



Make-A-Macro

EXPLORATION

BACKGROUND INFORMATION

What is an Adaptation?

Adaptations are characteristics that are outcomes of natural selection, and increase chances of survival and reproduction. Adaptations can be physiological (body parts), behavioral (actions that increase survival), or structural (other physical features that aid survival).

Example of an Adaptation:

Benthic macroinvertebrates have an array of structural adaptations that aid in their survival. Black fly larvae, for instance, have little feather brushes on their heads that help them collect food. Whirligig beetles have eyes divided horizontally so they can see both on top of and below the water line. The water boatman paddles underwater with long, oar-like legs, covered in hairy fringe, which spread out on the forward stroke and fold in on the return. This allows it to get the most power out of the forward stroke and reduce drag on the recovery.

Benthic macroinvertebrates have a range of behavioral adaptations critical to their survival as well. When water gets too warm and oxygen levels decrease, stoneflies will do "push-ups" to increase the amount of water flowing over their gills to increase oxygen. The net-building caddisfly larva attaches a funnel-shaped net to a rock, and then periodically creeps out of its crevice to harvest the tiny plants and animals caught in the mesh.

Human Adaptation:

What physical characteristics do humans have to survive and reproduce? The human body readily responds to changing environmental stresses in a variety of biological and cultural ways. We can acclimatize to a wide range of temperature and humidity. When traveling to high altitudes, the level of oxygen is the same, but at a couple of miles above sea level, the pressure is lower, so the oxygen molecules are farther apart. Over time, our bodies adjust to the lower pressure and adapt to a less dense atmosphere. We also are constantly responding in physiological ways to internal and external stresses such as bacterial and viral infections, pollution, and dietary imbalances. To understand structural adaptations, try to zip a zipper without using your thumbs.

PROCEDURE: MAKE-A-MACRO STEP-BY-STEP

1. PREPARATION: Create Cards

- a. Copy the body part card masters onto cardstock, one set for each group of students.

Goal:

To apply understanding of macroinvertebrate adaptations to design the ultimate macroinvertebrate.

Class Time:

One class period; two class periods for students needing more background instruction time

Group Size:

3-4 students per group

Materials List:

- 1 set of macroinvertebrate adaptation cards per group
- Scissors for cutting out the macroinvertebrate body parts
- Glue
- Copies of assessment rubric (one per group)
- Flip chart, chalkboard, or whiteboard for recording definitions/answers
- Choice of crayons/colored pencils/markers/paint



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- b. Cut the cards apart. Have them create a new macroinvertebrate from the cards. Based on what they learned in the macroinvertebrate PowerPoint or online activity, have them describe the conditions under which their macroinvertebrate will thrive.

2. PRESENTATIONS

- a. Each group will present its macroinvertebrate to the class.
- b. Each group should identify and explain its macro, including its name, what adaptations are present, how it has adapted to its environment, and what adaptations are important to its survival.

3. EXTENSION/HOMEWORK

- a. Ask students to research the life history of a specific macroinvertebrate of their choice. Many of them are juvenile forms of insects.
- b. How are they adapted for where they live and what they eat? How would a sudden change of habitat affect them?
- c. Investigate how some macroinvertebrates got their names. For example, why is a dragonfly larvae called a "dragon" fly? Explore the scientific names of various macroinvertebrates.

SUGGESTED ADAPTATIONS:

- Have more physically active students pantomime and verbally explain the adaptations of their invented macroinvertebrate instead of drawing and writing.

For students who need extra instruction split this into two class periods. Students can create their own macroinvertebrate in the first period and then describe its adaptations during the second class period.

- If students are having difficulty grasping the concept of adaptations, show them pictures of animals which have obvious adaptations:

Giraffe → long neck → allows it to eat leaves from tall trees

Zebra → stripes → camouflages in tall grasses

Owl → large eyes → helps it to see prey at night



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Group Members/Name: _____

Date: _____

Your group is to create an original, fictitious macroinvertebrate that has all of the body parts on the cards you randomly selected. You'll need to select parts to complete your macro, and then provide an explanation that includes where your macro lives, what it needs in its habitat to survive, and how its various body parts help it to compete. Your group will be assessed based upon the criteria in the following rubric.

