

4-H Educational Insect Pinning Demonstration Model for Supplemental Curation Teaching Material

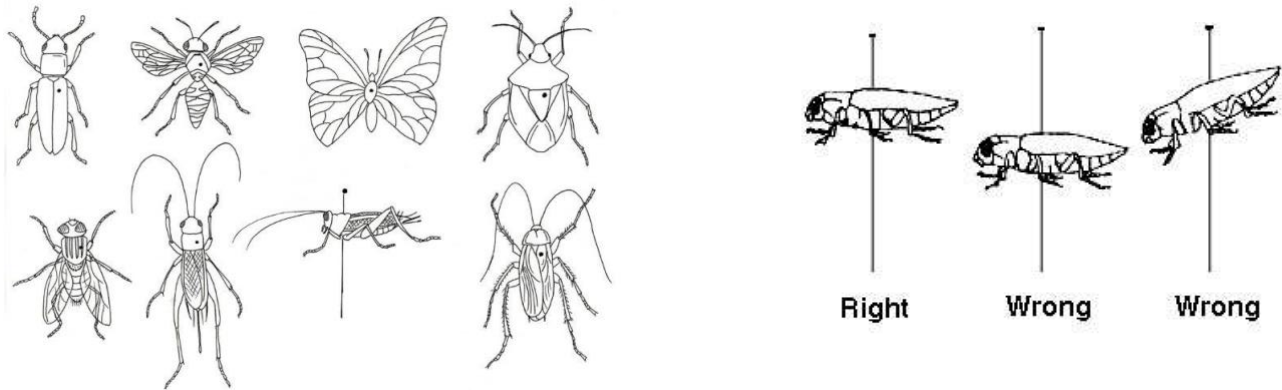
Introduction:

This activity is designed to teach 4-H students the basics of pinning and displaying insects in a fun and approachable way. The exercise will show students the importance of pin placement when displaying insects, how to spread the wings of a butterfly for drying and display as well as allow the students to express their creativity while designing their own insect models.

Why make insect models?

Everyone loves collecting and playing with insects, right? Ever wonder how we are going to teach the youth of today the best way to preserve and identify their new specimens?

Much of the teaching material today on insect pinning techniques relies heavily on worded instruction and 2-D illustration of correct pin location and alignment.

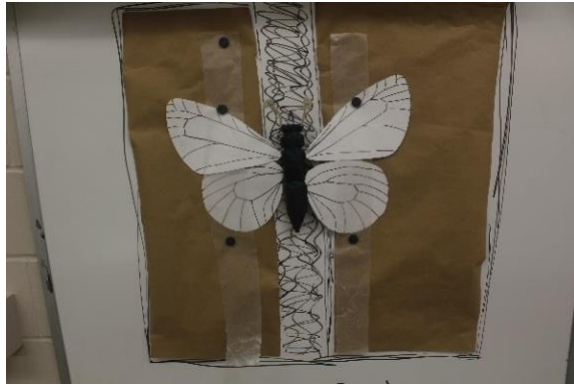


Often, informative guides on insect pinning are published by colleges and institutions focused on educating students who have more background information about insects.

Collecting insects can teach young students useful things about science and entomology. However, many instructions and models were not created with these students' learning needs in mind. Including multiple modes of learning can increase the ability to learn new concepts and, in this case, will provide a fun scenario to build an insect model to get students familiar with the process of pinning an insect.

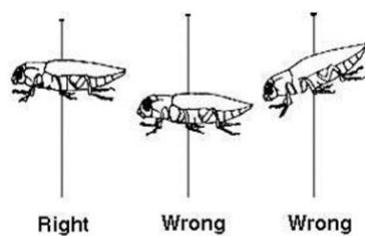
What is the model and how to use it?

The model is a 3-D object with the intent to provide a hands-on experience in developing practical techniques and concepts in insect curation. This allows the student to reduce collected insect damage or destruction by practicing the basic concepts on a larger model meant for use. It also provides an activity for the expression of the imagination in the development of the models, as you can have students create their own that they can take home.

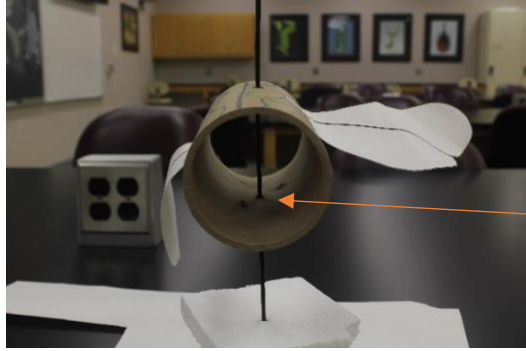


The models are best used in conjunction with 2-D illustrations and are meant as a supplemental teaching aid to show the placement of pins on insects for curation. More in-depth teaching of concepts can be accomplished by the addition of using point-mounted models and label models.

