STUDENT GUIDE

Rhinoceros Beetle Model Project

STEAM: Science

The Scientific Method has five parts:

ASK A QUESTION RESEARCH THE ANSWER CONSTRUCT A HYPOTHESIS

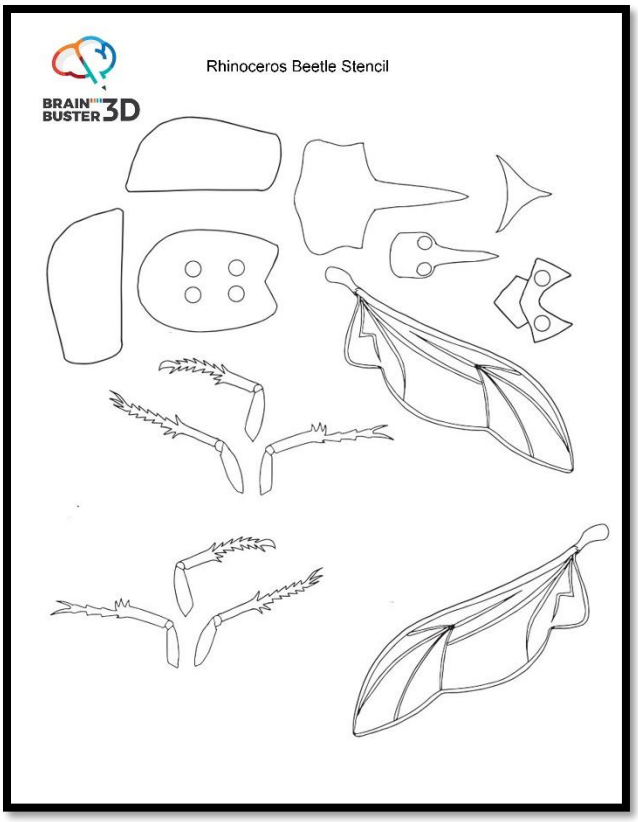
DO AN EXPERIMENT ASK (DID IT WORK?) & REPEAT…

Building a Rhinoceros Beetle model will help you learn Science. How?

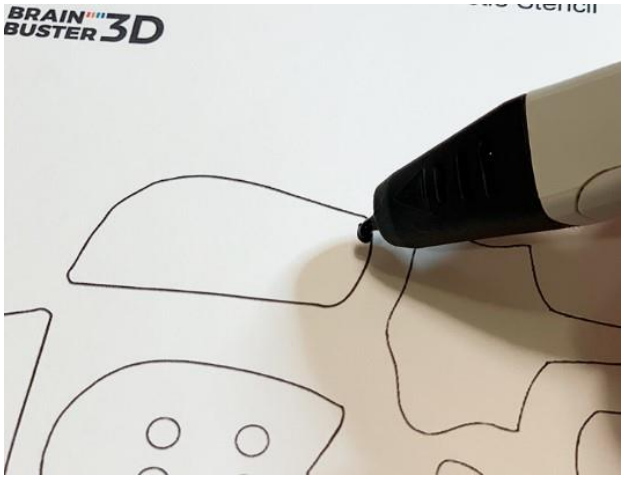
- You will be using a stencil to create each part of the insect.
- You will need to arrange the parts of the insect as you would a puzzle, and determine which parts need to be welded together to create the 3D form of the insect.
- You will use a technique of melting the plastic to add contour to the shape. You will need to use caution when working with hot plastic to shape and form it.

Materials Needed: Rhinoceros Beetle Stencil, 3D Pen, 2-3 colors of PLA filament, scissors, silicon thumb & finger protectors, a paper towel or napkin.

Optional: To keep your stencil intact, place it in a plastic sheet protector.



