fab CONNECT her

Future Female Innovators In STEAM

CONDUCTIVE DOUGH

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Partner:

Fundación TMA - Fab Lab León

Address :

Avda. San Ignacio de Loyola, 177

24191 San Andrés del Rabanedo (LEON), Spain

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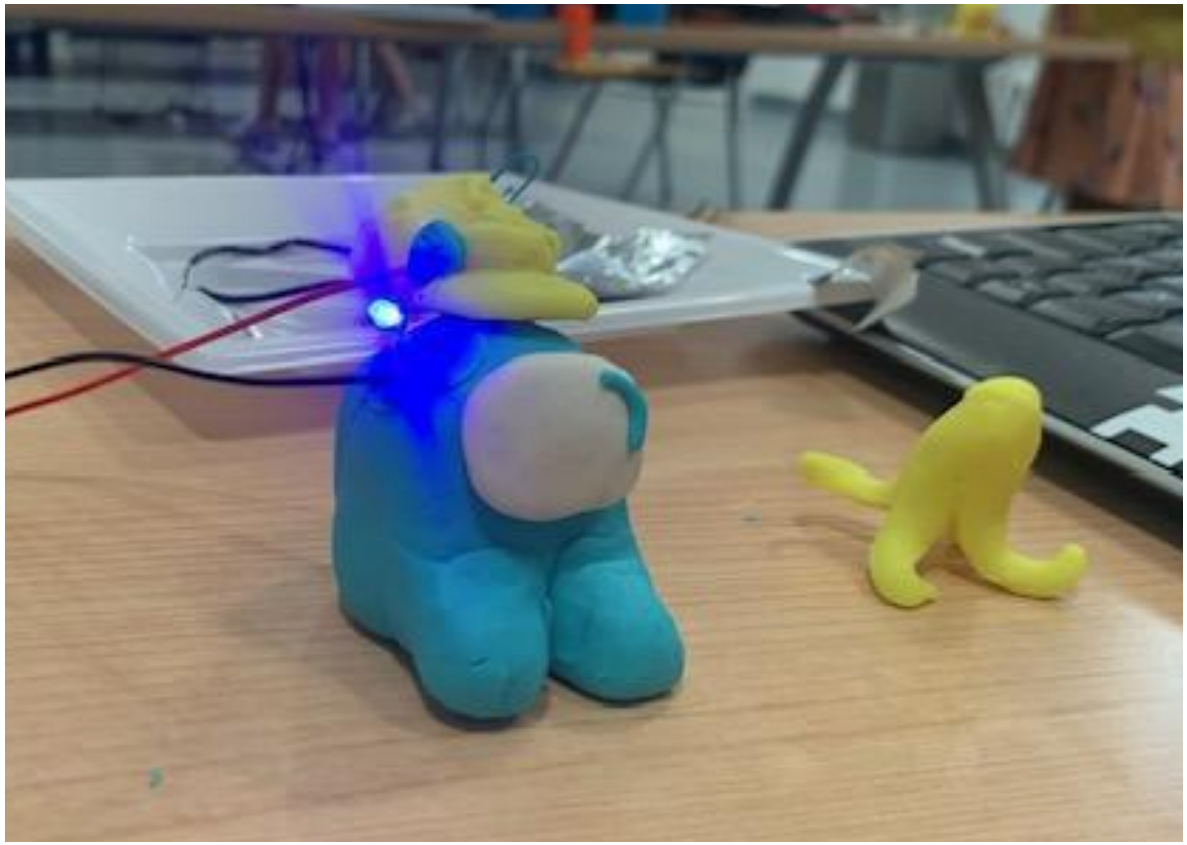
Conductive dough

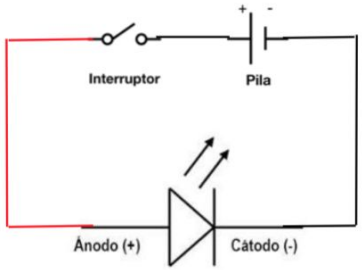
Electronic Circuits with Conductive Dough



We will learn how to create electronic circuits with conductive dough to light up our characters.

