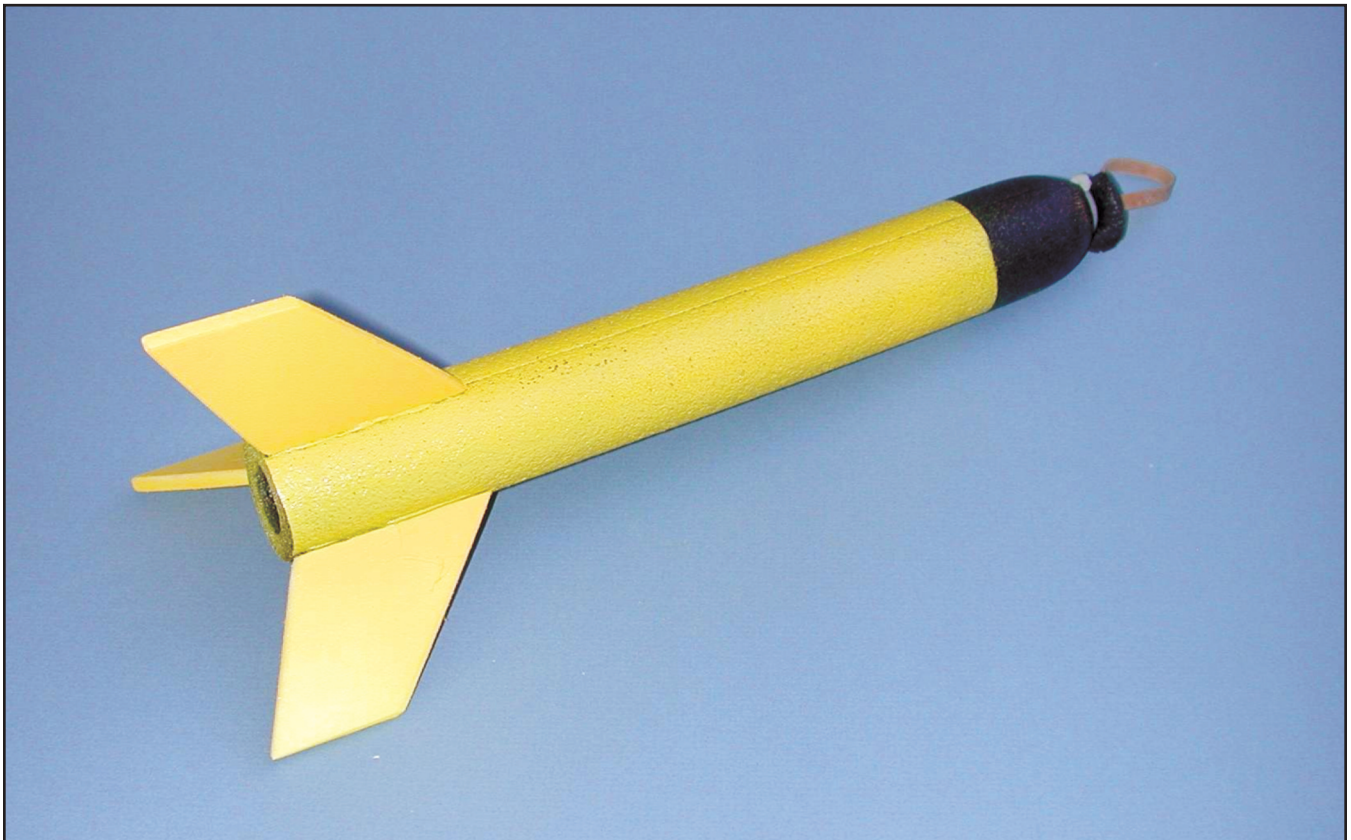




# REDSTONE

## Hands-on Option Two

### THE GODDARD ROCKET



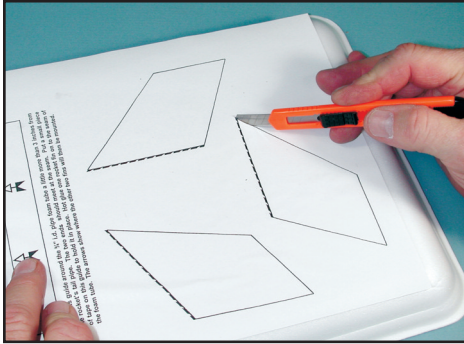
The completed Goddard Rocket - a foam rocket that can be built for a quarter!

