

Dual Fidgety Art Bot



Our instructions will take you through the step by step procedure to build a Dual Fidgety Art Bot, an Art Bot built with two fidget spinners stacked together. Since our investigation revealed the disadvantage of using a fidget spinner body we will walk you through building the motor circuit with an attached switch first. You can then modify the rest of our steps to fit your own design.

Note: This is a great time to send your kids on an investigation of their own. Let them put their critical thinking skills to the test as they decide what features are needed for a successful Art Bot body. Once they decide on the features needed send them to their rooms, so they can raid their closet.

We raided our supplies to see what alternatives we could come up with. There were plenty of options to choose from as you can imagine. We chose a large trash can from the Trash Pack toy set because we were able to hide the battery, wires and most of the switch inside.

We enjoyed building our Trashy Art Bot just as much as our Fidgety Art Bot.



Step 1 - Supplies:

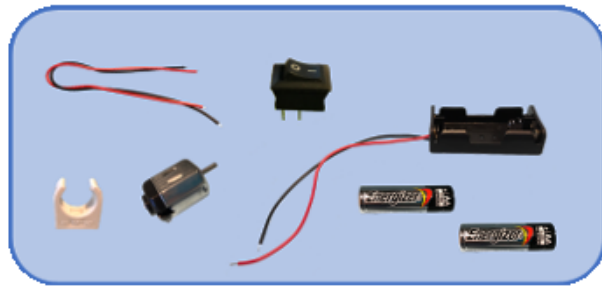


Image 1.1



Image 1.2

1.1 We divided our supplies into two groups. **Image 1.1** consists of the supplies used to wire our motor to a power source. **Image 1.2** consists of the supplies used to build the Art Bot body.

Note: There's a good chance that your supply list will vary from ours on this project, especially if you and your kids decide to design your own Art Bot.

1.2 You will also need electrical tape and a glue gun to complete this project.

Step 2 - Testing:



Image 2.1

2.1 If you haven't already done so, be sure to test your motor and batteries. Place the AA batteries into the battery holder and then touch the red and black wires from the battery holder to the two copper terminals on the motor (**Image 2.1**).

Note: The polarity doesn't matter when testing to see if the DC motor works. The polarity only matters when the rotational direction of the motor matters. If you connect the positive (red) wire to the positive motor terminal and the negative (black) wire to the negative motor terminal the motor will rotate clockwise. Reverse the wires to have the motor rotate counter clockwise.

During our investigation we read that some DC motors may rotate in the opposite direction, depending on the manufacturer. Just switch the wires around to get the rotational direction your project needs.

Note: Some motors will have the positive and negative terminals marked. The motors from our sets don't but the schematics provided shows which terminal to connect the red (positive) wire to.

2.2 If you're using older markers be sure to test them as well. Old, dried out markers will create faded art work.

2.3 We recommend that you test the motor a second time, after you've wired the switch. This will verify that the switch works and that you didn't damage anything while stripping the wires.

Step 3 - Wiring DC Motor to AA Batteries with an On-Off Switch

The EUDAX DC Motor kit that we're using comes with two styles of AA battery holders, one with a built-in metal swing arm and one without. We'll take you through the process of using a battery holder without the swing arm, so you can see how to add an on-off switch to a circuit.

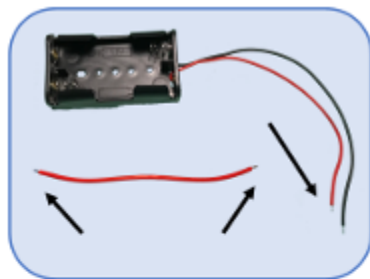


Image 3.1

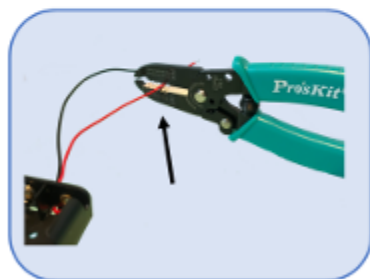


Image 3.2



3.1 The battery holder wires, as well as the extra red wire needed later, come with some of the insulation already stripped off at the ends, but it's not enough (**Image 3.1**).

