

PROTRACTOR

THE AERONAUTICAL VEHICLE

Hello Maker!

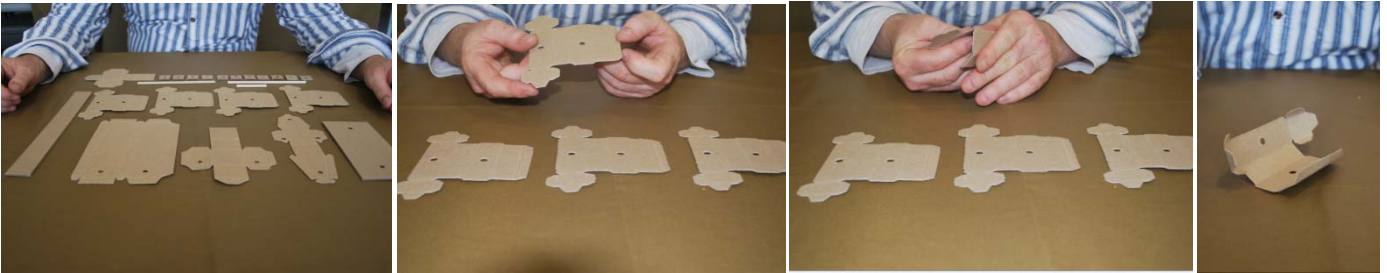
I know you are probably anxious to start building your Protractor. Please take time to become familiar with the parts. The best way is to spread them out on a table to identify them. Get ready to start making!

Parts List:

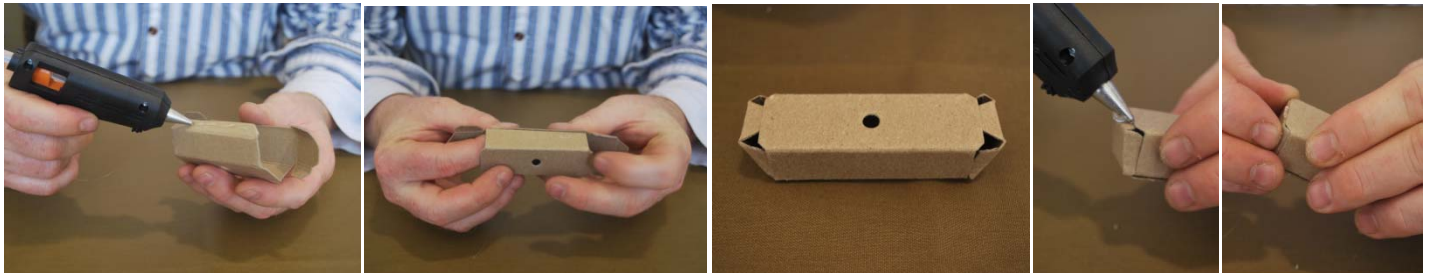
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|------------------------------|-----------------------------|------------------------------|
| a. Cardboard/Wood Body Parts | b. 2 x Mini Toggle Switches | c. 2 x Propellers |
| d. 2 x AA Battery Holder | e. 6" Red Hookup Wire | f. 2 x 5' Red Hook up Wire |
| g. 2 x Motor | h. 4 x Cardboard Wheels | i. 2 x 5' Black Hook up Wire |

*You will need a glue gun, 2 x AA batteries and tape to assemble. These are not included in the kit. The circuit connections can be glued or for the more advanced maker you can solder them together instead.

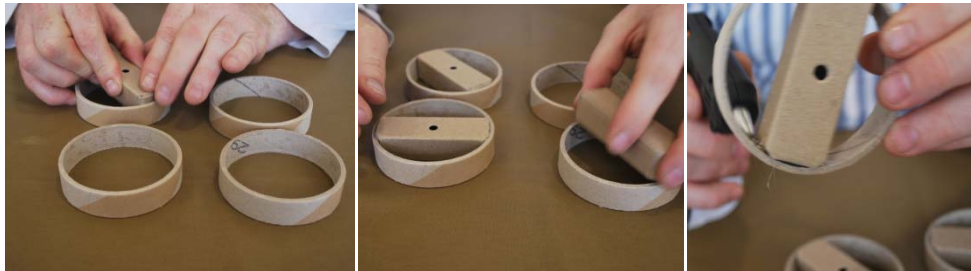
Protractor Assembly Instructions:



Take the t-shirt shaped card pieces. Crease and gently fold each scored area. Heat up your glue gun and have your glue sticks ready to go.



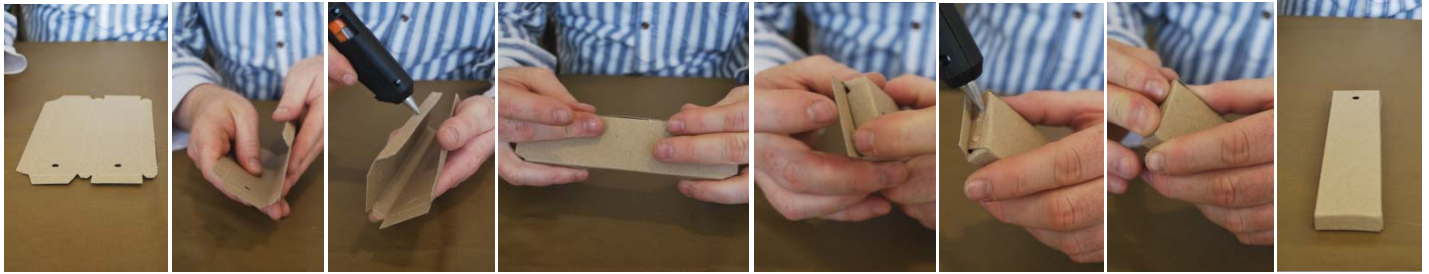
Fold the cardboard piece into the shape of a wheel hub. Begin gluing and sticking the tabs inside the hub. Align and square up each side of the hub so that it is even. Repeat this step to complete the four wheel hubs.



