

Cut-and-assemble model viruses

Background information:

A virus is right on the dividing line between living and non-living. Although it contains DNA, the building block of life, a virus has very little in common with a real cell. It does not have the organelles found in all living cells, such as mitochondria, nucleus, endoplasmic reticulum, and outer membrane. A virus is simply a random piece of DNA wrapped in a protein shell. A virus cannot reproduce on its own, and it has no method of sexual reproduction (swapping DNA). It must attach itself to a living cell and “high jack” that cell’s machinery to make more viruses. A certain virus can only attach itself to one kind of cell. A virus that attacks lung cells can’t harm your stomach, for instance.

Viruses are very geometrical in appearance. They look more like geometrical figures than living creatures. The adenovirus shown here has 20 sides and in geometry class would be called a dodecahedron. Sometimes there are long skinny spikes jutting out from the corners. I suggest using an Internet search engine to find some photographs of viruses.

The other virus shown here, the T2, only attaches itself to bacteria. You’ll never catch this one! It is called a “bacteriophage.” Its shape is perhaps the most interesting of all viruses. What does it remind you of? Maybe some kind of space ship? The protein strand is in the top part and the legs at the bottom are what attaches to the bacteria. The legs pull the body down to touch the cell, and the virus DNA is squirted into the cell.

You will need:

- scissors
- white glue (regular, not school glue)
- copies of the pattern pages printed onto card stock (any color is fine)
- chenille stems (i.e. pipe cleaners used for crafts) in any color (3 per virus)
- paper clips or clothespins to hold the joints while they dry
- anything extra you want to use to decorate with: spray paint, glitter, etc.

NOTE: If you want your viruses to be in bright colors, I suggest copying the patterns onto brightly colored card stock. This will avoid having to paint them at the end. If you do want to paint them, a light coat of spray paint works the best.

Directions for the adenovirus:

- 1) Cut out the virus on the solid lines.
- 2) Pre-fold on all the dotted lines. Make sure your folds are crisp and neat. The crisper and neater your folds, the better your model will look. This really makes a difference!
- 3) Begin gluing joints. Start with just one or two and press and hold them for at least ten seconds, then clip them (if you wish) and let them dry another minute or so. After a minute or two, these joints should be adhered well enough to be able to go to other joints. If you are assembling two viruses at once, you could do a few joints on one, then switch to the other one while the first one dries.
- 4) Be very patient as you assemble the virus. Patience is the key. When you get to the last flap and can no longer get your fingers on the inside to press and hold, just pull the glue flaps out enough so that they apply a little pressure to the inside of the figure, then glue and hold the flap in place for a minute or two. A little patience with holding it will pay off. The glue sets in just a minute or two, and you can put the figure aside to finish drying by itself.
- 5) If you would like to decorate your virus when you are finished, I recommend a light coat of spray paint (silver or gold looks cool).

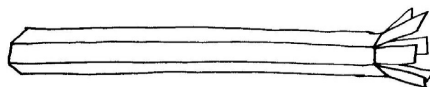
6) If you look at viruses on the Internet and would like to imitate the ones that have the spikes coming out of the corners, I recommend putting polyester stuffing inside the figure before you close the last flap, then inserting pins (the kind with the big colorful head) into the corners, with a dab of hot glue to hold them.

Directions for the T2 virus:

