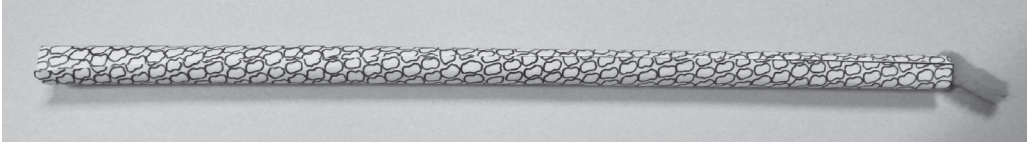


# TMV VIRUS

COPY ONTO REGULAR PAPER

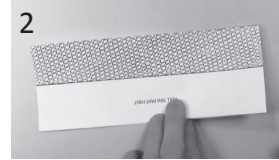


## You will need:

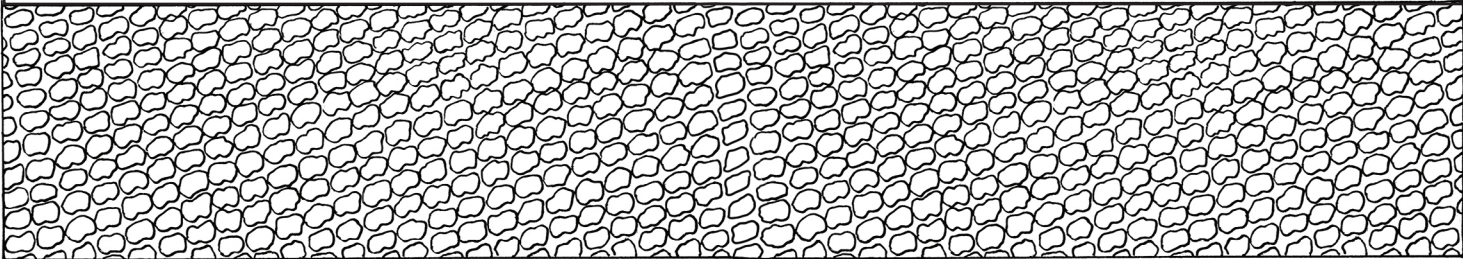
- this page copied onto regular paper (not card stock)
- scissors, and glue stick
- a new, unsharpened pencil (or as close to new as possible)
- a chenille stem (pipe cleaner used for crafts)

## How to assemble:

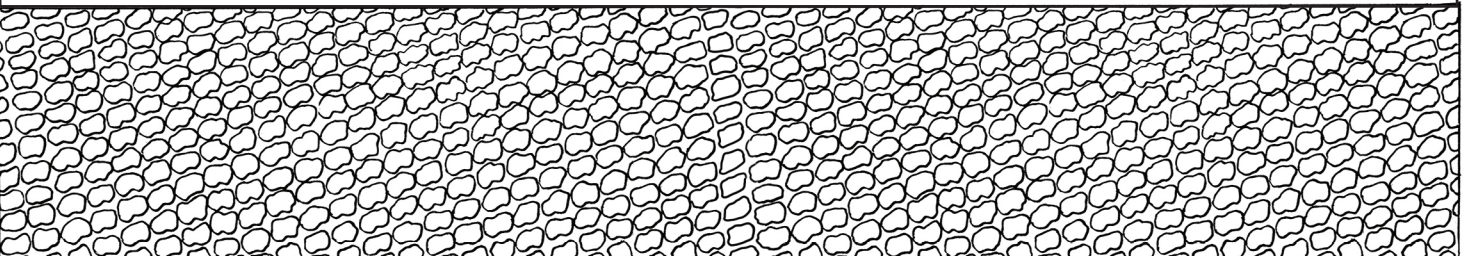
- 1) The patterns below let you make two TMV virus models. Cut out the patterns.
- 2) Put a pattern paper onto a piece of scrap paper as shown in picture. Flip over.
- 3) Apply glue stick JUST TO THE TOP EDGE. Push the glue stick right off the edge of the paper to make sure the top edge is well covered.
- 4) Use an unsharpened pencil to begin rolling the paper from the bottom. Be patient, it is tricky to get it started.
- 5) Roll all the way up and then stick and smooth the seam.
- 6) Wind a chenille stem around something thin, like a coat hanger.
- 7) Push twisted chenille stem into the hollow tube. (Chenille stem represent RNA, of course.)