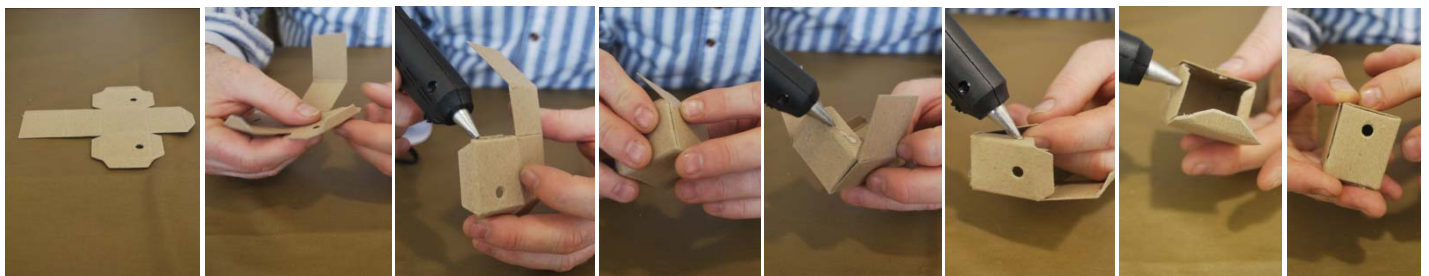
Place and press the wheel hubs in the center of the cardboard wheels. Hot glue the wheel hubs to each of the cardboard wheels in each of the eight corners of the wheel hub.

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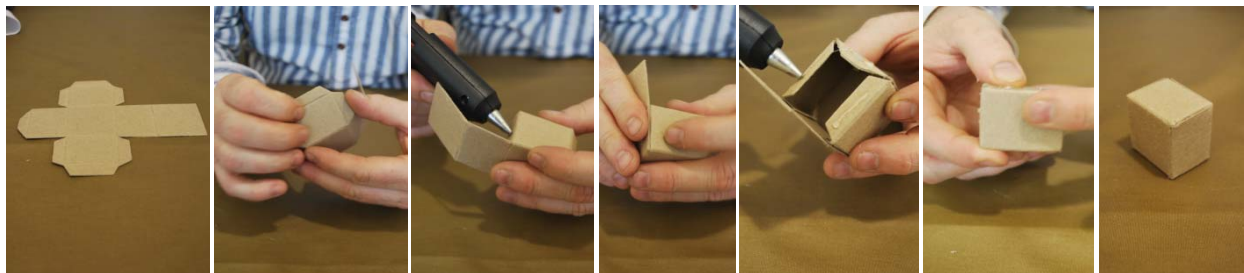
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Take the rectangular shaped card piece with two holes. Crease and gently fold each scored area. Fold the cardboard piece into the shape of a wheel hub. Begin gluing and sticking the tabs inside. Align and square up each side so that it is even.



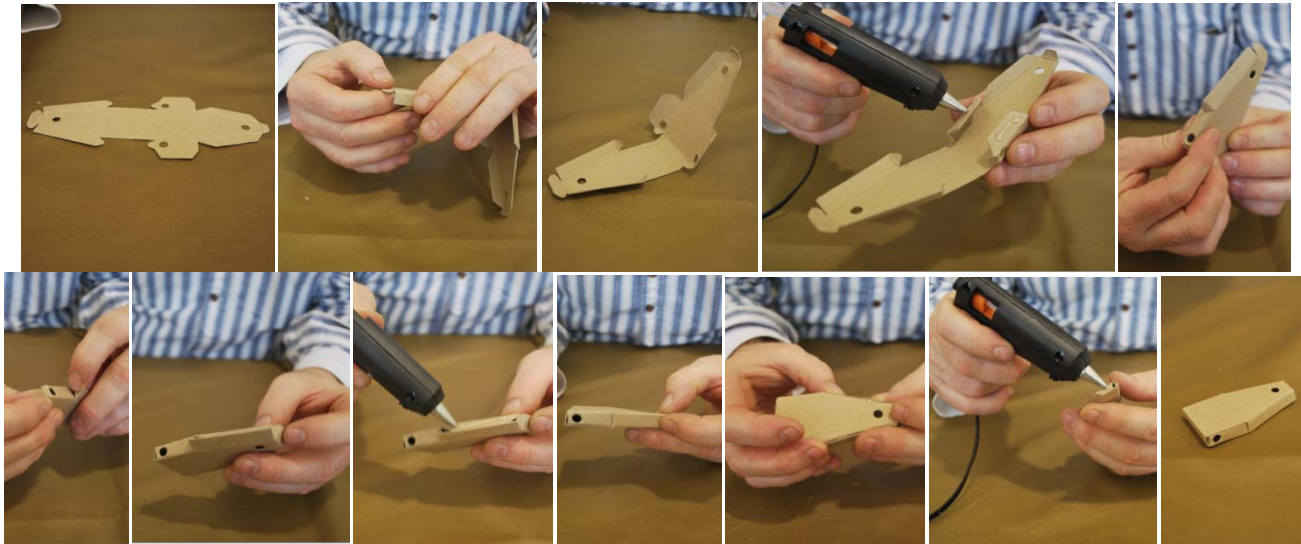
Take the card piece shaped like a cross with two holes. Crease and gently fold each scored area. Fold the cardboard piece into a block. Begin gluing and sticking the tabs inside. Align and square up each side so that it is even.



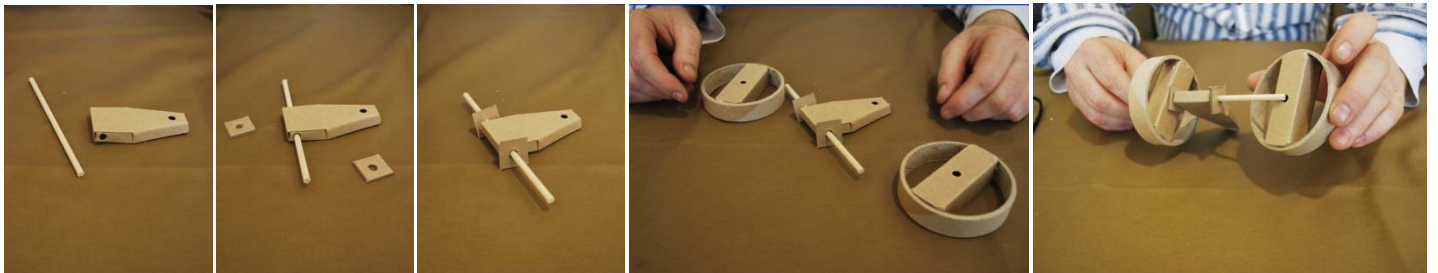
Take the card piece shaped like a cross with no holes. Crease and gently fold each scored area. Fold the cardboard piece into a block. Begin gluing and sticking the tabs inside. Align and square up each side so that it is even.

