

**Pre- and Post-Visit Activities:
Come Fly with Me: Butterflies**

Overview:

These activities, which support the Staten Island Museum's lesson "Come Fly with Me: Butterflies and Moths," introduce students to butterfly anatomy and its life cycle.

Background Information for Educators:

Butterflies, along with moths, make up the order of insects known as Lepidoptera. Lepidoptera, in Latin, means "scale wing" and is in reference to the physical scale-like structure of their wings. Like all insects, butterflies have three parts to their bodies (head, thorax, and abdomen); they have an exoskeleton, two antennae, and six legs. Scientists estimate that there are more than 17,000 different butterfly species worldwide and they can be found on every continent except Antarctica. Scientists estimate that butterflies may have lived on Earth beginning around 135 million years with the oldest known butterfly fossil dating back to 55 million years ago. They range in size from the Western Pygmy Blue, which is smaller than a dime and found in North America, to the Queen Alexandra's Birdwing of Papua New Guinea, which has a wingspan of up to 11 inches (28 centimeters). Although some tropical butterflies can live up to one year, the average life span of a butterfly is at most two months. Butterflies display every color of the rainbow in their wings, and no two butterflies are exactly alike. This coloring serves many purposes: from attracting a mate, to blending in with its surroundings, to warning its enemies that it is poisonous and should be avoided.

Butterflies are also unique insects due their very transformative process of metamorphosis. They have a four-stage life cycle where a butterfly will go from egg, to larva (caterpillar), to a pupa (chrysalis), to adult. After mating, the female lays her eggs in sticky, small clusters on the leaves of a specific plant. Each species selects its own special variety of plant, and the eggs of each are different in shape and appearance. In many species, the female dies shortly after doing this. When the egg hatches, the larva emerges; a tiny caterpillar eats its way out the egg, and then proceeds to eat the eggshell. This caterpillar devours the leaves of the plant where its mother laid her eggs, trying to eat as much as possible. In their short lifetimes, they may eat as much as twenty times their own weight. Caterpillars naturally grow quickly with all this eating, and since their skin cannot stretch, it splits and is shed. This is called molting, and it happens several times as the caterpillar gets fatter and fatter. It is at this slow-moving stage that caterpillars are most vulnerable to hungry birds. Still, many protect themselves by using their colors to blend in with their environment. Other have sharp spines or prickly hairs on their bodies to deter predators, while still others have circles or spots on their skin that trick their predators into thinking that the caterpillar is really a larger animal than it is.

In the final week leading up to its transformation the caterpillar will begin to grow a thickened shell underneath its skin. That way when they shed their final skin, the caterpillar will already be immersed in its chrysalis or pupa. It is at this point that the caterpillar liquidizes inside the chrysalis, turning into a

goo of proteins—it actually releases enzymes that essentially begin to eat itself making it into caterpillar soup. However, some proteins remain clustered together where they are pre-programed to start reassembling the cells into the final form, a butterfly. Even throughout this deconstructive process, the butterfly is able to retain memories made as a caterpillar! When the butterfly emerges, its wings are crumpled and wet so the butterfly will flap their wings to dry them. The pumping action also increases blood flow through the wings and by the end of the day, they will be fully hardened.

As an adult, the butterfly no longer eats leaves but rather drinks nectar from flowers using its proboscis. By drinking nectar, butterflies are also important pollinators helping to create and sustain the wide variety of plants and flowers we have here on Earth.

Vocabulary:

- Abdomen-the third segment of the body of an insect
- Antennae-feelers found on the head; help the butterfly and moth to smell and touch
- Camouflage-blending in with one's surroundings
- Caterpillar-the larva stage of the butterfly and moth; before it has wings
- Chrysalis- a hard, protective shell that forms over the pupa; usually made by the caterpillar of a butterfly
- Cocoon- the silky case that forms over the pupa; usually made by the caterpillar of a moth
- Compound eye- an eye that is made up of many small lenses
- Hibernate-to pass the winter in an inactive state; all body functions slow down
- Lepidoptera- large group of insects known as butterflies and moths, with two pairs of broad wings, covered with very fine scales; from the Greek meaning "scale wing"
- Metamorphosis- the series of changes that take place in some insects development from egg to larva to pupa to adult
- Migrate-to move to a new living area, usually seasonal
- Mimicry-a protective device where harmless butterflies or moths look like another insect that is dangerous
- Molting- when an animal regularly sheds an outer layer of skin, feather or hair
- Nectar- a sweet liquid found in plants
- Proboscis-a long flexible tube that is used to suck nectar from flowers
- Pro legs-fleshy legs found on caterpillars that help it move its long body
- Larva-a stage of metamorphosis when the insect is wormlike and has no wings; caterpillar
- Pupa-the stage between the larva and the adult in metamorphosis of a butterfly or moth
- Scales-thin plates that cover the wings of butterflies and moths
- Thorax-the second segment of the body of an insect to which the legs and wings are attached
- Veins-hardened tubes that stiffen the wings of an insect
- Wings-structures that are used in flying

Before Your Visit:

1. Create a mind map or word web with your students to understand their background knowledge.
2. Read aloud, *The Very Hungry Caterpillar* by Eric Carle.

After Your Visit:

1. Complete the butterfly anatomy diagram.
2. Display the butterfly puppets in a “flower garden” of artwork created by the students.
3. Raise real butterflies in a net cage from caterpillars through the chrysalis stage; set the emerged adult butterflies free in the schoolyard.

Come Fly With Me: Butterflies and Moths

Name: _____

Date: _____