Conductive dough

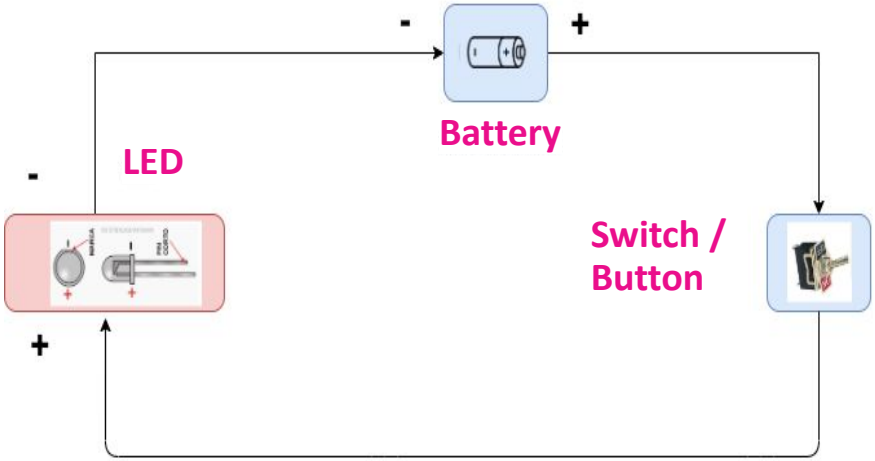
We will learn:

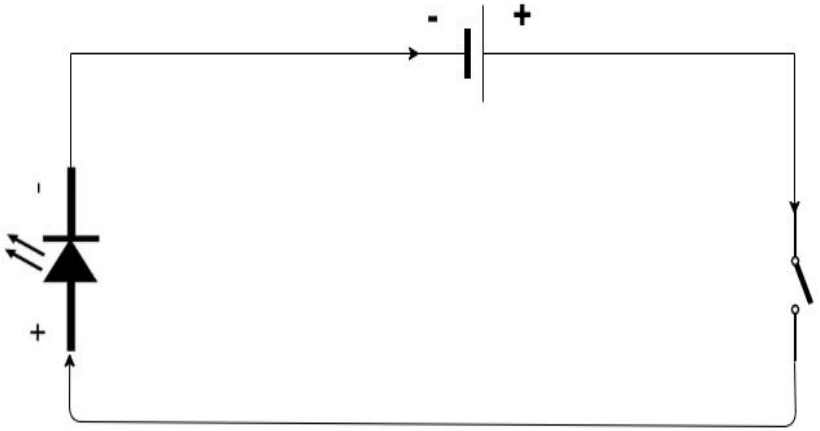


- The parts of an electric circuit.
- The difference between conductive and insulating materials.
- How to build a character using modeling dough.
- How to add lights to our character.

Conductive dough

Parts of a circuit:





Conductive dough

List of materials:

9v Battery

9v Battery Holder

LEDs

Jovi modelling dough
(non conductive)

Conductive Dough

Conductive dough

Pay Attention:

- <u>Never connect</u> the two terminals of the battery directly to each other.
- Always cover the battery when not in use.

- The red and black wires of the connector, when attached to the battery holder, must <u>never touch</u> each other directly.

Conductive dough

Tip: Playdough is conductive dough

STEP 1: Make two Play-Doh bars approximately 8 cm long and fairly thick.

Tip: JOVI dough: It is an insulator.

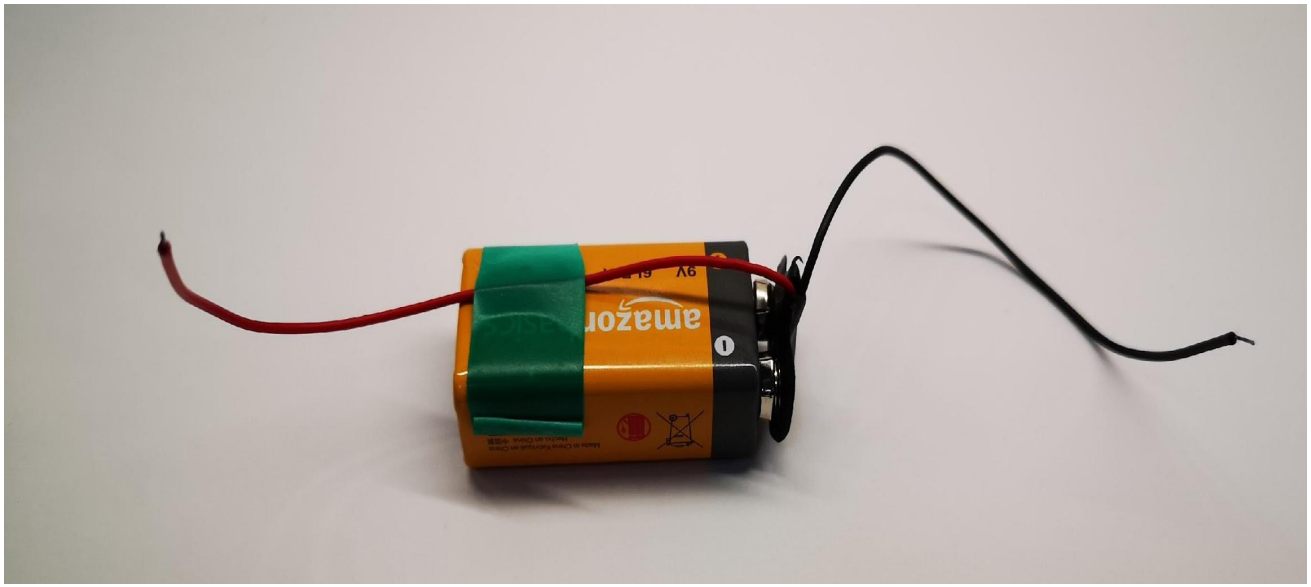
STEP 2: Make a JOVI dough bar, longer and thicker than the other two.

