

SMART CHELI

STEM challenge #06

Scribble Bot



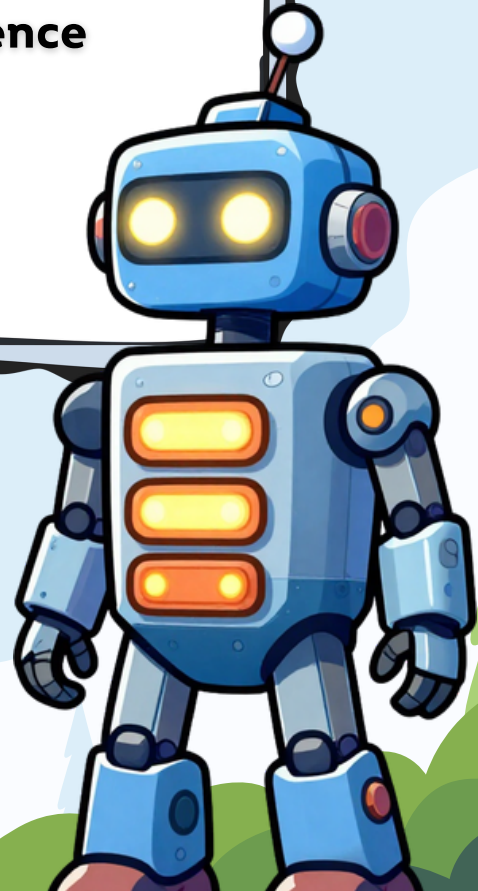
Age: 9-13years

Time: 30-45 min

**STEM Areas: Chemistry + Science
+Engineering**

Difficulty: ★★☆☆☆

Internet needed: No





One day at home, Mini's little sister had a small buzzing toy that hopped and skidded across the table the moment it was switched on no wheels, no legs, yet it moved all by itself!

Mini picked it up, pulled out her trusty magnifying glass, and peeked inside. There was just a tiny motor with something lopsided spinning around and around.

The next day at school, her teacher announced a new challenge: "Build a robot that can draw on its own – without anyone pushing it, and without any remote control."

Mini thought about the buzzing toy and grinned: "I think I know what makes something shake and move without wheels..."

Let's, Build a bot together.



But, how should I build it?





1.SPOT THE PROBLEM

What does mini want her robot to do?

What part could make the robot move or vibrate?

What do you think will happen when the robot moves across a sheet of paper?



2. EXPLORE

Before you build, let's explore movement and vibration.
Hold the small motor carefully and observe what happens when it is powered.



Engineers make predictions and then test them!



Think about it:

1. What happens when the motor starts spinning?
2. What might happen if you attach the motor to a cup?
3. How could vibration make the cup move?



Make your prediction

I think my robot will draw:



3. WHAT YOU'LL NEED



DC motor



AA battery



Battery cap



Eraser



3-4 Markers



plastic cup



**Double
side tape**



Rubber band



Scissor



Googly eyes



Engineers often solve problems using materials that are already available.



Look around your home, what everyday materials could you reuse to make your robot?



4. IMAGINE

Before you start building, become the robot designer.

What will your robot look like?



MY ROBOT DESIGN



Think about:

- Where will the markers go?
- Where will the motor go?
- How will your robot balance?
- Where will you place the battery?
- What will your robot look like?
- What kind of drawing might it make?



5. CREATE

Follow the steps in order. go slowly and watch carefully.

Step 1 — Add the robot's legs

- Tape 3 or 4 markers evenly around the edge of the cup.
- Make sure the marker tips touch the paper when the cup stands upright.
- These markers will act like your robot's legs.



Step 2 — Add the motor



- Use double-sided tape to attach the small DC motor to the top of the cup.
- If the motor has a spinning shaft, attach a small piece of eraser to one side of the shaft.
- This will make the motor's movement unbalanced and create vibration.

Step 3 — Connect the power

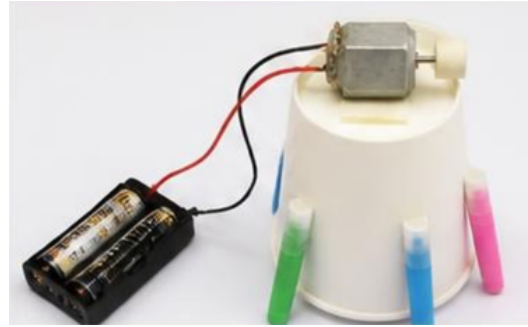
- Connect the motor wires to the battery terminals using the battery cap.
- When the circuit is complete, the motor should start spinning and vibrating.