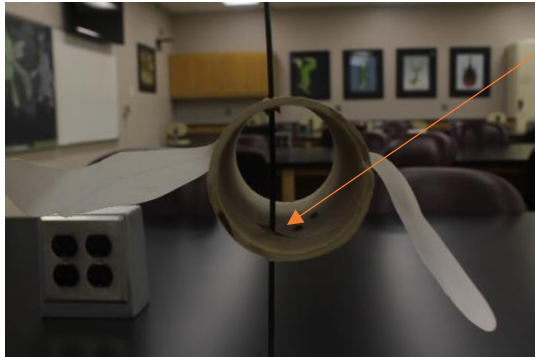
Using the basic insect model:



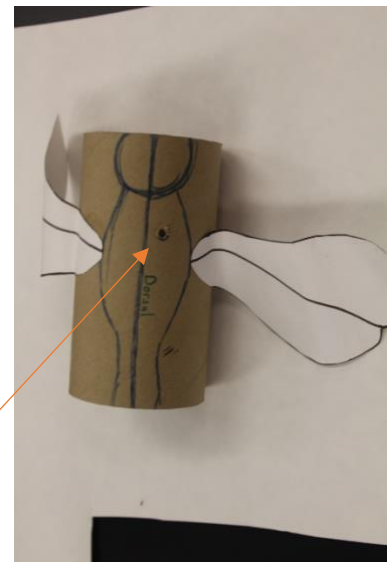
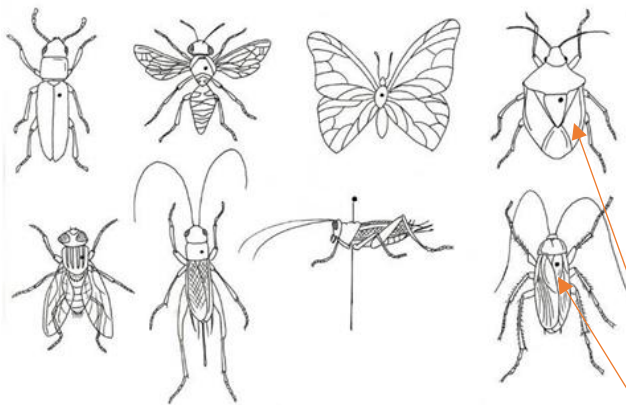
The basic insect model has one opening on the dorsal (top) side of the model while having three on the ventral (bottom) side. This model is used to demonstrate how the entry point and exit point of the pin allow for a completely symmetrical and straight puncture from all angles.



3 holes on ventral (bottom) side of the model allows for the visual demonstration of what happens when pin is not put through in the correct location.

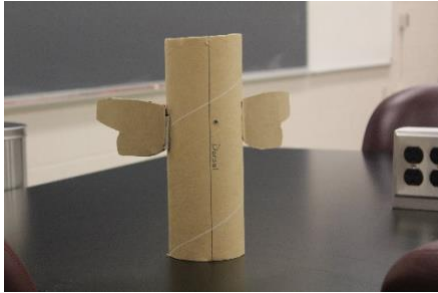


Using a piece of Styrofoam on the bottom of the model will allow for the 'pinning' action and is helpful in getting the model to demonstrate more of a realistic simulation. It also helps in showing the asymmetrical orientation from an incorrect pinning location as it gives a nice point of reference for the viewer. Clay can be used on the ventral side of the insect to act as a stopper, so the insect does not slide down.



Demonstration of proper dorsal pinning locations. You can make different models for different insect orders to demonstrate what body part the pin goes through.

Building the basic insect model:



- A piece of hard cardboard tubing with a diameter of about 2 inches or more
- Some scrap cardboard pieces
- A long plastic rod or wood skewer to act as a pin.
- Elmer's Glue
- Scissors
- Saw (Be Safe!) or scissors depending on tube.
- Drilling/cutting device
- Sharpie or marker
- Ruler
- Any other fun arts and crafts tool at your disposal.

Assembly:

Step 1- Cut down your piece of hard cardboard tubing to a manageable size to begin building your insect body. For our build this was roughly 15 inches.