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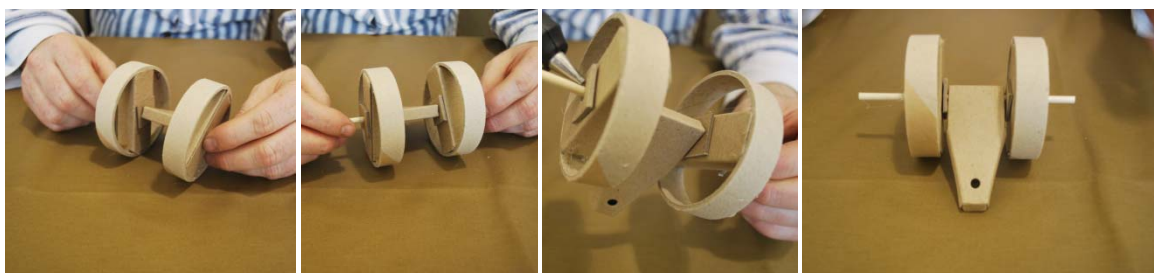
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Take the card piece with triangular shapes. Crease and gently fold each scored area. Fold the cardboard piece into a triangular shape. Begin gluing and sticking the tabs inside. Tuck all the small tabs in as you go. Align and square up each side so that it is even.



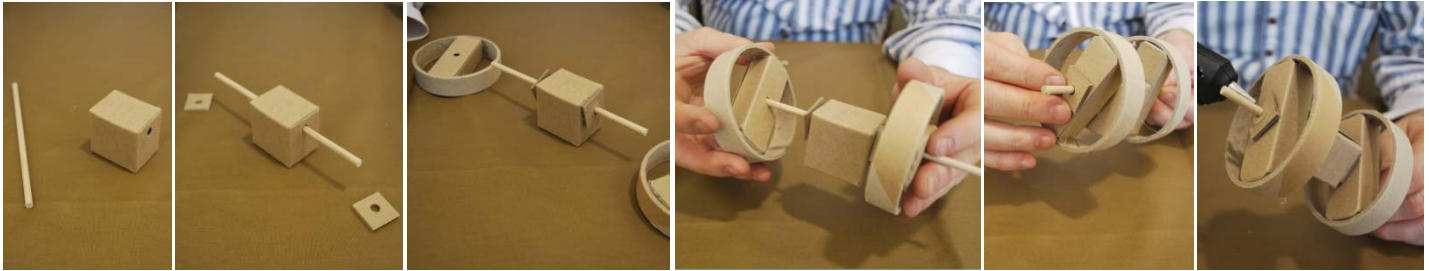
Place one of the long wood dowel axes through the long hole in the triangular shaped piece. Place a washer on either side. Place a wheel on either side.



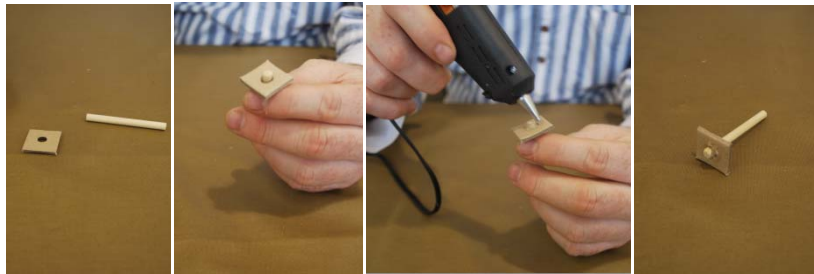
Put a washer on the outside of both wheels on the axle. Glue in place leaving a little room so that the wheels can move freely.

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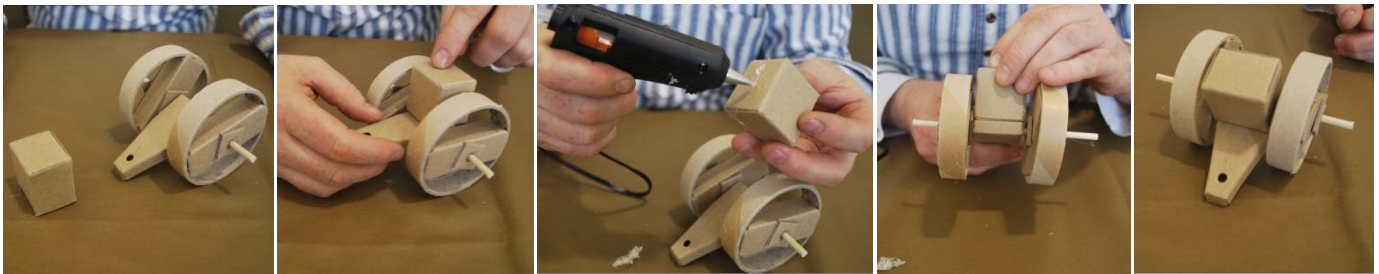
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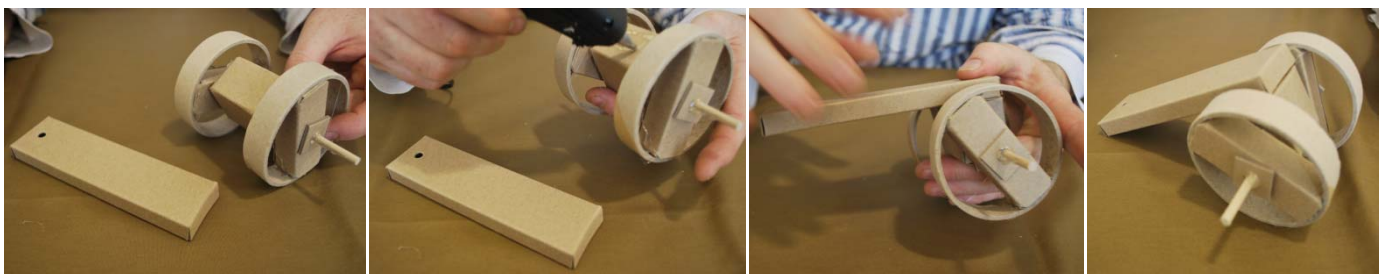
Place one of the wood dowel axles through the block shape with a hole in it. Place a wood washer either side of the block on the axle. Hot glue the washer to the axle on the outside only leaving a little room so that the wheels can move freely. Repeat this step on the other side.



Slide the small wooden dowel through the center of a wood washer so it protrudes slightly. Hot glue to the washer.



