Jr Level 1 Push DX3 Build Guide

JrLevel1.com

Special Thanks To:

MadcowRocketry.com - Put Some Fun In Your Rockets!

BayAreaRocketry.com - Raising the BAR

Madcow Rocketry and Bay Area Rocketry have come together to offer a discount on the 2.6” DX3 kit and a motor package for Jr Level 1 Push participants.

RocStock.org - ROC hosts monthly launches, including the ROCtober launch event, where all Jr Level 1 Push participants will do their certification launches.

Introduction:

Transitioning from low powered rockets to mid and high powered rockets can be a bit confusing. Low powered kits typically have detailed instructions and include all of the components needed to build the rocket, as you move up you will find

that many of the higher powered kits have different options in how the rocket is built and may require the builder to provide some of the components of the rocket.

For the Jr. Level 1push we selected the Madcow DX3 as its a great transitional kit that includes all needed parts. It is not a difficult kit to build but it may require some skills that you have not needed before. All that is needed to build the kit is glue, some fine sandpaper, masking tape (blue painters tape also works well), a hobby knife, a ruler, a pencil, and optionally, paint.

There are many different methods that can be used to build a rocket like the DX3. This tutorial shows one way, using simple tools and wood glue. Look at the pictures and read the text for each step before proceeding. Remember there are a number of steps that require the glue to set before going on to the next step. Give yourself time to complete the rocket.

FAQs:

What glue/adhesive should I use?

Adhesives or Glues that work on one kind of material may not work on another. Some adhesives can actually damage certain rocket parts.The DX3 is constructed of wood and special cardboard. For these materials there are two types of adhesives that work well, epoxy and wood glue.

> Wood Glues - These are the ‘yellow glues’ that you find in hardware or hobby stores. They are similar to ‘white glue’ glue you may be used to from school. Wood glues are specifically designed for wood and paper. They are safe to work with, easy to sand, give some time for part alignment / positioning, easy to use since they are ‘one part’ and inexpensive. The bad part is that they take some time to set up and develop full strength. If used properly they are stronger than the fins or body tube of the rocket.

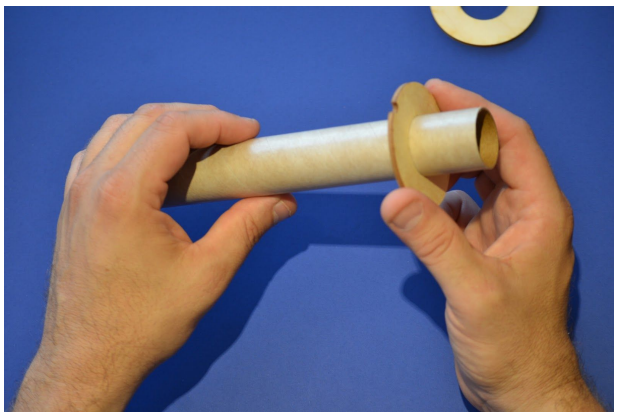
Epoxy Adhesives - Epoxy adhesives consist of two parts that when mixed together create a strong tough bond. They are thicker and don't shrink as much when they harden like the wood glues do. Another advantage over wood glue is the ability to bond to many different things including plastic and fiberglass. They do require the additional step of mixing and can cost more than wood glue. One important thing to be aware of is you must wear gloves with epoxy, the chemical in it can build up over time and cause allergic reactions, plus they don't clean off easily with water

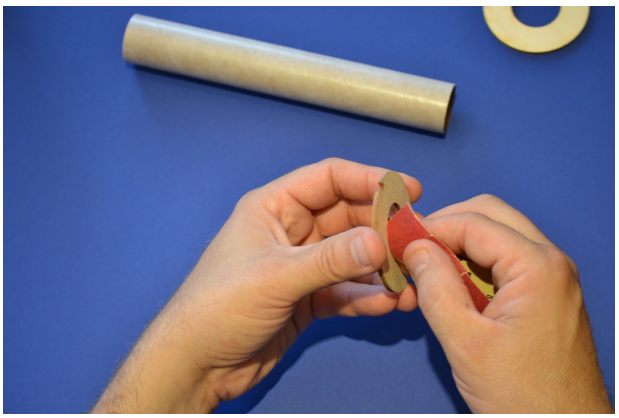
Most mid powered kits use phenolic paper for the body tube and wood for the fins. With these materials, wood glue or epoxy can be used. For the purposeses of this guide, wood glue is being used.

Can I use super glue?

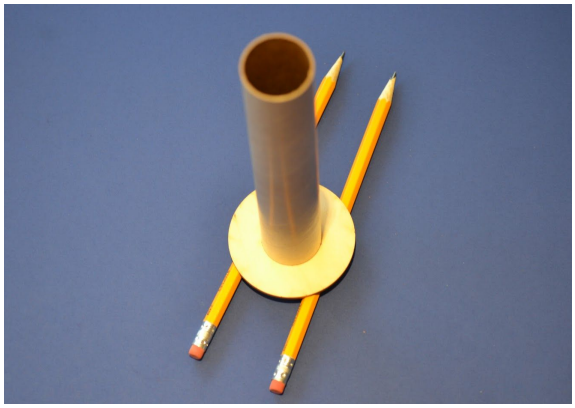
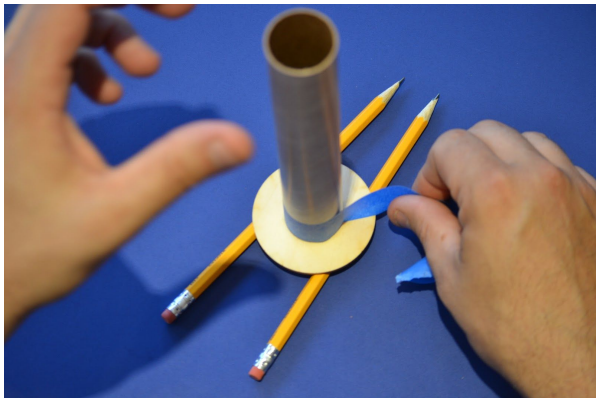
Super glue isn't a good choice for rockets like the DX3, it doesn't stick work well on porous surfaces. If in a real hurry, use a fast curing epoxy.

