

# Easy Homemade Rocket from CPVC pipe.

by **ClCrow** on July 2, 2008

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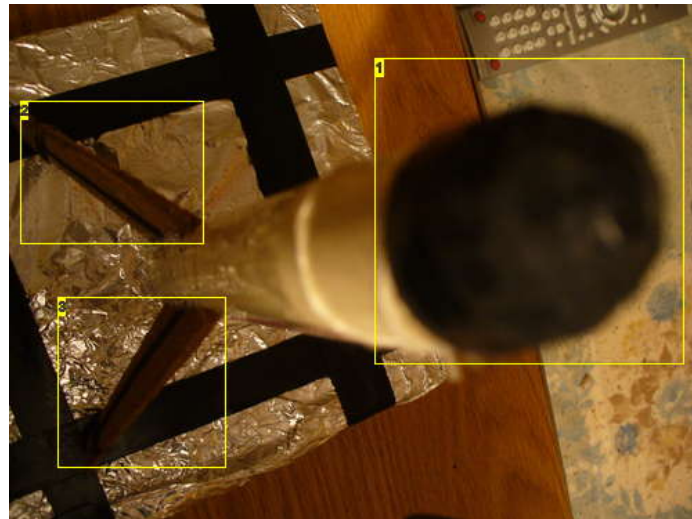
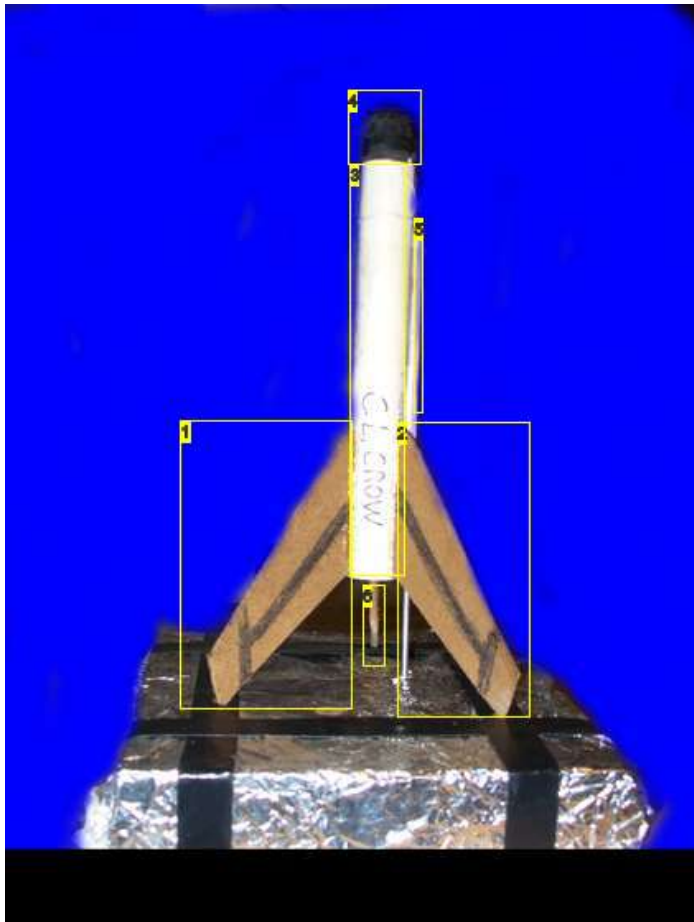
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## intro: Easy Homemade Rocket from CPVC pipe.

If you are like me, you like experimenting with designs without spending a lot of money in case it goes miserably, and you like to do things without safety taking too high a priority and obstructing or ruining a good chance to experiment. If you are not like me, it is probably for the better as you will probably live longer, but you will miss out on all the fun. In this Instructable, I will tell you how to make an inexpensive rocket out of CPVC pipe. This method of making a rocket may very well be common knowledge. Though I thought of the Idea on my own, others had thought about it as well. You could probably just do a Google search and find this-you don't need to tell me. In fact, I searched this out and I read of how someone else did this, so I felt more comfortable attempting it. Advice is most welcome. This is my first Instructable, so sorry if it is confusing. Sorry that I don't have any videos or that many pictures at the moment. Enjoy.