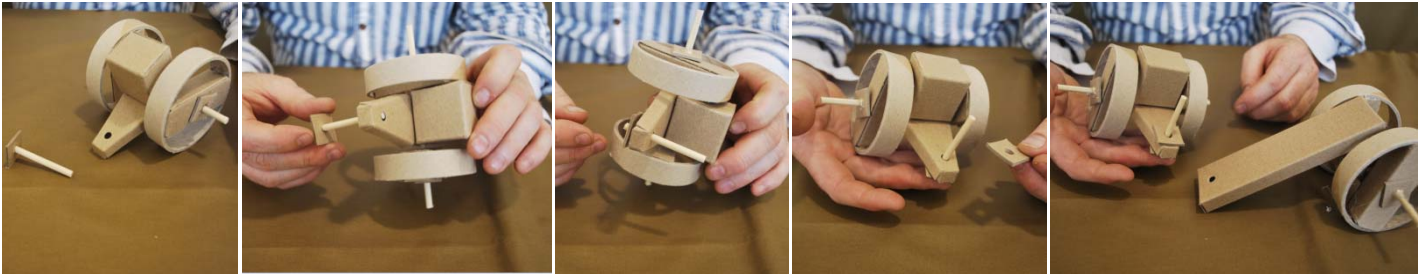
Take the block shape with no hole in it and place it flush on the square end of the triangular shaped piece to find the smaller face of the block. You will know you have the correct face of the block if the block protrudes above the height of the wheel. Glue the block in place.



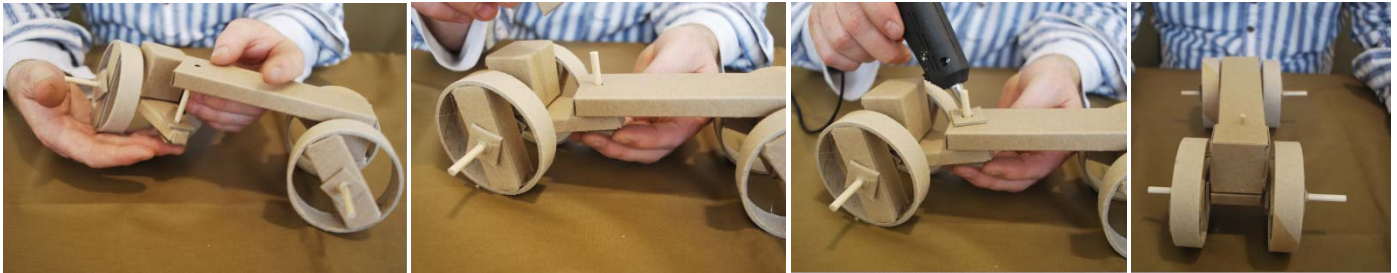
Find the rectangular shaped piece with a hole in one end. Place glue on the top surface of the block. Quickly take the rectangular piece and hold the end without the hole flush with the block shape. Hold firmly in place until glue is dry.

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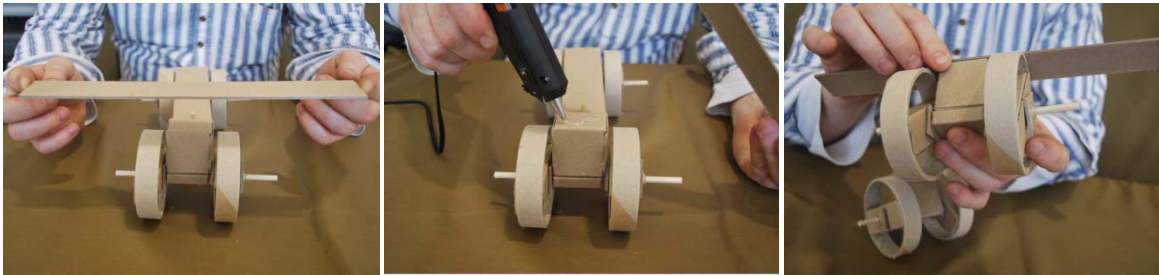
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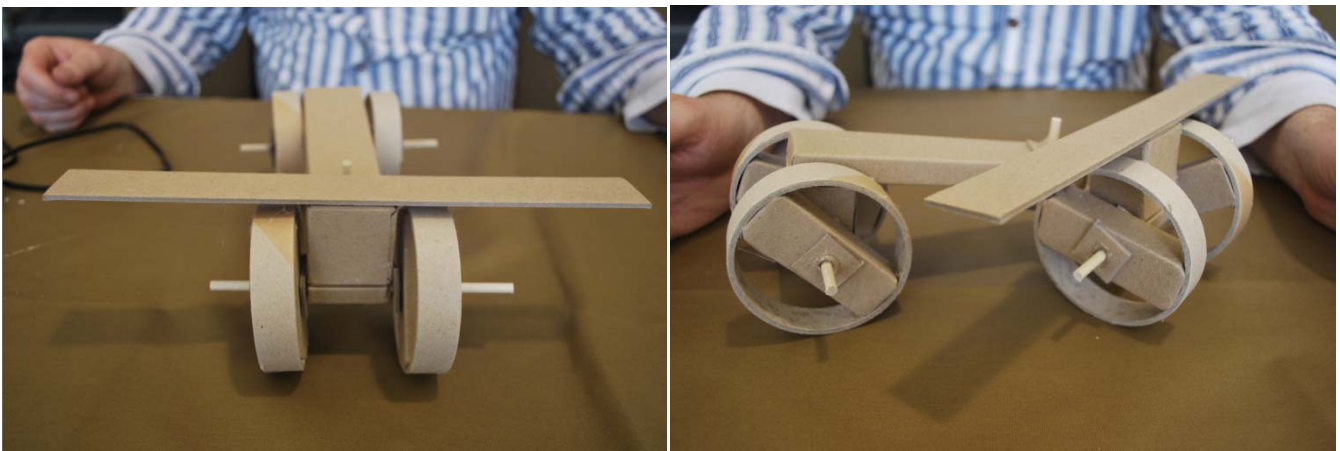
Take the small dowel with the washer glued to it and slide it up through the hole in the triangular piece. Place a washer on top to hold in place.



Then take the rectangular piece and slide over the small dowel. Place another washer on top and glue in place. Hold the pieces together while gluing and make sure to leave it loose enough that all the pieces can move freely.



