

Choose Your Defense

Spines, Vomit, and Camouflage

Grade Level: 9-12

Subject Areas: Science (Ecology, Biology), Environmental Education, Expressive Arts, Language Arts

Duration: one or two 80 minute class sessions

Group size: any

Core Standards:

Biology

Standard 1

Students will understand that living organisms interact with one another and their environment.

Objective 1

Summarize how energy flows through an ecosystem.

A. Arrange components of a food chain according to energy flow.

C. Describe strategies used by organisms to balance the energy expended to obtain food to the energy gained from the food (e.g., migration to areas of seasonal abundance, switching type of prey based upon availability, hibernation or dormancy).

D. Compare the relative energy output expended by an organism in obtaining food to the energy gained from the food (e.g., hummingbird - energy expended hovering at a flower compared to the amount of energy gained from the nectar, coyote - chasing mice to the energy gained from catching one, energy expended in migration of birds to a location with seasonal abundance compared to energy gained by staying in a cold climate with limited food).

Objective 3

Describe how interactions among organisms and their environment help shape ecosystems.

A. Categorize relationships among living things according to predator-prey, competition, and symbiosis.

Learning Targets:

- I can identify and describe the advantages of adaptations in parasitoids and hosts and the roles adaptations play in interactions between the two
- I can explain the interaction between parasitoid and host
- I can outline the life phases of a parasitoid

Method:

Students design and create imaginary caterpillars and associated parasitoids then write reports including descriptions of the caterpillar and parasitoid adaptations.

Materials:

Poster board

Pens, color pencils, markers

Computers with internet access

Procedure:

PART 1 Design your own caterpillar suited for a specific environment and/or situation. Think about designing a caterpillar for the following:

- The caterpillar is on a green leafy tree with an abundance of tropical ants nearby
- The caterpillar is on a branch of a tropical tree. There is a large bird flying overhead
- The caterpillar is crawling across a blanket of decaying leaves on a forest floor. A rat lurks behind the nearest tree trunk.
- Design your own

You may want to run through the online activity at the website below to get a sense of some caterpillar adaptations

http://teacher.scholastic.com/activities/explorer/ecosystems/be_an_explorer/map/caterpillar_play.htm

This site allows you to play with adjusting COLOR, SPINES, or EXTRA to match the situation described.

Draw a rough draft of your caterpillar in your biology journal (due 5/12/09)

Create a final draft in class (5/14/09) using colored pencils or markers. Include:

- On the backside of your poster describe why you chose these features for this particular caterpillar and include a common name and scientific name

PART 2

Design a parasitoid that would parasitize your caterpillar. Make your parasitoid either a fly or a wasp, but you be creative in what it looks like and how it behaves! Draw a rough draft of your caterpillar in your biology journal (due 5/12/09). Final drafts will be completed in class 5/14/09.

a) Sketch and color all developmental phases (adult, egg, larva, and pupa)

b) Give your parasitoid a common and scientific name

b) On the backside of your poster write a paragraph describing its life history. Include the following:

-How is the host caterpillar found?

-where and how are the eggs laid?

-what special features does it have that allow it to be a parasitoid?

-how does the egg change to larva, pupa, and adult?

-how long does it take to go through all the life stages?

You may wish to use the internet to conduct research about real parasitoid wasps and flies before beginning your design. Keep in mind though that I would like you to be creative and create your own highly specialized parasitoid.

Helpful websites:

bugguide.net

caterpillars.org

<http://www.earthwatch2.org/lff/DuRoss/>

Lesson Submitted by: Erika DuRoss

Adaptation examples	Advantage
Spines	
Sticky hairs	It is difficult for mouthparts of insect predators such as ants to grasp the caterpillars, but parasites may have an advantage in laying their eggs on the caterpillars
Poison spines	Poison spines can irritate the skin of larger predators making it so they often don't get farther than the first touch
Closely packed hairs	It is harder for parasitic wasps to lay their eggs on caterpillars with tightly packed hair
Long hair spines	The caterpillar is able to detect predators through vibrations felt with long hairs. This gives it early warning to get away.
Glands	Glands near the caterpillars head can emit repulsing chemicals or squirt poisonous liquids
Vomit response	Vomit can be toxic, burning the skin of the potential predator
Yellow spots	Yellow spots imply that a caterpillar may be poisonous or taste bad
Fake eyes	Fake eyes give the impression that the caterpillar is a snake, allowing it extra time to drop to the ground and get away from a predator
Red	Is a warning that the caterpillar may be poisonous or taste bad
Brown	Provides camouflage protection. Blends in with tree trunks or dead leaf matter
Bright yellow	Is a warning that the caterpillar may be poisonous or taste bad
Green	Provides camouflage when on green vegetation
White	Is a warning that the caterpillar may be poisonous or taste bad