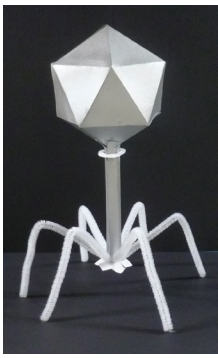


ROLL THIS PART FIRST



ROLL THIS PART FIRST





# PHAGE VIRUS

COPY ONTO CARD STOCK

*"Phage" is short for "bacteriophage"*

You will need:

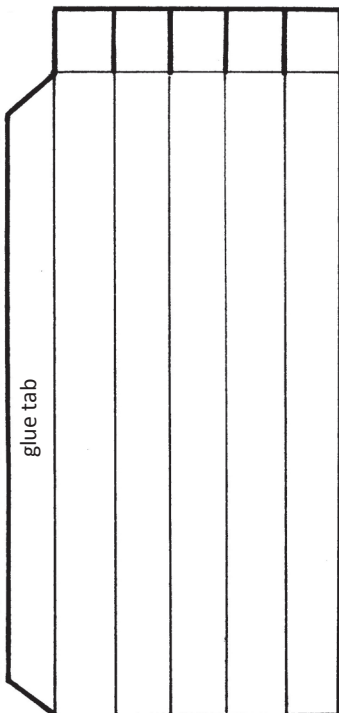
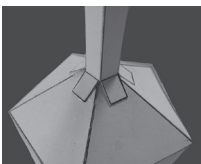
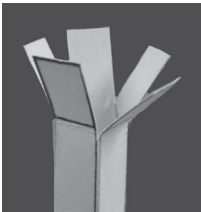
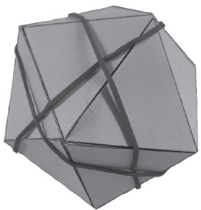
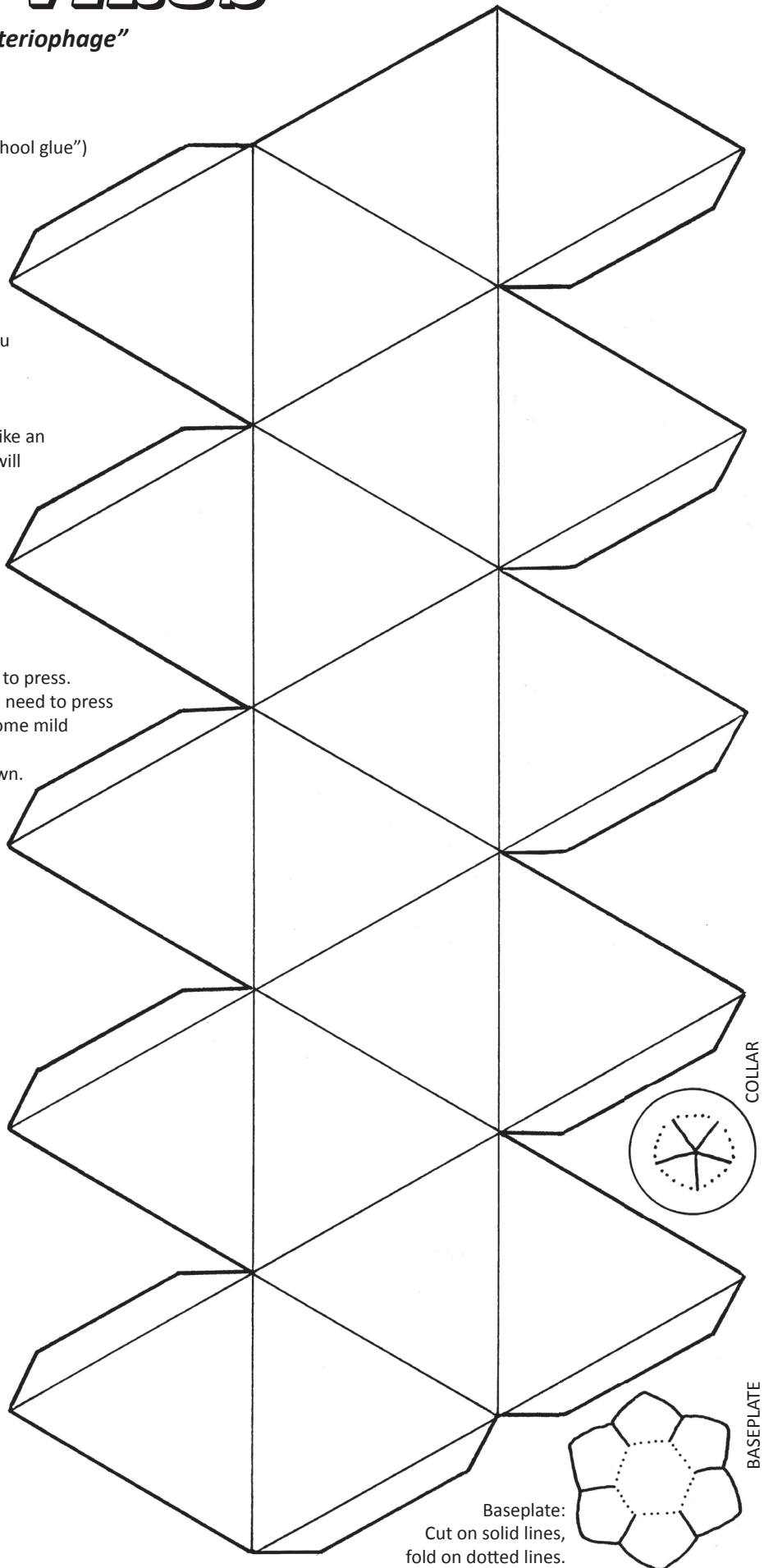
- this page copied onto card stock
- scissors, and white craft glue or a good quality glue stick (not "school glue")
- 3 chenille stems
- a ruler or straight-edge
- a sharp point of some kind to

