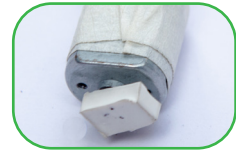


# Scribble Bot

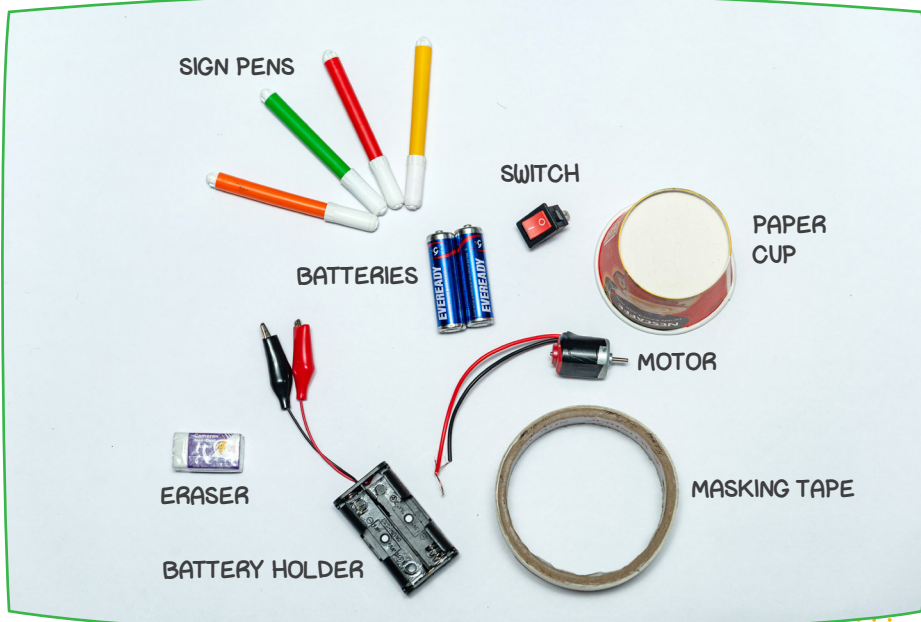


A Scribble bot is a simple device that draws random, beautiful patterns as it vibrates and moves. It uses an offset motor to generate vibration, causing it to follow unusual paths.

**Note:** *an offset motor is a motor with weight unevenly distributed around its shaft. Observe in the photo how the shaft is not inserted at the eraser's center. This makes one side of the shaft heavier.*



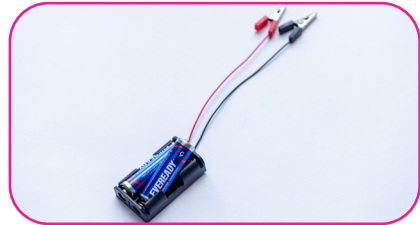
## WE WILL NEED THESE MATERIALS



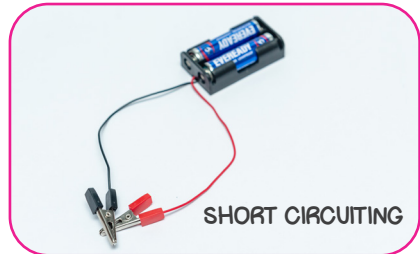
BEFORE WE BUILD THE SCRIBBLE BOT, LET'S TINKER WITH THE ELECTRONIC COMPONENTS FOR A WHILE.

LET'S RUN A MOTOR

Insert the batteries in the holder. The flat face of the battery goes in at the spring end.



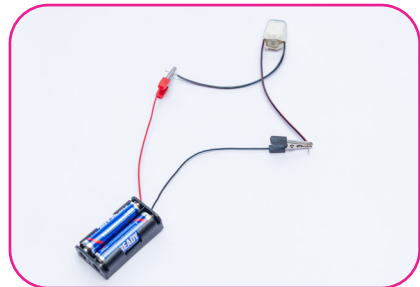
**Caution: Directly touching the two battery terminals will cause a high amount of current to flow through. This is known as short circuiting. It will drain the battery and can damage it.**



Connect the two wires protruding from the motor to the wires of the battery holder. What do you observe?

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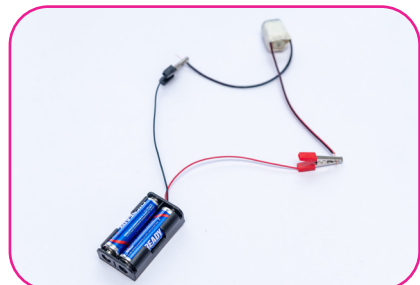


Now reverse the connection. What happens?

