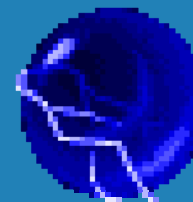
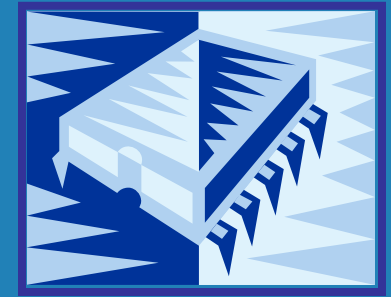


USING ELECTRICITY ON THE JOB!

By I. B.
Learning

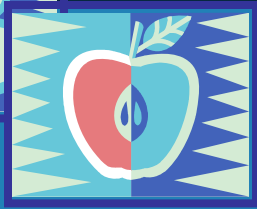


WHAT IS ELECTRICITY?



- ❖ Electricity is the property of matter where negatively charged electrons build up on atoms and create an electric charge. Once too much charge builds up, the atoms can't take any more, and the electric charge gets discharged. That's what causes electric current!
- ❖ An electric circuit occurs when electrons travel from a source (batteries) through wires and closed switches to a resistor/load.

WHY IS ELECTRICITY IMPORTANT?

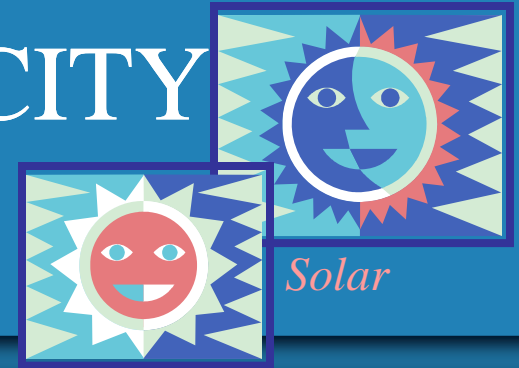


- ❖ People need electricity for everyday functions like cooking, food storage, lighting, watching television, and playing computer games.



- ❖ People also use electricity on their jobs.

WHERE DOES ELECTRICITY COME FROM?

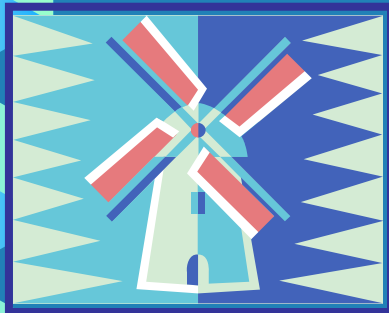


Geothermal



Hydroelectric

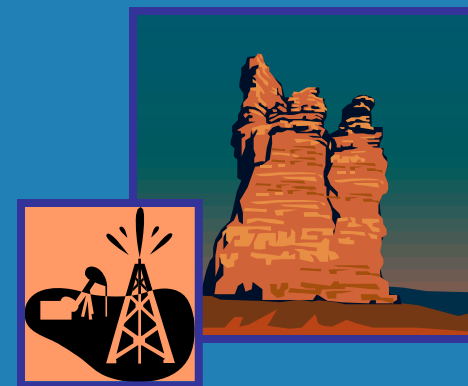
We can harness the Earth's power to generate electricity by using water, wind, the sun, fossil fuels, and nuclear power.