Part 1: Motor Mount





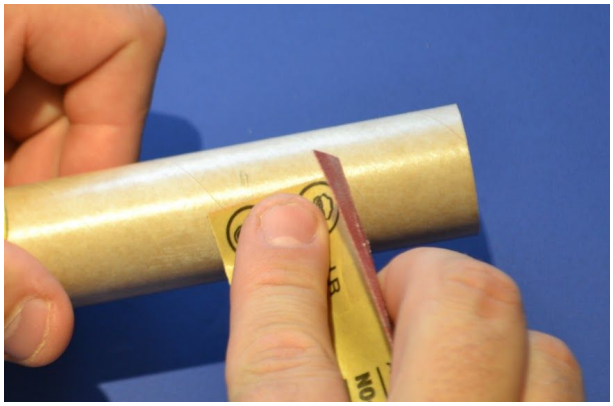
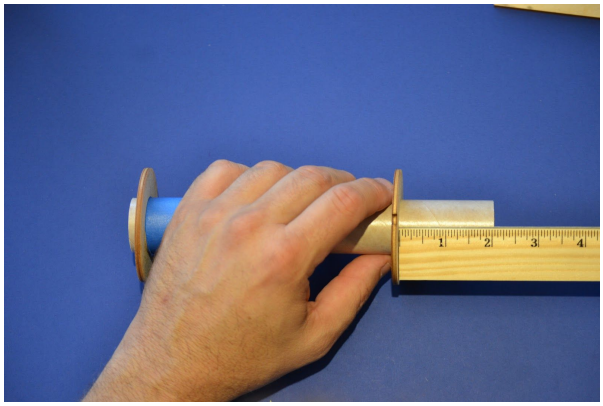
Test fit the centering rings on the motor mount tube, and sand them as needed. The rings should be snug, but able to be moved along the tube without damaging it. Lightly sand off the motor mount tube's shiny coating approximately ½ inch from one end.

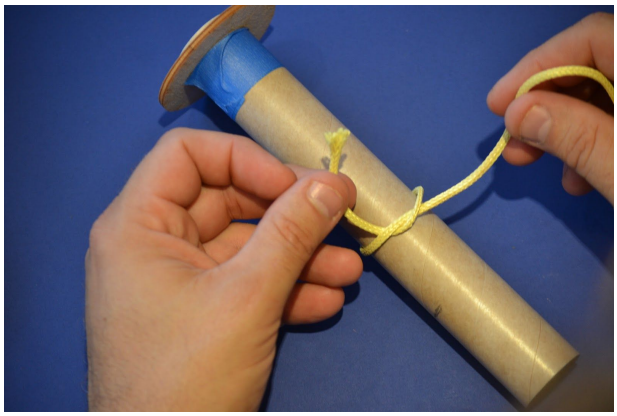
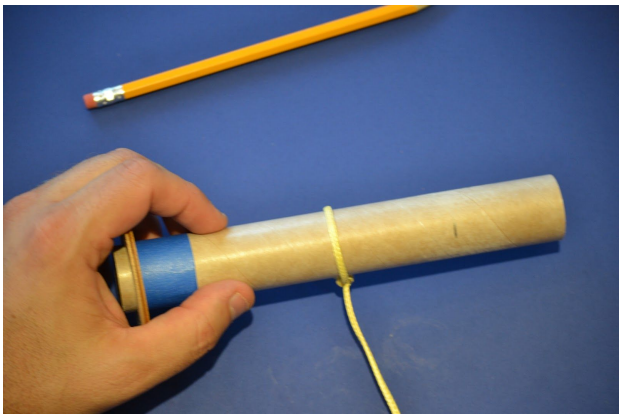
Place the motor mount tube between two pencils, then slide the unnotched centering ring to be resting on the pencils, then wrap painters/masking tape above the ring.

Spread glue on the inside of the unnotched centering ring and on the motor mount tube.

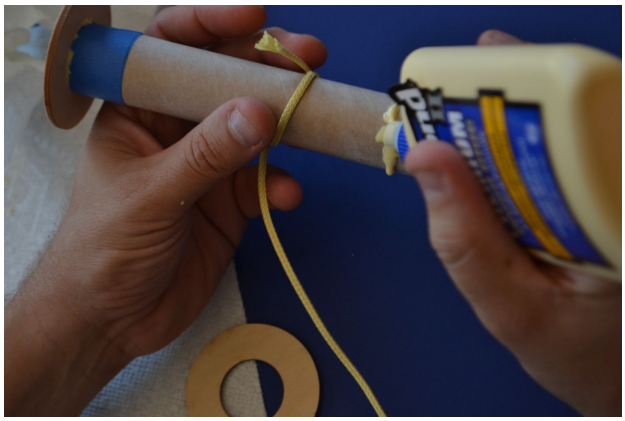
Twist on the centering ring to the tape, then clean any excess glue, it is important to make sure there is no glue inside the motor mount. Allow the glue to set.