You need to strip the wires until there's about 5/8" of bare wire on the ends of each wire so there's enough bare wire to twist around the components (**Image 3.2 & 3.3**).

Note: Without the longer wire to twist around the components the wire tends to come apart while the Art Bots are wobbling around.

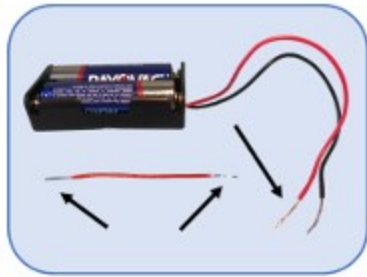


Image 3.3

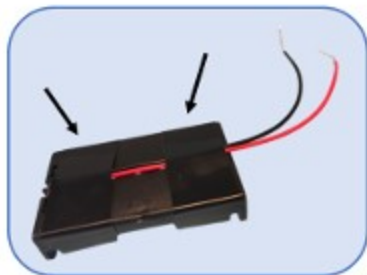


Image 3.4

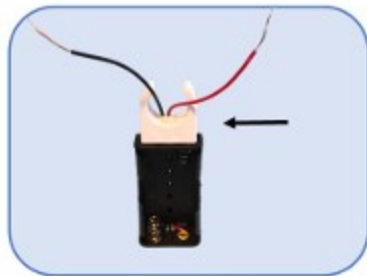


Image 3.5

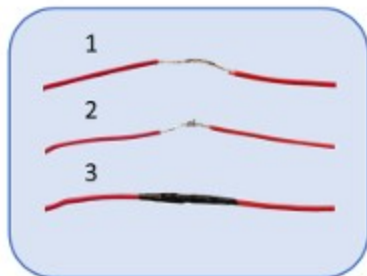


Image 3.6



3.2 Carefully fold the red and black wires of the battery holder up the back of the holder and attach them with electrical tape (**Image 3.4**).

3.3 Attach the motor's mounting bracket to the end of the battery holder (**Image 3.5**).

Note: Attaching the mounting bracket now will help you determine if the battery holder's wires are long enough to complete the wiring of the motor.

3.4 If the wires are too short you will have to splice two pieces of wires together and secure with electrical tape (**Image 3.6**).

Note: The first set of spliced wires in **Image 3.6** slide apart easily. We found that the second set of wires stayed connected better due to the bend we added in the wire.

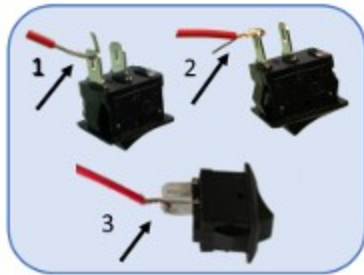


Image 3.7

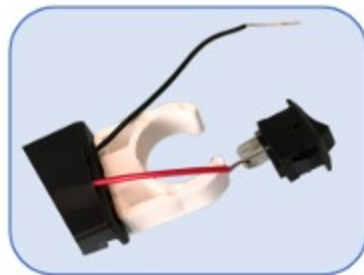


Image 3.8



Image 3.9

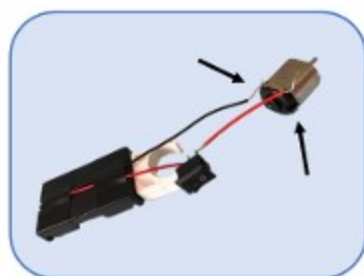


Image 3.10



3.5 It's time to connect the battery holder's red wire to one of the switch's legs. Thread the end of the red wire through the hole in one of the switch's legs until half of the bare wire is through the hole (**Image 3.7, step 1**).

3.6 Bend the bare wire back towards itself (**Image 3.7, step 2**), and twist the end around the rest of the bare wire (**Image 3.7, step 3**).

3.7 The battery holder is now wired to the switch (**Image 3.8**).

You will use the same technique to complete the rest of the wiring.

Note: Don't secure any of the wires with electrical tape yet. During our investigation we found it easier to troubleshoot any issues with our circuits while the wiring was still visible. Most issues were the result of disconnected wires.

3.8 If you didn't strip the extra insulation off the second piece of red wire during **Step 3.1** you should do that now. Both ends of this second piece should also have about 5/8" of bare wire showing (**Image 3.2 & 3.3**).