Wind

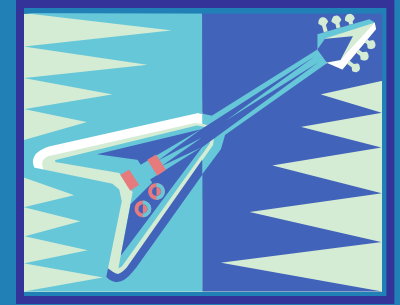


Nuclear



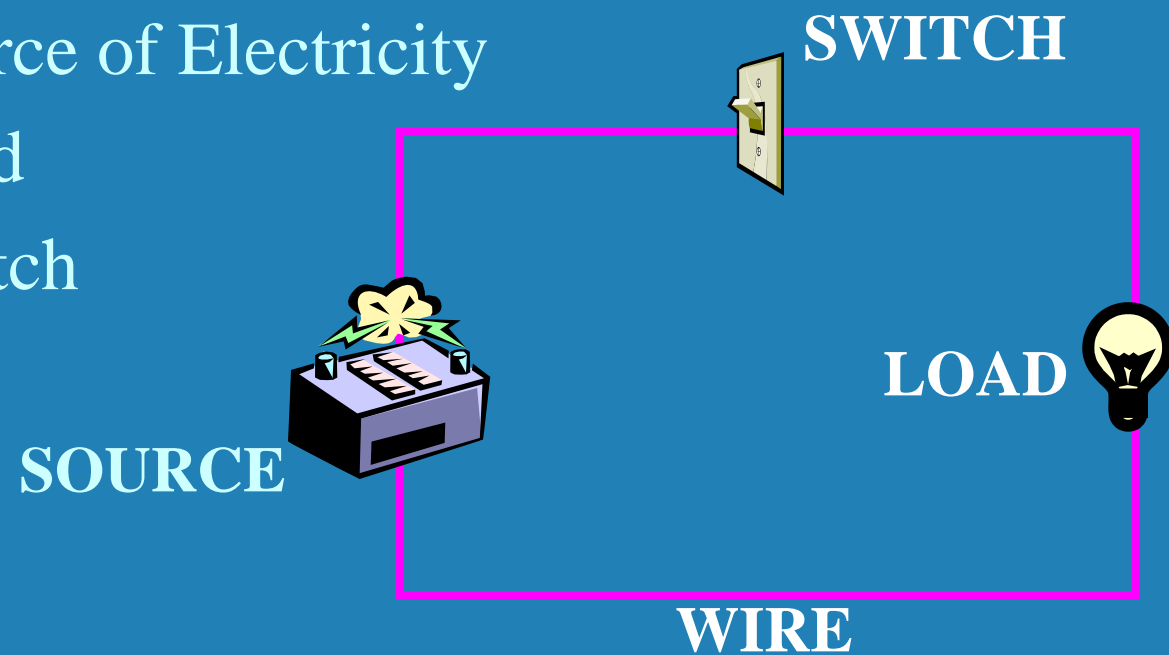
Fossil Fuels

WHAT IS AN ELECTRIC CIRCUIT?

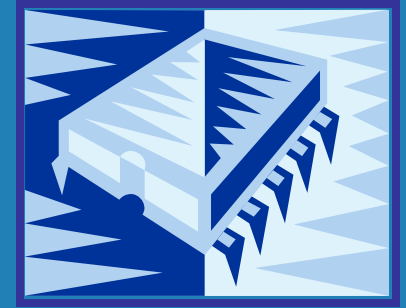


❖ FOUR PARTS OF ELECTRIC CIRCUITS

- Wire
- Source of Electricity
- Load
- Switch



OHM'S LAW



Ohm's Law – Explains electric circuits because the current in a wire or electrical circuit is equal to the ratio of voltage to resistance/load:

- Formula:
$$\text{Current} = \frac{\text{Voltage}}{\text{Resistance}}$$

$$I = \frac{V}{R}$$

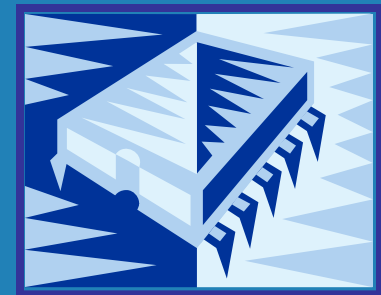
- Units of Measure:
$$(\text{Amps}) = \frac{(\text{Volts})}{(\text{Ohm})}$$

WHO USES ELECTRICITY IN THEIR JOBS?

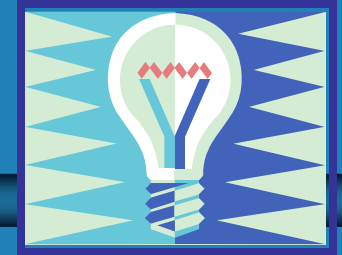


- ❖ **COMPUTER TECHNICIANS** - Computer professionals use electricity every day. Computers use electrical circuits that are integrated with each other. They are called integrated circuits.

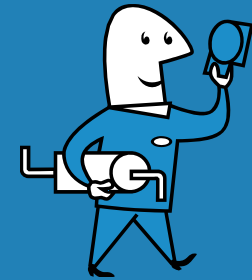
- ❖ **ELECTRICAL ENGINEERS** – Many engineers design computer hardware and software.



WHO USES ELECTRICITY IN THEIR JOBS?

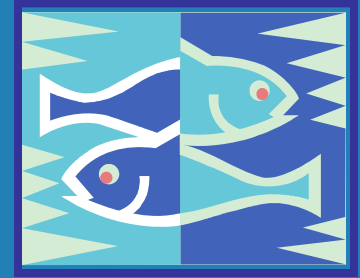


MECHANICS – Mechanics use electricity when they use diagnostic machines to repair automobiles, trucks, and other vehicles.