Never connect the two pieces of Play-Doh together. This would cause a short circuit!!

Conductive dough

Power source: The battery:

STEP 3: Attach the battery holder to the battery, and connect the red wire (positive) to the battery using tape.



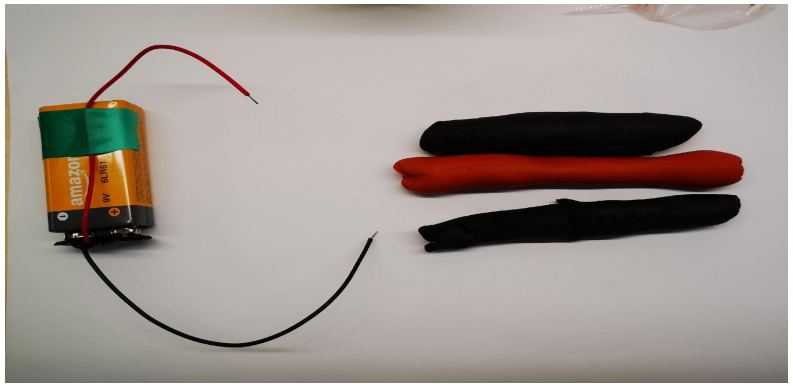
ATTENTION PLEASE

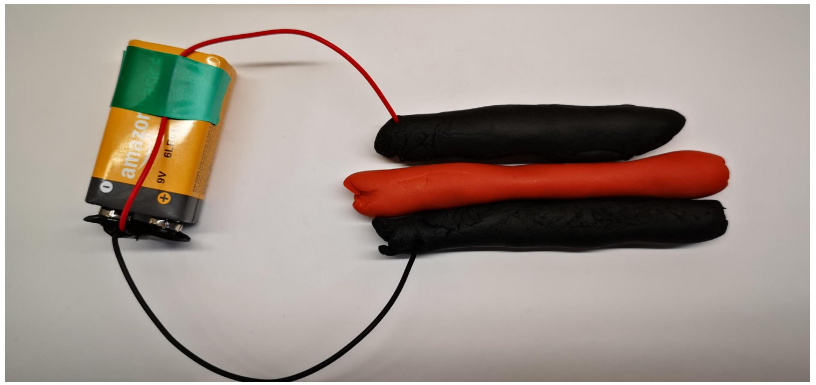
The red and black wires of the connector, when attached to the battery holder, must never touch each other directly

Conductive dough

Power source: The battery:

STEP 4: Connect the battery wires, each to one of the conductive Play-Doh bars (pay attention to the color of the wires)



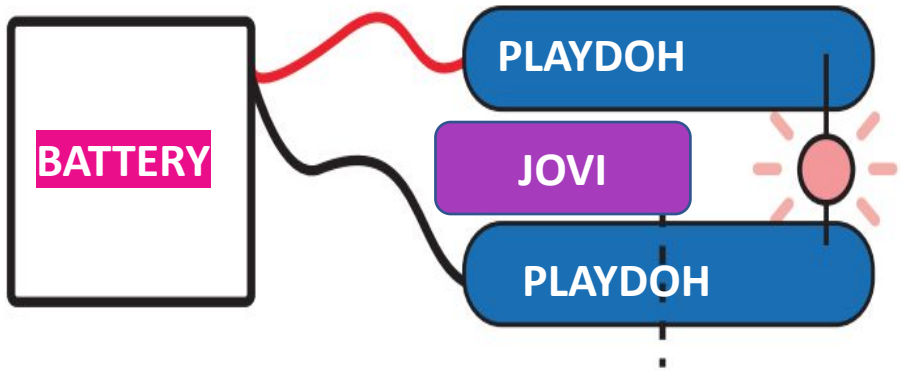


Conductive dough

Test the circuit:

STEP 5: Use the LED to test the circuit.

If you connect the positive leg of the LED to the Play-Doh connected to the red wire, and the other leg to the Play-Doh connected to the black wire, the LED should light up.



