Water Level Sensor

Electronics
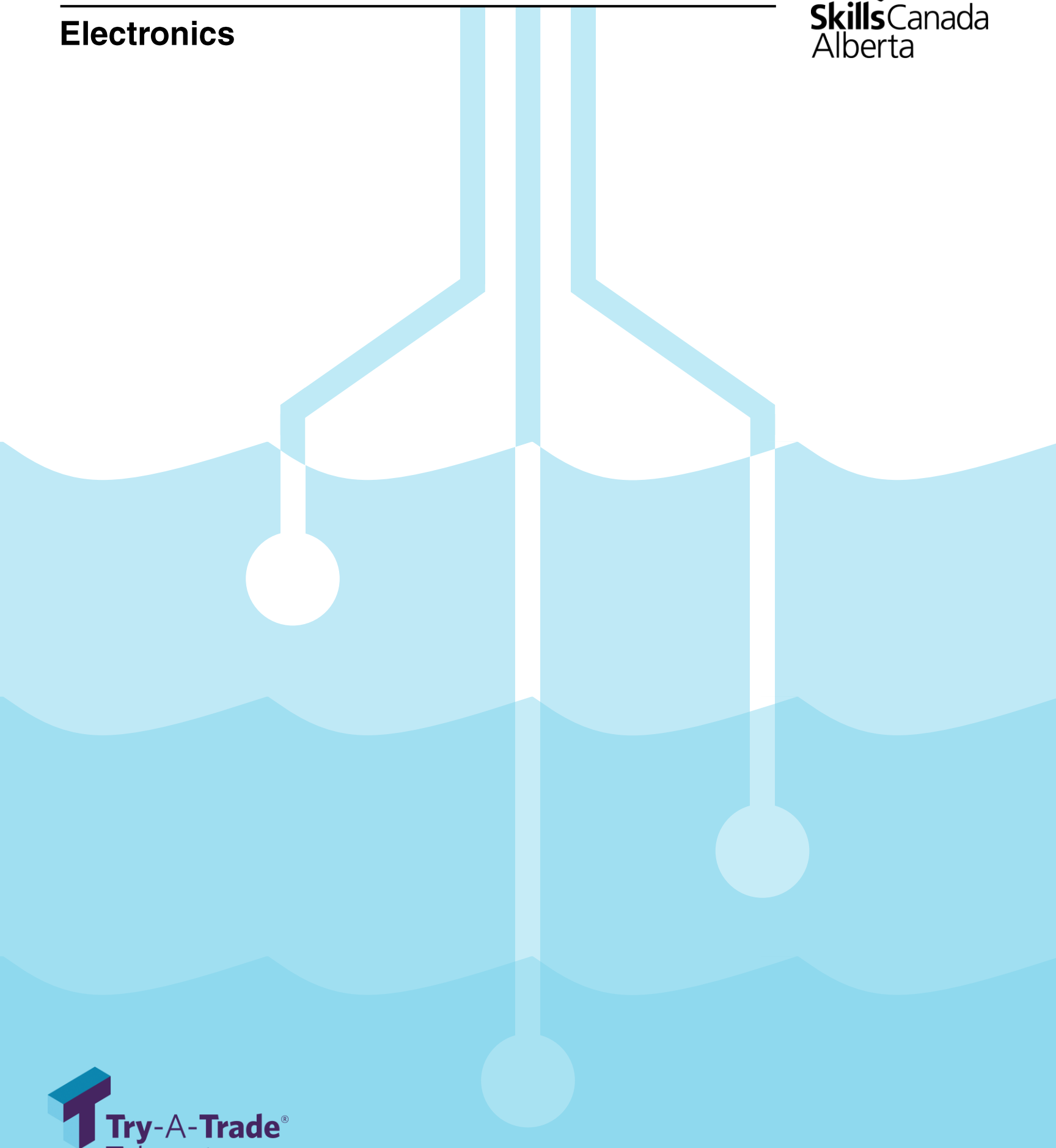
Water Level Sensor

Provided materials

1. Breadboard x2
2. 9V Battery
3. Battery leads
4. Short wire bundles