RUBRIC FOR MAKE-A-MACRO

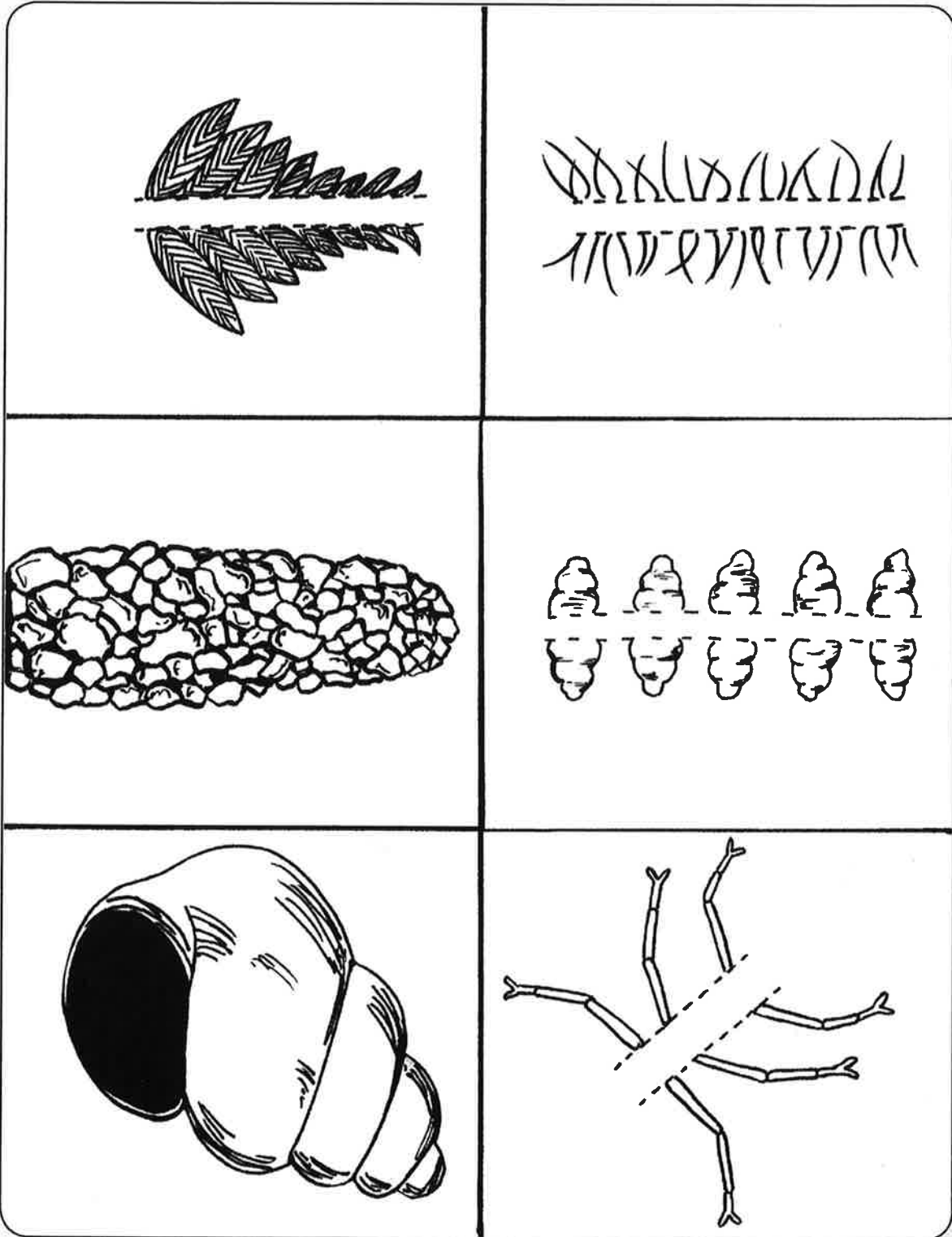
CRITERIA	3	2	1	0
Adaptations are present and explained in picture.	All adaptations and explanations are present in picture.	Missing one or two adaptations and/or explanations in picture.	Missing more than 2 adaptations and/or explanations in picture.	Adaptations and/or explanations are absent in picture.
Name of macroinvertebrate and reasoning for name.	Name and reasoning for name are present and well-explained.	Name and reasoning for a name is present but not well-explained.	Just name is present; reasoning for name is absent.	Name and reasoning for name are absent.
How has the macroinvertebrate adapted to the environment?	Description for adaptation is detailed and supported with reason.	Description for adaptation is fair and somewhat supported.	Description for adaptation is weak and not well-supported.	Description for adaptation to environment is absent.
How are the adaptations important to their survival?	Importance of adaptation is detailed and supported with reason.	Importance of adaptation is fair and somewhat supported.	Importance of adaptation is weak and not well-supported.	Importance of adaptation is absent.