Conductive dough

LEARNING BY DOING:

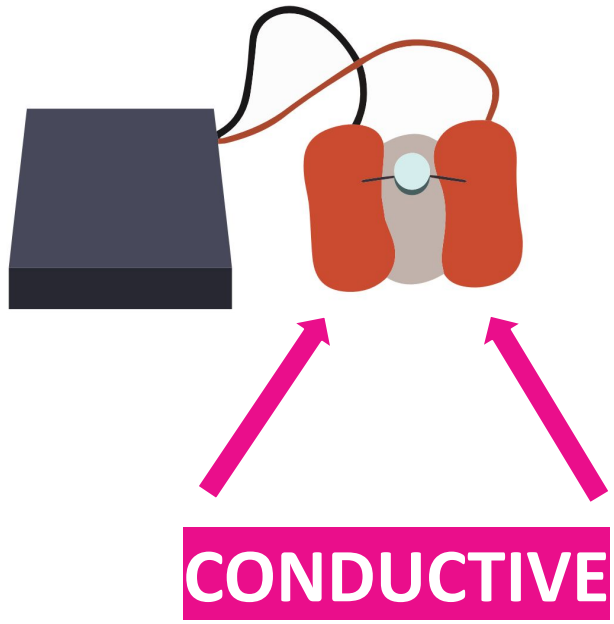
Let's experiment with different materials to identify which ones CONDUCT electricity and which ones DO NOT.

Conductive dough

Materials that Conduct Electricity:

These are materials that allow the flow of electrical energy.

- Copper (e.g., wires)
- Aluminum (e.g., foil)
- Steel (e.g., paper clips)
- Graphite (e.g., pencil lead)
- Brass (e.g., keys)
- Silver and Gold (found in small electronic components)
- Conductive Play-Doh

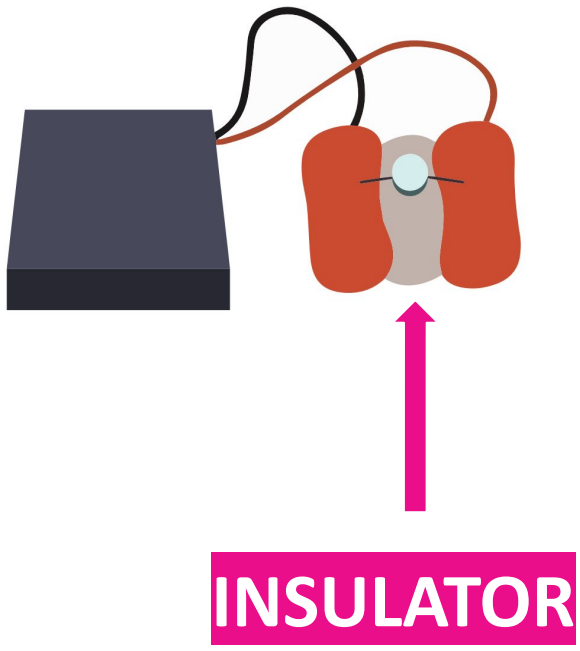


Conductive dough

Materials that Materials that Do Not Conduct Electricity:

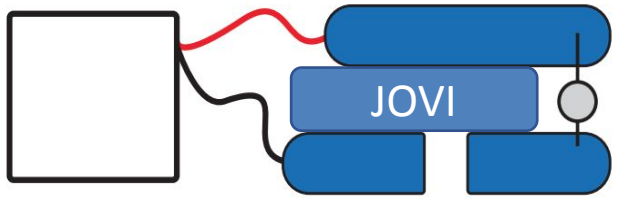
Also called insulators, these are materials that hinder the flow of electrical energy.

- Plastic (e.g., bottle caps)
- Wood (dry)
- Rubber (e.g., erasers)
- Glass
- Ceramic
- Dry Paper
- Insulating Dough (e.g., JOVI dough)



Conductive dough

Material Tester



Materials Needed:

- A 9V battery with a holder.
- Conductive Play-Doh.
- An LED.
- Various materials to test (e.g., wood, plastic, foil, paper, etc.).

Assemble the Circuit:

- Connect the battery wires to two separate pieces of conductive Play-Doh
- Insert one leg of the LED into the first piece of Play-Doh (or wire).
- Leave the other leg of the LED free, so it can touch the materials for testing.

Testing Materials:

- Place one side of the material on the free Play-Doh.
- Touch the second side of the material with the free leg of the LED.

Observation:

- If the LED lights up, the material is conductive.
- If it does not light up, the material is an insulator.