score fold lines (compass point, small nail, scissor point)

- some large, thin rubber bands
- any art supplies you want to use if you decide to add color to your T2 (find pictures online for ideas) In real life, the don't have any color, so you can make them however you want to. (I spray painted mine silver and added white legs.)

How to assemble:

- 1) Score the fold lines before you cut. Scoring might seem like an unnecessary step, but if you score the lines first, your folds will be neat and crisp and easy to do. (The fold lines are thinner and are not part of perimeter.)
- 2) Cut out the two pieces, and cut the flaps on the tail piece, as show below.
- 3) Fold on all fold lines.
- 4) Apply glue to glue flaps one at a time, and begin to assemble the icosahedron. Press and hold each flap until it is secure before you go on to the next flap. When you get down to the last flaps, it will be harder to get your fingers in to press. For the final flaps, don't bend them very much, so you don't need to press from the inside, and use thin, large rubber bands to apply some mild pressure, just enough to keep everything together. Let dry.
- 5) While icosahedron is drying, assemble tail sheath, as shown.
- 6) Glue sheath to one vertex of the icosahedron, as shown. (Optional: If you want to add a collar, do it now.)
- 7) Cut your 3 chenille stems in half and insert them (with some glue) into the bottom end of the tail piece. Bend into shape when dry.
- 8) Cut out baseplate, fold, and glue to bottom.



Baseplate:  
Cut on solid lines,  
fold on dotted lines.