3.9 Thread one end of the second piece of red wire through the hole in the second leg of the switch until half of the bare wire is through the hole. Bend this wire back towards itself and twist the end around the rest of the bare wire (**Image 3.9**).

3.10 It's time to test the switch. Gently insert the bare end of the black and red wires to the two motor terminals and turn the switch on and off to verify the motor is working (**Image 3.10**).

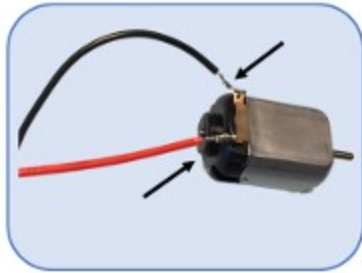


Image 3.11

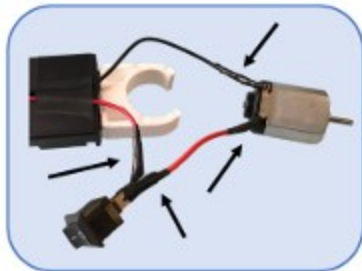


Image 3.12



Image 3.13

3.11 With the wires through the contacts, bend them back towards themselves, and twist the ends around the rest of the bare wire for a solid connection (**Image 3.11**).

3.11 Double check that everything still works and then secure all the wire connections with electrical tape (**Image 3.12**).

Note: The electrical tape did not want to stick to the wire connections initially. Once we cut the tape in half, length ways, and stretched the tape before using we were able to keep the electrical tape secure.

3.12 Attach the motor to the mounting bracket and secure it with some glue from a glue gun (**Image 3.13**).

3.13 Attach the switch to the side of the mounting bracket and secure it with some glue from the glue gun (**Image 3.13**).

Note: Attach the switch near the top of the mounting bracket so it doesn't hit any of the rotating marker legs.

Congratulations, you just wired the DC motor to a switch and power source.

Step 4 - The Body

It's time to assemble the body of our Art Bot and attach the motor. There's a very good chance that you're using a body design of your own. If so, be sure to include an agitator on your motor for maximum wobbling movement.

Every Fidgety Art Bot we built had complications with the cap that covers the center ball bearing. The cap would come loose and dislodge every time, no matter the cost of the spinner. But have no fear, we found a reliable work around, as long as you can carefully glue the cap in place.



Image 4.1



Image 4.2



Image 4.3

4.1 Gently remove the cap from the center ball bearing and carefully apply a small amount of super glue around the outside of the center plug, located on the underside of the cap (**Image 4.1**).

4.2 Carefully push the cap back into place and let it dry according to the instructions on the glue bottle (**Image 4.2**).

4.3 Insert the markers into the prong holes (**Image 4.3**).

4.4 Use hot glue to fasten the markers inside the holes on each fidget spinner prong, leaving one prong empty until the motor has been installed (**Image 4.3**).

Note: This step can be a bit tricky for kids as the markers need to be positioned completely straight and level. They may need your help.



Image 4.4



Image 4.5



Image 4.6



Image 4.7

4.5 Use hot glue to attach the bottom of the motor assembly to the cap in the center of the fidget spinner (**Image 4.4**)

Note: You may need to use electrical tape to secure any loose wire to the back of the battery holder. Loose wires will interfere with the Art Bot's legs and motor as it spins across your paper.

4.6 Insert and fasten the last marker into the empty spinner prong (**Image 4.5**).

4.7 The Art Bot is almost finished but without an agitator it won't have enough of a wobble.

Bend the pipe cleaner in half and attach it to the side of the pencil cap eraser with a piece of electrical tape (**Image 4.6**).

4.8 Hold the pencil cap eraser sideways and slowly push it down on the motor axle until the axle pushes through the eraser. We added a small dab of hot glue where the axle pushed through the eraser, so it stays on while the Art Bot is wobbling across your paper (**Image 4.7**).

4.9 Bring out the paper, it's time to test your Art Bot. Remember to change the shape of the pipe cleaner agitator to see how the Art Bot's path changes.

Have your kids analyze their findings and use this information to create amazing artwork.

ENJOY!