

Making Electric Dough Circuits

Description: Ever wanted to make your own Play-Doh and learn about electricity at the same time? In this experiment, you can do both! With the supervision of a parent or guardian, you can make your own electrically 'conductive' dough and 'insulating' dough, build different circuits, and have tons of fun!

Materials:

'Conductive' Dough

- Stovetop
- 1 ½ cups of flour
- 1 cup of water
- ¼ cup of salt
- 3 Tbsp cream of tartar (or 9 Tbsp. of lemon juice)
- 1 Tbsp vegetable oil
- Food coloring
- Medium-sized saucepan
- Cooking spoon
- Baking tray (or cutting board)

'Insulating' Dough

- 1 ½ cups of flour
- ½ cup of white sugar
- 3 Tbsp vegetable oil
- ½ cup of water (use distilled water if available)
- Food coloring
- A large bowl
- Baking tray (or cutting board)

Electric Dough Circuits!

- 'Conductive' dough
- 'Insulating' dough
- AA or AAA batteries
- AA or AAA battery pack (with wires coming out if possible)
- LEDs (or another electrical device such as a motor)

Instructions:

'Conductive' Dough [Get help from parent/guardian] (30 minutes - 1 hour)

NOTE: THIS ACTIVITY REQUIRES A STOVETOP!

1. In a saucepan, over a stovetop on low heat, dissolve the $\frac{1}{2}$ cup of salt in the 1 cup of water.
2. Add favorite food coloring color (4-10 drops works just fine).
3. Add 3 tablespoons of cream of tartar (or 9 tablespoons of lemon juice), 1 tablespoon of vegetable oil, and 1 cup of flour.
4. Heat dough on low heat, stirring constantly with a spoon, until the dough becomes solid and makes a ball-like shape.
5. Place dough on a lightly floured baking sheet (or cutting board) and flatten the dough.
6. Knead in more flour into dough until dough no longer feels sticky.

'Insulating' Dough (30 minutes - 45 minutes)

1. Mix 1 cup of plain flour and $\frac{1}{2}$ cup of white sugar in a large bowl.
2. Add 3 tablespoons of vegetable oil and mix well!
3. Add one tablespoon of water at a time until dough begins to clump together. To avoid mess, you can add your food coloring (4-10 drops) to the water, otherwise, you can add the food coloring in the next step.
4. Add your second favorite color of food coloring (make sure it's a different color from the one you used for your 'conductive' dough!). Add 4-10 drops.
5. Transfer dough onto a baking tray (or cutting board) with no flour and knead dough into a ball.
6. Add water one tablespoon at a time and knead. Continue adding water one tablespoon at a time until the dough becomes sticky.
7. Knead in flour until the dough stops feeling sticky and feels like Play-Doh!

Electric Dough Circuits! (As long as you'd like!)

1. Place your batteries into the battery pack.
2. Take two pieces of 'conductive' dough and one piece of 'insulating' dough. Have the 'insulating' dough separate the pieces of 'conductive' dough.
3. Connect one end of the battery pack to one of the 'conductive' pieces of the dough. Connect the other end of the battery pack to the other 'conductive' piece of dough.
4. Take an LED or electric device, and connect it to the two pieces of 'conductive' dough (for individual LEDs, if you notice that it is not lighting up try taking the LED out and connecting the LED's legs into the conductive pieces of dough the opposite way).
5. Try multiple LEDs or other electrical devices!
6. Have fun trying different designs with your dough! Try to make a car with headlights, a unicorn for an LED horn, whatever you'd like!

Tips: Where to find a battery pack, LEDs, or other devices that I can use with my electric

dough?

You can find a lot of cool devices that you can use with your electric dough circuit at an electronics store near you. I got my battery pack and LEDs at a RadioShack store, but you can always check out Amazon for LEDs, small motors, or any other electrical devices. Make sure to have a parent or guardian with you if you are looking for devices on Amazon. To find a battery pack, I suggest searching for "4 AA battery holders" on Amazon. To find LEDs, I suggest searching "3mm LED 10pcs." Since LEDs typically ship in bulk, I recommend looking for items that include 10 LEDs.

Where to find cream of tartar and distilled water?

You can find cream of tartar and distilled water in most grocery stores. I found my cream of tartar at the local Safeway.



Activity Presenter ~ Patrick McGrath: Hi! My name is Patrick McGrath and I am the creator of the electric dough video that you may have watched. I am a third-year student at OSU studying Electrical and Computer Engineering (ECE). My primary language is English, but I am able to speak a little bit of Spanish and Gaelic as well. After I graduate, I plan to work as a software developer and make applications that everyone around the world can use.