One more request. **Please** stop referring me to Google.com. I get the idea.

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### Image Notes

1. Nose Cone
2. Fin
3. Fin

### Image Notes

1. Fin
2. Fin
3. Rocket Tube
4. Nose Cone (It is a little blurred)
5. Drinking Straw
6. Bottom of Fin

## step 1: Things needed

### Materials

7" of 3/4" CPVC pipe.(I am not exactly sure what that is, but I found it at Ace hardware. You might find a lighter type of pipe, but make sure that the rocket engine fits snugly inside the pipe.) You will have to get it in one foot length's, so it is up to you if you want a longer rocket.

A 1" rubber stopper for the cone. (if you can think of something else, it is up to you.) You can also get this from Ace.

A sheet of balsa wood about 6" by 5" (I used a different type of light wood, But I am clueless as to what it is called.)

A normal plastic bag (for the parachute)

Thin Super Glue

Tough string for parachute ( You *might* could use fishing wire for this- I used what I had on hand)

Metal eye.

Thin rubber band (shock cord)

<http://www.instructables.com/id/Easy-Homemade-Rocket-from-CPVC-pipe/>

Drinking straw

Model Rocket engine. (I would use a C6-2, a C6-3, or C6-4)

**Tools needed:**

Protractor (would immensely help)

Hacksaw

Razor (or sharp knife)

Scissors (both light and heavier duty)

Marker

Screwdriver

Ear swab

Hot glue gun (with glue of course)

File (moderately large, but not a rasp)

Optional Paint.

**step 2: Making the Parachute**

First we will make the parachute for our recovery system. You will need this to be at least a foot in diameter. This step is somewhat self explanatory. A moderately good size of a plastic shopping bag will serve this purpose well. Trace a marker around to make a circle, and then cut this out carefully. Next, you will need to tie four 14" strings (or wires) to the parachute at quarter sectors. Now, carefully tie the other ends into one big knot. You will want to test this parachute to make sure of accuracy in it's vertical float to the ground, minimal spinning, and rigidity. Inspect the sectors where the wire is tied to the parachute to make sure it is still securely tied. When the parachute has met your standards, secure the sectors by covering it in super glue. This is an outstanding help to the parachute. If you want, you may use more strands for a better parachute, but it will make it a lot more complicated.

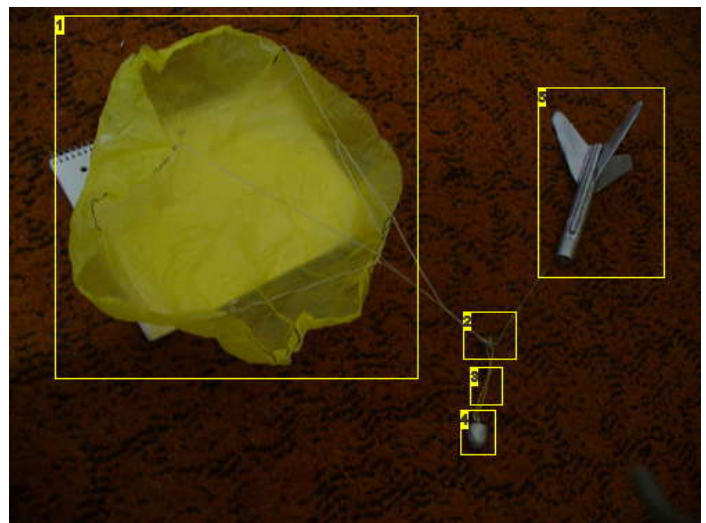
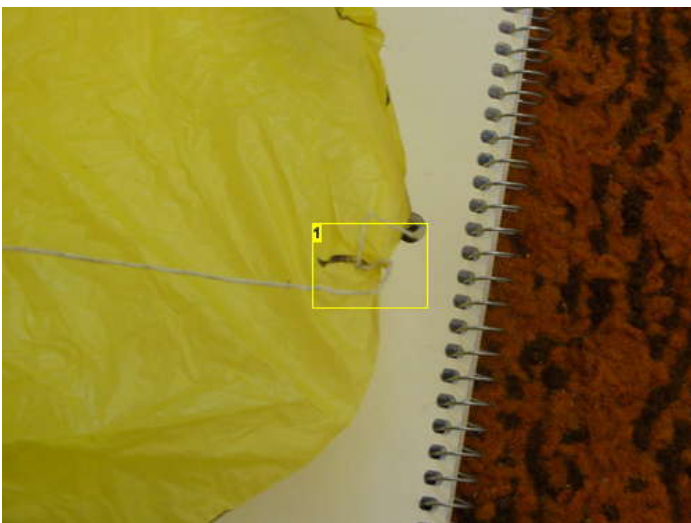