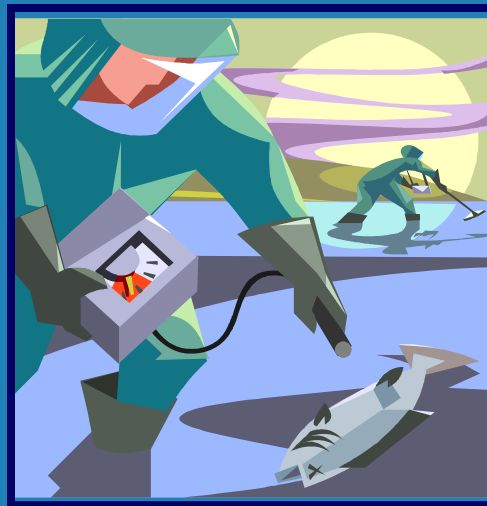


RACE CAR DRIVERS – Drivers use electricity every time they start their engines.

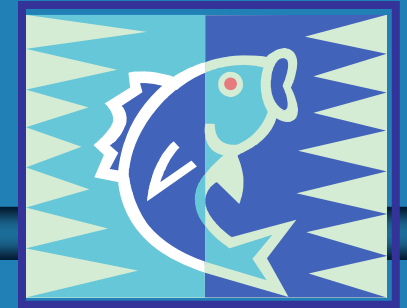
WHO USES ELECTRICITY IN THEIR JOBS?



WILDLIFE BIOLOGISTS – Biologists and technicians use electricity to count populations of fish in streams and rivers.



BIOLOGISTS USE ELECTRICITY TO COUNT FISH

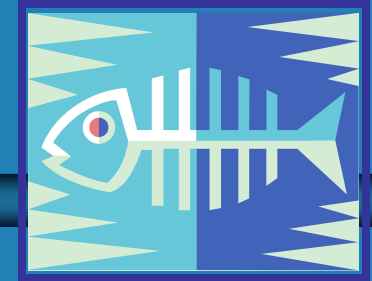


❖ Why Count Fish Populations?

- Fish represent the biodiversity of life on the planet.
- Fish, especially trout, are used for recreation, such as sport fishing.
- Fish serve as a food source for humans.



WHY USE ELECTRICITY TO COUNT FISH?

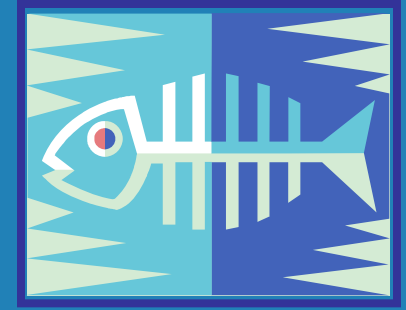


Because the fish gets zapped, it gets stunned and faints. The fish must be immobilized so that the biologists can identify and measure its length and weight. Also, they need to keep it out of the water so it doesn't get counted twice.

Don't Worry! The fish only gets enough electricity to be stunned. Then it gets put back safe and sound.



ELECTRO-FISHING AT HANGTOWN CREEK



❖ What We Did

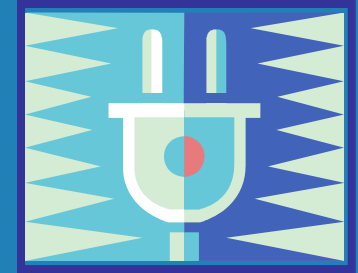
- We worked with officials from the California Department of Fish & Game.
- We analyzed fish populations.
- We measured the length and mass of fish.

❖ Why We Did it

- Hangtown Creek has been “degraded” since the Gold Rush Days (about 150 Years). Fish need to be protected because they provide food and recreation. Information scientists gain from electro-fishing is used to provide an improved environment for the fish.