Experiment with Various Materials:

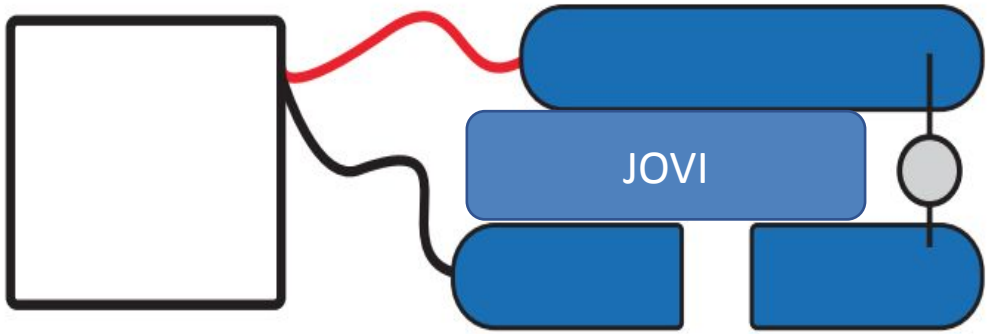
- Test metals, plastics, fabrics, and other items to identify their properties.

Conductive dough

Material Tester:

The two Play-Doh bars must not touch each other.

Cut one of the conductive Play-Doh bars into two halves. The LED will stop lighting up because the circuit is now open.



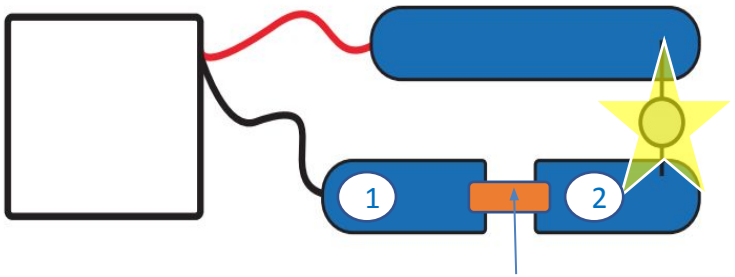
Conductive dough

Get to know the materials:

Test each material and classify it as either a conductor (allows electricity to pass through) or an insulator (blocks the flow of electricity).

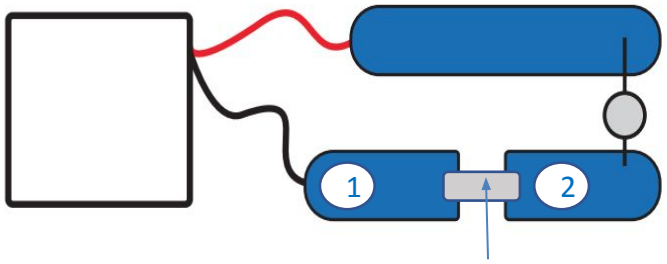
To determine if a material is conductive, connect it between the two Play-Doh halves (1 and 2).

If the LED lights up, the material is conductive.



Conductive Material

If the LED does NOT light up, then the material is an insulator.



Insulator material

Conductive dough

It’s Your Turn:

Test different materials by placing them between the two Play-Doh halves (1 and 2). Based on the results, classify them into Insulators and Conductors.

Create a Table :

MATERIAL	TYPE (INSULATOR / CONDUCTOR)
 ALUMINIUM FOIL	
 PLASTIC THREADS	
 PAINTED PAPER CLIPS	
 METAL PAPER CLIPS	

Conductive dough

LEARNING BY DOING:

Let's create a Safe System to Place an LED Inside Our Figure.

Conductive dough

LED CIRCUIT

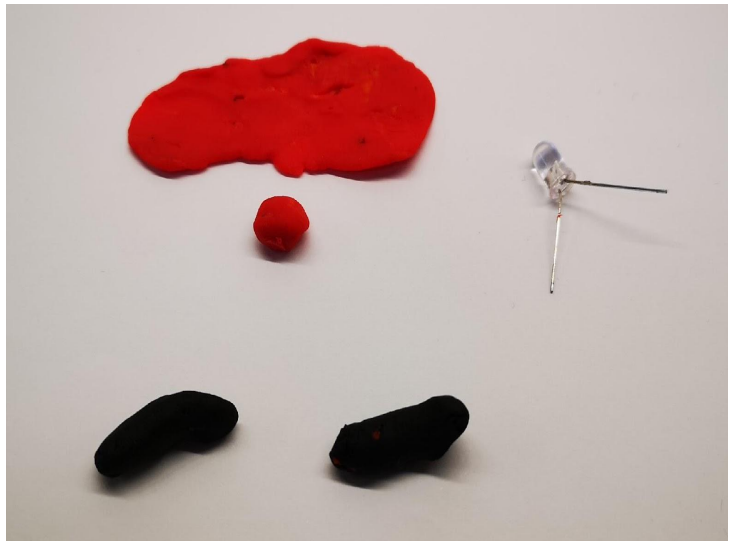
Red Dough (JOVI): INSULATOR
Black Dough(Play Doh): CONDUCTOR