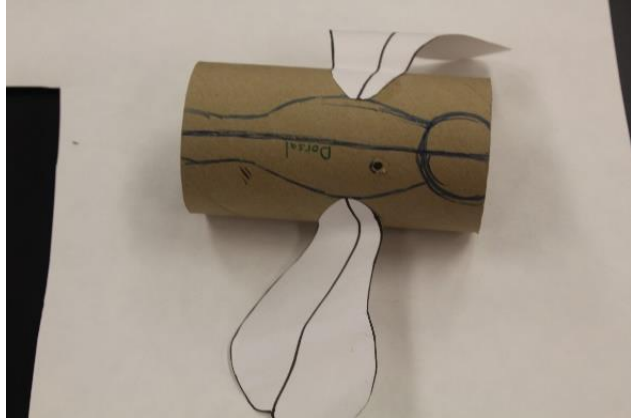
Step 2- Using the ruler and the marker, make 2 lines roughly half an inch apart down the length of the cardboard. Do this for both the top and bottom of the tube.

Step 3- Using the scrap pieces of cardboard, cut out the shapes of two wings.

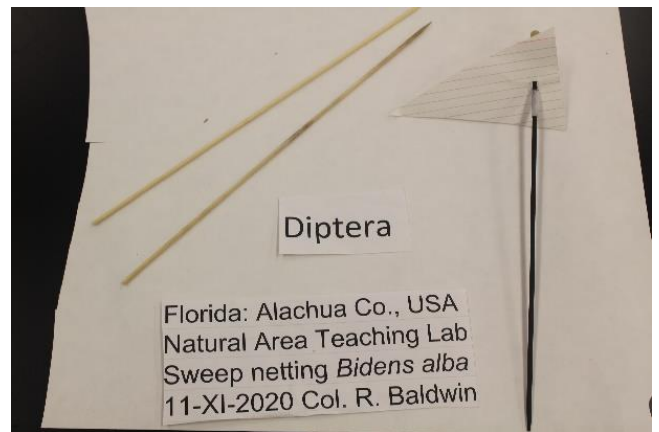
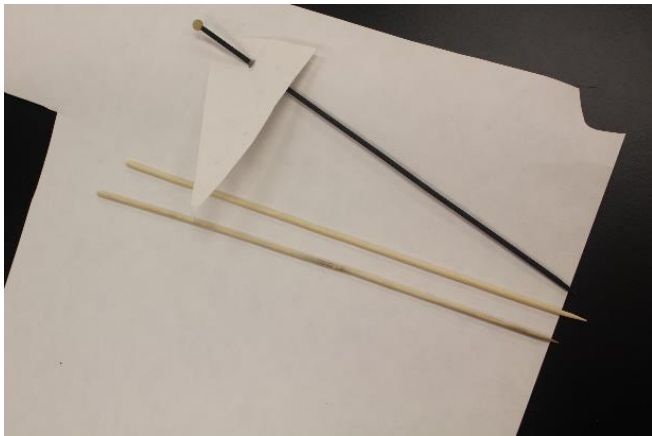
Step 4- Using the Elmer's glue, attach the wings to the sides of the cardboard tubing to resemble the wings of an insect.

Step 5- Using the drilling device, we are now going to drill holes in the top and bottom of the tubing (as seen in the image below) with a diameter that will allow the plastic rod to fit through as depicted in the image above.

Step 6- Using the marker, we are now going to label the top of the tubing as dorsal, and the bottom of the tubing as ventral.



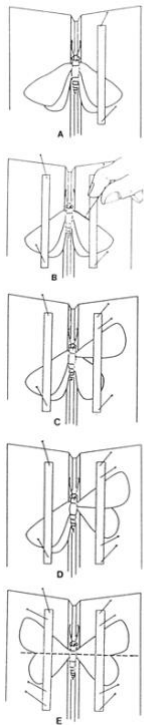
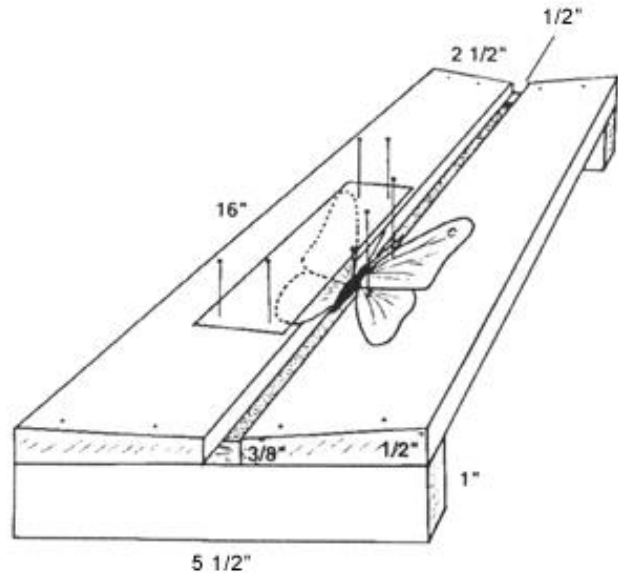
Step 7- Take a plastic rod or wood skewer and cut it to a proportional size of the model you have built. This will be used to demonstrate the pin. Hot glue can be used to make a pin head if desired. Paper can be cut out to also demonstrate point-mounting or even labels and what they should contain.



