mixtures can be stored for several months as long as they are mixed well before use.



Materials for Oobleck