With the insulating dough (JOVI):

- **Create a flat surface and a small ball.**

With the conductive dough (Play-Doh):

- **Create two small trunks.**



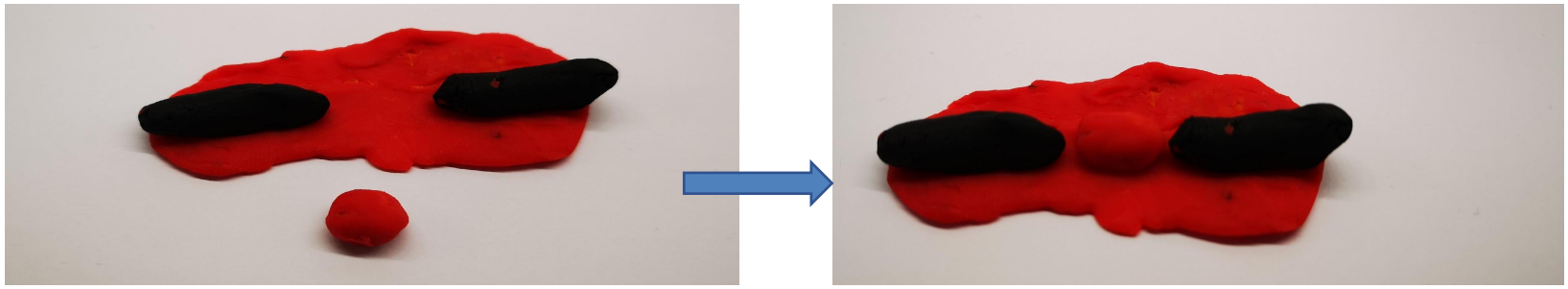
Conductive dough

LED CIRCUIT

Remember:

The two pieces of conductive Play-Doh must not touch each other.

To prevent this, place the two pieces of conductive Play-Doh (black) apart on top of the insulating Dough surface (red). Then, place the small piece of insulating Dough(red) between the two conductive pieces to keep them separated and prevent them from touching.l trunks.

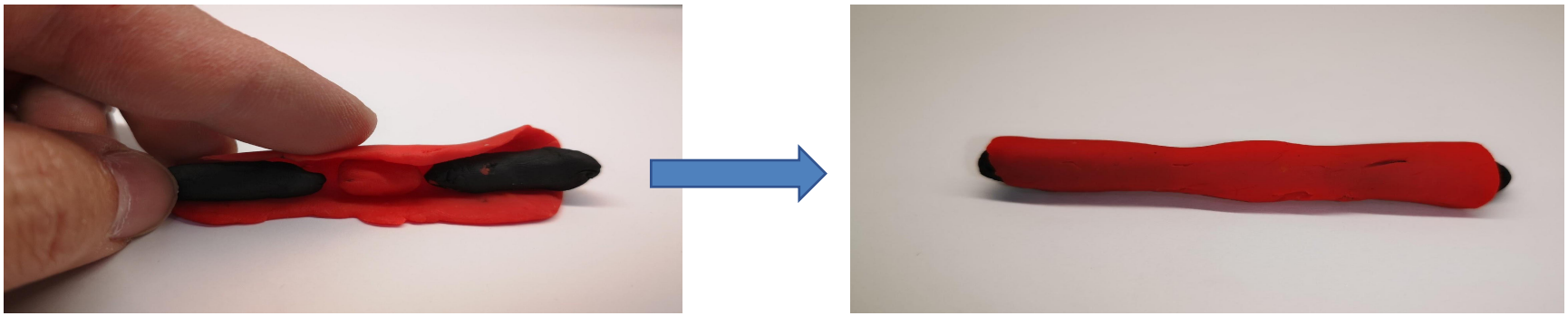


Conductive dough

LED CIRCUIT

Wrap everything inside the insulating dough surface.

Check first that the insulating Dough is doing its job: ensuring the conductive Play-Doh pieces do not touch each other. If you need to add more insulating Dough in the middle, do it now.

