How to Build a Vine Robot: The 1-Minute Vine Robot

Javier Reyna Zepeda
How to Build a 1-Minute Vine Robot

Table of Contents

1. Prepare the Robot Body
2. Attach the Air Supply Tubing
3. Evert the Robot
4. Add Turns
5. Grow the Robot
Step 1: Prepare the Robot Body

1. Cut 2 feet of plastic from the roll

2. Using a permanent marker, mark straight line at 1” from both ends. One of the ends must be marked all around (as shown by the right end in Figure 2).

Quality Check:
- Make sure your 1” pocket is actually sealed completely (must be airtight)
- You can inflate the tube to check, if necessary
Step 2: Attach the Air Supply Tubing

1. Insert the air supply tube into the unsealed end of the robot (~1 inch into the plastic).
2. Wrap tape around the end of the robot body to create an airtight seal and secure the air supply tube.
3. Increase the air pressure to about 1 psi to inflate the tube and make it easier evert.

Warning:
- If the plastic roll inflates too much and seems like it will pop, reduce the pressure applied.
Step 3: Evert the Robot

1. Using a permanent marker, sketch a 2” circle, 0.5” circle, and a 0.125” circle in the locations shown in Figure 1.

2. Drill holes using the corresponding bits for each hole. Use the largest bit available to you for the 2” circle.

3. Use a Dremel to expand the 2” hole to the appropriate size.
Step 4: Add Turns

Adding a turn works by shortening one of the robot’s side. This allows the robot to turn in the direction of the shortened side.

1. Create a 1 inch (~2.5cm) fold in the outstretched and deflated robot body.
2. Cut a piece of red tape and place it as shown in Figure 2.
3. Lay the fold flat and tape it down. Make sure the tape has a firm grip.

General Advice:

- The red tape is double sided, so the non-stick protective side may come off during eversion and stick to the inside of the robot.
- Before applying the tape to the robot, apply the tape to a piece of the spare plastic roll to make that side “non-stick” and cut the desired length. One side should now have the plastic stuck to it and the other side the removable red cover (use this side to join parts in the robot).
Step 5: Grow the Robot

1. Evert the robot as shown in Step 2 in preparation for growth
2. Increase the pressure to ~1-2psi to grow the robot
3. You now have a turn!

Alternative:
- You can also inflate the robot, enforce the bend you would like by hand, and apply the tape to hold the robot in that shape.
- This method works for when you do not know where to place a turn.