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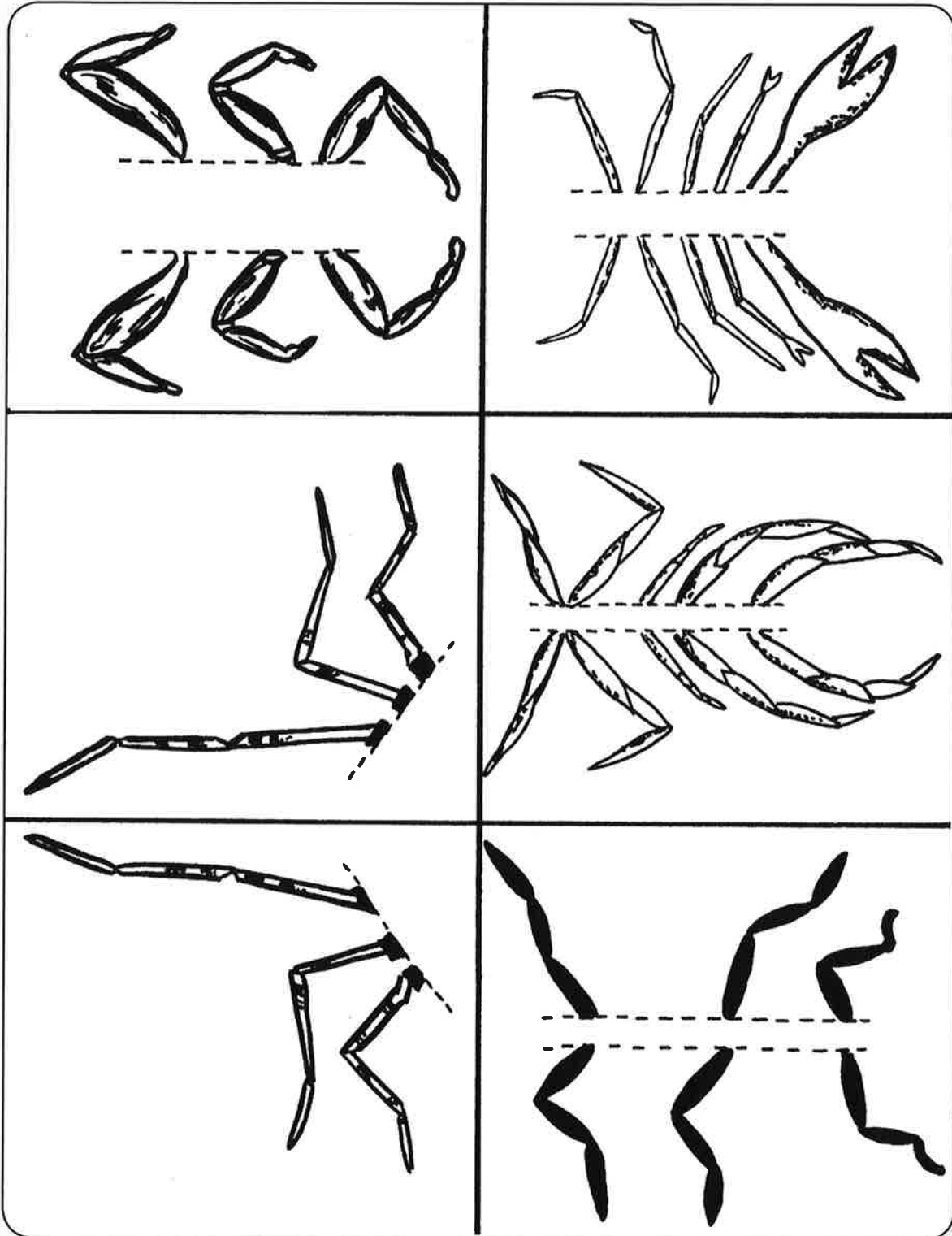