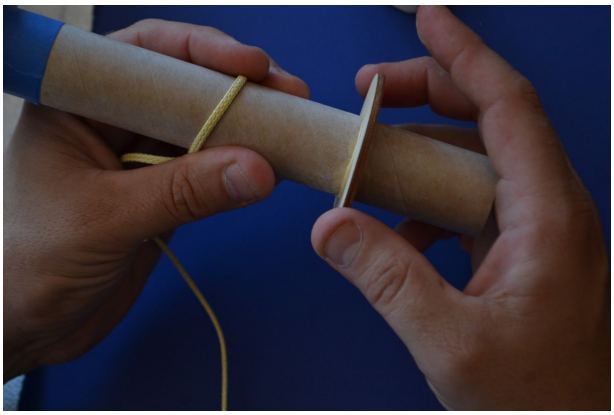
Lightly sand off the coating on the other end of the motor mount tube, approximately 2” from the end. Place the notched centering ring at 2 inches from the other end, then mark with a pencil.

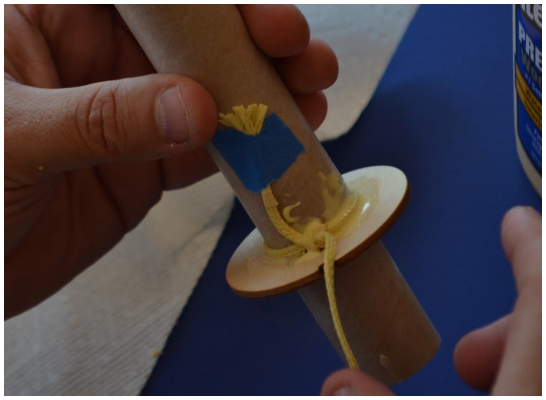
Tie one end of the kevlar cord snug to the motor mount tube on the longer side of the tube at the mark.



Spread glue to the inside of the centering ring and onto the motor mount tube at the mark.

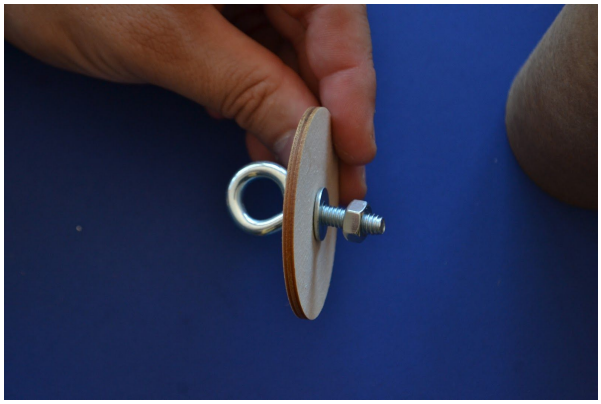
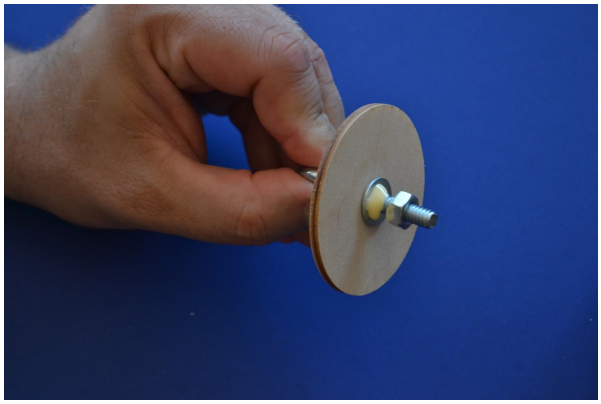


Twist on the centering ring, cleaning up any excess glue, then slide down the kevlar loop to be against the centering ring and the knot aligned with the notch in the centering ring.

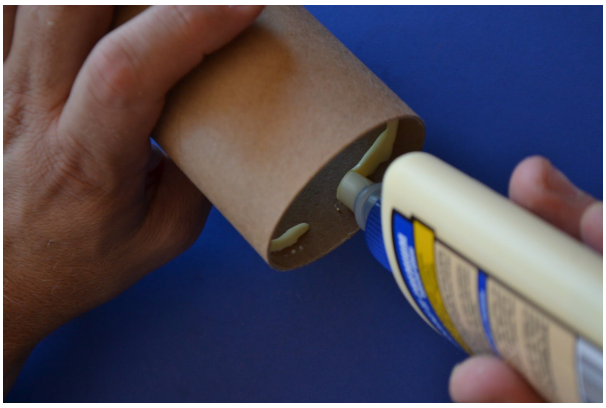


Use more glue to glue the kevlar loop to the motor mount tube and centering ring. Cut and tape down excess kevlar.