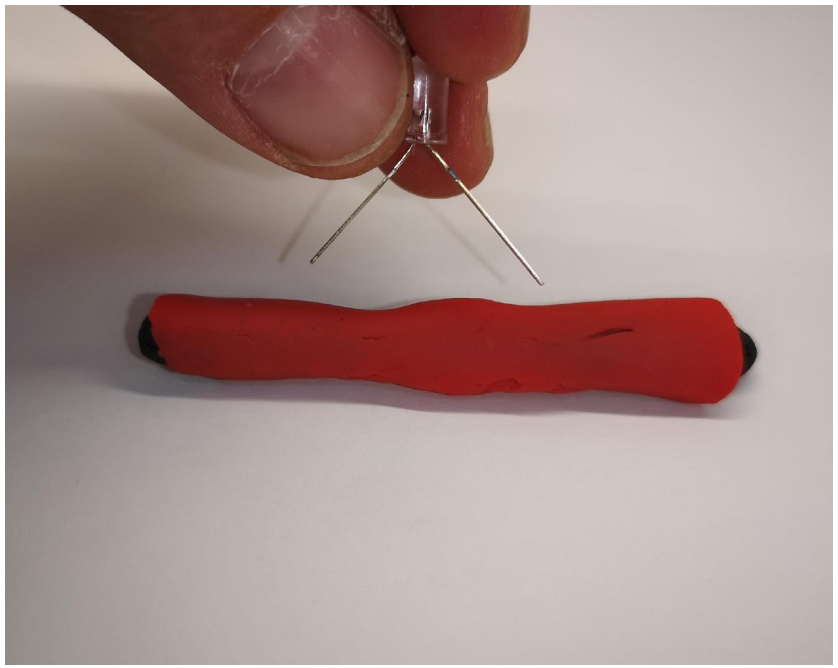


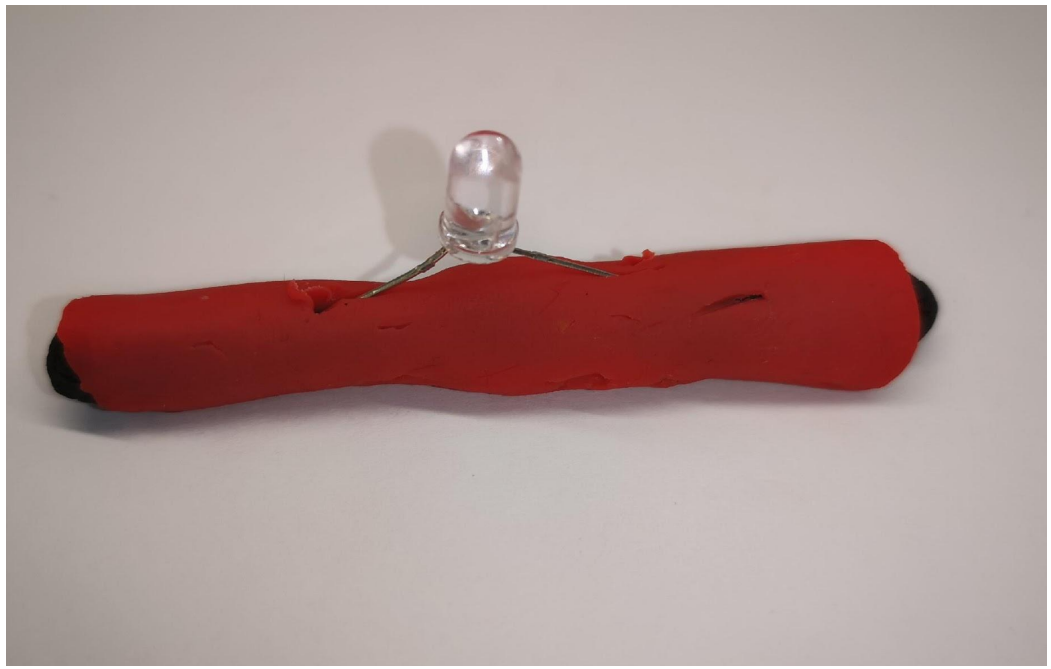
Conductive dough

LED CIRCUIT

Embed the LED, ensuring each leg reaches the conductive Play-Doh

Remember where you place the positive leg of the LED and where you place the negative leg. You can mark the Dough to keep track..