Using the butterfly insect model:

Spreading lepidopteran (butterfly/moth) wings is an art form. The wing of many lepidopterans is fragile, and even the slightest manipulation can damage important morphological features needed for identification. To properly curate these insects, the use of a spreading board is required. Spreading boards can hold the wings in an anatomically sound way as the insect dries.

The butterfly model is designed to be used in conjunction with a white board, and lets the wings be manipulated to demonstrate the correct 90-degree positioning of the forewing in relation to the hind wings. Magnets are used to attach the Lepidoptera to the whiteboard and are also used to demonstrate the multiple pins used to hold down thin strips of wax paper used in holding the wings in proper position during the drying/curation process.



Magnets representing pin locations



90-degree wing position

A few pieces of brown paper can be used to give the illusion of the spreading board on the white board. This model set up can walk through all of the steps needed to successfully pin a lepidopteran.

Building the butterfly insect model:



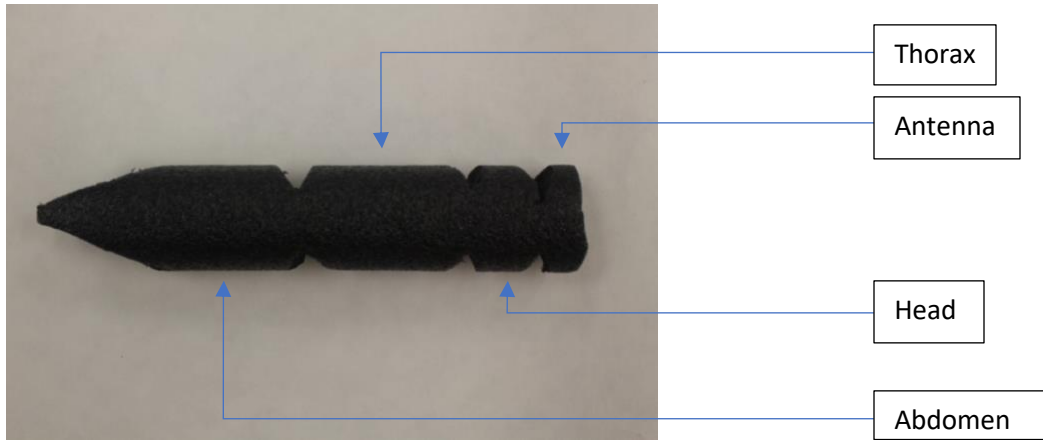
- A piece of foam tubing or pool noodle/pipe insulation
- Cardboard paper
- Some flexible metal wiring (we used floral wire) and pipe cleaner
- 6 circular magnets
- Glue gun and glue
- Scissors
- Marker
- Some long sheets of wax paper

Assembly:

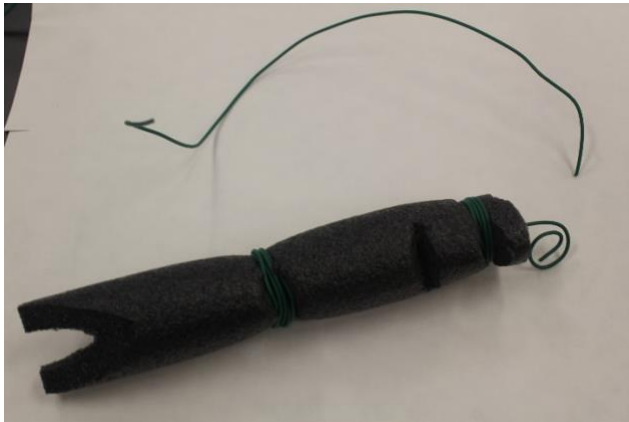
Step 1- Cut your foam tubing to a size of around 8-10 inches in length.