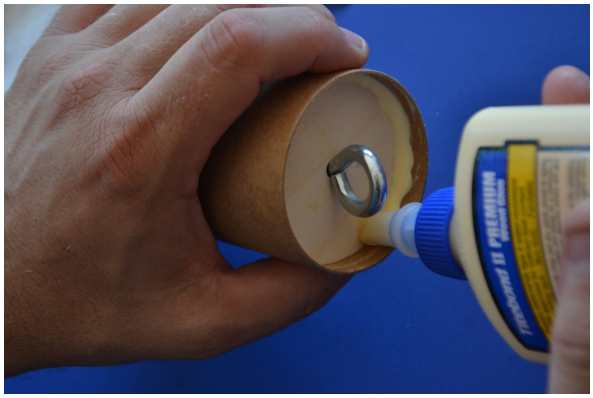
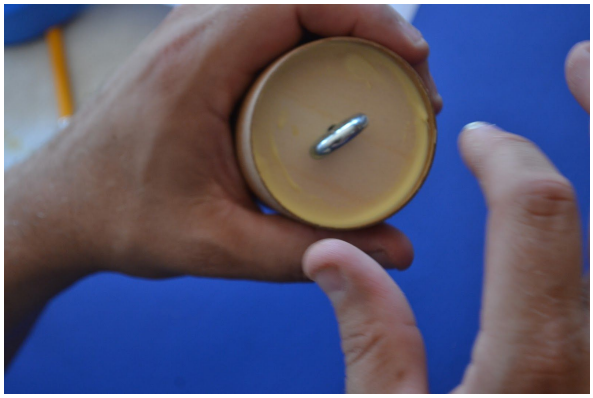
Part 2: Coupler

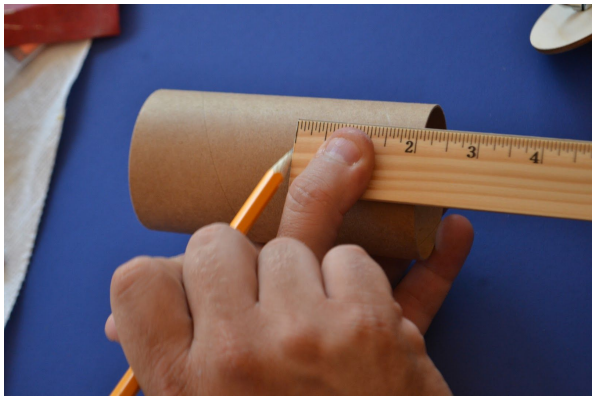
While waiting for the glue on the motor mount to dry, assemble to bulkhead as shown: Eye bolt → bulkhead → washer → drop of glue → nut and tighten until snug.



Glue the bulkhead into one end of the coupler, push the bulkhead in until there is ¼-⅛ of an inch of coupler exposed.

Add and spread glue to the corner of the bulkhead and the coupler



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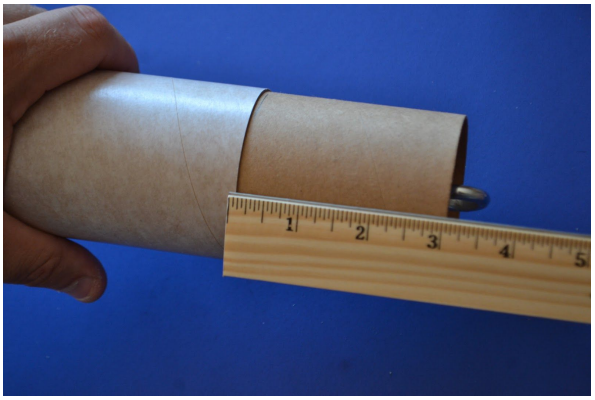
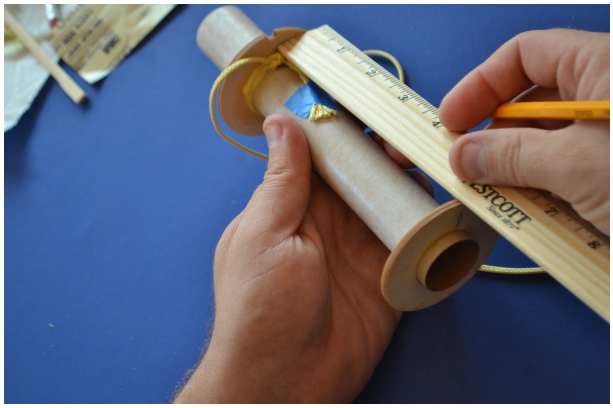
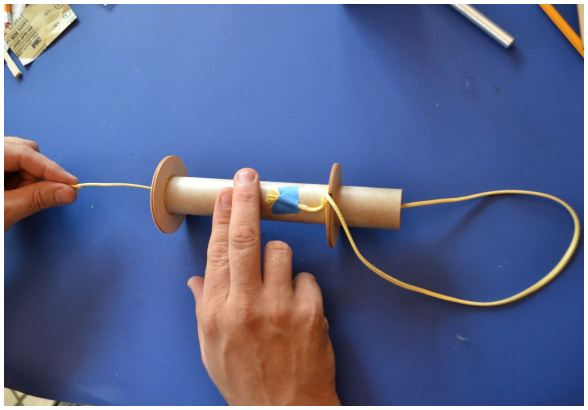
Measure and mark two inches from the end without the bulkhead and test fit the coupler in the forward body section.



