

Thursday, December 11, 2025

- Decided to join the Calgary Youth Science Fair after hearing about it from our classmates (Dilan & Rudra)

Friday, December 12, 2025

- Talked to our school's science fair coordinator about how to join (Dilan & Rudra)
- Decided on the topic of using a sports drink as a conductor (Dilan & Rudra)

Monday, December 15, 2025

- Discussed with our school's science fair coordinator and changed our topic to using dehydrated mangoes as a conductor (Dilan & Rudra)
- Completed Basic Project Info form (Dilan)
- Completed Ethics Due Care 2A form (Dilan)
- Started Science Fair Logbook (Dilan)

Saturday, December 20, 2025

- Decided to use potatoes instead of mangoes after doing research and finding that normal mangoes don't conduct enough electricity to power a simple LED (Dilan & Rudra)

Tuesday, January 6, 2026

- Talked to our school's science fair coordinator about how to switch the title and description of our project (Dilan & Rudra)
- Changed the projects title and description to match our change of material (Dilan)

Sunday, January 11, 2026

- Called for three hours (Dilan & Rudra)
- Completed Hypothesis (Dilan & Rudra)
- Completed Variables (Dilan & Rudra)
- Made plans for a day to meet up and complete the experiment (Dilan & Rudra)
- Decided to use a red LED due to its low voltage requirement (Dilan & Rudra)
- Decided to try two batteries with different voltages and decide later which one we would use in the experiment (Dilan & Rudra)
- Conducted research on volts, amps, and ohms to make sure that the control experiment would actually work (Dilan & Rudra)

Monday, January 12, 2026

- Completed the Participant Image requirement (Dilan & Rudra)
- Inserted a placeholder image for the Project Image requirement (Dilan)

Monday, January 19, 2026

- Tested dehydrating a 4 mm slice of potato in the microwave (Dilan)
- Cut a whole potato into 4 mm slices to prepare for the experiment (Dilan)

Saturday, January 24, 2026

- Conducted the experiment, starting with the control, and then testing the dehydrated potato (Dilan & Rudra)
- Documented our observations and measurements (Rudra)
- Took pictures of the experiment for use in the trifold (Dilan & Rudra)
- Completed the rough draft for the procedure and observations (Dilan)
- Imported the images to the Science Fair Logbook Document (Dilan)
- Completed the idea for the application (Dilan)
- Typed out some sources of error (Dilan)

- Updated the Project Image with an actual image of the experiment (Dilan)

Sunday, February 1, 2026

- Completed the materials list (Dilan)
- Completed steps 1-26 of the procedure (Dilan)

Monday, February 2, 2026

- Completed steps 27-39 of the procedure (Dilan)
- Added the phone to the materials list (Dilan)

Wednesday, February 4, 2026

- Completed steps 40-41 of the procedure (Dilan)

Friday, February 6, 2026

- Completed steps 42-44 of the procedure (Dilan)
- Completed the procedure (Dilan)
- Added the hypothesis to the Logbook document (Dilan)
- Added the variables to the Logbook document (Dilan)

Sunday, February 8, 2026

- Pasted the full procedure into the CYSF platform (Dilan)
- Generated an image with ChatGPT for our header image (Dilan)
- Completed the observations (Dilan)
- Added the observations to the Logbook document (Dilan)
- Completed the analysis (Dilan)
- Added the analysis to the Logbook document (Dilan)
- Completed the conclusion (Dilan)
- Added the conclusion to the Logbook document (Dilan)
- Completed the application (Dilan)
- Added the application to the Logbook document (Dilan)

Thursday, February 12, 2026

- Decided to draw the titles of the trifold instead of printing them (Rudra)

Saturday, February 14, 2026

- Sketched out different font styles (Rudra)
- Decided on a bubble letter type font (Rudra)

Sunday, February 15, 2026

- Drew header for intro (Rudra)
- Drew header for hypothesis (Rudra)

Monday, February 16, 2026

- Drew header for variables (Rudra)
- Drew header for materials (Rudra)

Wednesday, February 18, 2026

- Drew header for procedure (Rudra)
- Drew header for observation (Rudra)

Saturday, February 28, 2026

- Drew header for analysis (Rudra)

Sunday, March 1, 2026

- Drew header for conclusion (Rudra)

Hypothesis

If a potato is dehydrated, and then rehydrated in tap water with salt, and then connected to a simple circuit with a battery and an red LED, the LED will turn on due to the potato allowing electrons to flow just like a normal potato would because the water that goes back into the dehydrated potato restores a pathway for electrical current.

Variables

Controlled Variables - voltage of the battery, conductivity of the wires

Manipulated Variable - water content of the potato

Responding Variable - brightness of the red LED

Materials

- One russet potato
- One knife
- One potato peeler
- One small bowl
- 250 mL of tap water
- One tablespoon of salt
- Four breadboard wires
- One 9V battery
- $\frac{3}{4}$ teaspoons of salt
- One red LED
- $\frac{1}{4}$ teaspoon measuring spoon
- One roll of invisible tape
- One ruler
- One pencil
- $\frac{1}{4}$ cups measuring cup
- One electric scale
- One notebook
- One plate
- 20 paper towels
- One microwave
- One timer (phone app)
- One smartphone equipped with a camera capable of capturing long exposure photographs