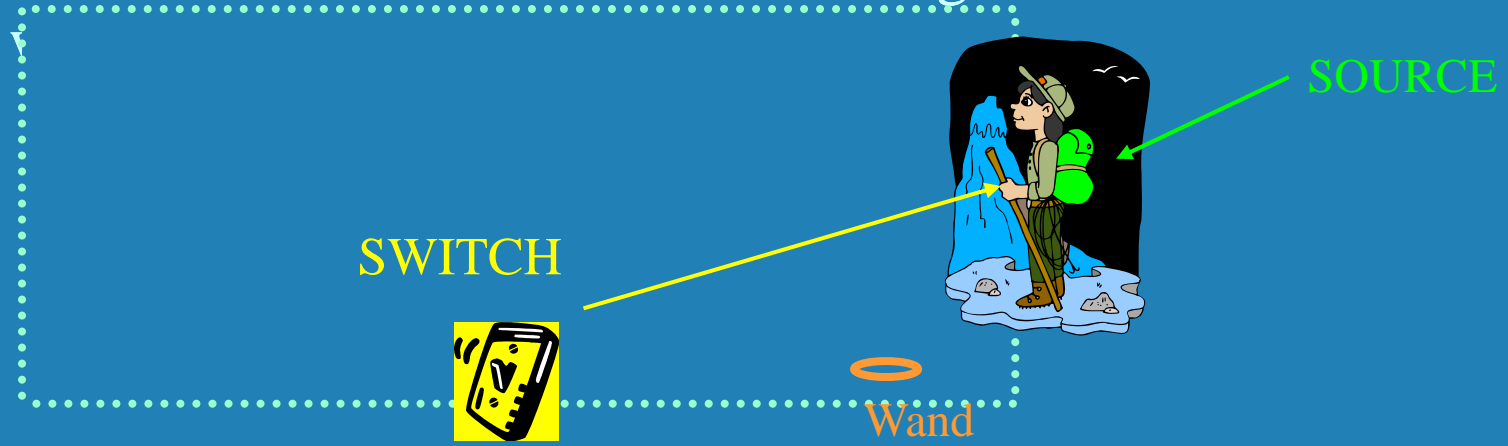


USING ELECTRIC CIRCUITS TO COUNT FISH

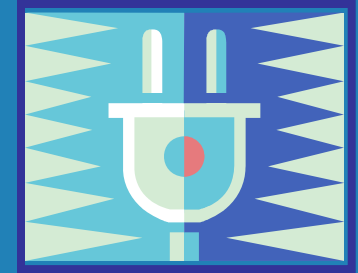


Wildlife Biologists for the CA Department of Fish & Game use electrical circuits to count fish.

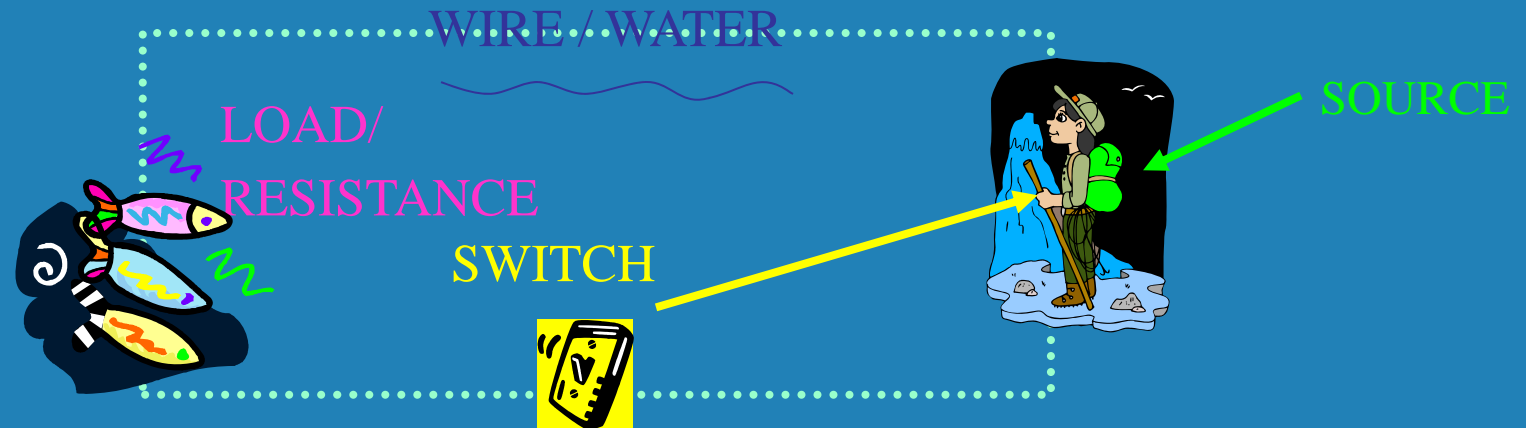
1. **Source of Electricity** – The biologist carries a backpack that is the power source.
2. **Switch** - The biologist flips the switch by pressing a button that sends an electrical current through a wand into the



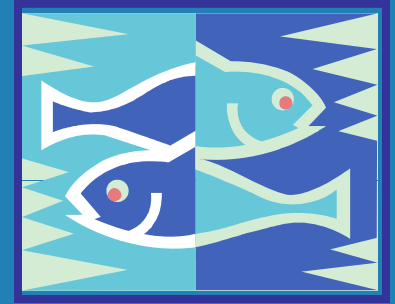
PARTS OF THE ELECTRIC CIRCUIT



3. **Wire** - Ions (charged particles) in the water serve to conduct the electricity just like wires in your computer.
4. **Load** – The fish serves as a resistance to the electric current. The fish gets stunned and faints. Don't worry! The fish only gets enough to get caught, identified, counted, and measured. Then the fish gets put back safe and sound.