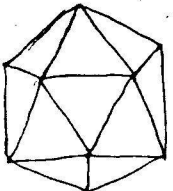
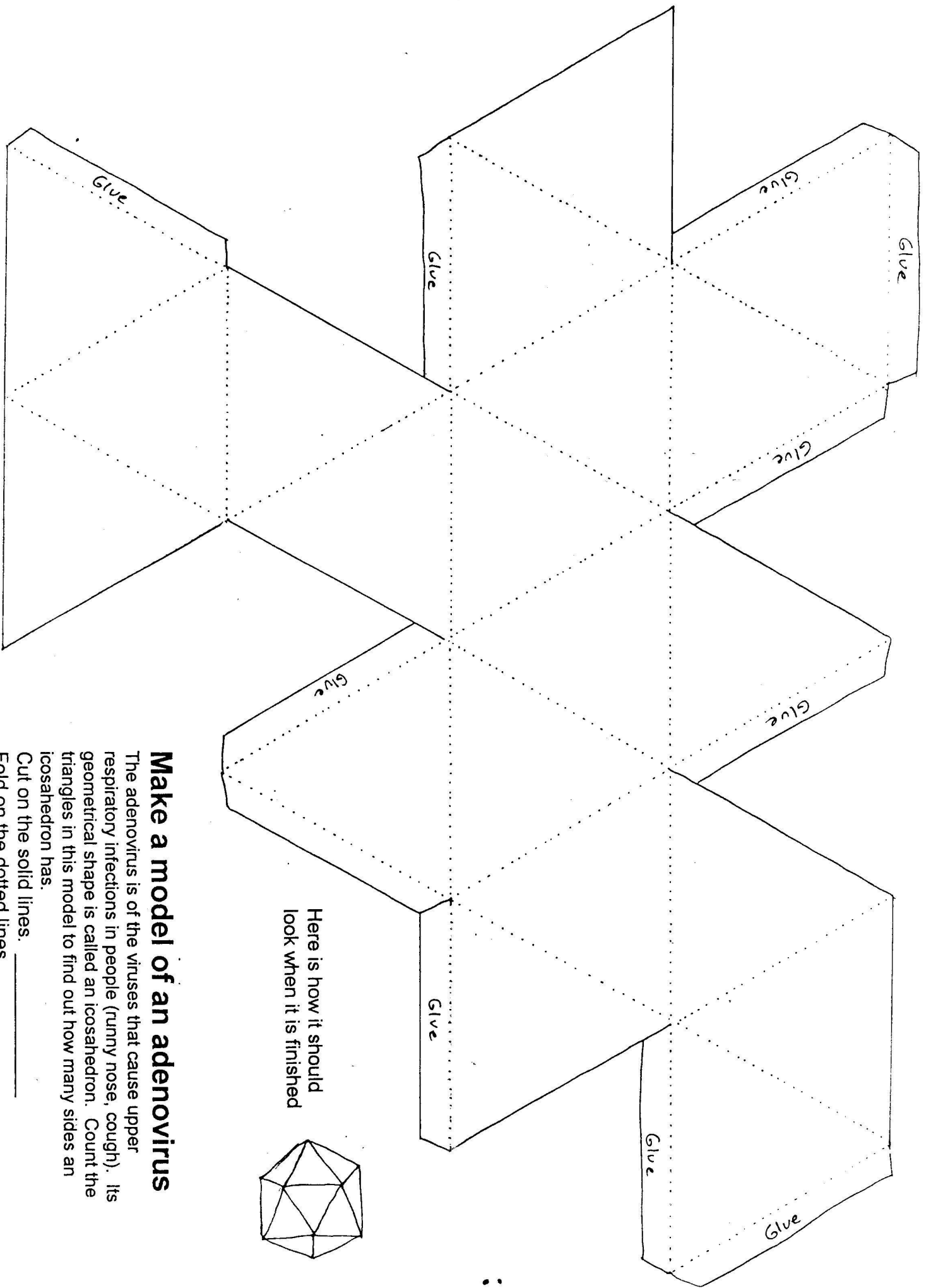
- 1) Cut out the three body parts, cutting on the solid lines.
- 2) Pre-fold on the dotted lines. Once again, make sure your creases are sharp and accurate.
- 3) Assemble the two halves of the upper body before trying to connect them. Connecting them can be a little tricky, but it is definitely possible and, once again, patience is the key. Patience has a big pay-off here: you get a really cool virus model!

NOTE: If you really need to have something on the inside, applying pressure as you glue the final flap in place, you could try using an opened paper clip stuck through one corner, going into the figure. The paper clip could be your “hand” inside the figure.

- 4) Roll the long, skinny lower part and glue along the glue tab. Make sure to cut the pieces on the end so it looks like this:



- 5) Glue the long “neck” onto the body.
- 6) Cut the chenille stems in half, so you have six identical pieces. Put a fairly generous amount of white glue in and around one end of them (no more than an inch) and stick them up into the bottom of the neck. Let this dry for as long as possible before twisting legs out into position.
- 7) You don’t need to decorate the T2, but if you want to, I recommend a light coat of spray paint. Don’t use too much wet paint. If the paper gets soggy, the figure will bend and sag. Also, be careful that your T2 doesn’t get top-heavy.



Here is how it should look when it is finished

Make a model of an adenovirus

The adenovirus is of the viruses that cause upper respiratory infections in people (runny nose, cough). Its geometrical shape is called an icosahedron. Count the triangles in this model to find out how many sides an icosahedron has.