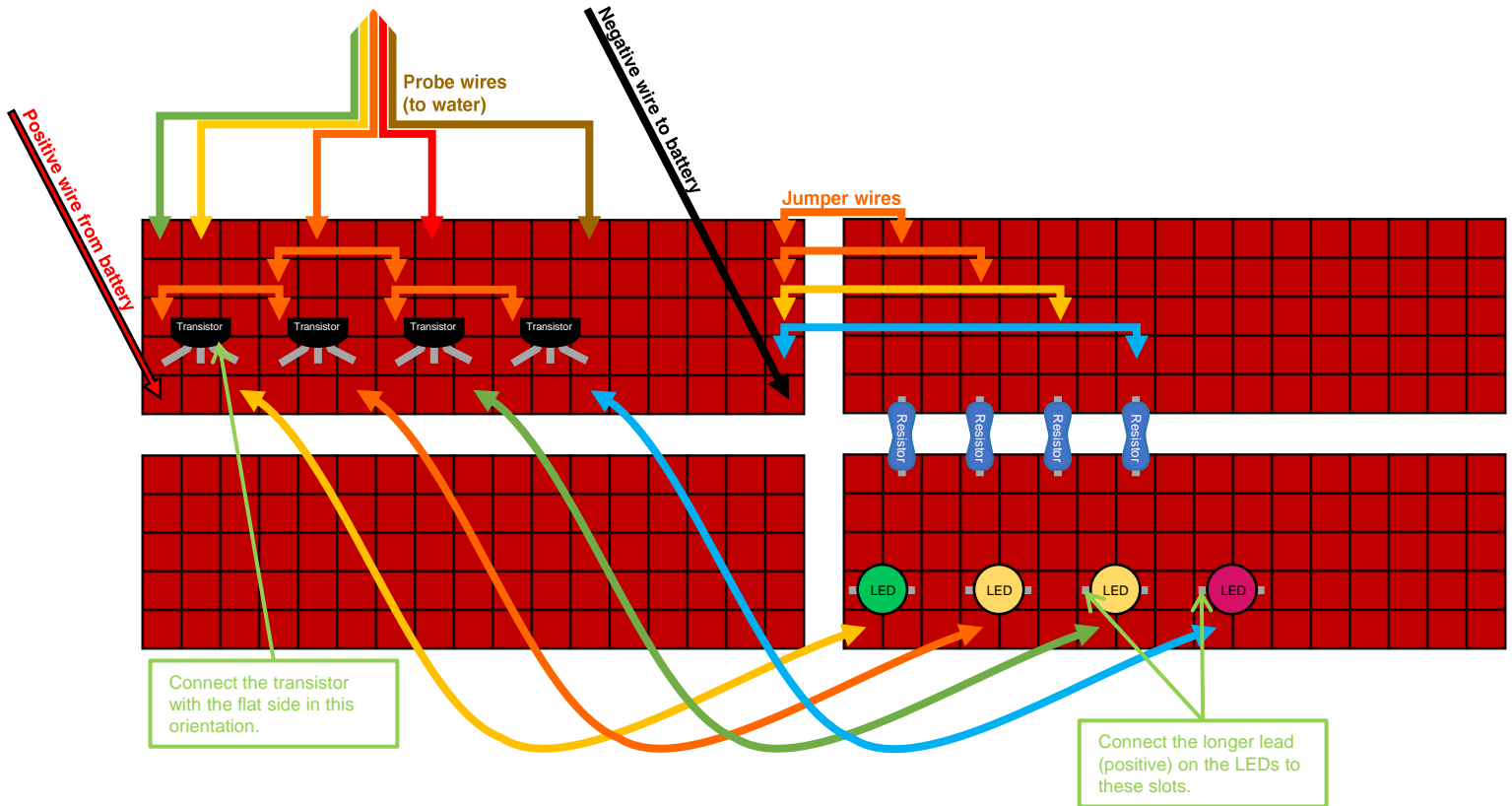5. Long wire bundles
6. Transistors x4
7. Resistors x4
8. LED x4
9. Jumper wires x7
10. Wire strippers
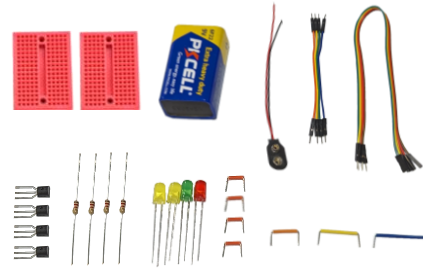
1. Connect two breadboards together, end to end.