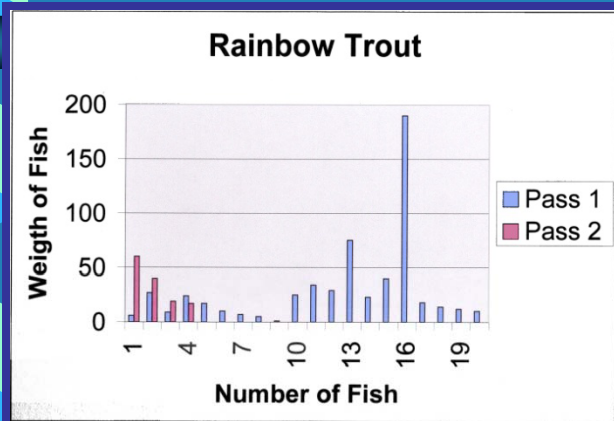
ELECTRO-FISHING: THE EXPERIMENT



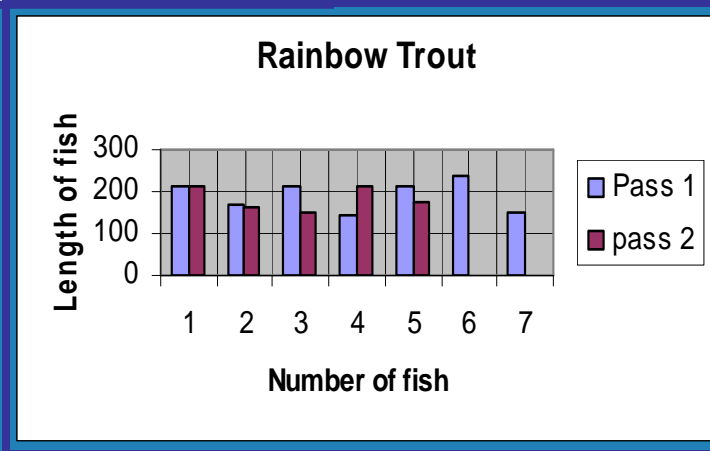
❖ STUDENT DUTIES:

- Fish Collection – Netting the fish after the biologist zapped it with electricity
- Fish Measurement
 - Fish Identification – Decide what type of fish it is (trout, perch, sucker, minnow, and so forth)
 - Length Measurement– Measured length of fish in centimeters
 - Mass Measurement– Measures each fish's mass in grams
 - Recorder – Writes down EVERYTHING!

WILDLIFE BIOLOGISTS HAVE FUN USING ELECTRICITY!



We KNOW this is a fun job because we got to do it!



Wildlife biologist Mr. Somer uses electricity when he zaps fish with a current and then again when he types reports on his computer!



Are You a Person Who

- ❖ ...likes to study fish?
- ❖ ...likes to play with electricity?
- ❖ ...likes doing real scientific research?
- ❖ ...likes being outside?
- ❖ ...can use the scientific method?
- ❖ ...wants to understand, “When will I ever need to know this stuff?”

THEN BEING A FISH ZAPPER IS THE JOB FOR YOU!!!



Learn More About Electro-Fishing

Check out these links:

Electro-Fishing, EPA New England Regional Laboratory
www.epa.gov/region1/lab/ecology/efishing.html

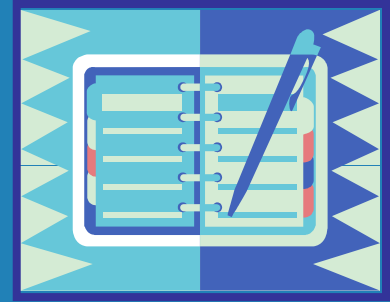
Electro-Fishing on the North Branch www.boquetriver.org/newselfish.html

Fresno Flyfishers for Conservation
www.fresnoflyfishers.org/electropics/indexelectrofish.htm

Eastern Sierra Watershed Project www.wmrs.edu/eswp/dscrptn.htm

How to Start Electro-Fishing www.electrofisher.com/How_to_electrofishing.html

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<http://cgl.microsoft.com/clipgallerylive/default.asp>