**OBJECTIVE:** This activity allows cadets to build an inexpensive, safe, flying model of a rocket.

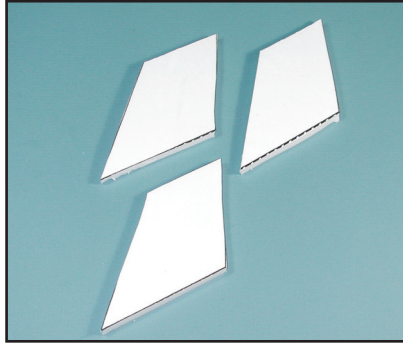
## MATERIALS:

1. A template sheet for fins (make reproduction for class or squadron on a copy machine)
2. 1 foam meat tray or other flat foam stock (approx. 0.2 inch in thickness)
3. 1 pipe insulation tube cut to a length of 14" (Note foam pipe insulation tubes come in five foot lengths. You can get 4 rockets from one tube. For a class of 30, you will need 8 tubes. The cost varies, but the average is around \$1.00 per tube. **Note** that the fin guide is tailored for tubes that are 5 11/16" in circumference.)
4. 1 hot glue gun
5. 1 snap knife, X-acto knife, or hack saw (to cut foam)"
6. 1 cable tie and one soda straw, or two cable ties
7. 1 #64 rubber band

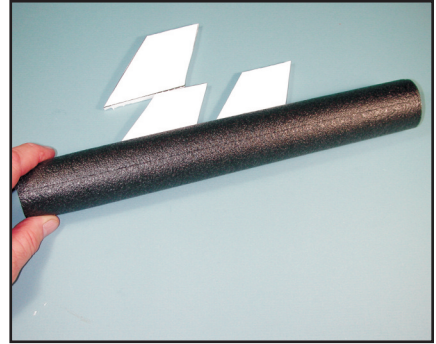
## PROCEDURE:



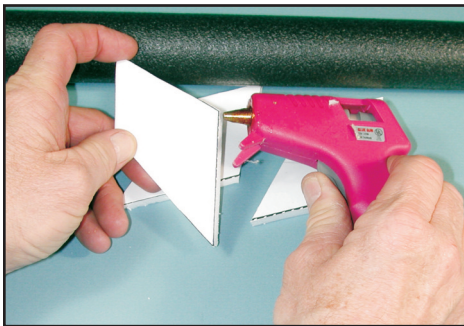
Position the template on the foam meat tray and cut out the fins using a snap knife.



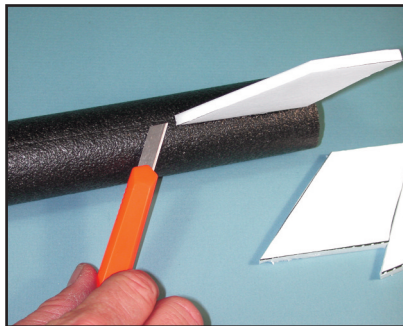
The fins may be left as is or sanded to round the edges for a more aerodynamic shape.



Cut a piece of pipe insulation to a length of 14".



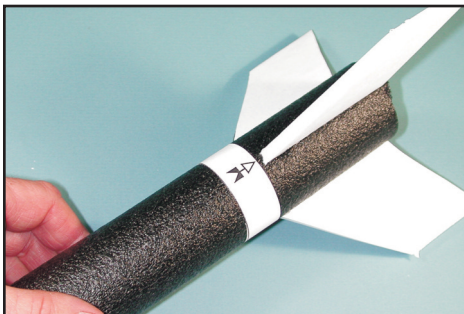
Apply hot glue to the edge of the fin, not to the pipe foam.



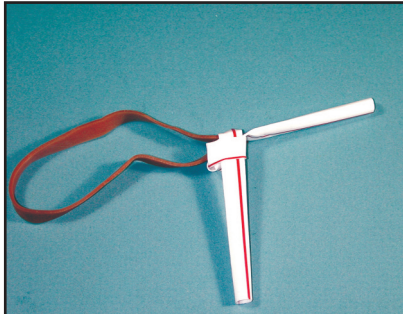
Place the fin on the pipe covering seam. This seam acts as a positioning guide.



Wrap the fin guide around the pipe foam as shown. Wrap it around the tube so that it ends at the seam. Secure with tape.



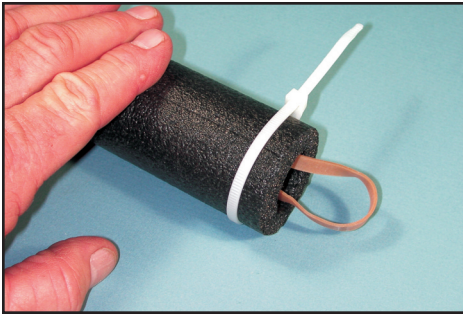
The small arrows show the builder where the other fins are to be mounted.



