



Drawdio

Amount of time Demo takes: Under 5 minutes

Try this at home!

Lesson's Big Idea

- Use conductive properties of graphite, copper, and the human body to create sounds.

SAFETY: Safe Demo!

Materials

- [Drawdio pencil](#)
- Plain printing paper
- AAA battery

Background Information

- The drawdio is powered by a AAA battery and uses an oscillator to create audio frequencies that can be heard using an amplifier. Similar to a stereo but on a smaller scale.
- Oscillator: converts direct current from the battery into an alternating current signal that can carry sound
- The Drawdio is able to create noise when the circuit is complete. Once the circuit is complete, the electric current is able to flow through the Drawdio. Copper is connected to graphite, so when you touch both the copper tape on the pencil and the graphite already written on the paper, you complete the circuit.

Set-up Instructions

1. Put the battery in the Drawdio pencil
2. Sharpen pencil (if necessary)
3. Make sure the copper tape is touching the pencil lead

Instructional Procedure

1. Draw dark and thick lines/patterns on paper
2. Place a finger on already drawn lines that connect to what you're drawing

3. Try putting copper tape on paper (sound produced when you and the pencil are touching the copper tape)
4. Can also try touching another person and “drawing” on them
5. Have students try to create their own circuits following your demonstration.

Tips & Tricks

- Make sure your hands are clean for a better connection.

Assessment Questions

- What changes the tone of the sound produced?
 - The frequency changes based on the resistance between two points.
- Why do you have to be touching already drawn graphite for the drawdio to make noise?
 - Your body becomes part of the resistive loop.

Careers & Real-World Applications

- Electrical Engineering, Audio Engineering

Clean Up

- Take out the battery from Drawdio.
- Put the pencil back in the bag.

References

- <https://learn.adafruit.com/drawdiodesign>
- http://en.wikipedia.org/wiki/Electronic_circuit

Related Next Generation Science Standards

- K-5
 - 1-PS4 Waves and their Applications in Technologies for Information Transfer
 - 4-PS3 Energy
 - 4-PS4 Waves and their Applications in Technologies for Information Transfer
- 6-8
 - MS-PS2 Motion and Stability: Forces and Interactions
 - MS-PS4 Waves and Their Applications in Technologies for

Information Transfer

- 9-12
 - HS-PS4 Waves and Their Applications in Technologies for Information Transfer