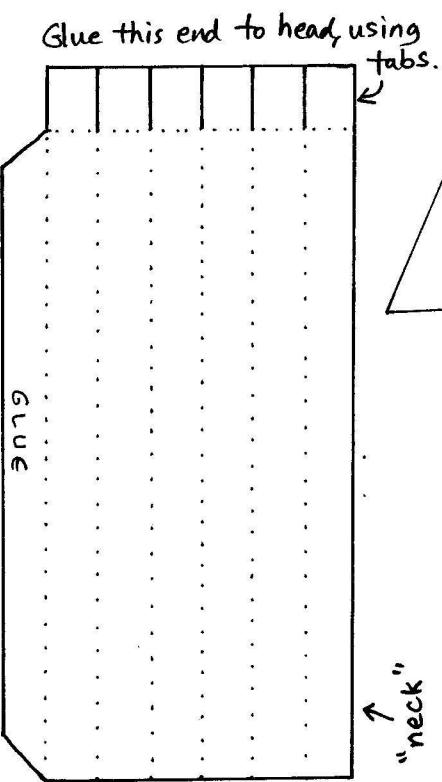
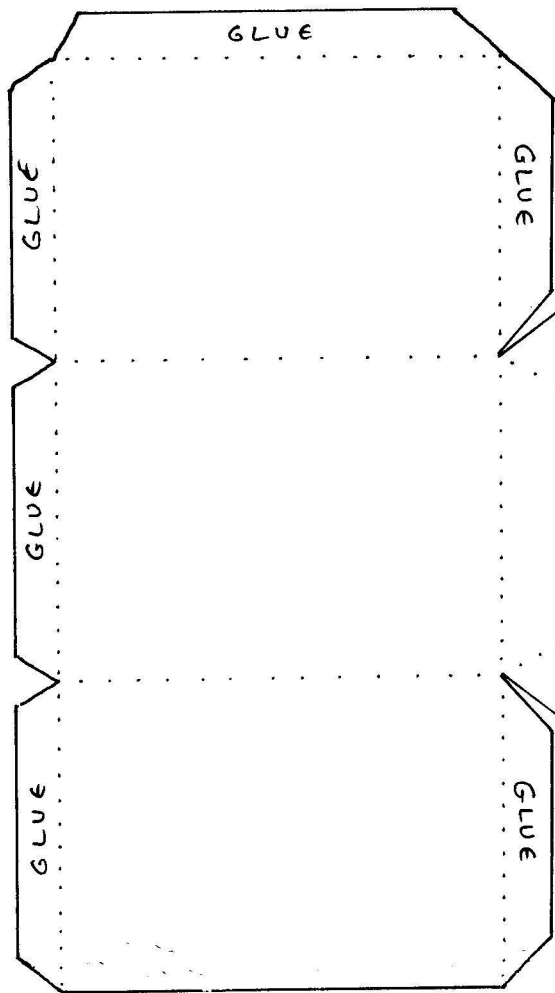
Cut on the solid lines. _____
 Fold on the dotted lines.

T2 VIRUS

You will also need 3 chenille stems ("pipe cleaners" used for crafts)