Image Notes

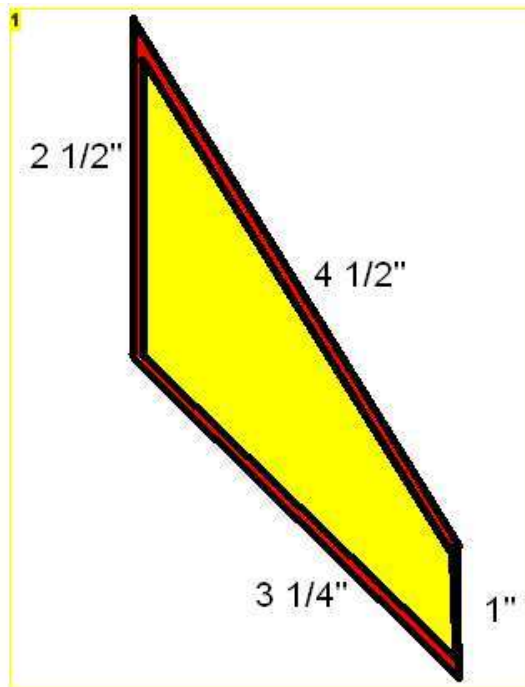
Image Notes

1. One of four sectors joining to the parachute.

1. Full view of parachute
2. This is where the rocket, parachute, and shock cord join.
3. Shock Cord (rubber band)
4. Nose Cone
5. Rocket with fins after painting.

### step 3: Making the fins

Now it is time for the piece of balsa wood (or other light wood). I have uploaded a document with the dimensions if you want to trace it. You can design your own if you want. Cut three of these out **carefully** with a razor or sharp knife. Sand the edges of each fin smooth except for the 2 1/2 " edge that attaches to the rocket. You will need this edge to be flat, level, and having as much surface as possible. Preferably, the balsa (or other wood) should be at least 1/8 " thick (It depends on the strength of the wood you are using). I don't have any experience in balsa wood as it is rare in my area, so pardon any ignorance I might express. Because the rocket is heavy, thin balsa wood is very likely to break.



#### Image Notes

1. Fin Dimensions and Layout

### File Downloads



Fins.doc (28 KB)

[NOTE: When saving, if you see .tmp as the file ext, rename it to 'Fins.doc']

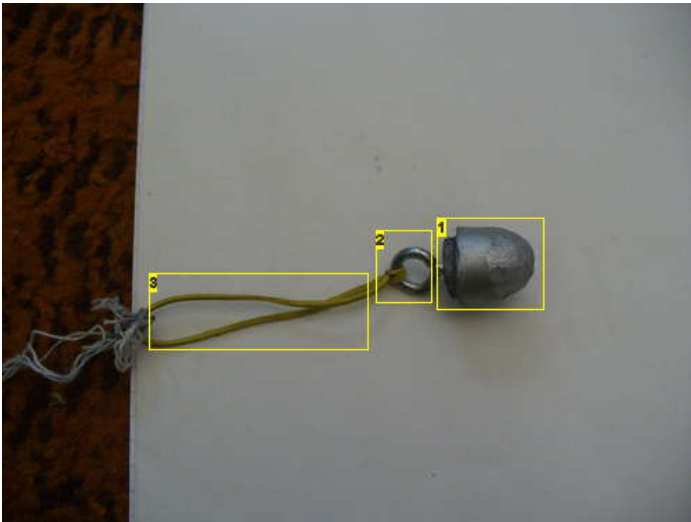
### step 4: Making the nose cone.

