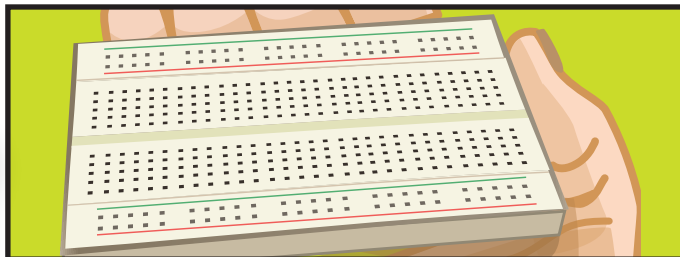


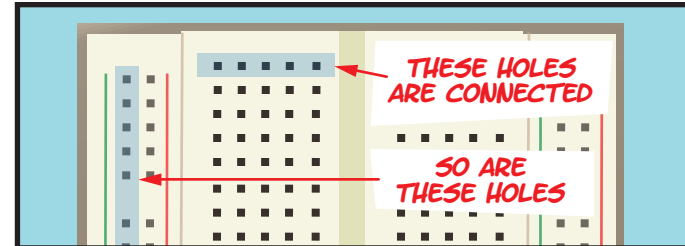
What is a BREADBOARD?

(and how do I use it?)

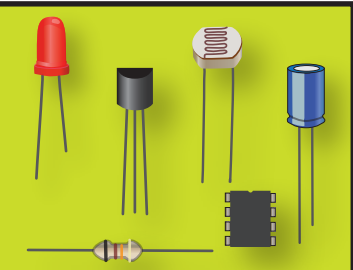
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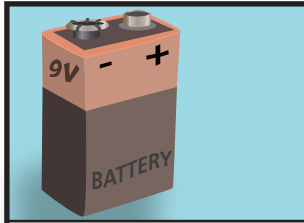
A **SOLDERLESS BREADBOARD** IS A PLASTIC BOX FULL OF METAL STRIPS, WITH A GRID OF HOLES ON TOP. IT IS USED TO BUILD AND TEST CIRCUITS QUICKLY.



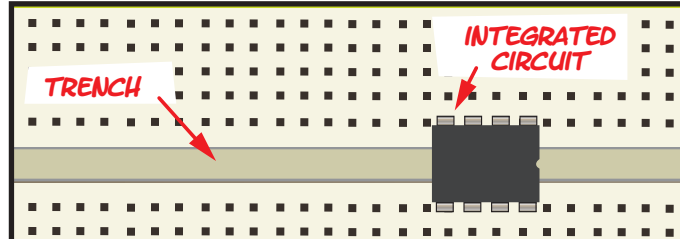
THE HOLES IN THE BREADBOARD ARE CONNECTED IN PATTERNS THAT ALLOW YOU TO ATTACH **COMPONENTS** TO EACH OTHER AND TO **POWER** AND **GROUND**.



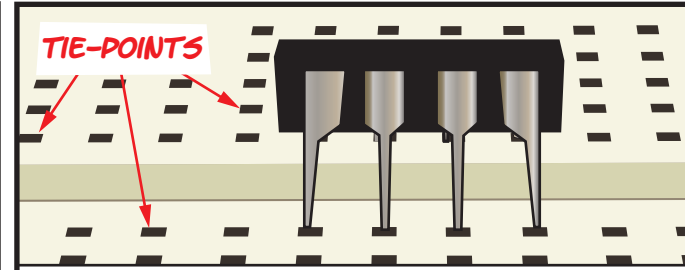
COMPONENTS ARE PARTS USED TO BUILD OUR CIRCUIT.



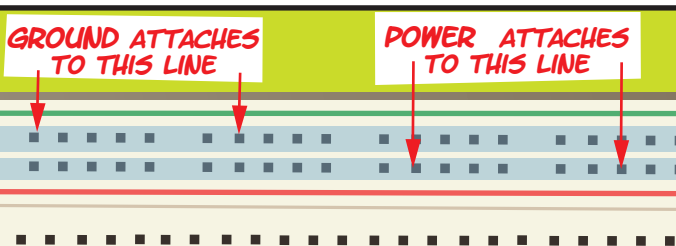
WE WILL ATTACH A **BATTERY** OR OTHER **POWER SOURCE** TO **POWER** AND **GROUND** TO RUN OUR CIRCUIT.