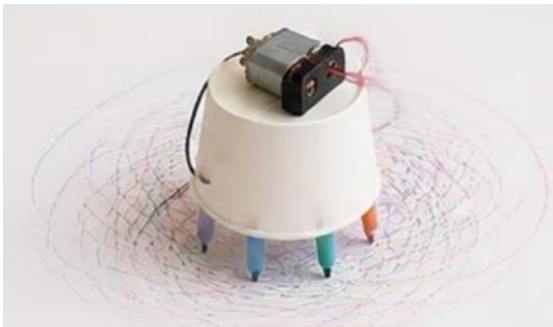


Scribble Bot

- If the motor does not move, check your connections or try switching the motor wires.



Step 4 — Test your Scribble Bot

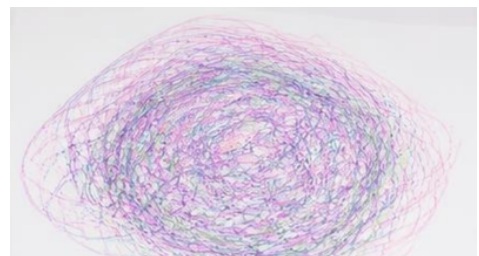


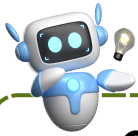
- Place your robot on a large sheet of paper.
- Turn on the motor.
- Watch carefully as your Scribble Bot begins to move and draw!

Step 5 — Decorate your robot

- Carefully place the bottle rocket in its launch position with the pencil legs supporting it.

e.g.





6. TEST IT !

Scientists and engineers don't just build — they test and observe.

Place your Scribble Bot on a large sheet of paper and let it move.

What happened?

Did your robot move?

☐ Yes

☐ No

Did your robot make marks on the paper?

☐ Yes

☐ No

Did your robot make marks on the paper?

☐ Circles

☐ Curves

☐ Zigzags

☐ Random lines

☐ Something else: _____

What surprised you?



7. IMPROVE IT!



Change one thing about your robot and test it again.

Think about your rocket.

What could you improve?

- ☐ Moving the markers.
- ☐ Changing the position of the motor.
- ☐ Changing the weight on the motor.
- ☐ Changing the way the robot balances.
- ☐ Changing the number of markers.

My change:

My prediction:

What happened?



8. WHAT'S THE SCIENCE ?



Electricity Makes the Motor Move

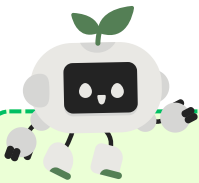
A battery provides electrical energy. When the circuit is complete, electricity flows through the wires to the motor. The motor changes electrical energy into movement.



Vibration Creates Movement

The small piece of eraser on the motor shaft makes the motor spin unevenly. This creates vibrations.

The vibrations make the cup shake and move across the paper. As the robot moves, the markers touch the paper and leave lines and patterns.



Robot + Engineering

Your Scribble Bot shows how engineers can combine:
Electricity → Motor → Movement → Drawing
Even a small change in the design can change how the robot moves and what it draws.





9. STEM AROUND US

Robots are not only a toy. They are used in many various fields. We use them to explore space, build things in factories, help doctors, clean our homes, and even play games.

Find four things that use a motor:

1. _____
2. _____
3. _____
4. _____

What does the motor help each thing do?

(Discuss with your friends)

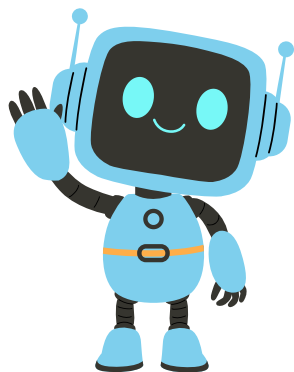


10. My STEM Discovery

One thing I discovered today:

One thing I am proud of:

One thing I changed in my design:



REMEMBER

Your robot doesn't have to move perfectly. Every time you **imagine, build, test, change,** and try again, you are thinking like an engineer. And sometimes, the most interesting discoveries happen when you don't know exactly what will happen!

Keep experimenting!