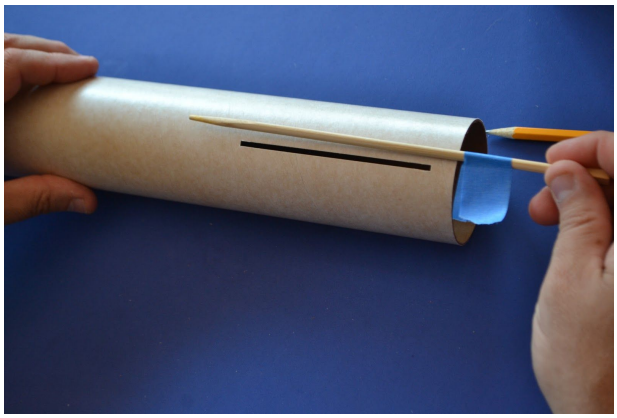
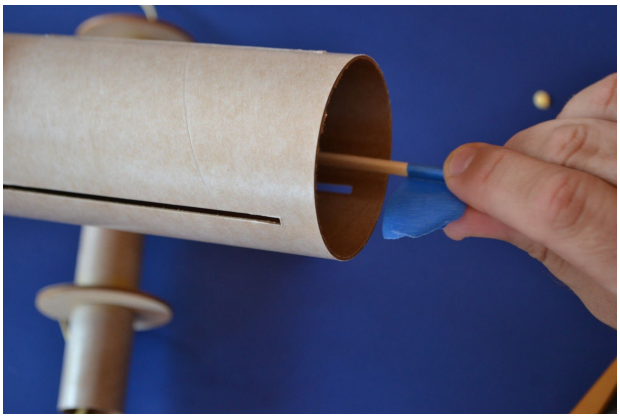
Apply glue to one end of the forward body tube (the one without fin slots), and spread it out before sliding in the coupler to your mark. There should still be about 3 inches of the coupler exposed. Clean any excess glue.

Part 3: Installing the Motor Mount

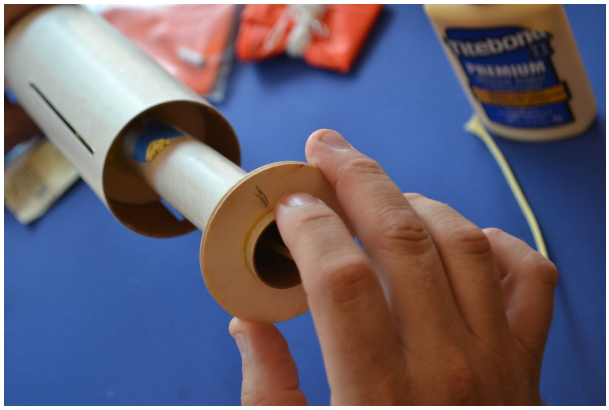
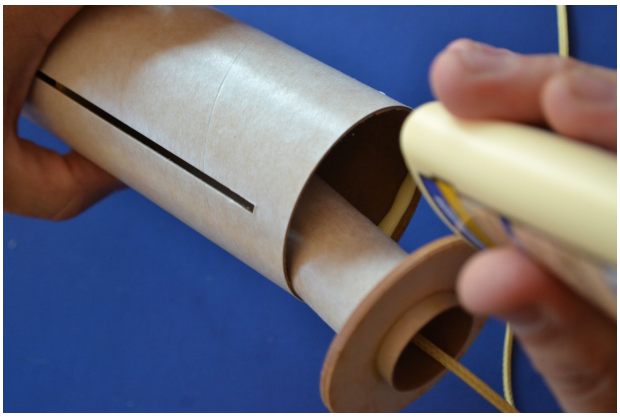
You must wait for the glue from Part 1 to dry before starting this part.

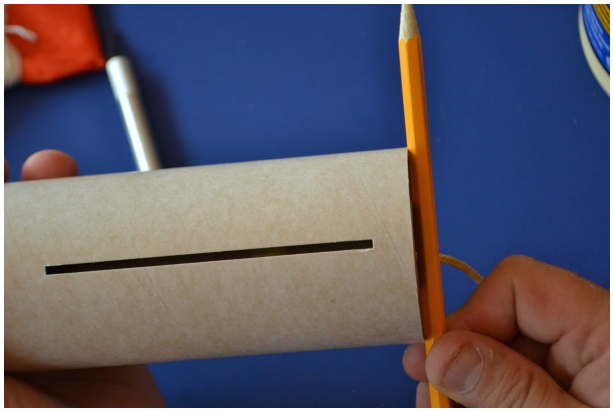
After the glue has set on the motor mount, remove the tape from the lower centering ring. Mark where the excess kevlar is on the flat side of the lower centering ring. Push the kevlar through the motor mount tube and pull out the slack. Test fit the motor mount assembly in the body tube, and sand as needed, the motor mount should slide in snug.

Mark a pencil or skewer with tape so that the end of it is just past the fin slots on the body tube. Using the tape as a measurement for how deep to go, place a bead of glue on the end of the skewer and spread in the body tube above the fin slots. Clean any excess glue that is in the fin slots.

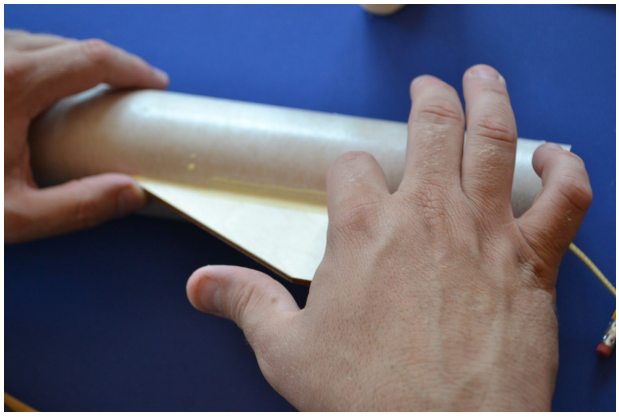
Slide in the motor mount tube until just the lower centering ring is sticking out. Spread glue in the body tube below the fin slots. Keep the glue off of the motor mount. Align the mark on the lower centering ring between two fin slots.



