

Amazing Butterfly – Metamorphosis Simulation!

Essential Question(s):

What is the life cycle of a butterfly?

What challenges do butterflies face reaching their next life stage?

At a Glance: Learners participate in a simple game that introduces the stages of butterfly metamorphosis.

Background Information:

Butterflies go through four life stages – egg, larva, pupa, and adult. Adult butterflies lay their eggs on the underside of a host plant most often in early to mid-summer. The host plant is usually specific to the butterfly and the larva (i.e., Milkweed is the only plant which Monarch caterpillars will eat). In the larval stage, the caterpillar emerges from the egg and becomes an eating machine. A caterpillar will grow up to 100 times its size, shedding its skin repeatedly to allow for further growth. Once the caterpillar finishes growing, it moves into the pupal stage.

The last shedding of skin hardens around the caterpillar to become the chrysalis for the transformation into a butterfly. This stage may last from a few weeks to a month (some species last two years). Once fully developed, the butterfly will emerge from the chrysalis. Fluid from the butterfly's abdomen is pumped through the wings and the butterfly will hang and wait for its wings to dry before it flies away. As an adult, butterflies pollinate plants and reproduce to start the cycle over again. Butterflies may live a few weeks to several months. Those which migrate and hibernate will live longer.

Procedure:

This activity is modeled after the game that many educators are familiar with, *Rock, Paper, Scissors*. Explain to students the four life cycle stages of a butterfly or moth. For this activity each of these stages is represented by a movement or posture.

- Egg – holding your knees huddled near the ground
 - Larva – crouching a bit taller than egg wiggling fingers like a caterpillar
 - Pupa – hold hands palms together over your head in a pupa shape
 - Butterfly – flap arms like wings
1. Practice the posture or movement for each life stage, repeating the name of the stage with the movement.
 2. Once students understand the stages and how they can show what stage they are in, review the rules of *Rock, Paper, Scissors*.
 3. Rules of *Rock, Paper, Scissors*: Two players stand opposite each other and count to three. On three they both display a hand shape: Stone-fist, Scissors-two fingers stretched out like a pair of scissors, Paper-hand out flat. Stone beats scissors, scissors beat paper, and paper beats stone.
 4. All students begin the activity as eggs.

Location: Schoolyard or open space in classroom

Objectives: Learners will:

- 1) describe the four life stages of a butterfly
- 2) name three problems that butterflies may face during their life.

Skills: communication, role playing, teamwork

Subjects: Physical education, science

Time: Activity: 15-20 minutes. Discussion: 5 minutes

5. The winner of *Rock, Paper, Scissors* will advance into the next stage (egg to larva, larva to pupa, etc.) and searches for a new partner in that new life stage. Students must pair up with a similar life stage to play *Rock, Paper, Scissors* – egg with egg, larva with larva, etc.
6. The loser continues in the same stage and searches for another matching partner to play against until he wins and advances to the next life stage.
7. The activity continues until all or most students have reached the butterfly stage.
To extend the activity length, once students become butterflies, have them simulate laying eggs and then becoming that egg again (this reinforces the complete life cycle).

Discussion/Assessment:

Ask students if everyone became a butterfly. If not, discuss if all real butterfly eggs become butterflies? (Approximately 2% of all eggs survive to adulthood.)

What challenges might a real butterfly face when undergoing metamorphosis? (predation, natural selection, tough environmental condition, migration)