2. Follow the wiring diagram below. Pay close attention to LED and transistor orientations.

Probe wires (to water)

Negative wire to battery

Positive wire from battery

Jumper wires

Transistor   Transistor   Transistor   Transistor

Resistor   Resistor   Resistor   Resistor

LED   LED   LED   LED

Connect the transistor with the flat side in this orientation.

Connect the longer lead (positive) on the LEDs to these slots.

3. Cut the long set of wires as shown, to create the water probe wires:
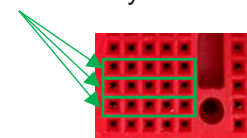
4. Bend and trim the resistor leads to allow them to sit flush on the board:

Breadboards

The inside of a breadboard is filled with sets of parallel conductive "bus bars" that carry the current along their own line.

Breadboards allow for easy component connections.

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Skills Canada Alberta

5. When complete, your board should match this picture, and should light the LED's in sequence as the probe is inserted deeper into a container of water. If it does not work, ensure that the battery, transistors, and LED's are inserted in the correct orientation.
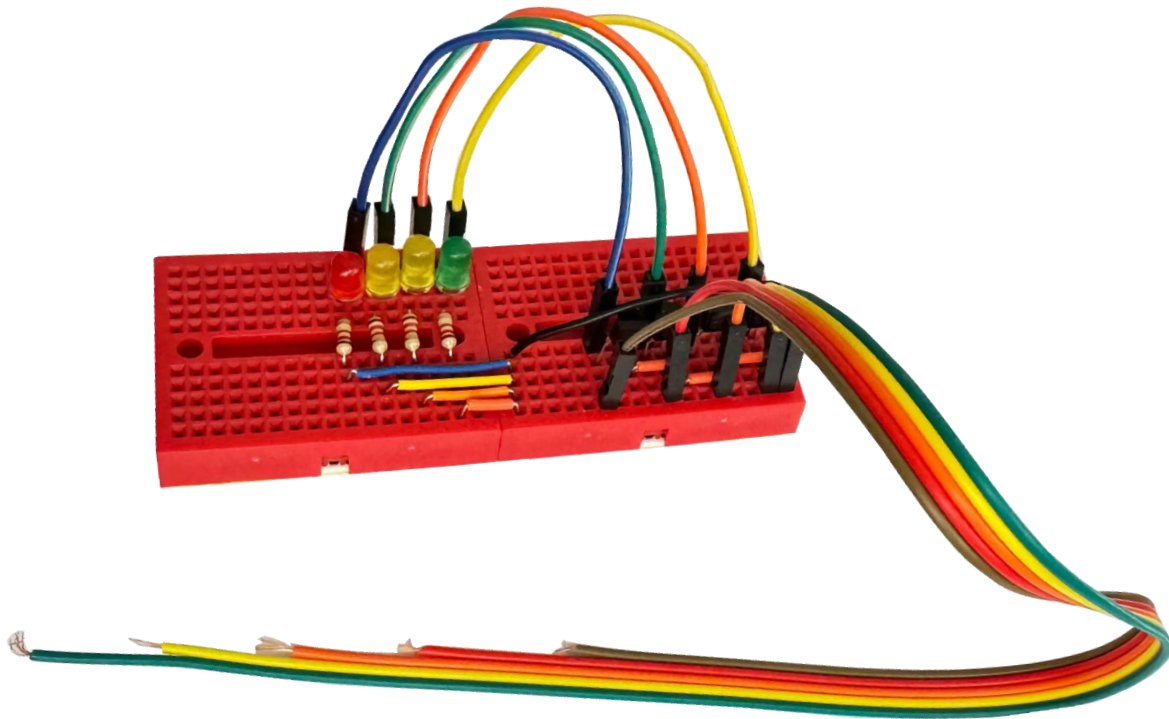
Transistors

Transistors control the flow of electricity without the use of a physically moving switch. This is achieved using semiconductors.

Semiconductors are combinations of materials that allow electricity to flow only under certain conditions. Made with either an excess or a lack of valence electrons, semiconductors are sensitive to the direction and polarity of current. Transistors use this property to control current flow by sandwiching two types of semiconductor materials together and providing a signal voltage to the material. This signal balances the valence electron counts in the semiconductor and allows current to flow, but only while the signal current is active.