STEP ONE:



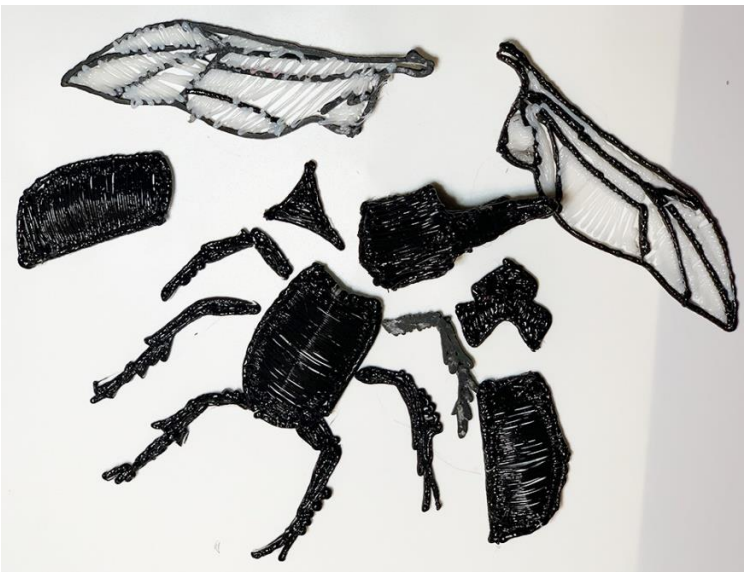
Find a starting point on the stencil to anchor your filament.

Move your 3D pen along the lines to outline each part.

Once all the parts are outlined, fill in each part by moving your 3D pen back and forth between the outline you made.

You can select any color of filament to create your beetle model. If you do not like the PLA filament colors' that you have, you can paint the parts with acrylic paint before you remove them from the stencil or paint your finished beetle model.

STEP TWO:



If you use a plastic sheet protector, the parts should peel off the stencil easily.

If you made the parts by extruding the filament directly on the paper stencil, some of the paper will stick to the back of the parts you made.

To remove the paper, rinse the plastic parts with warm water and dry them with a paper towel.

Arrange the parts as you would a puzzle to see which ones will need to be welded together to form your 3D beetle model.

Find the two parts to make the head of the beetle. You will need to use your 3D pen to melt the plastic in the middle of the larger piece and shape it into a “v”. Melt the horn and bend it upwards slightly.

Take the smaller triangular part and melt it down the middle to shape it into a “v”. You will weld it under the larger horned shaped head to form a jaw.

Be careful when you use the pen to heat the plastic and shape the plastic with your fingers. It will stay pliable as it cools so you can easily shape it without the plastic being excessively hot to touch.

STEP THREE:

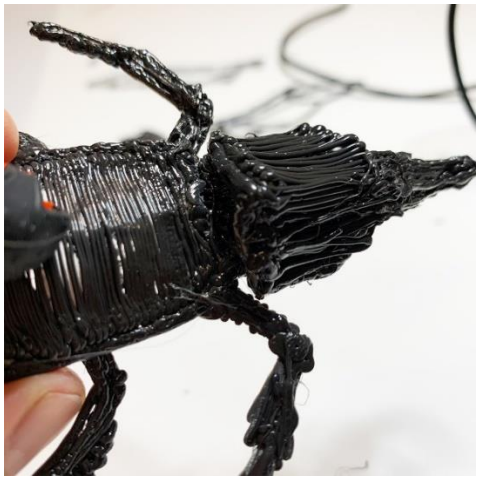
Once again you will use your 3D pen to heat plastic down the middle of the shell to bend it in a “v” shape as you see pictured above.

STEP FOUR:

Arrange the legs around the shell. You will weld the legs to the underside of the shell that makes up the body.


STEP FIVE:


To attach the head, find the part pictured above and weld it to the underside of the top of the shell. Weld the head to the attached part.



You should see a gap between the head and the shell when you turn it over right side up as you see pictured above.

STEP SIX:

There are two sets of wings. You will attach and weld the large white wings to the body of the beetle first, then you will weld the second set of black wings to the top of the large white wings.

Your Rhinoceros Beetle is now complete!

Test your Rhinoceros Beetle by placing it in interesting places.

Observe to see if people think your model is the real thing!

Rhinoceros Beetle Stencil