
From Caterpillar to Chrysalis

Overview

The caterpillar is about to undergo an amazing transformation. Soon it will turn into a chrysalis, the third stage in its life cycle. Students will observe the characteristic J-shape the caterpillar assumes before the transformation. Also, students may have the opportunity to witness the final molt that results in the chrysalis. A few days later, they will transfer the chrysalises to the butterfly flight cages.

Objectives

- Students observe the J-shape that precedes the caterpillar's transformation into a chrysalis.
- If possible, students witness the final molt that results in the chrysalis.
- The teacher assesses student progress in learning caterpillar anatomy and finds out how much students know about butterfly anatomy.

Background

The caterpillar is about to enter the third and most mysterious part of its life cycle. No one knows exactly how the next changes take place. Hidden within the thin shell of the chrysalis for about a week, the worm-like caterpillar body is changing into a graceful butterfly.

The six stumpy legs at the front of the caterpillar's body will become the long slender legs of the butterfly, and the prolegs will disappear. The leaf-chewing jaw will become a nectar-sucking organ called a **proboscis** (pro-BOSK-is). Four wings and the muscles to move them will develop. The insignificant lenses of the caterpillar's eyes will be replaced by hundreds of lenses in a compound eye, enabling the butterfly to see well enough to fly. These eyes also will seek a mate and then plants upon which to lay the fertilized eggs, because the adult butterfly's main job is to reproduce.

All of these dramatic changes are taking place inside a seemingly lifeless form. The chrysalis is not completely motionless, however, and you may observe it twitching from time to time. There are many excellent trade books illustrating the wide variety of chrysalis shapes, colors, and textures that conceal and protect the animal changing inside. (See the **Bibliography**, pg. 109.) The word "chrysalis" (plural: chrysalides or chrysalises) comes from the Greek word *chrysos*, which means gold. The Painted Lady chrysalis glistens with spots that are the color of this precious metal.

Another name given to this third stage in the life cycle is *pupa*. In Latin, *pupa* means doll. Many of these developing insects, especially the moths, do look like a baby in a blanket.

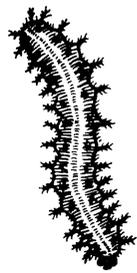
The Beginning of Pupation

Although the process of pupation is somewhat mysterious, the caterpillars will give you some clues that it is about to occur. When the caterpillars reach a length of 25 to 35 mm or about 1 to 1½ inches, watch for the following important signs. Also see Figure 7-1.

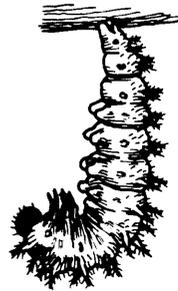
- The larvae stop eating and crawl to the lid of the cup.
- They spin a silk button on the lid.
- They hang head-down from the silk button in a characteristic J-shape. This means that chrysalises will form in a matter of hours.

Figure 7-1

From caterpillar to chrysalis



A. Caterpillar at 25 to 35 mm (1 to 1½ inches)



B. Caterpillar hanging in a J-shape from a silk button



C. Chrysalis

Materials

For each student

- 1 caterpillar or chrysalis in cup
- 1 hand lens
- 1 **Activity Sheet 6. What Happens to the Caterpillar?**

For the class

- 2 butterfly flight cages
- Twigs
- Paper towels

Class Calendar

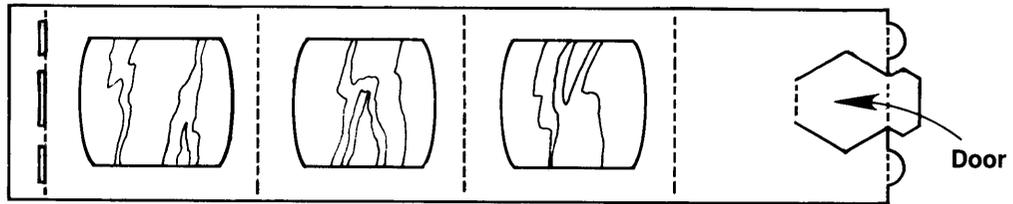
Note: See **Appendix C** for ideas about how to construct free or low-cost butterfly cages.