This is so complicated that I recommend a different method or just buying a nose cone. However, I will tell how I made a nose cone, even though it is rather sloppy. Try this at your own risk, but don't say I didn't warn you: Doing this right is hard.

Take the 1" rubber stopper and trim the base to 11/16 of an inch. This can be done by trimming a groove around the base. Just imagine cutting out a 1/8" thick washer out of the base that is 1/8" wide. Or in simpler terms, cause part of the base to fit just inside the tube of the rocket for 1/8". If I manage to upload some illustrations, understanding this will be easier. I would use a razor, and you will likely need a file.

If you have success with this, then you can use a tough pair of heavy duty scissors to shape the top of the stopper into an oblique shape. This looks very choppy, so I recommend a different method. However, you can try smoothing it out with a file.

If all this goes well (Then I am amazed), then screw the metal eye into the center of the base of the cone. Give it several good twists. Attach the rubber band to the metal eye with a slip knot as your shock cord.



**Image Notes**

1. Nose Cone
2. Metal Eye
3. Shock cord (rubber band)



**Image Notes**

1. Rubber Stopper





### step 5: Making the rocket tube.

If all goes well (it probably will not), then you can make the rocket tube. Cut the CPVC pipe to a 7" length (or longer if you prefer) with a hacksaw (or other pipe cutter). Using a large file, you will want to make sure that ends of the pipe are evenly perpendicular to the rest of the pipe (another way of saying it : a straight cut).

The next thing is easy to do, but also easy to mess up. Take an ear swab, and coat it with super glue. You will need to measure how far the engine should go in with about a fourth of an inch sticking out. Insert the ear swab to the same length and make a ring inside with the glue. This is just right to keep the engine in place.

Next take a length of the tough string (about +/- 7 inches) and tie it securely to the outside of the rocket tube. Make sure that doesn't come off by covering the knot all around with super glue. Make the knot as small, neat, and unnoticeable as possible.

