

K-3 4-6 7-9 10-12 Gen



8

Corn Starch Putty

What's sillier than Silly Putty®? Corn starch putty! This activity demonstrates the unusual properties of corn starch putty.

Activity Guidelines

This is a great hands-on activity which allows students of all ages to participate in making their own observations.

Time

Getting Ready: none
Doing the Activity: 15–20 minutes

Materials

- aluminum pie pan or other shallow container
- 1 cup of corn starch
- $\frac{1}{4}$ – $\frac{1}{2}$ cup of water
- (optional) food coloring
- plastic spoon
- paper cup
- knife
- one or more of the following objects:
 - piece of metal or a coin
 - block of wood
 - several plastic objects
- scissors
- balloon
- (optional) a wide-stem funnel; the top cut off of a 1- or 2-liter plastic soda pop bottle works well.
- (optional) straw

Safety and Disposal

There are no special safety precautions. Discard the putty in a waste can or wash it down the drain.

Doing the Activity



1. Place 1 cup of corn starch in the clean pie pan.
2. Using your fingers to mix, add water slowly until a gooey fluid-like consistency is achieved.

The gooey fluid will pour or drip slowly from your hand, but when you strike it with a hard blow, it will not splatter. (See Figure 1.)

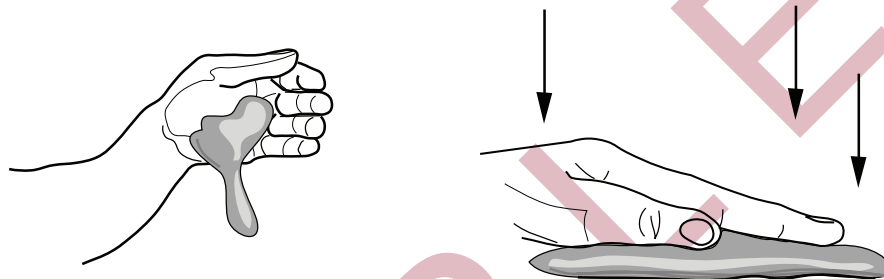


Figure 1—Gooey corn starch putty



If you added too much water, add additional corn starch to reach the desired consistency.

3. (Optional) Mix a couple of drops of food coloring into the putty to give it different colors.



You may want to read *Bartholomew and the Oobleck* by Dr. Seuss to your class. Add food coloring to turn your oobleck green.

4. Transfer the gooey putty into other pans or cups by breaking it into pieces.
5. Examine the properties of the corn starch putty by trying the following:
 - Pat the putty with your fingers.
 - Pour the putty and cut the stream of putty with a pair of scissors.
 - Rub some putty between your fingers and feel it become powdery.
 - Slice the putty in the pie pan with the knife and watch it flow back together.
 - Roll the putty into a ball and watch the ball flatten.

- ❑ Place a metal, wood, or plastic object on the mixture and watch it sink.
- ❑ Strike the putty in the pan with your hand.

6. Examine the stretchy nature of corn starch putty using balloons. First, fill a balloon with putty using a funnel. (See Figure 2.)

A straw can be placed between the balloon and the funnel to make the filling easier.

7. Knot the balloon containing the putty, then tie off another balloon without putty inside.
8. Stretch the balloons several ways. Compare their properties.

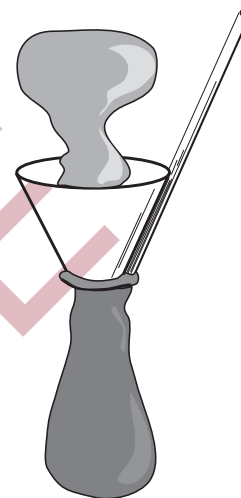


Figure 2—Putting putty inside a balloon



Explanation

Corn starch putty is a suspension of corn starch in water. This putty has the properties of both a solid *and* a liquid; it is a non-Newtonian fluid, which means that it does not behave as a typical fluid. The putty flows like a liquid but breaks into pieces like a solid. It looks wet but becomes powdery when you rub it between your fingers. It withstands sudden shocks, but it doesn't support the weight of an object laid on its surface. This latter observation is a result of its dilatant nature; it tends to dilate (or expand) under stress. In other words, it tends to "push back" when struck with a firm blow. The viscosity of cornstarch putty increases when a stress is applied. Other familiar non-Newtonian fluids are paint, ketchup, and Silly Putty®.

Curriculum Integration

A suggested use of this activity is in a unit on properties of solids and liquids.

References

Bartholomew, R.; Tillery, B. W. Heath, *Earth Science*; D. C. Heath: Lexington, MA, 1984.

Sneider, C. I. *Oobleck, What Do Scientists Do?: Teacher's Guide*; Lawrence Hall of Science, University of California: Berkeley, 1985.