Slide in the motor mount so that the end of the motor mount tube is flush with the body tube. Allow the glue to set.

Part 4: Fins

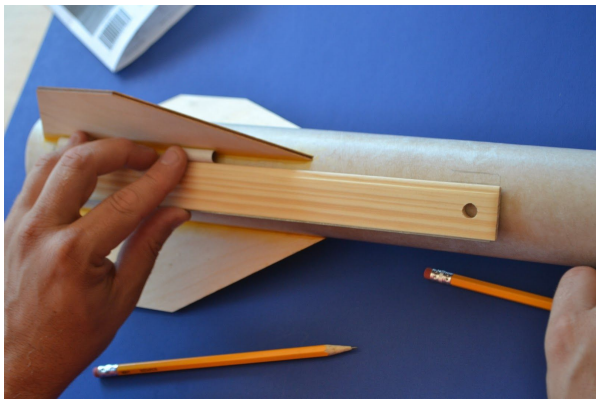
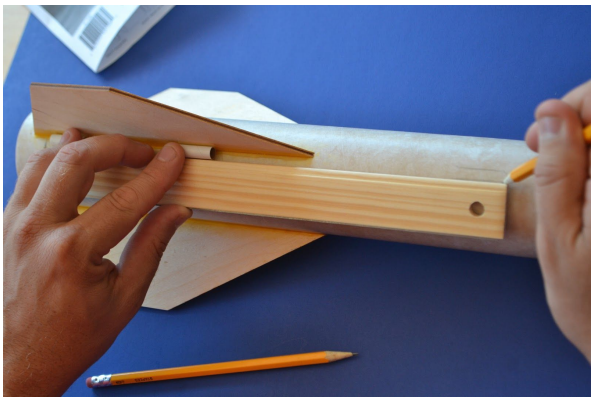
Test fit each fin in the body tube, and sand as needed, the fins should slide in snugly. Lightly sand the edge of each fin and the body tube above each fin slot.



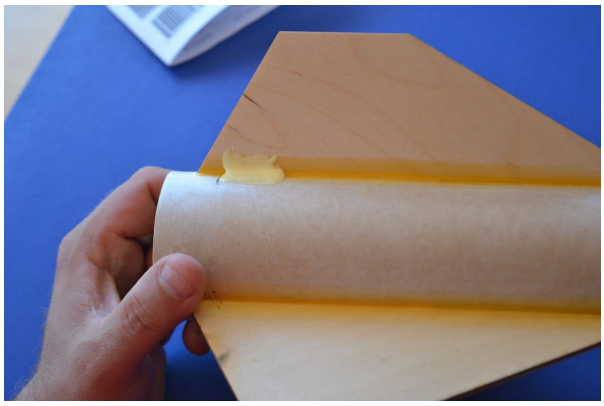
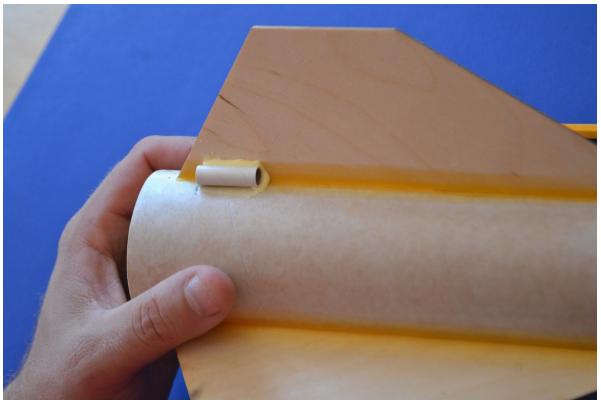
Spread glue on the edge of a fin, then insert it into the fin slot, ensuring that it is against the motor mount. Add and spread glue in the corner of the fin and the body tube to make a smooth

fillet. Repeat for each fin. After the fins have dried, add additional thin layers of glue in the corners to build up the fillets.

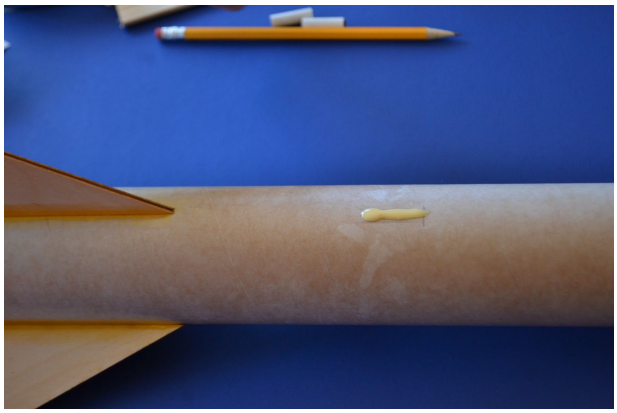
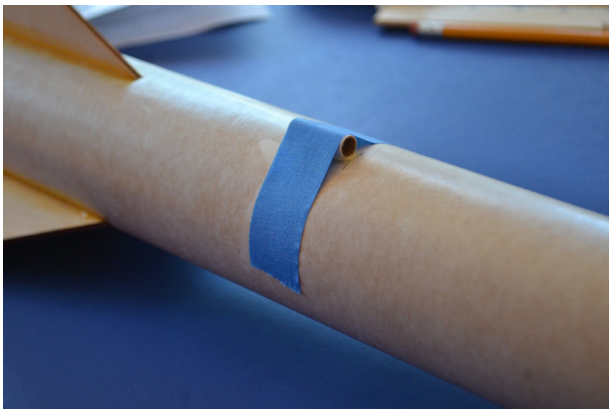
Part 5: Launch Lugs