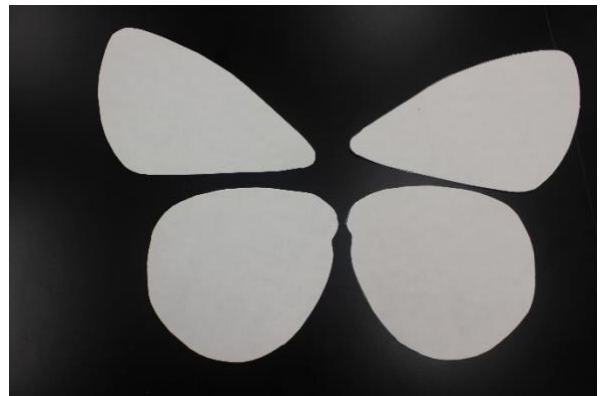
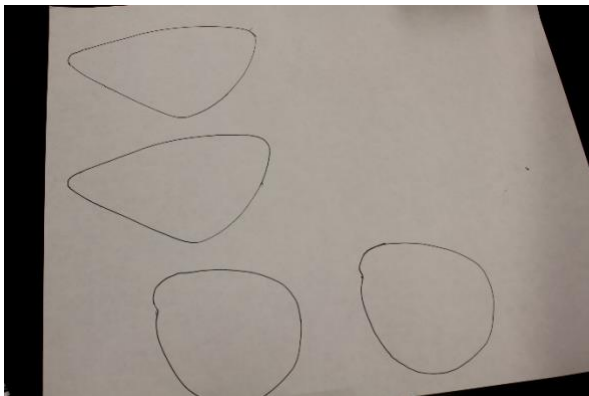
Step 2- Using the scissors cut the rough shape or outline of a butterfly in the tubing.



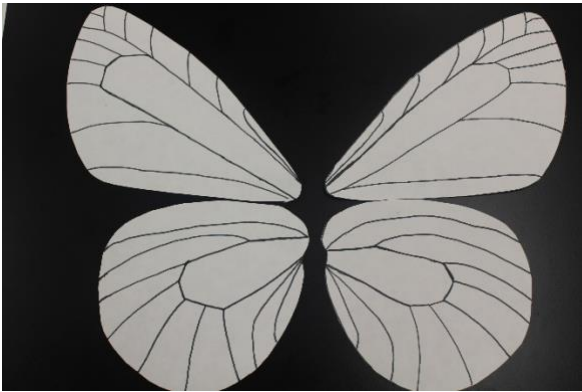
Step 3- Wrap metal wire around the 3 cuts made into the foam tubing, to outline 3 parts of an insect. Wire length may vary depending on size of the tubing, but around 10 inches should be sufficient.



Step 4- Outline the shape of Lepidopteran wings, both fore and hind wing using a marker.



Step 5- Cut out the outlined wings and continue to add wing venation.



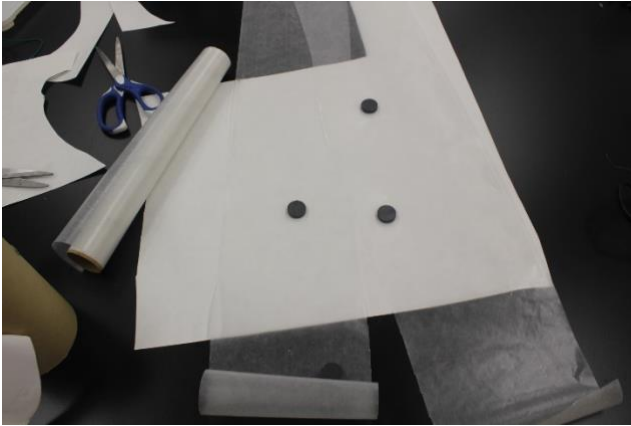
Step 6- Using pipe cleaner, make a U-shape on the underside of the wing with around 1.5 inches of the ends hanging off the wing. The ends will be used to push into the foam to attach the wings to the main body. Then super glue the wings to the pipe cleaner.



Step 7- Continue gluing pipe cleaner to all four of the wings and insert them into the thorax portion of the foam in an anatomically correct way.



Step 8- Cut the clear wax paper into strips with dimensions of 4-inch width and 11-inch length. (The longer the length the better!)



References:

Department of Entomology. Purdue University. 2021 Youth and Entomology Extension Purdue University. <https://extension.entm.purdue.edu/401Book/default.php?page=home>

IFAS. University of Florida. 2015. Florida Bugclub. https://entnemdept.ufl.edu/bug_club/index.shtml

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