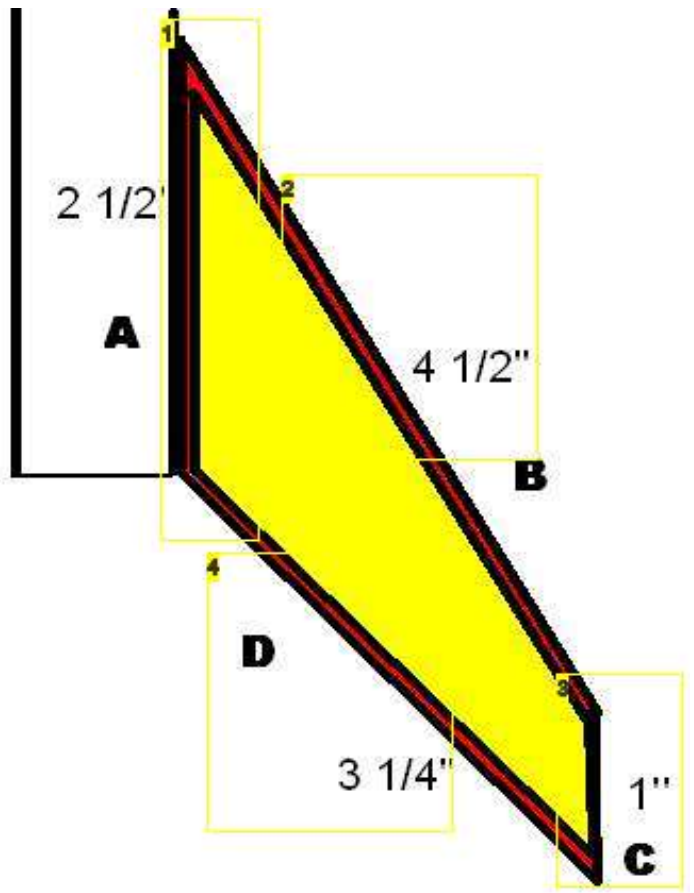
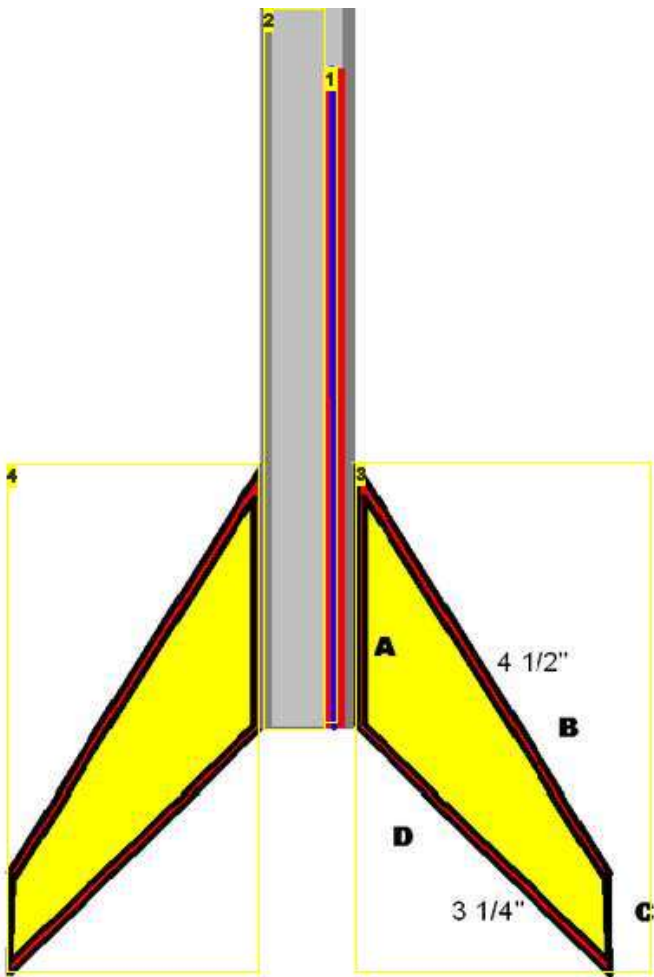
### step 6: Glue Fins and Straw to Rocket Tube

This step could be the hardest of all. You will need to glue the fins on to the rocket. Dividing the rocket into thirds is pretty tricky, and the fins must all be glued at the same height, so that the rocket will remain perpendicular to the ground. The fins must also be glued perpendicular to the rocket tube as well. This step is very difficult. You will want to mark out thirds on the tube (if you have a protractor, that would definitely help.) Then you will need to extend that mark up to 2 1/2 inches on the side of the rocket tube as to outline where you will glue the fins.

Use a hot glue gun for this as it works the best. First apply the glue on side A of the fin, then apply the glue along the mark on the rocket tube carefully. Carefully push the two together. Needless to say (but I will say it anyway) this is trickier than it sounds. If you need to make any adjustments, make them quickly. Hold it in position for about ten seconds. Now repeat this for the other two fins, but remember that the two other fins must be at thirds of each other, or 120 degrees. Do not worry if it is slightly off or crooked, but if it is noticeable or if you have high rocket standards, you can carefully break them off (if wood is strong enough-I do not know about balsa), and retry. When you are done, let glue dry with fins pointing upward (or rocket inverted). When this has dried, (I, not being an expert, wait no more than 30 minutes.), apply glue along both sides of each fin and let this dry with fins pointing down (or normal rocket position).