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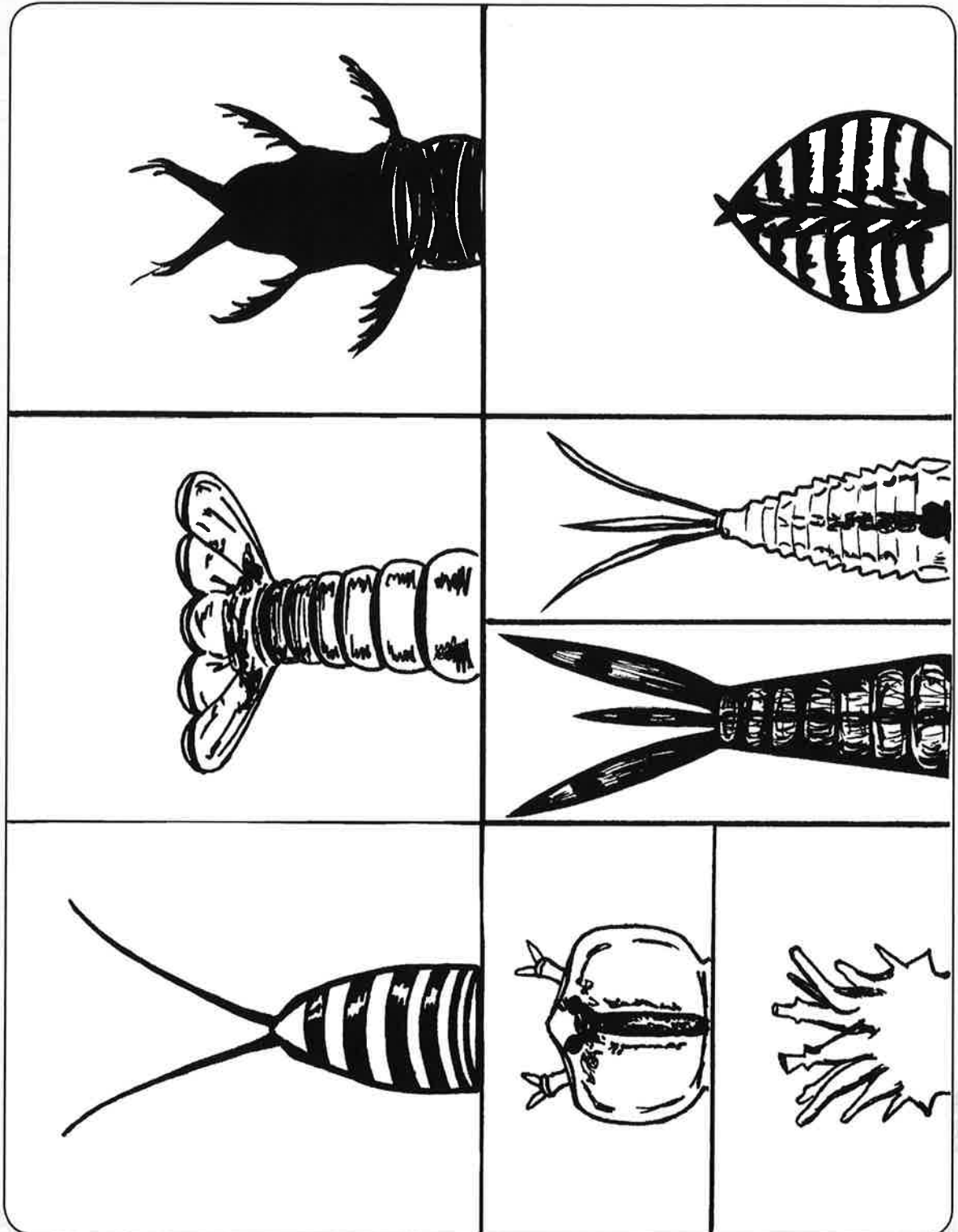