Preparation

1. Two or three days after the transformation, you will need to move the chrysalises into the butterfly flight cages that you have prepared. Here is a brief summary of several types of cages you might use:
 - Two commercially made butterfly flight cages are included in the unit. Assemble them according to the directions provided in Figure 7-2. Two of these cages will provide enough space for all of the butterflies.

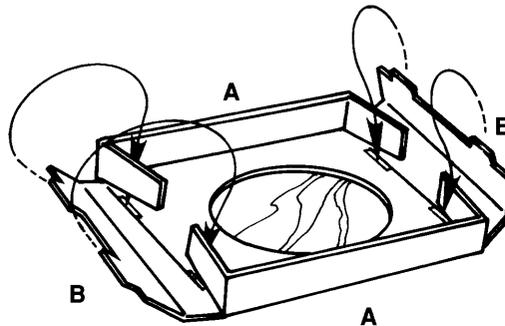
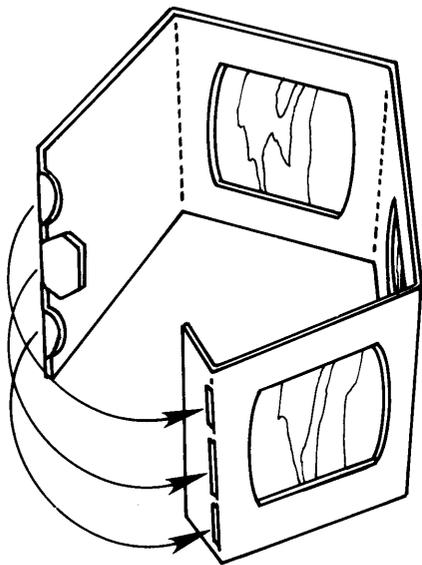
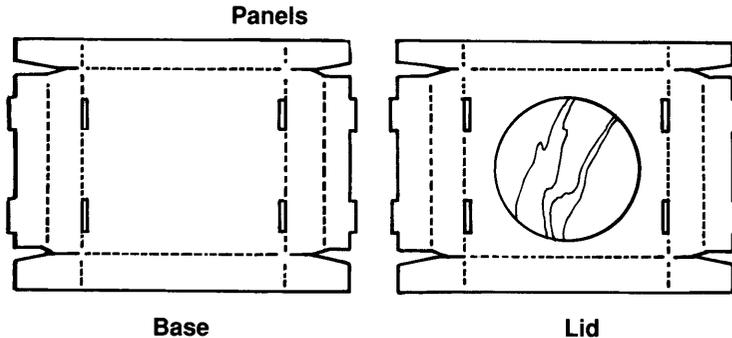
Figure 7-2

Assembling a flight cage



Solid lines are die-cut; broken lines are scored for folding. Note that base and lid are identical except for window in lid.

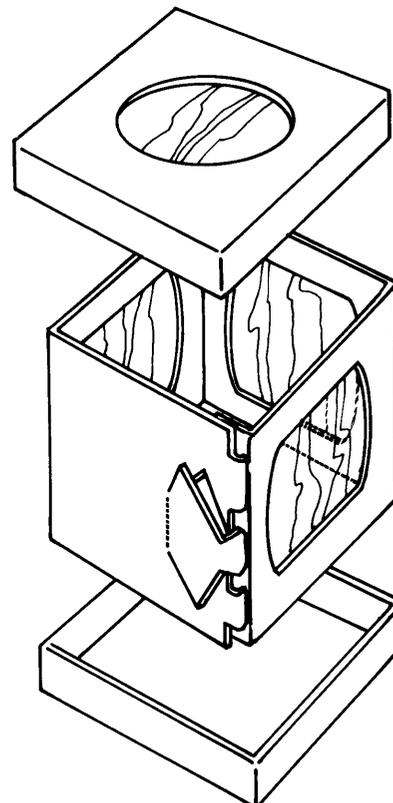
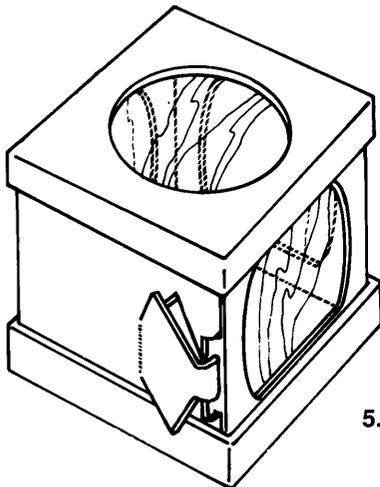
1. Fold panels inward (cellophane inside) and insert tabs into slots.