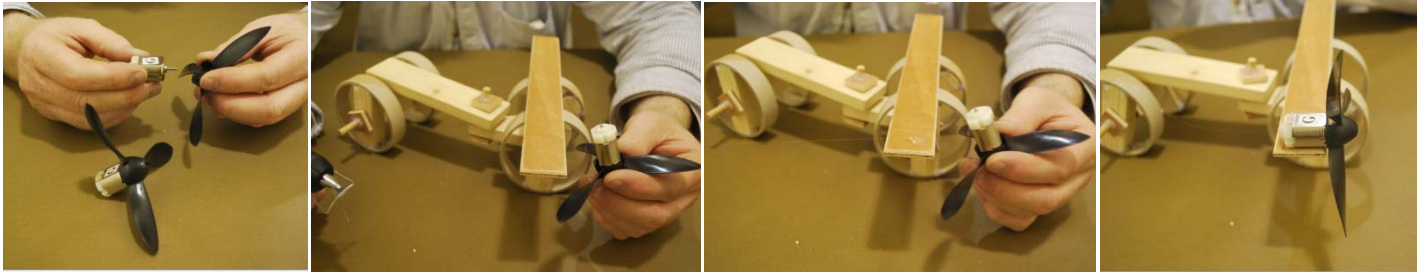
Find your long rectangular wing and locate the center. Place hot glue on the top surface of the wooden block at the front of the vehicle and quickly center the wing on top. Hold firmly in place until glue is dry.



Congratulations, the body of your Protractor is complete.

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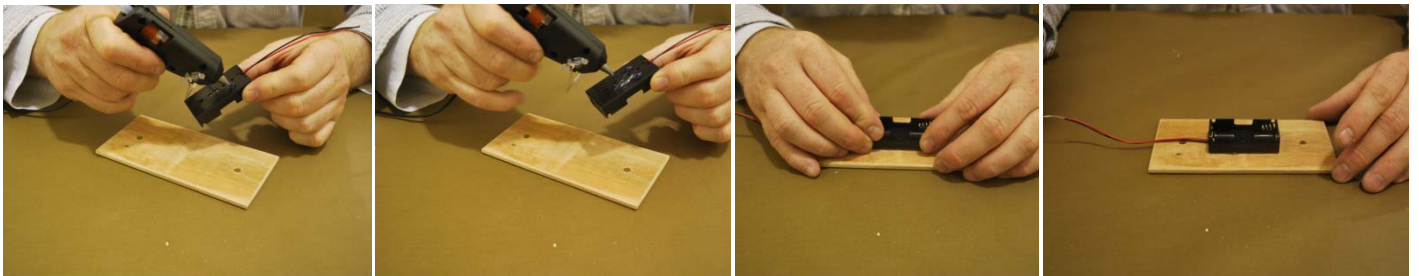
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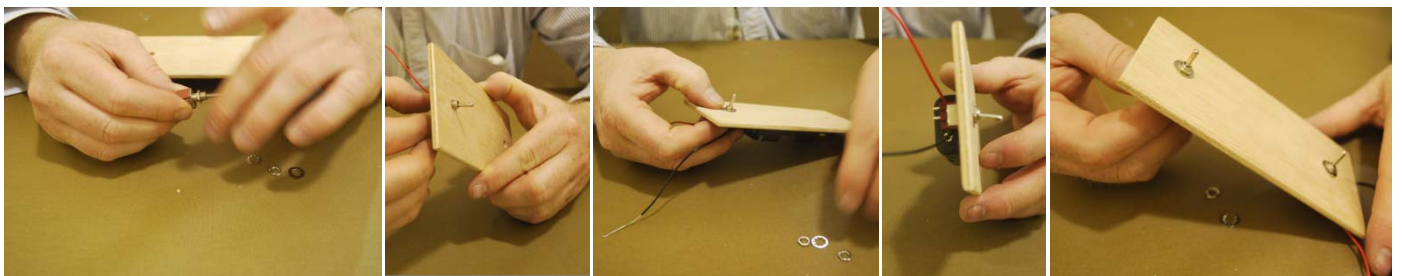
Pop the propellers onto the shaft of the motors. Place a small amount of hot glue in the center of the wing close to the edge. Place the motor on the glue with the propeller facing forward making sure the motor is forward enough that the spinning propeller will clear the wing. Repeat on the other side.



Hot glue the motor to the wing by placing hot glue along the two sides and back of motor, making sure not to get any hot glue near the propeller.



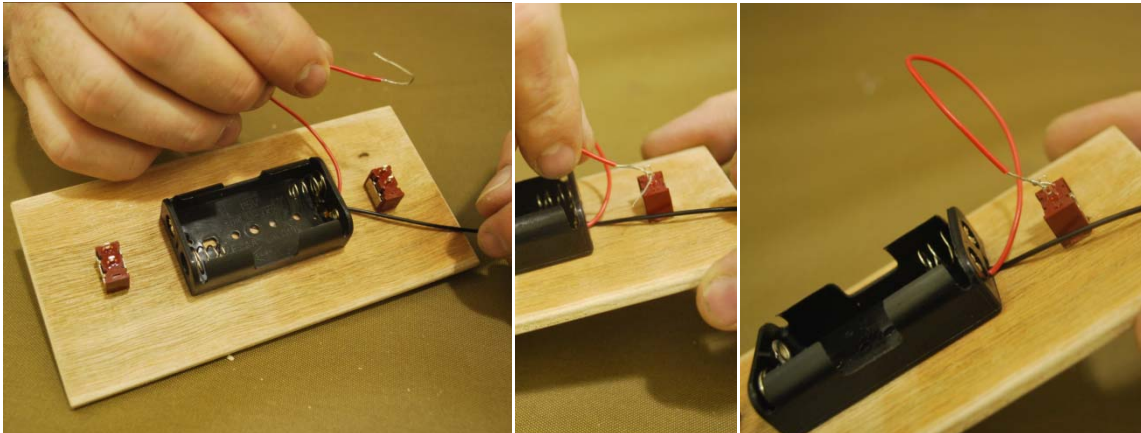
Locate the control panel. It is rectangular and has two holes in it. Take the back flat surface of your AA battery holder and place two lines of hot glue on it. Place and hold the glued surface to the center of the control panel and hold firmly in place until glue is dry.