Now for something a little easier. Cut a drinking straw to 5 1/2", and glue it alongside the rocket to the rocket tube as parallel to the tube as possible. You could do this alongside a fin if you want, but I would not as I have found this to complicate re gluing the fin should it break off. This will guide the rocket in the first milliseconds of it's flight. This step will not help if you do not have a launcher with a guide rod.



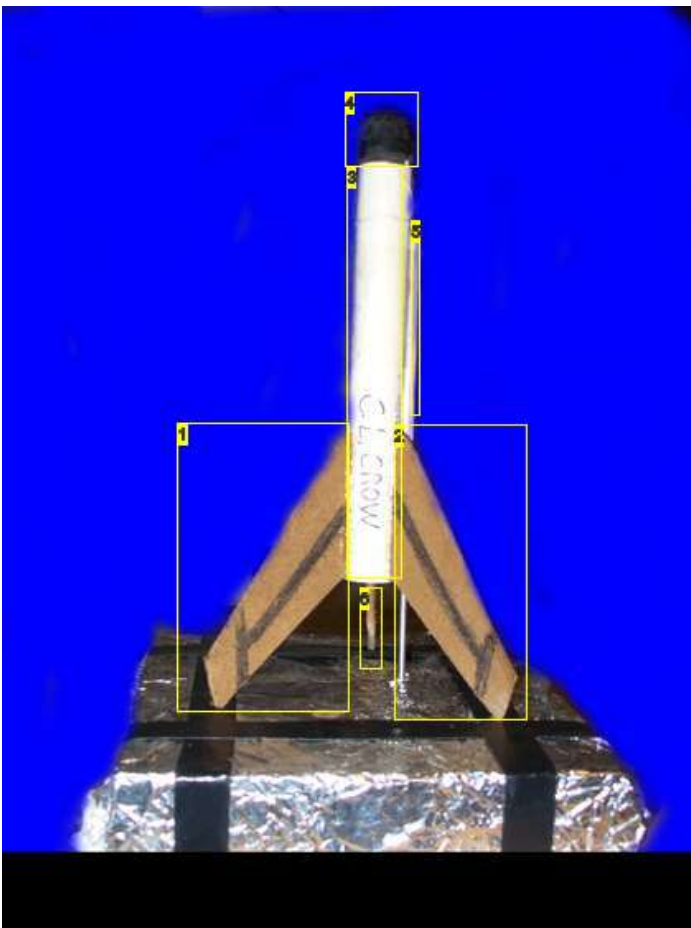


**Image Notes**

- 1. Drinking Straw
- 2. Rocket tube. This is not to scale.
- 3. Diagram of fin. Side A is 2 1/2 inches long
- 4. Fin.

**Image Notes**

- 1. Side A glues to rocket. Make this edge as flat as possible to give it more surface for gluing to rocket tube.
- 2. Smooth edge B
- 3. Smooth edge C too.
- 4. It wouldn't hurt to smooth Edge D as well.



#### Image Notes

1. Fin
2. Fin
3. Rocket Tube
4. Nose Cone (It is a little blurred)
5. Drinking Straw
6. Bottom of Fin

### step 7: Putting It All Together

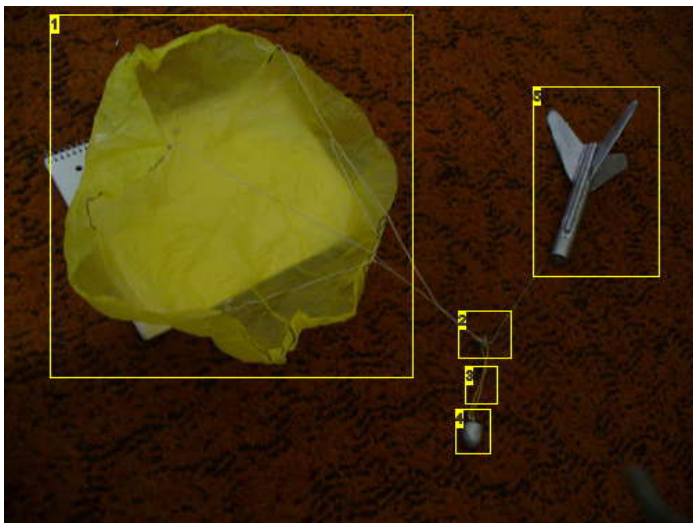
This step might should have been done differently, so if there is a rocket expert out there that would *kindly* set me strait, I would appreciate it. I tied the string attached to the tube in step 5 and the knotted together strings from the parachute in step 2 to the rubber band (shock cord) in step 4. I don't think this is the proper way, but that is how I did it. Make sure these knots are very secure as the ejection charge is quite powerful. Using super glue here is a good idea as well.

