

# SeaPerch Build Lesson: Electrical System

Legacy SeaPerch Resource

[www.seaperch.org](http://www.seaperch.org)

**Grade Level: 7<sup>th</sup> – 12<sup>th</sup> grade**

**Length of Lesson: 1 day**

## Goals:

- Students will investigate how an electric circuit works
- Students will create the electrical system for their SeaPerch ROV

## Next Generation Science Standards:

- PS2-B: Types of Interactions
- PS2-C: Stability and Instability in Physical Systems
- PS3-A: Definitions of Energy

## Materials:

- Power Point: SeaPerch Electrical System
- SeaPerch kits (one for each 2-5 students)
- SeaPerch Construction Manual
- Ohmmeter / Digital Multimeter

## Lesson: LAUNCH

Introduce students to electric circuits and how they work. The videos below introduce students to the basics - electric charge, electric fields, voltage, electric energy, capacitors, electric current, DC resistors, batteries, and circuit analysis. Choose videos to show based on your desired lessons.

Electric Charge: Crash Course Physics #25:

[https://www.youtube.com/watch?v=TFIVWf8JX4A&list=PL8dPuuaLjXtN0ge7yDk\\_UA0ldZJdhwkoV&index=26](https://www.youtube.com/watch?v=TFIVWf8JX4A&list=PL8dPuuaLjXtN0ge7yDk_UA0ldZJdhwkoV&index=26)

Electric Fields: Crash Course Physics #26:

[https://www.youtube.com/watch?v=mdulzEfQXDE&list=PL8dPuuaLjXtN0ge7yDk\\_UA0ldZJdhwkoV&index=27](https://www.youtube.com/watch?v=mdulzEfQXDE&list=PL8dPuuaLjXtN0ge7yDk_UA0ldZJdhwkoV&index=27)

Voltage, Electric Energy, and Capacitors: Crash Course Physics #27:

[https://www.youtube.com/watch?v=ZrMltpK6iAw&list=PL8dPuuaLjXtN0ge7yDk\\_UA0ldZJdhwkoV&index=28](https://www.youtube.com/watch?v=ZrMltpK6iAw&list=PL8dPuuaLjXtN0ge7yDk_UA0ldZJdhwkoV&index=28)

Electric Current: Crash Course Physics #28:

[https://www.youtube.com/watch?v=HXOok3mfMLM&list=PL8dPuuaLjXtN0ge7yDk\\_UA0ldZJdhwkoV&index=29](https://www.youtube.com/watch?v=HXOok3mfMLM&list=PL8dPuuaLjXtN0ge7yDk_UA0ldZJdhwkoV&index=29)

DE Resistors & Batteries: Crash Course Physics #29: [https://www.youtube.com/watch?v=g-wjP1otQWI&list=PL8dPuuaLjXtN0ge7yDk\\_UA0ldZJdhwkoV&index=30](https://www.youtube.com/watch?v=g-wjP1otQWI&list=PL8dPuuaLjXtN0ge7yDk_UA0ldZJdhwkoV&index=30)

Circuit Analysis: Crash Course Physics #30: [https://www.youtube.com/watch?v=-w-VTw0tQIE&list=PL8dPuuaLjXtN0ge7yDk\\_UA0ldZJdhwkoV&index=31](https://www.youtube.com/watch?v=-w-VTw0tQIE&list=PL8dPuuaLjXtN0ge7yDk_UA0ldZJdhwkoV&index=31)

### Lesson: INVESTIGATE

Have the students take out their SeaPerch Construction Manuals. Focus the students' attention on the "Assembly of the Control Box" section of the manual.

Explain the process for electrical system construction and soldering. Make sure that the students know to follow the correct order when adding components to the circuit board, or it will become difficult to solder pieces on the board.

### Lesson: PRACTICE

While the other students are working on the other SeaPerch systems, help the electrical engineers to create their control box for their ROV. Students should visually inspect their soldering to ensure there are no short circuits, and should conduct a continuity test with an Ohmmeter or digital multimeter.