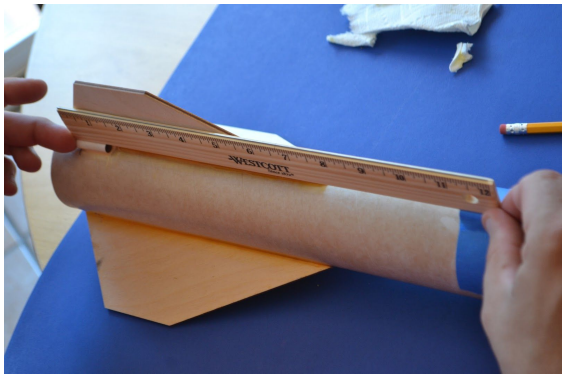
Place one launch lug against a fin then use a flat edge against the launch lug to make a mark about 13.5 inches from the end of the rocket.

Glue one launch lug in the corner of a fin and the body tube. Be sure to clean any excess glue blocking either end of the launch lug.

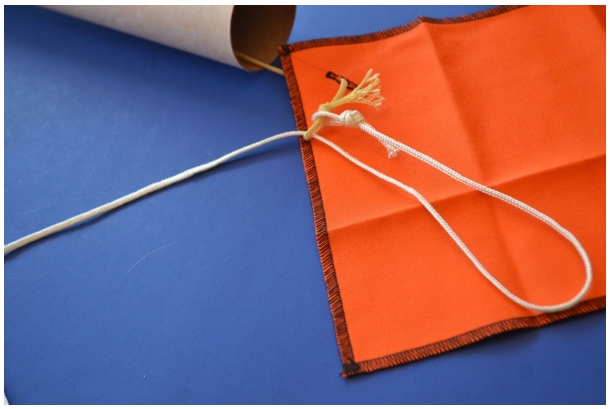



Using the mark made earlier, glue on the other launch lug, and use tape to hold it while the glue dries.

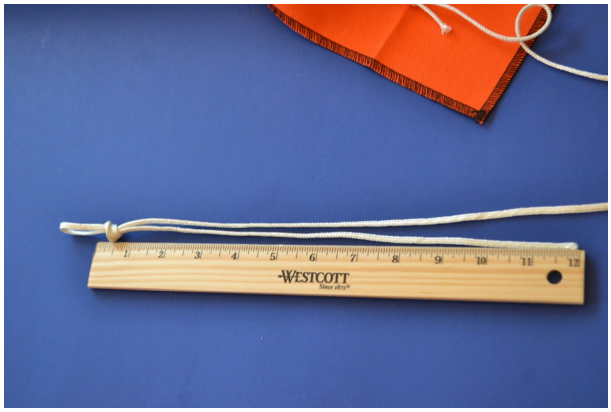


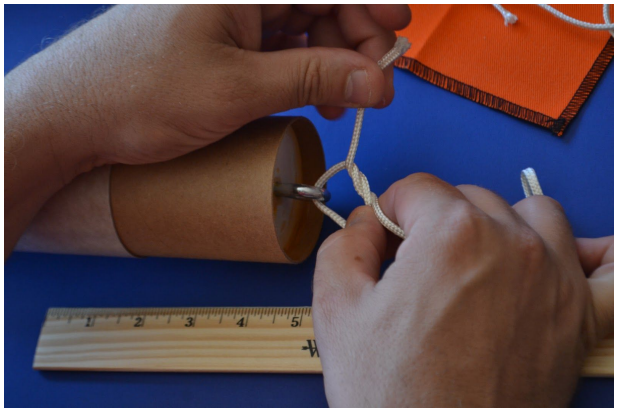
Before the glue dries, double check that both launch lugs are aligned.

Part 6: Parachute

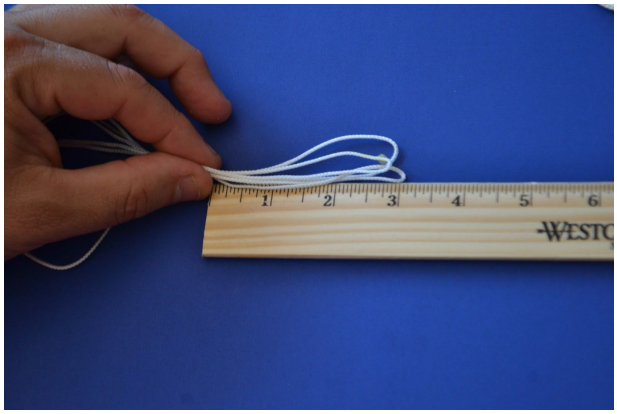
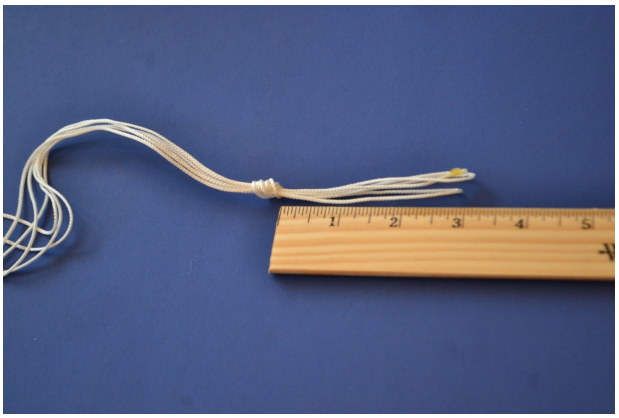


Thread the kevlar shock cord through the blast protector and tie a loop. Tie a loop at one end of the nylon shock cord and tie the two together.