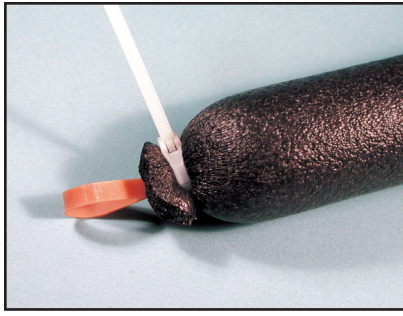
You are now ready to work on the power source. Tie a soda straw or a cable tie around a #64 rubber band.



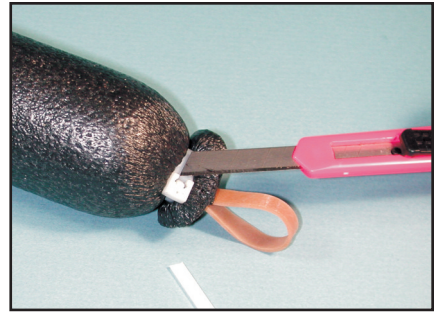
Stuff soda straw ends or cable tie into the nose of the foam tube so that some of the rubber band sticks out.



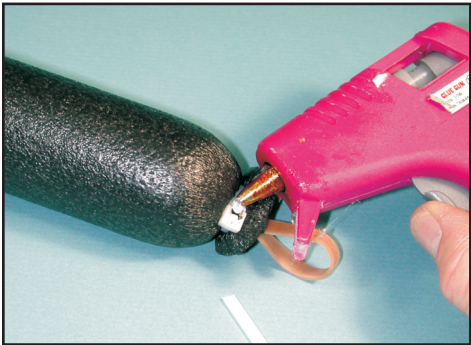
Wrap a cable tie around the opening about 3/8" from edge as shown. Notice how much of the rubber band is showing out the end of the tube.



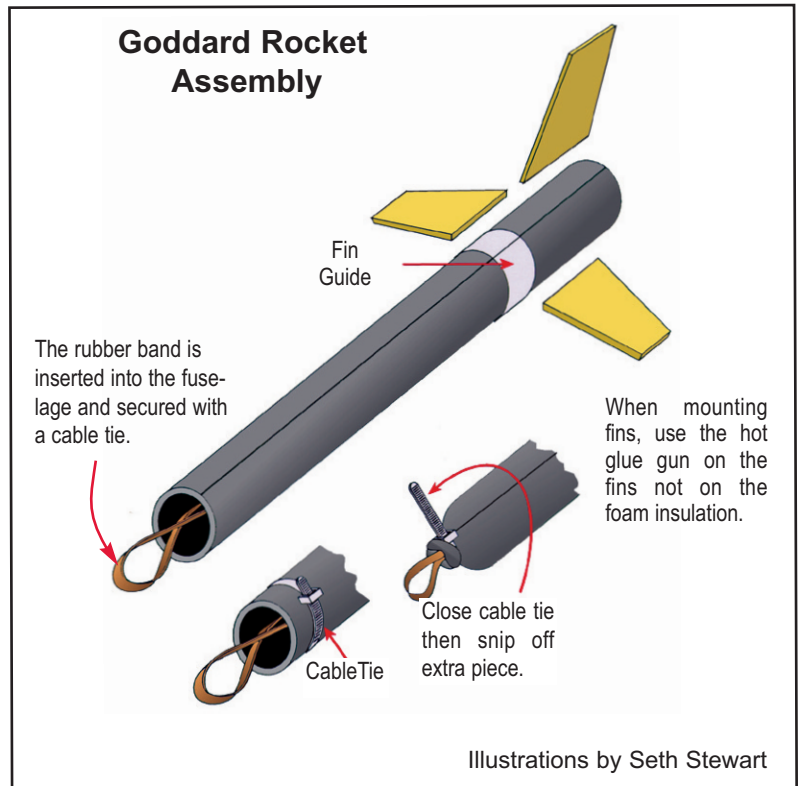
The cable is cinched down with force. Make it tight.



Trim the tail off the cable tie with knife, scissors, or diagonal cutter. Make sure that no sharp edges remain.



A big blob of hot glue is squeezed on to the cable tie head to add a measure of safety to the construction.



### To Launch the Rocket

1. Put one thumb into the aft opening and hold the tail firmly.
2. Put the other thumb into the rubber band.
3. Stretch the rubber band to about 4".
4. When you launch the rocket, pitch it forward in a slight arc. This adds just a small amount of thrust and makes the rocket fly straighter.

Copy the guide below and wrap it around the pipe foam tube a little more than 3" from the rocket's aft end. The two ends of the guide should meet at the seam. Put a small piece of tape on this guide to hold it in place. Hot glue one rocket fin on to the seam of the foam tube. The arrows show where the other two fins should then be mounted. **Note** that the guide is tailored for foam tubes that are 5 11/16" in circumference.