If you would like to paint the rocket than that will be the final step in *Making* the rocket.

I used a C6-5 engine, but i would recommend a C6-3 or C6-4 as to have less ejection delay. Insert this into rocket, making sure the glue ring is in place and working.

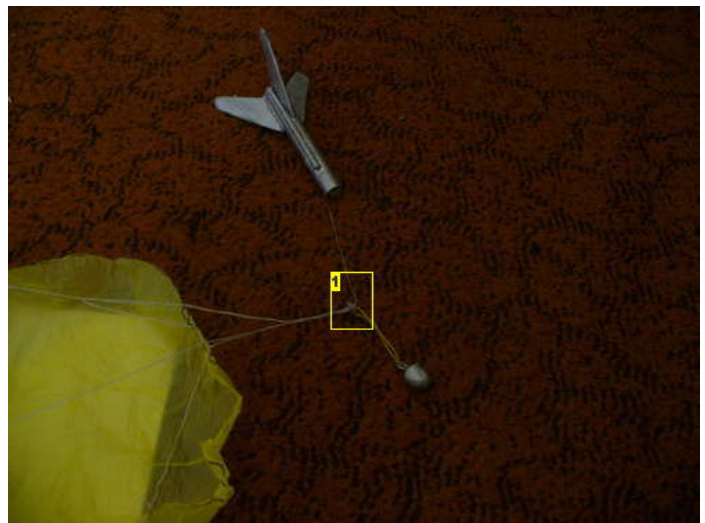
Follow instructions that come with engine on packing recovery wading.





#### Image Notes

1. Full view of parachute
2. This is where the rocket, parachute, and shock cord join.
3. Shock Cord (rubber band)
4. Nose Cone
5. Rocket with fins after painting.



#### Image Notes

1. Tie the four strands of the parachute that you knotted together in step two to the shock cord as well as the string from step five.



### step 8: Final Preparations

Sorry that I do not give a definite way to pack the parachute but I will give an Idea of how I did it. It is a little hard to explain. Sorry I don't have pictures yet- You don't have to tell me- this step is lousy.

Fold Parachute in half *away from rocket*. This means you will be sort of inverting it. What you see on the picture for step 2 is facing toward the rocket: you will want to fold it away. Just think about the way you would normally fold it in half and do the opposite. Now bring both halves down to the halfway fold you just made. Bring the two upper folds you just made down to the same place. You will have something resembling a rectangle. Lay it down flat and take one end and roll it up halfway, then, keeping this rolling in place, flip it around and roll the other side as well. You do not want to roll the edges like a scroll, but on opposite ends. Imagine unrolling one end of a scroll all the way and rolling it back on the other side. If possible, insert the parachute into rocket. It will be a tight fit.

This step is very lame and hard to understand- you do not need to tell me. If you know another way to pack a parachute, by *all means-do so!* You can even experiment with your own ideas.

## step 9: Caution!

The first thing I should warn you about is about following my instructions. Doing that can indeed lead to frustration and leave you absolutely baffled. (Please comment if something is confusing) Because of the lack of common sense in some teenagers (and myself) I find it necessary to say as well that this rocket is dangerous. I am not responsible for how you use (or misuse) this information. This is a heavy rocket. If you do not understand something in this Instructable, or if something isn't clear, by all means ask me or bring it to my attention. One more thing- You are welcome to comment, but it is my duty to inform you that I may respond to any negative statements- and I have plenty of time to think of my responses. Please comment about any errors or something wrong with the Instructable that I need to change. I would rather my ears not be a garbage can for obscenity so leave that out, thank-you. **I am not liable for any damages caused by using this information.** Check local and (if necessary) parental legality before launching.