NPN
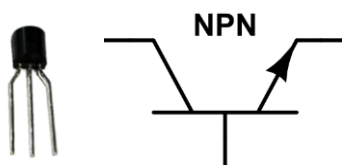
Resistors

An electric current is formed when electrons flow through a complete circuit.

A resistor restricts the number of electrons that can flow through a circuit, turning their energy to heat or light instead of electricity.
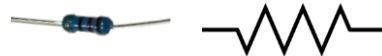
Light Emitting Diodes

Light Emitting Diodes or LEDs operate in a similar method to laser diodes. A key difference is that LEDs emit "incoherent" light, which is a mixture of light phases and spectrums as opposed to laser light's purer phase and spectrum band. LEDs are much more efficient to operate compared to laser diodes.
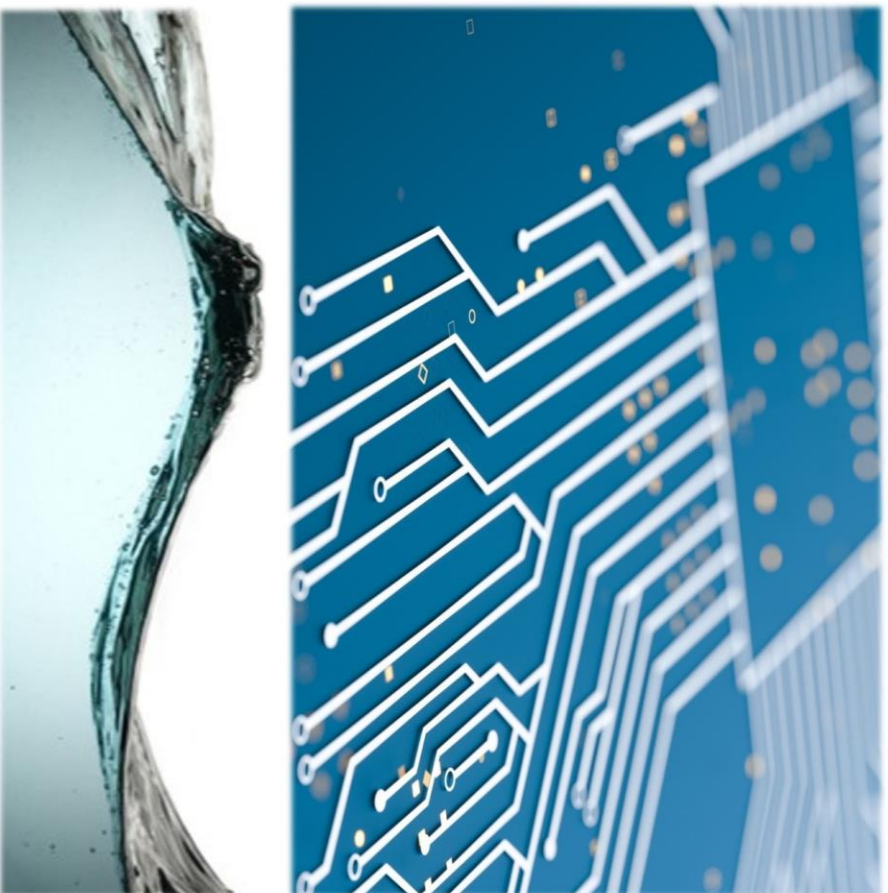
Try-A-Trade® Takeout Program	
Activity: Water Level Sensor	V3
Skill Area: Electronics	
CTS Cluster: TMT	

Water Level Sensor ◣

Project

Students wire a breadboard using transistors and resistors to create an LED water-depth sensor.

Electronics 📡

Schooling

- Education varies depending on sector and job.
- Start early with the Registered Apprenticeship Program (RAP) or explore options available through Career and Technology Studies (CTS).

Jobs

- Electronic and Avionics Engineers, Automotive Technicians, and many more.
- Develop, maintain, and deploy electrical components, systems, and infrastructure.
- Average salary: $64,714.00 - $103,500.00/year
- Average wage: $31.12 - $51.35/hour

More information:

Find your trade:
Or visit:
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