Procedure

1. Gather all the materials:
 - One russet potato
 - One knife

- One potato peeler
 - One small bowl
 - ¼ cups of tap water
 - One tablespoon of salt
 - Four breadboard wires
 - One 9V battery
 - ¾ teaspoons of salt
 - One red LED
 - ¼ teaspoon measuring spoon
 - One roll of invisible tape
 - One ruler
 - One pencil
 - ¼ cups measuring cup
 - One electric scale
 - One notebook
 - One plate
 - 20 paper towels
 - One microwave
 - One timer (phone app)
 - One smartphone equipped with a camera capable of capturing long exposure photographs
2. Completely peel the russet potato with the potato peeler
 3. Slice the russet potato into 4 mm thick slices with the knife
 4. Rinse each sliced potato under lukewarm tap water
 5. Pat each slice of potato down with a paper towel until dry
 6. Leave the potato slices on a fresh paper towel
 7. Place one paper towel on the plate
 8. Put one slice of potato on the paper towel
 9. Place one paper towel on the slice of potato
 10. Place the plate, along with the things on it, into the microwave
 11. Run the microwave at 40% power for one minute
 12. Take the plate and its contents out of the microwave
 13. Replace both paper towels with new ones
 14. Put the used paper towels in the appropriate waste collection bin
 15. Repeat steps 10-12 six more times
 16. Put the used paper towels in the appropriate waste collection bin
 17. Measure the weight, length, width and thickness of the dehydrated potato using the scale and the ruler
 18. Write the measurements in the notebook under a header labeled “Dehydrated Potato”
 19. Put 250 mL of lukewarm tap water into the small bowl
 20. Dissolve ¾ teaspoons of salt into the water by stirring
 21. Place the dehydrated potato into the saltwater
 22. At the same time, start a 30 minute timer
 23. Take the dehydrated potato out of the bowl once the timer ends

24. Measure the length, width and thickness of the dehydrated potato using the ruler
25. Write the measurements in the notebook under a header labeled "Dehydrated Potato"
26. Measure the length, width and thickness of a normal potato slice using the ruler
27. Write the measurements in the notebook under a header labeled "Normal Potato"
28. Cut the dehydrated potato and one normal potato slice in half along the short edge
29. Place all four pieces on a new paper towel, making sure they don't touch
30. Tape two wires to the positive and negative terminals of the 9V battery
31. Stick the other ends of the wires into the two normal potato halves, one in each.
32. Put the red LED into the potatoes, the short end into the potato with the wire going into the negative terminal of the battery and long end into the potato with the wire going into the positive terminal of the battery. Use tape to hold the wires in place on the battery if necessary.
33. Observe if the LED is on or not
34. Using the phone camera, take a 10 second long exposure photograph of the circuit and a normal exposure picture
35. Disconnect the LED and the wires from the two potato halves
36. Insert one wire into one half of the dehydrated potato
37. Insert one wire into the other half of the dehydrated potato
38. Put the red LED into the potatoes, the short end into the potato with the wire going into the negative terminal of the battery and long end into the potato with the wire going into the positive terminal of the battery.
39. Observe if the LED is on or not
40. Using the phone camera, take a 10 second long exposure photograph of the circuit and a normal exposure picture
41. Disconnect the LED and the wires from the two potato halves
42. Dispose of the four potato halves in the appropriate waste container
43. Dispose of the salt water in the bowl into the sink
44. Return all materials remaining to the appropriate place

Observations

After rehydrating, the dehydrated potato got one mm thicker and 0.5 cm wider. After rehydrating, the dehydrated potato felt like human skin. The LED glowed brighter when the electricity passed through the rehydrated potato. The LED glowed when the electricity was passed through the normal potato and the rehydrated potato.

Analysis

What caused the dehydrated LED to be brighter?

The LED glowed brighter when the electricity was passed through the rehydrated potato because of the added salt and water content. When rehydrating, the potato collected more water than it had before dehydrating. More water means that it conducts better. This is paired with the salt in the water. The salt is dissolved into ions which carry electrical current. These two are paired to lower the natural resisting force of the potato.

Why do potatoes conduct electricity, and what does water content have to do with it?

Potatoes are approximately 80% water, and the rest is minerals and starches. This causes them to conduct electricity relatively well because the water acts as a medium for electrons to flow through. Without the water, the potato would not be able to conduct. When salt was added to the water, it conducted even better because it formed an electrolyte solution within the potato. Naturally, potatoes are semiconductors.

How does the flow of electrons in a potato compare to a simple metallic conductor?

Both potatoes and metallic conductors can have electrons flow through them, but they do it in two different ways. In a metal, conduction occurs through a vast array of loose valence electrons that move freely. The current moves through these electrons, flowing from the negative terminal to the positive terminal. In a potato, however, electricity flows through ions. The potato acts as an electrochemical cell, with water dissolving minerals into ions which pass the flow of electrons. The ions conduct much slower, which is why potatoes have a much higher resistance than a copper wire, for example.

Application

A dehydrated potato cannot conduct electricity due to its lack of water. When you reintroduce water and minerals to the potato, it is able to conduct again. The potato can be compared to human muscle tissue. If it doesn't get enough water, it will not function as well as it could. When given enough water, it can work at its full potential. This project proves the importance of hydration in the human body. The water in muscles contains sodium and potassium ions, which conduct small amounts of electricity to contract and relax your muscles. When you don't drink enough, your body has to pull water from your muscles and put it in your blood, essentially dehydrating them. There isn't a good enough pathway for electricity to contract your muscle, so it weakens. This project is a great simplification of why we should drink enough water every day for those who refuse to understand the importance of it.

Conclusion

To conclude, the hypothesis was proved to be correct. When the potato was dehydrated, it lost its electrical conductivity. When it was rehydrated with saltwater, the salt ions and the water worked together to restore a pathway for the electrons. In the end, it can be confidently said that it is possible to dehydrate, and then rehydrate a potato slice to restore an electrical pathway to reach an LED.