Rate this how you will. Have fun (safely of course, and preferably staying in one piece).

## Related Instructables



**How To Build A Water Thrusted Rocket** (video)  
by rethhc



**Matchstick Rocket, Make A Simple Matchstick Rocket, Rockets** (video)  
by lajocar



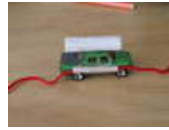
**Folded Paper Rocket: High-Flying, Easy-To-Make and Amazingly Simple**  
by mediocrates



**airsoft rocket launcher**  
by wazupdoc



**Jolt Can Rocket** (video)  
by shaneok7



**Black Powder Rocket motors.**  
by Eric-the-halfabee



**Trust Me I'm A Rocket Scientist**  
by Kiteman



**Homemade bottle rockets**  
by goawayndstay



## Comments

[10 comments](#) [Add Comment](#)



**Dipankar** says:

The model is very well done but , where is the engine for the rocket?  
What is this (C6-2,3,or 4 model rocket engine) explain yourself.

Jul 21, 2008. 11:15 PM [REPLY](#)



**CiCrow** says:

O-kay. The important thing is the beginning "C6". If you have a C6-5 engine, the "5" means that the ejection charge will fire 5 seconds after the blast ends. Because this is a heavy rocket, I will say to use a C6-2 engine, or a C6-3 engine. Sorry that was not clear. I'll try to fix that soon. Thanks.

Jul 22, 2008. 6:23 PM [REPLY](#)



**CiCrow** says:

One more thing. You might could use a C11 engine for more power, but I have not tried it yet.

Jul 30, 2008. 7:29 AM [REPLY](#)



**Dipankar** says:

Crystal clear.  
Now I can use a firecracker rocket and inside the tube and make it work. This is easy and cheap. Thanks---

Jul 22, 2008. 6:47 PM [REPLY](#)



**mikeasaurus** says:

Video of ignition!  
Video of crash landing!  
Video of burning debris!

Jul 21, 2008. 3:09 PM [REPLY](#)



**CiCrow** says:

Jul 21, 2008. 6:22 PM [REPLY](#)

Yeah, sorry I do not have any of those videos-that would be cool-but this rocket doesn't do any of that except one time I did a hurried job packing the parachute and it free-fell a few hundred feet (the only damage was a broken fin and that was easily re-glued). Sorry to disappoint you, but I will have to build a sloppier rocket to show you any of that cool stuff.

P.S. Why would the debris(CPVC, Rubber, and wood be *Burning*? Let me know if you know a way to get a rocket engine to make CPVC catch on fire. I would be most interested.

---



**mikeasaurus** says:

Jul 22, 2008. 8:37 AM [REPLY](#)

I can't think of anything off hand that would outright ignite it, but tires burn and they are rubber, and everyone knows wood already burns, seems to me like you just need to have some kind of amazing accelerant in there to really kick things off like coating the fuselage in polyurethane .. or maybe just guide the rocket into an acetone factory!

---



**CiCrow** says:

Jul 22, 2008. 6:17 PM [REPLY](#)

How true. Pardon me. I should have added not to launch this in the city or in a dry season fire hazard. And definitely not near a gas station. However, it seems that the made-in-China rockets might be just a little easier to catch fire. But you are right. It should not be launched in any other area than a large field.

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**Wolf Seril** says:

Jul 21, 2008. 11:23 AM [REPLY](#)

-1 for saying "this is my first instructable, so..."

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**CiCrow** says:

Jul 21, 2008. 11:30 AM [REPLY](#)

What do you mean? I see people do that that everywhere. I figured I would get a lot of negative comments and people telling me that it was sloppy, so I figured I would say it first. However, I appreciate your comment and I guess something like that should go somewhere else than the description.

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