

Innovation Collaborative Out-of-School-Time STEAM Lesson/Activity
STEAM is most effective as a unit or group of related experiences, not a one-time lesson.

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Lesson or Activity Title: Butterfly Symmetry	Age(s)/Grade Level(s): Grades PreK - 3rd
Science Concepts: Survival of a species, adaptation, camouflage, warning coloration, mimicry	Science Practices: Asking questions, using models, constructing explanations
Arts Concepts/Skills: Color, line, shape; folding, drawing, cutting, painting	Arts Habits of Mind Imagination, originality, expression, ownership of learning :

Duration: 30 minutes

Big Ideas

- Butterflies are symmetrical
- Butterflies can survive through the use of camouflage, warning coloration, and mimicry.

Objectives/Outcomes

- Students learn that symmetry means approximately equal on both sides
- Students learn that, to survive, butterflies have adapted. They have used camouflage, warning coloration, and mimicry to outwit predators.

Activity

- Materials
 - Cardstock paper, tempera paint, pencil, paper towels, and scissors

- Procedures
 - Give the youth an introductory explanation of butterflies, their symmetry, and how they survive by using camouflage, warning coloration, and/or mimicry.
 - Invite the youth to decide which of the survival techniques listed above they want to focus on with their butterfly.
 - Have the youth fold their paper in half by matching the short sides of the paper and running their finger along the crease to make a good fold.
 - Then, ask them to use a pencil to draw the butterfly wings on 1 side. They only need to draw half of the butterfly.
 - Have them use their scissors to cut out the butterfly shape along its perimeter, making sure not to cut the fold. They can now unfold the wings.
 - Next, invite them to place various sized globs of tempera paint that relate to the survival skill chosen onto one half of the butterfly shape, then fold along the crease, pressing with their fingers to spread the paint.
 - Now, to see their creation, have them carefully open the wings. Ask them to notice the beautiful patterns on the wings. Compare one half of the shape to the half over the fold line; they are symmetrical. Allow their butterfly to dry. Make lots of butterflies and tape them to the walls for a beautiful butterfly collage.
 - Invite the youth to discuss how butterflies are formed and how their butterfly shows a survival skill, either camouflage, warning coloration, and/or mimicry.

- Resources
 - *Background*
 - Butterflies face many challenges for survival. They begin their lives as vulnerable eggs, develop into small, squishable caterpillars, and then find themselves as defenseless pupae until they finally grow into fragile adults. Birds, bats, lizards, ants, wasps, parasites, toads, lizards, snakes, and even monkeys find tasty treats in butterflies at all stages of life. But, butterflies have adapted strategies in order to complete their life cycle and reproduce.
 - *Camouflage*
 - Camouflage is the act of disguising the body with its surrounding environments. Many butterflies (like the Comma) and moths in their adult, larval, and pupal stages resemble dead leaves, bark or twigs when they perch on the ground under trees. It's especially important for moths to blend into their surroundings since most sleep during the day on bark or leaves. The tropical Blue Morpho butterfly lays its nearly transparent eggs singly. When there are raindrops on the surface of the leaves, as there often are in the rainforest, the eggs are nearly indistinguishable from the water droplets.
 - *Warning Coloration*
 - Some of the same butterflies and moths that look like dead leaves and bark when their wings are closed may be brightly colored when their wings are open. This flash of color may startle an unsuspecting predator, allowing the butterflies to escape. Caterpillars can be seen wearing overwhelming fluorescent colors to advertise to prey that they may be poisonous.
 - *Mimicry*
 - The classic example of mimicry are the Monarch and Viceroy butterflies. Although it was originally thought that Viceroy's simply used mimicry to trick predators into thinking they were poisonous and distasteful (like the Monarch), it is now found that they, too, are toxic in some form. Their coloration is a warning

signal. This is a form of Mullerian mimicry, which is when one species is mimicked by another, but both are dangerous or distasteful to the predator. Batesian mimicry is when a harmless species is mimicking one that is harmful or distasteful. Giant Swallowtail caterpillars mimic bad tasting bird droppings. Pupae may hang and look like indigestible un-ripened fruit.

Background

- Information on museum exhibits or other experiences to which the activity relates
 - This relates to the museum's Cockrell Butterfly Center.