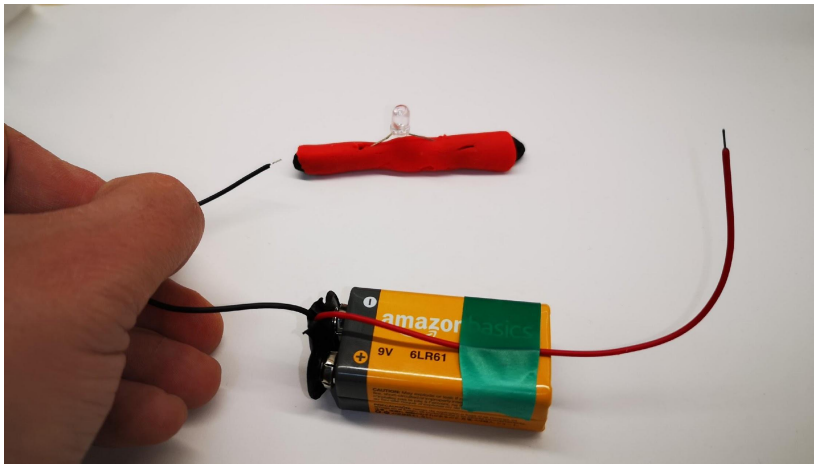


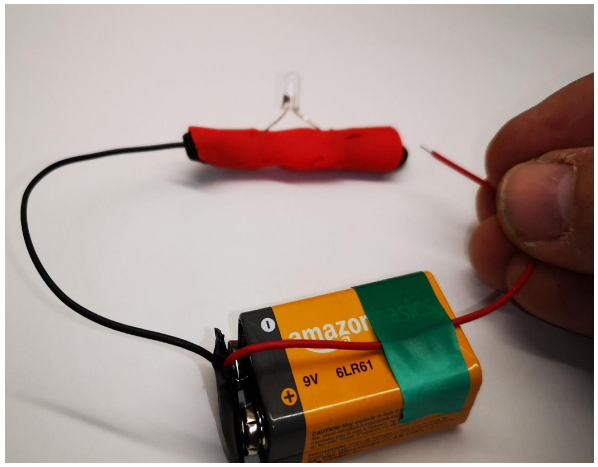
Conductive dough

LED CIRCUIT

Now attach the battery to the battery holder, and embed each wire into one side of the circuit

Each wire must make contact with the conductive Play-Doh hidden inside. Once connected properly, the LED should light up.





Conductive dough

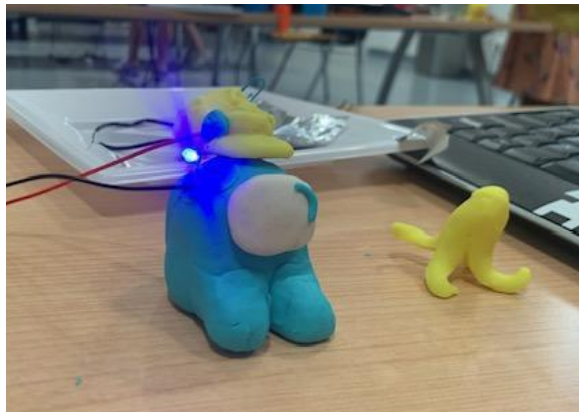
LEARNING BY DOING:

Let's create a Safe System to Place an LED Inside Our Figure.

Conductive dough

Creativity in motion

Create your favorite character using insulating dough by shaping and modeling the material into the design of your choice.
Add creative details and experiment with features to make it unique!

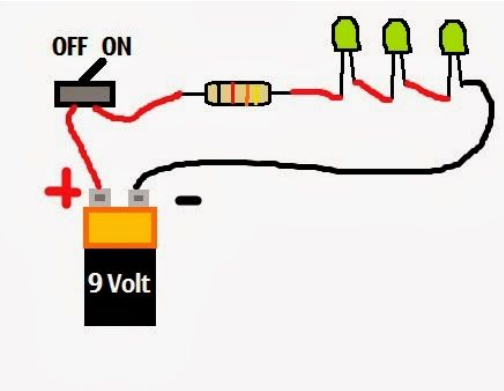


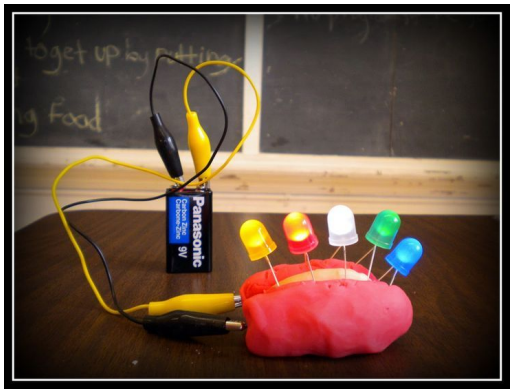
Conductive dough

EXTRA CONTENT

There are two ways to connect LEDs:

1. In Series: One LED is connected after another in a single loop.
2. In Parallel: The LEDs are connected with all the positive (+) terminals joined together and all the negative (-) terminals joined together.





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¡¡GRACIAS!!

PARTNER CONTACT

FabLab León | Nuria Robles | nuria@fablableon.org | +34661802774

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