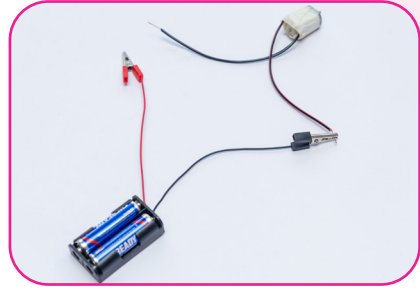
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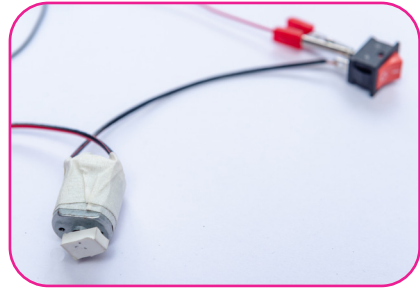
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This path through which current flows is known as a circuit. Break the above circuit at any one point.



Cut a small piece of eraser and attach it to the motor shaft. Reconnect the wires and observe what happens.

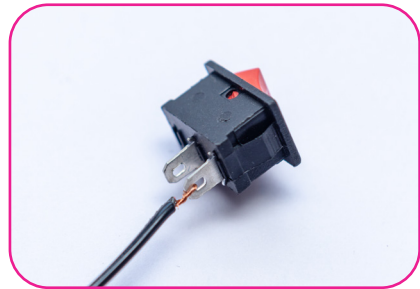


### USE A SWITCH TO TURN IT ON/OFF.

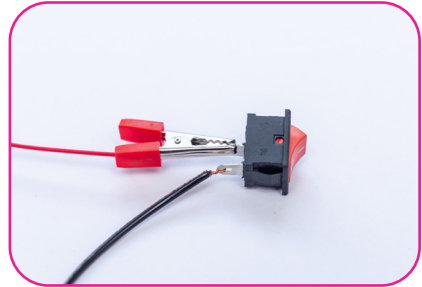
Get a switch. Turn it off, as shown in the photo. Once again break the circuit at any one point.



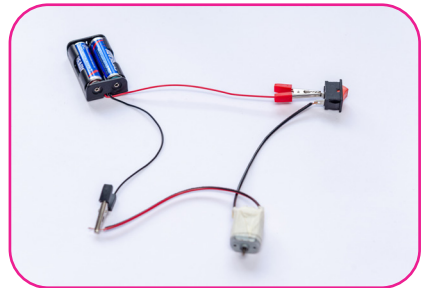
A switch has two metal terminals with holes. Insert the free wire from the motor into one of the holes. Bend and twist it gently to secure the connection.



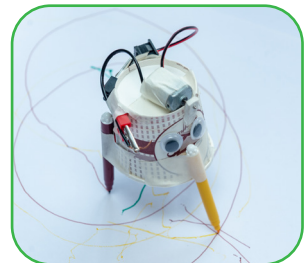
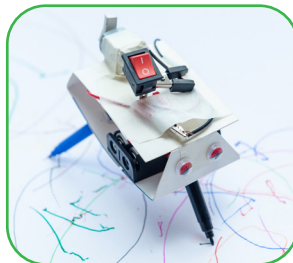
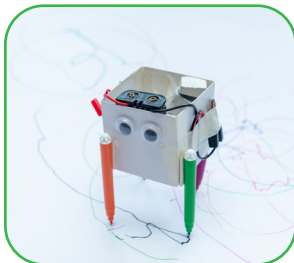
One alligator clip of the battery holder is already connected to the motor. Now connect the free alligator clip to the other terminal of the switch.



Turn on the switch. What happens?



**NOW LET'S BUILD OUR SCRIBBLE BOT**  
**HERE ARE SOME MODELS OF SCRIBBLE BOT. THEY WILL HELP US GET**  
**IDEAS BUT LET'S COME UP WITH OUR OWN DESIGNS.**



## WE FOUND THESE HINTS TO BE HELPFUL WHILE BUILDING THE SCRIBBLE BOT

- ✓ Do not directly connect the battery terminals. This will cause a short circuit and will quickly drain or damage the battery. When batteries are placed in the holder, do not directly connect its wires.
- ✓ Short circuit also happens when current is flowing through the motor but it is unable to rotate due to an impediment. Make sure the eraser attached to the shaft can rotate freely.
- ✓ When the battery gets low, the current supplied might not be enough to start the motor. In such cases, you can give a gentle push to help the motor start.
- ✓ Apply masking tape around naked wires and alligator clips to avoid short circuiting.

### Think like an engineer

What factors affect the patterns drawn by the scribble bot?

### Think like a physicist

Why does an offset motor vibrate?



Let's experiment  
with the  
design

- How can you get the scribble bot to change the patterns it scribbles? Or move slow and smooth? Or fast and jittery?
- What happens if you change the position of the battery? Or insert the shaft at different points in the eraser? Or change the size of the eraser on the shaft?
- Try your own ideas. I wonder what happens if

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### Reflection

What challenges did you face while building your scribble bot?  
How did you overcome them?

What new questions do you have?