Cut on solid lines —
Fold on dotted lines

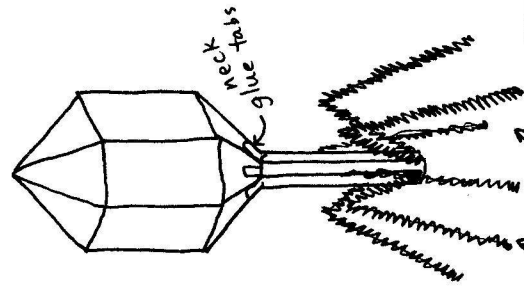
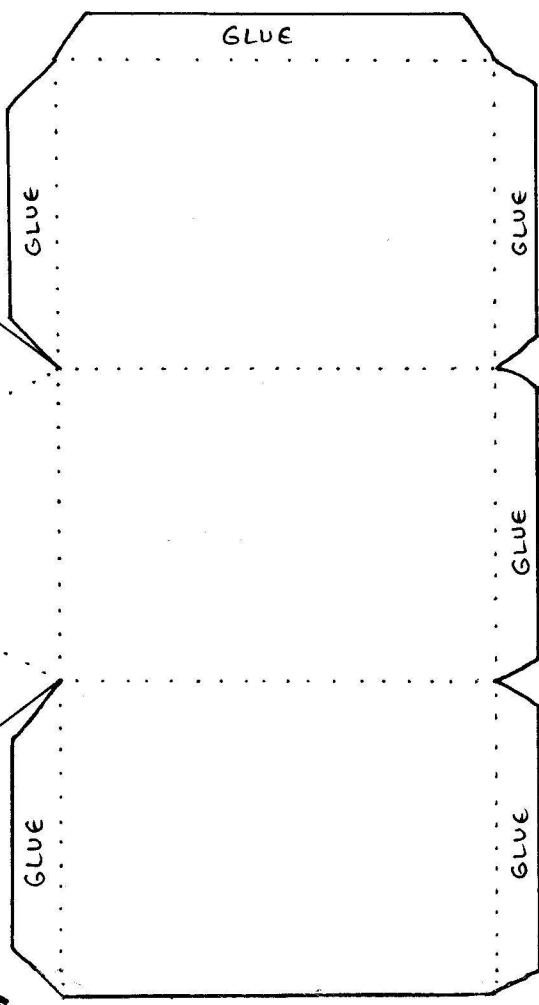
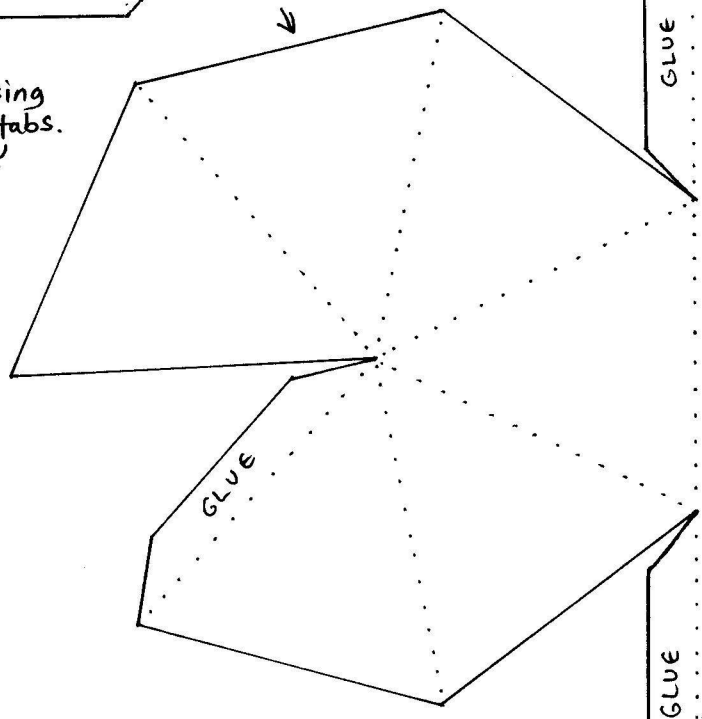
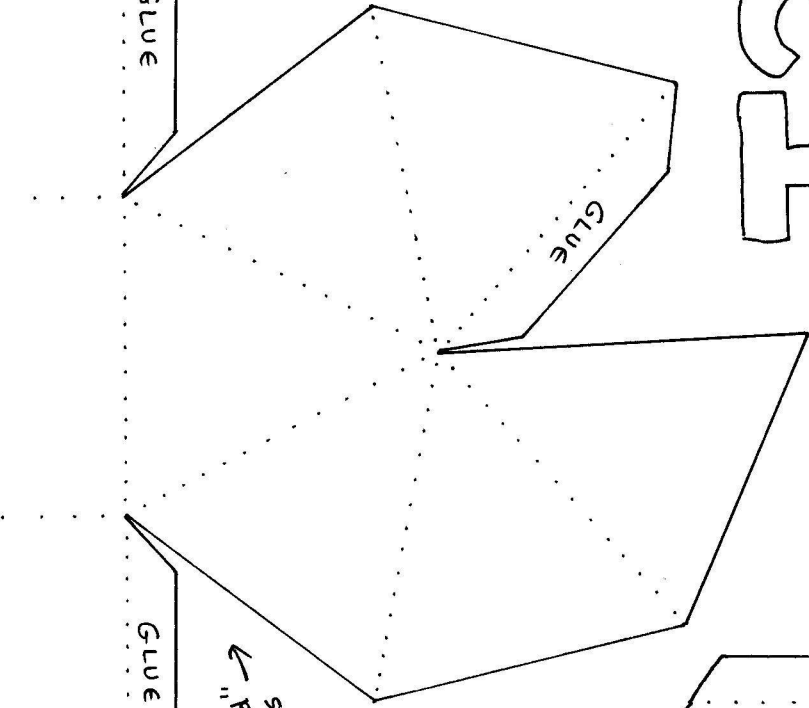
COPY THIS PAGE ONTO CARD STOCK - (any color)



legs go inside this end

USE GLUE SPARINGLY!!

No OOZING GLUE!!!



cut 3 chenille stems in half to make "6" legs

Glue or tape "legs" up inside neck