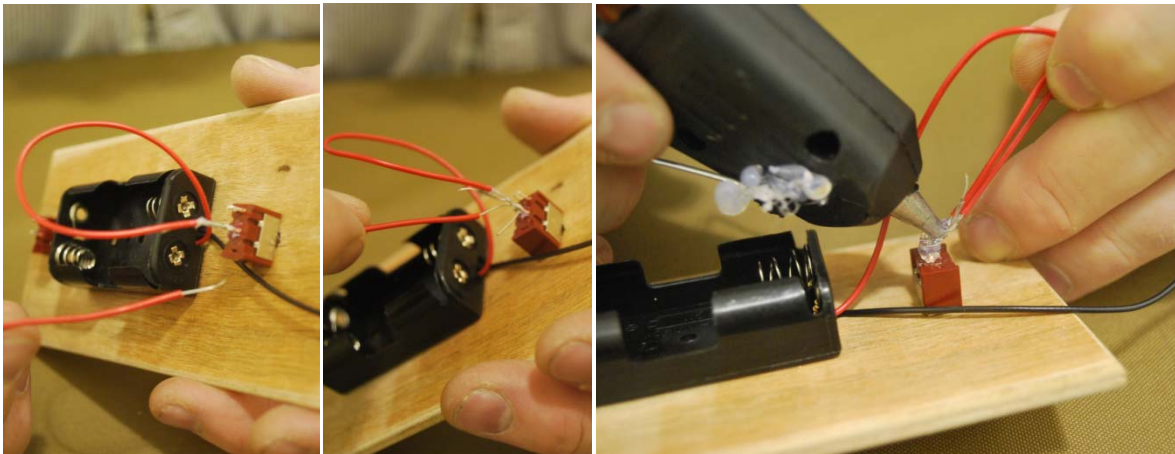
Remove the washers and nuts from the two toggle switches. Push each switch through from the side that has the battery holder attached. Replace the washers and nuts to the outside and tighten firmly in place.

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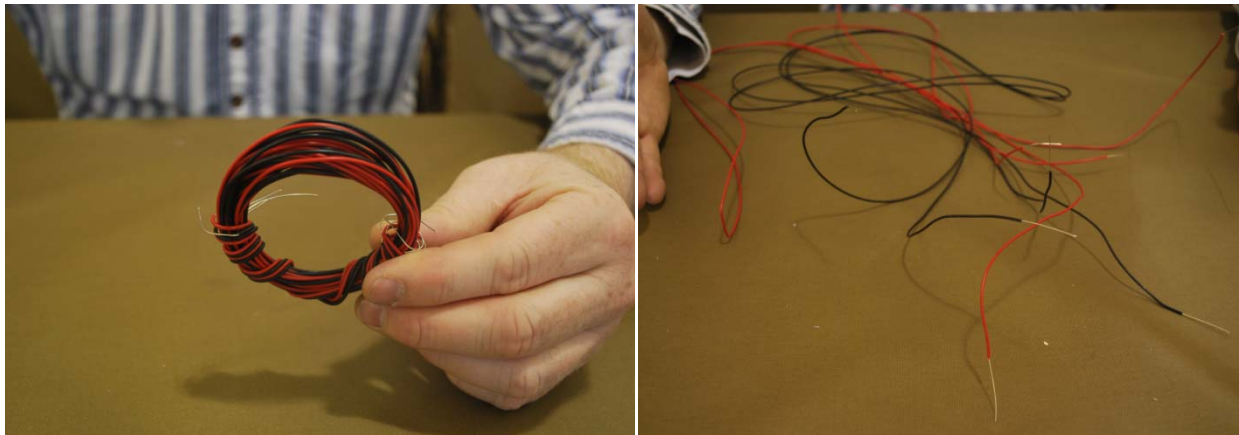
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Take the red wire from the battery holder and create a hook shape in the end. Feed the hook through the center eyelet in the switch closet to the wire. Twist and tighten around the eyelet to ensure it hugs the eyelet tightly for a good connection.



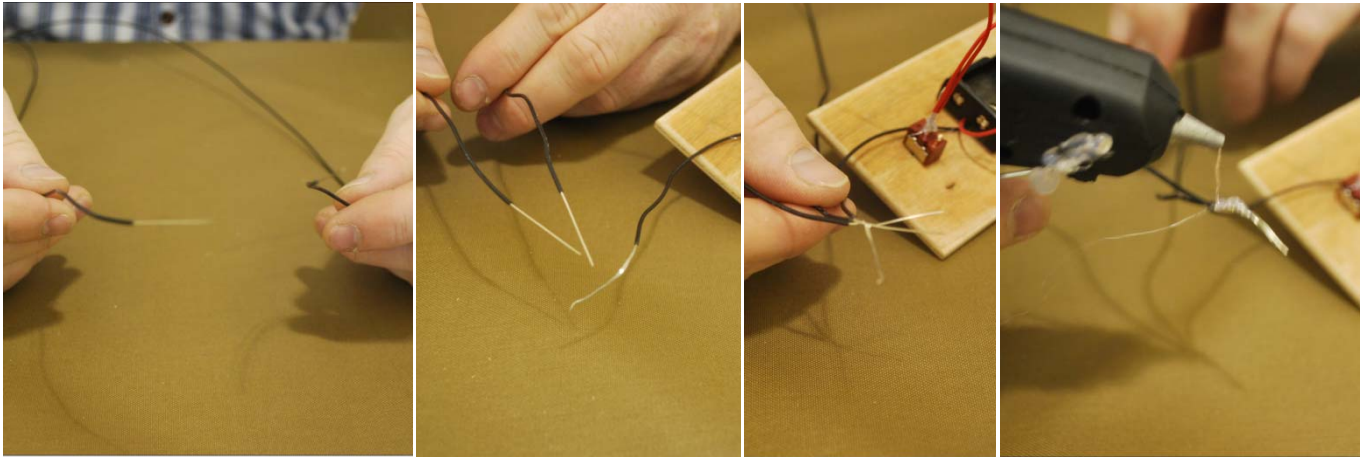
Take the 6" loose red hook up wire; make a hook shape in either end. Feed one of the ends through the same switch and same center eyelet as in the previous step. Pull tension on both wires and secure in place with hot glue making sure to keep tension until the glue is dry.