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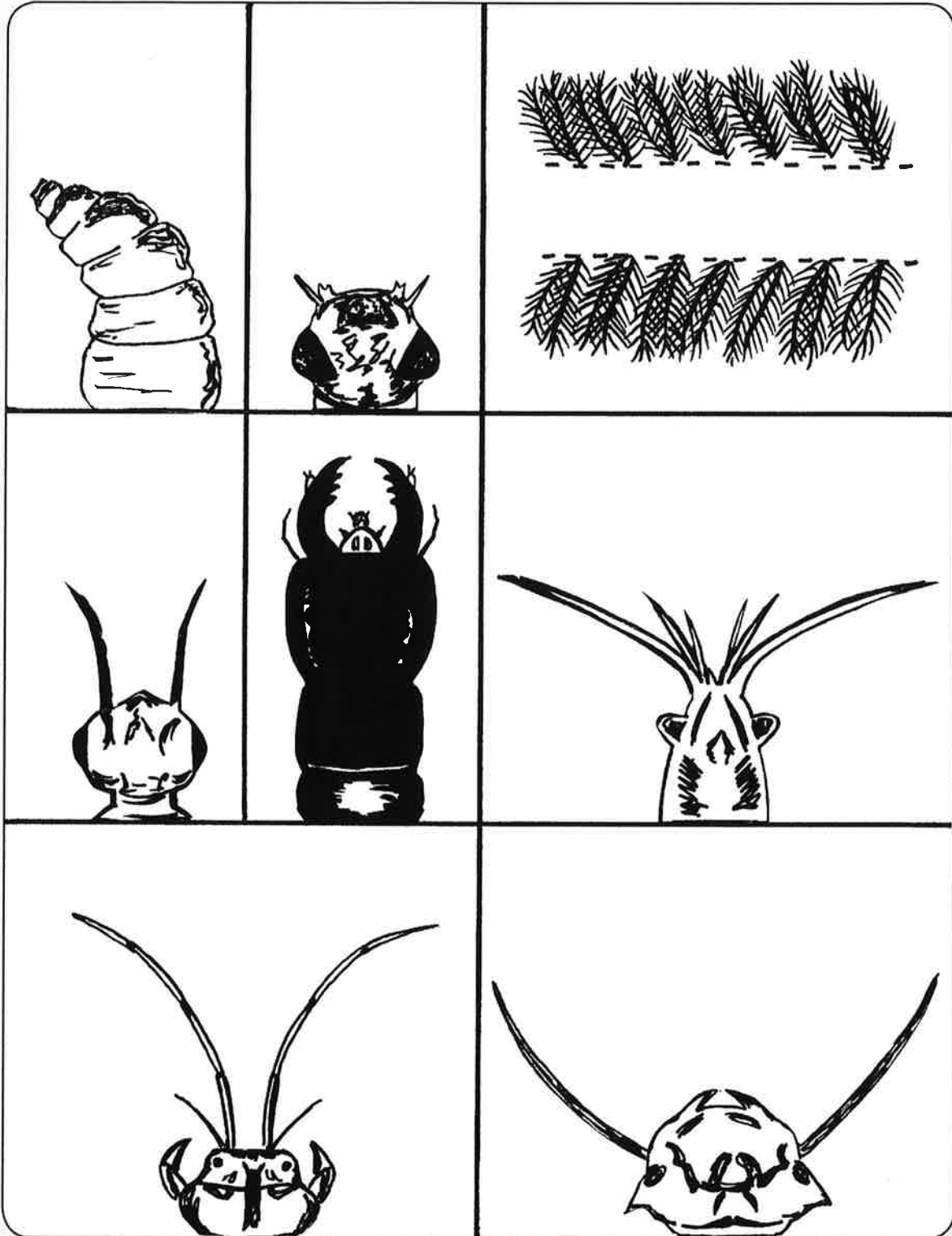




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