



# Make a Brush Monster

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Follow this step-by-step guide on how to make a brush monster.

Associated resources:

Brush monsters lesson plan

Brush monsters PowerPoint

Brush monsters worksheet

Brush monsters worksheet - suggested answers

### You will need:

#### Parts

- 1 dustpan brush
- 1 battery holder
- 1 snap battery connector
- 2 AA cells (zinc chloride, **not** alkaline or re-chargeable)
- 1 toggle switch
- 1 motor
- 1 motor mount
- 3 crocodile leads
- 1 eraser
- 2 wiggly eyes
- 5 cable ties
- 3 pipe cleaners



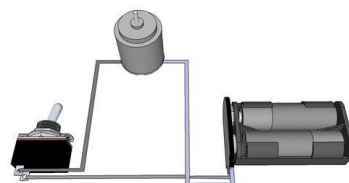
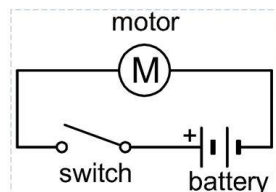
#### Tools and consumables

- Ruler
- Ball point pen
- Large scissors
- Low melt glue gun



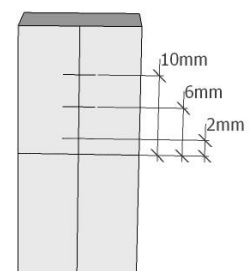
### Step 1

Make the circuit shown below and check that the motor shaft goes round when you switch on. Be careful not to short circuit your battery (i.e. connect the wires from your battery directly together) - they must go via the motor. Tie the wires from your battery snap in a reef knot as shown on the right - then you are less likely to accidentally short circuit your battery.



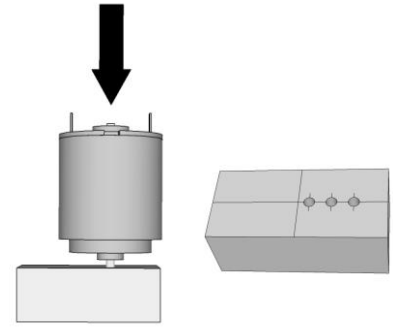
### Step 2

Draw two centre lines on your eraser, on the side opposite from the TTS symbol. Measure and mark lines 2mm, 6mm and 10mm from the short centre line as shown.

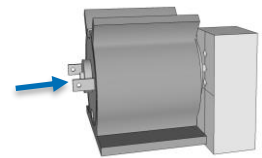


**Step 3**

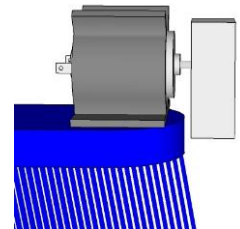
Unclip the crocodile leads from the motor terminals. Put the eraser flat on the table with the lines you marked on the top. Use the motor shaft to make vertical holes in the three positions you marked. Push down hard in the middle of the motor – be careful not to bend the motor terminals. Remove the eraser from the motor shaft.

**Step 4**

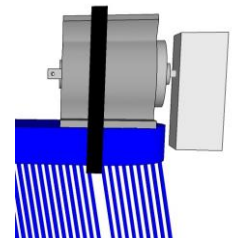
Push the motor into the motor mount from the end (see the direction of the arrow - if you clip the motor in from above you can snap the motor mount). Rotate the motor in the mount until the motor terminals are at roughly the same height. Push the motor shaft into one of the offset holes you made in the eraser.

**Step 5**

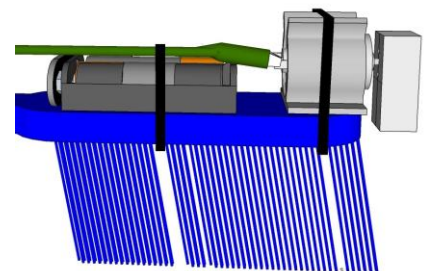
Make sure the back of the motor lines up with the back of the motor housing; the front of the motor should protrude a little. Remove the plastic film from the sticky pad on the bottom of the motor. Stick it near the end of the brush (leave a gap of roughly 6mm to the end). Make sure there is a small gap between the eraser and the end of the brush, so the eraser doesn't jam when the motor turns.

**Step 6**

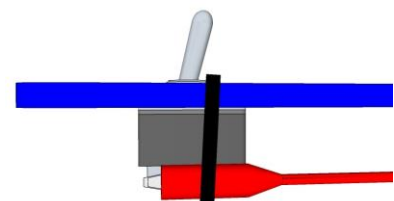
Feed a cable tie between the bristles and use it to attach the motor firmly to the brush so it doesn't vibrate loose. Don't put the cable tie too near the end of the brush as it could slide off. Try to fit the cable tie into one of the gaps between the bristles so you don't distort the bristles. Pull the cable tie very tight and then trim off the loose end.

**Step 7**

Clip the crocodile leads back onto the motor terminals. Switch on and check the eraser rotates, then switch off. Place the battery holder on the brush, leaving a gap between this and the motor. Cable tie both the battery holder and crocodile leads together to the brush.

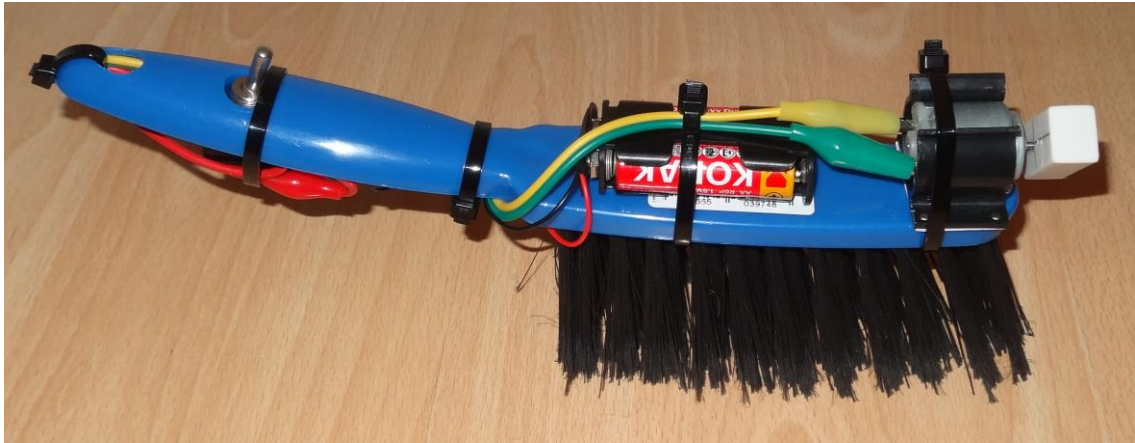
**Step 8**

Unscrew the first nut from the switch and remove the on/off label. Store these safely in case you need them in the future. If the nut is screwed on very tightly you may need to loosen it with pliers. Push the switch body up through the larger hole in the handle. The switch terminals should be facing the handle end of the brush. Lie the crocodile clips flat across the bottom of the switch and cable tie the switch and crocodile clips together firmly to the brush handle.



### Step 9

Tidy up the remaining crocodile leads and cable tie to the brush. Try out the brush monster on a smooth floor. You can try mounting the eraser using a different hole – the further the hole is from the centre, the more the brush should vibrate. When you push the eraser onto the motor hold the motor in position so that it doesn't move back, or the eraser could jam against the end of the brush. See if you can get the brush monster to go in a straight line. Swapping over the two crocodile clips attached to the motor contacts can change the direction of movement a little.



### Step 10

Decorate the brush monster.

