

Science

It's All Fun!

Purpose:

- Learn that matter can exist in three forms
- Learn properties of a solid, liquid or gas
- Use reading and math skills to make substances
- Learn to measure, observe and compare

Activity 1: Oobleck

Matter exists in three different states; solid, liquid and gas. Participants will create a substance that simulates properties of both a solid and a liquid.

Supplies:

- Cornstarch
- Water
- Ziploc sandwich bags
- Food coloring
(only in a protected area or outside)
- Measuring spoons

Oobleck -- Is it a liquid or a solid?

Properties of a solid:

A wood block is solid. A solid has a certain size and shape. The wood block does not change size or shape. Other examples of solids are the computer, the desk, and the floor.

Properties of a liquid:

Milk is a liquid. Milk is liquid matter. It has a size or volume. Volume means it takes up space. But milk doesn't have a definite shape. It takes the shape of its container. Liquids can flow, be poured, and spilled. Spilled liquid goes everywhere. The liquid

takes the shape of the floor and the floor is expansive—limitless boundary (until it hits the wall). You can't spill a wooden block. You can drop it and it still has the same shape.

Properties of a gas:

Run in place very fast for a minute. Do you notice how hard you are breathing? What you are breathing is oxygen. You need oxygen to live. That's why you can only hold your breath for a certain amount of time.

You can't see oxygen. It's invisible. It is a gas. A gas is matter that has no shape or size of its own. Gases have no color. Gases are all around you. You can feel gas when the wind blows. The wind is moving air. Air is many gases mixed together.

Instructions:

1. Open a plastic bag and add 2 tablespoons of water.
2. Measure 2 tablespoons of corn starch and add to the water in the plastic bag. Add two drops of food coloring to the bag before sealing. (Optional)
3. Seal the plastic bag and mix the corn starch and water.

Observe your new creation. What do you see? What does it look like? Open the top of your bag and touch it. What does it feel like? Does it feel like anything that you have touched before?

Is it a solid or a liquid? WHY?

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Adapted from Iowa State *Science is here*



3 activities for youth grades K - 8. Allow 45 - 60 minutes. Science Standard- Physical Science
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Activity 2: Glurch

Supplies:

- 9 t. liquid laundry starch
- 5 t. liquid white glue
- ¼ t. salt
- Ziploc sandwich bags
- Measuring spoons

Instructions:

1. Pour starch into a plastic bag. Add salt and mix until dissolved.
2. Add white glue.
3. Squeeze out the excess starch until the substance becomes doughy.
4. Knead. If glurch is runny, add a little more salt.

Activity 3: Silly Putty

Supplies:

- ¼ c. Glue
- 1/8 c. liquid laundry starch
- 2 drops food coloring
(use in an area or only if not worried about stains)
- table covering
- popsicle stick
- 5 oz. paper cup
- Ziploc sandwich bag
- Measuring cups

Instructions:

1. Cover area.
2. Combine the glue and starch. Stir mixture until it begins to stick together and stirring becomes

difficult.

3. Knead mixture with hands. If too sticky, add a little more starch.
4. Store in Ziploc sandwich bag.

- In 1943, James Wright, an engineer, was attempting to create a synthetic rubber. He was unable to achieve the properties he was looking for and put his creation (later to be called *Silly Putty*) on the shelf as a failure
- Silly Putty belongs to a special type of substance known as dilatants. Dilatants are viscoelastic non-Newtonian fluids. Silly Putty is weird stuff. Viscoelastic--means that Silly Putty and exhibits both viscous (sticky and resistant to flow) as well as elastic properties.
- The viscous properties of Silly Putty allow it to be molded and shaped. In general, viscosity is a measure of the internal resistance to movement. Fluids with high viscosity, like honey, flow slowly, while low-viscosity fluids will spill all over the place. The elastic properties of Silly Putty, on the other hand, give it its bouncy properties. Elastic substances will generally return to their original shape when they get deformed, giving them that familiar springy quality.
- Silly Putty can do both of these things due to its molecular structure. Elastic substances are generally made up of polymers. Polymers are extremely long molecules, sort of resembling strings. In an elastic substance, these polymers are cross-linked, meaning that they are attached to each other. When you stretch out an elastic substance, like a rubber band, the polymers stretch out but retain their cross-links. When you let go, the substance snaps back to its original shape.
- In a fluid, molecules are not held together as tightly, so they can slip over each other and flow. In a dilatant, the molecules are long polymers that can generally slip over each other and flow like a liquid. However, when you apply a rapid force to the dilatant, the polymers get tangled and snag on to each other, causing it to act like an elastic substance.

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