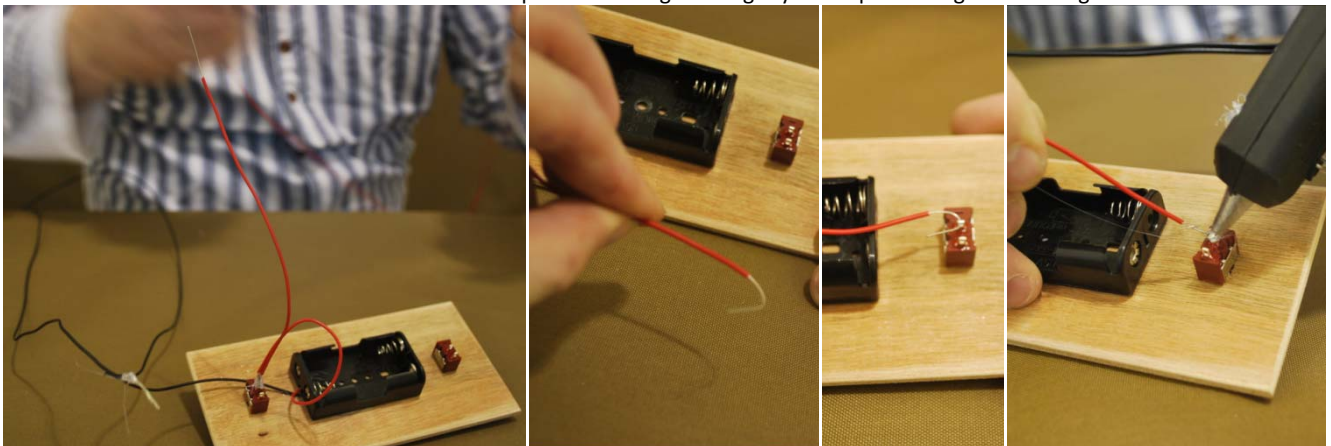
Take the circular bundle of red and black hookup wire and untie.

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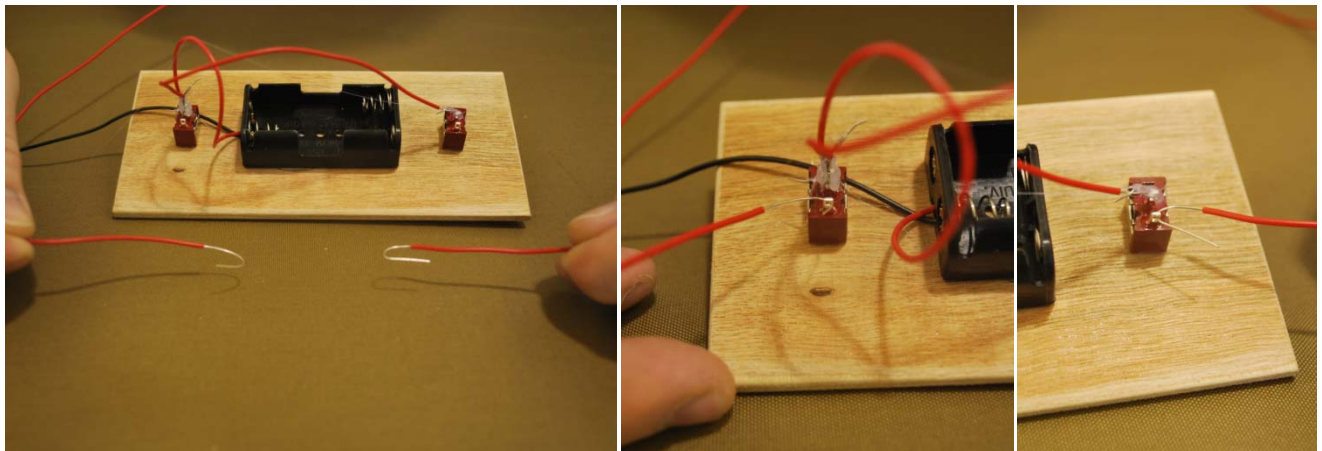
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Take the two black wires and bring one end of each to the other. Line these two ends up with the end of the black wire on the battery holder. Twist the three separate wire together tightly and tape or hot glue them together.



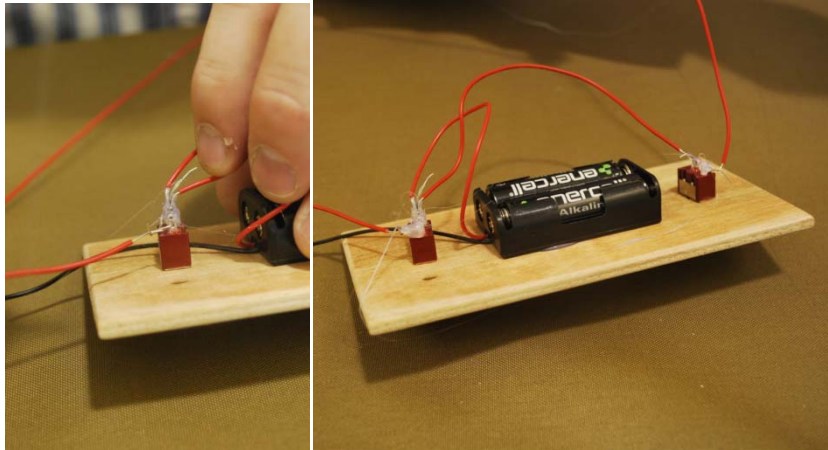
Take the loose end of the red 6" hookup wire and loop it through the center eyelet of the switch on the other side of the control panel. Twist wire tightly around the eyelet for a good connection. Hold tension on the connection and glue in place. Do not release tension until the glue is dry.