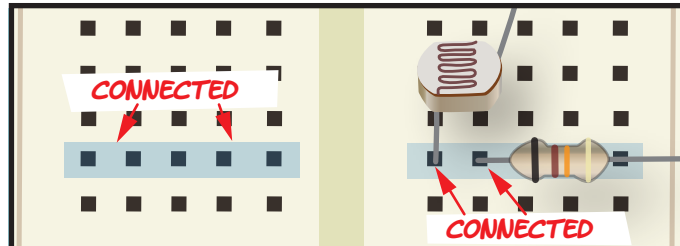
GENERALLY A BREADBOARD HAS A SLOT DOWN THE MIDDLE CALLED A **TRENCH**. THE WIDTH IS DESIGNED SO MANY **INTEGRATED CIRCUITS (ICS)** FIT RIGHT ACROSS IT.



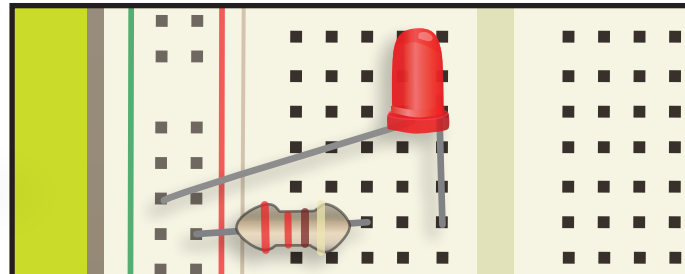
THE HOLES, CALLED **TIE-POINTS**, ARE THE SAME DISTANCE APART AS THE PINS ON MANY **ICS** AND OTHER COMPONENTS.



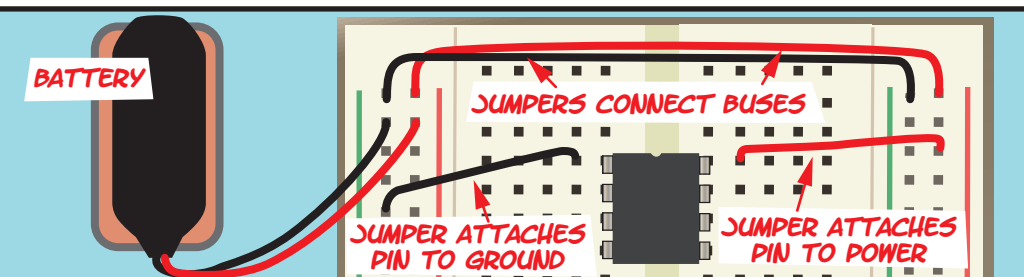
THERE ARE OFTEN 2 LINES OF HOLES ON EACH OF THE LONG SIDES OF THE BOARD THAT GET ATTACHED TO **POWER** AND **GROUND**. THESE LINES ARE CALLED **DISTRIBUTION BUSES**.



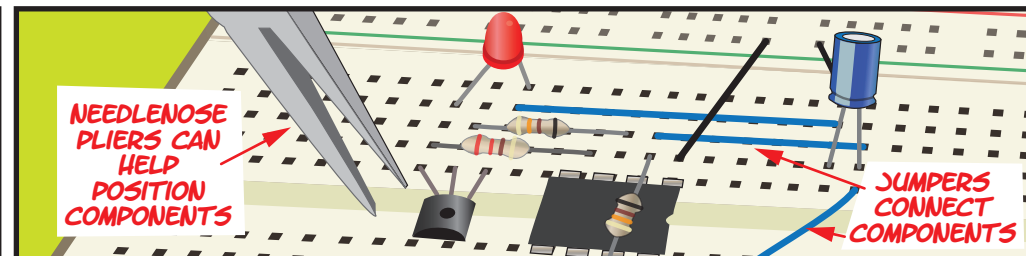
ROWS OF FIVE CONNECTED **TIE-POINTS** RUN PERPENDICULAR TO THE **BUSES**. TO CONNECT COMPONENTS, PUT THEIR LEADS IN **TIE-POINTS** IN THE SAME ROW.



HERE A **RESISTOR** IS CONNECTED TO **POWER** AND TO THE **ANODE** OF AN **LED**. THE OTHER LEAD OF THE **LED** ATTACHES TO **GROUND**.



YOU CAN MAKE CONNECTIONS BETWEEN ROWS OF **TIE-POINTS** BY INSERTING SHORT PIECES OF WIRE CALLED **JUMPERS** BETWEEN HOLES IN DIFFERENT ROWS.



USING A **SOLDERLESS BREADBOARD** ALLOWS YOU TO GET YOUR CIRCUIT UP AND RUNNING QUICKLY SO YOU CAN TEST IT. ONCE YOU HAVE IT JUST RIGHT, YOU CAN BUILD A MORE PERMANENT VERSION ON **PERFBOARD** OR A **PCB**!