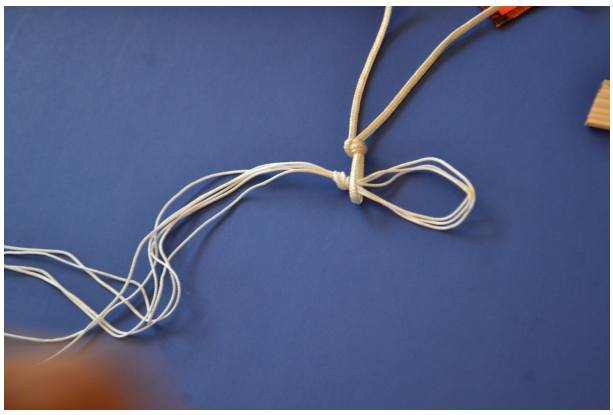
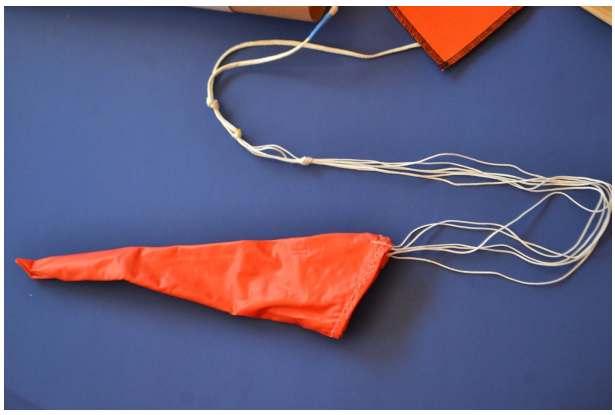




Tie a loop one foot from the other end of the nylon shock cord. Then tie the shorter end to the coupler.

Untangle the parachute cords and tie a single overhand knot three inches from the end of the cords.

Pull the end of the parachute cord through the loop in the nylon shock cord, then thread the parachute through the loop in the parachute cords to tie it to the nylon shock cord.

Part 7: Motor Retention

High power motors have a thrust ring that is on the motor, this keeps the motor from sliding too far into the rocket, but it doesn't keep the motor from ejecting out the back of the rocket when the ejection charge fires. We need to install a motor retainer for that.

While there are many different ways of retaining motors, for the Jr. Level 1 DX3 build Madcow Rocketry is including a motor retainer that consists of a metal plate held in place by two screws that attach to the rear centering rings. The retainer comes with instructions on how to install it.

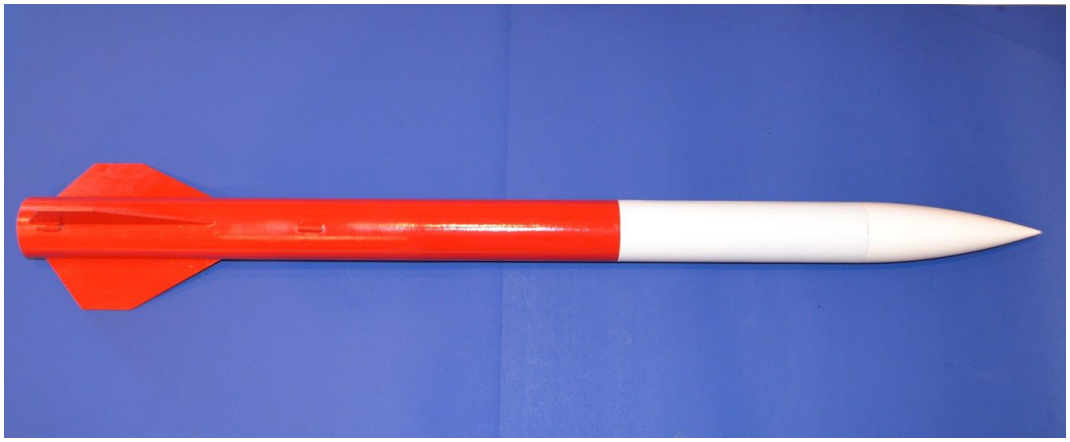
Part 8: Paint Prep

While this part is optional, painting will make it easier to distinguish your rocket. Especially if not painting, it is a good idea to write your name and a phone number on your rocket.

Wrap the forward section coupler in newspaper, then wrap the newspaper with tape to avoid damaging the coupler.

Crumple up newspaper and wrap it in more newspaper. Slide the newspaper into the lower section body tube. The newspaper should be snug and stay in place.

Tightly roll up newspaper and slide it into the launch lugs. Lightly sand the shiny coating off of the body tube to make paint adhere better. If painting the nose cone, lightly sand and use a paint that will adhere on plastic.



Paint. Clean any paint that is blocking the launch lugs, is on the coupler, or is inside the body tube.