2. Place lid face down (cellophane on top). Fold sides A up and corners inward. Fold sides B up and over corners, and insert their tabs into the slots.

3. Repeat Step 2 with the base.

4. Fit the base and the lid over the assembled panels.



5. The cage is complete.

- As an option, make free or low-cost cages from cardboard boxes or old lamp shades covered with nylon netting. Or construct a large hanging cage made of nylon netting. See **Appendix C**, pg. 105, for details.
2. No matter which kind of flight cages you use, you will need to line the bottom with paper towels to absorb the fluids the butterflies expel as they emerge. Also, the lining provides them with a foothold.
 3. Add a few twigs to each cage for the butterflies to use as perches.
 4. Duplicate **Activity Sheet 6**.

Procedure

1. Distribute the caterpillars and hand lenses. Allow time for observations. To help students focus on the changing caterpillar, ask them to notice the size of their caterpillars (about 25 to 35 mm, or 1 to 1½ inches), their level of activity (relatively inactive), whether or not they have spun a silk button on the lid of the cup, and their position in the cup (may be hanging in J-shape from lid).

Chances are that you will find caterpillars in different stages of transformation, so allow children to observe one another's insects, too. There may be an opportunity for the class to witness a caterpillar going through its final molt and to see the chrysalis stage as it emerges from under the last exoskeleton.

2. Distribute **Activity Sheet 6**. Preview the **Activity Sheet** with the class and then give them time to complete it.
3. Hold a brief class discussion. Note that not all children will have the same observations because the caterpillars will transform over a period of several days. Discuss their different observations and add the important ones to the **Class Calendar**.
4. Draw a box around the date on your calendar to indicate when the first chrysalises form. You will need this information again in Lesson 13. Continue the discussion by asking why some caterpillars have not yet become chrysalises. (Like people, they are individuals and develop at their own pace.) Ask those who still have caterpillars to predict what their insects will look like tomorrow. Emphasize again that predictions are not wild guesses, but are based on reasons. What reasons can children give for their predictions?

Final Activities

1. After several days, the chrysalises that have dried and hardened are ready to be moved to their new flight cages. Be prepared to help children remove the lid from the cup. Caution them to treat each chrysalis very gently.
2. Put a small piece of double-sided tape on the top of the tissue. Show the children how to stick the tissue carefully on the side of the box—the closer to the bottom, the better. This way, if the chrysalises fall, they won't fall far.
3. If any chrysalises have become detached from the silk button, lay them gently on the paper towels near the side of the box. Then the butterflies can grasp the side of the box when they emerge. Be forewarned that the chrysalises that do not hang suspended may emerge with some deformity. If you set up the terrarium, you may wish to give the extra chrysalises in the terrarium to children who have one that is detached.

Extensions



1. Read a trade book to the students about the life cycle of another kind of living thing. See the **Bibliography**, pg. 109, for suggestions.
2. Practice making predictions. Have children suggest other situations where they could make predictions (weather, sports events, the lunch menu, which butterfly will emerge first). Ask students to give a reason for each prediction they make.

Evaluation

In Lesson 1, students made a drawing of a caterpillar. Now ask them to draw a caterpillar again. Ask them to label any parts they can. Both you and the children can compare these before and after drawings to see how much they have learned. Look for details such as a distinct head, eyes, bristles, body segments, true legs, and prolegs.

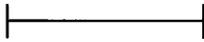
What Happens to the Caterpillar?

Activity Sheet 6

Name: _____

Date: _____

Watch your caterpillar carefully when it gets to be this big.



The caterpillar will crawl to the top of the cup and spin a strong silk button.

Then it will hang upside down from the button. It will hang in a J-shape.

Draw your caterpillar hanging in a J-shape.

Next, the skin splits along the caterpillar's back. After the last molt, you will see the chrysalis.

Soon the chrysalis will become hard. Then it is time for you to put your chrysalis in a new cage. Write the date when the chrysalis appeared:

Draw a caterpillar. Label all its parts.