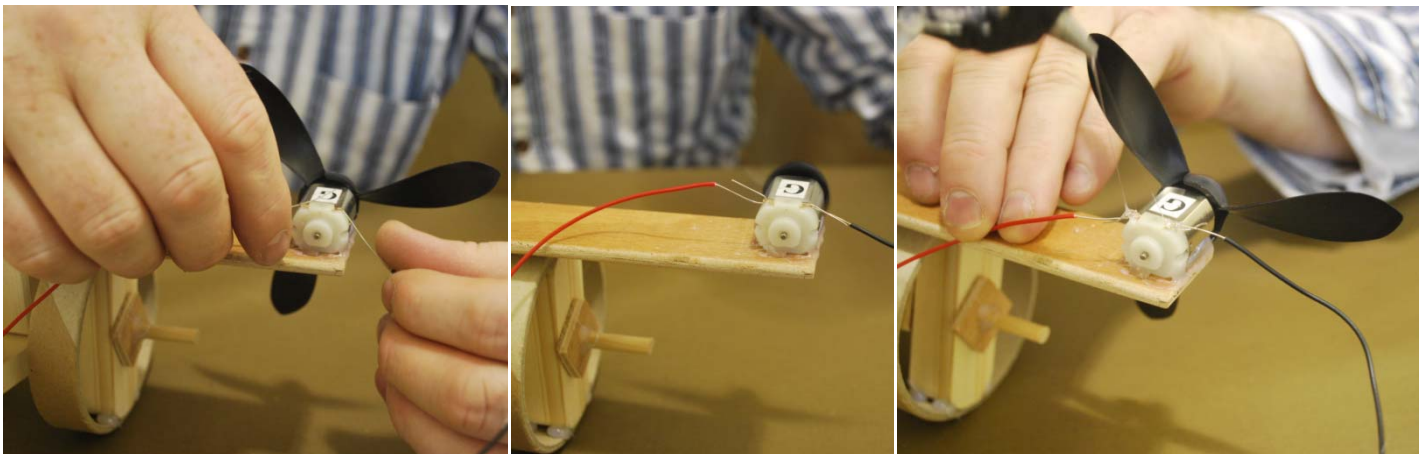
Take the two long red wires and put a hook shape in the end of each one. Place one in the outside eyelet of one switch and on in the outside eyelet of the other switch. Twist each firmly around the eyelet, hold tension and hot glue. Hold tension until glue is dry.

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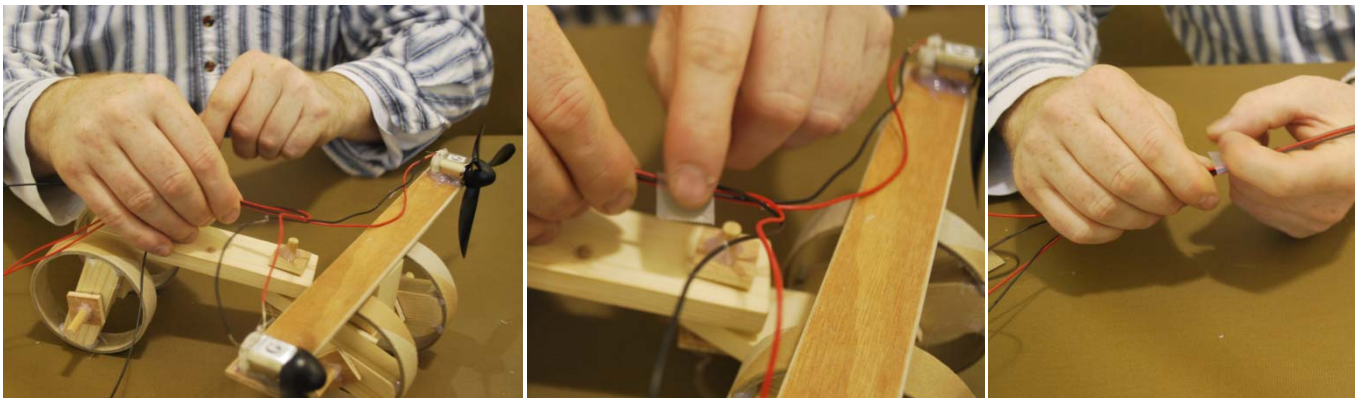
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Place two AA batteries into the battery holder.



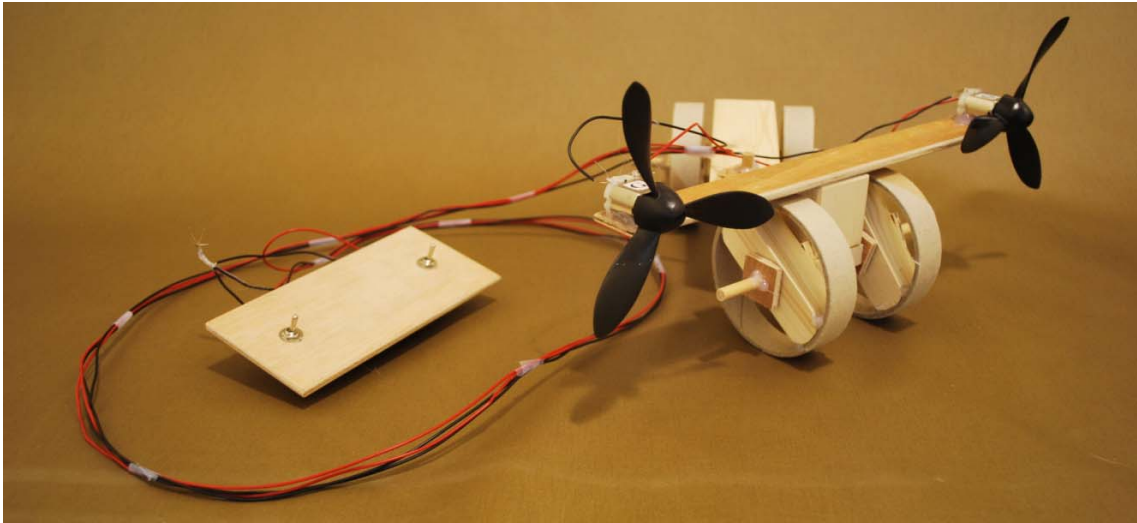
Now you will have two long red wires and two long black wires connected to the control panel. Take the end of one black wire and one red wire and hold each of them to the copper eyelet on the back of a motor to test the direction of the propeller. Make sure the switches are in the on position. If you are facing the propeller it should be rotating anticlockwise, if this is not the case switch both the wires to the opposite eyelets and try again. Once your propellers are running anticlockwise. Put a hook shape in each end and place each wire in its correct eyelet. Twist each wire gently around the eyelet until there is good contact. Hold in place with tension. Hot glue the connection while keeping tension until the glue is dry. Repeat this step for the other side.



Take all four wires and pull them together neatly. Place tape around the wire bundle about six inches from the wing to tidy them and keep them secure. Continue to place tape every ten or so inches until the wires are tidy.

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Congratulations, you did it! Now to have more fun. To operate the proptractor, place it on a smooth flat dry surface. Stand behind your Proptractor with the control panel in your hand. Push the two switches on for the vehicle to move forward. To turn the vehicle turn off one of the switches. Give yourself plenty of room to play. Keep the proptractor in an open area so it cannot crash into anything. Enjoy!