



WILD WINGS

Classroom Connections

Thank you for participating in our Wild Wings program! We hope that your students enjoyed exploring some of the ways wings are adapted to help butterflies survive.

WILD WINGS AND NGSS

We have designed Wild Wings with the potential to address a variety of standards, including the Next Generation Science Standards (NGSS). Disciplinary Core Idea LS1A: *Structure and Function* is one example, but there are several! Use your experience in the Butterfly Encounter in a way that fits your students' discoveries, interests and the relevant standards or crosscutting concepts. Below you will find some suggestions to help your class discuss their findings.



ANALYZE YOUR DATA

Now is the time to take a closer look at what you saw in the Butterfly Encounter. Look closely at the data you gathered on your Scavenger Hunt sheets - the pictures and various kinds of camouflage, colors, patterns, spots and wing shapes.

Some **questions** you may want to think about together (or in groups):

- Why do you think some butterflies have bright colors? Do you know any other animals that are brightly colored (ex. snake, frog, etc.)? Why do these animals have bright colors?
- Why might some butterflies have patterns on their wings? What about other animals that have patterns, what do they use them for?
- Butterflies with eyespots: What do these spots look like to you? Why might they be useful for a butterfly? If you were this butterfly's predator, and you looked quickly and saw these spots, how might you react?
- Camouflage: What type of places should this butterfly hide? Should it hide with wings open or closed?



Blue Morpho
Morpho peleidis

OUR WILD WINGS!

Get to know some of our butterflies and their wing adaptations. Check out the pictures under the Wild Wings tab.

BUTTERFLY WINGS QUICK FACTS

Wing Size – Big wings help a butterfly turn quickly and move erratically (to evade predators). Most butterflies are not very fast fliers. 5mph for the slowest and 30mph for the fastest.

<http://www.businessinsider.com/how-butterflies-fly-large-wings-effect-science-2015-7>



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Orange Dead Leaf
Kallima inachus

Color – Rich colors come from scales that protect the wings. Each scale is a single color. Often, the scales on the top of a butterfly's wings are brightly colored, while the scales on the underside are patterned for camouflage while the butterfly rests. Butterflies will often rest with wings closed to remain inconspicuous to predators (Think dead leaf). <https://www.wired.com/2010/06/butterfly-colors/>

Wing Patterns – Colors and patterns may help confuse predators. Some butterflies use colors or patterns to look like flies or wasps. Some look like the head is at the other end of their body so they can keep an eye on predators. Some butterflies even look like a writhing snake when they move their wings. Eye spots (on top or underside of wing) may be trying to resemble the eyes of predators (ex. owl, amphibian). They also may serve to draw a predator's attention away from the most vulnerable parts of the butterfly's body. It's better to lose a part of the outer wing or tail than a head!

Mimicry – Some butterflies are poisonous because of the plants their caterpillars feed on (ex. monarchs). Other butterflies have evolved to look like these poisonous species, yet are not poisonous. Once a bird knows a monarch does not taste good, they will also try to avoid any other butterfly that looks like a monarch. <http://www.reimangardens.com/butterfly/butterflies-use-wing-colors/>

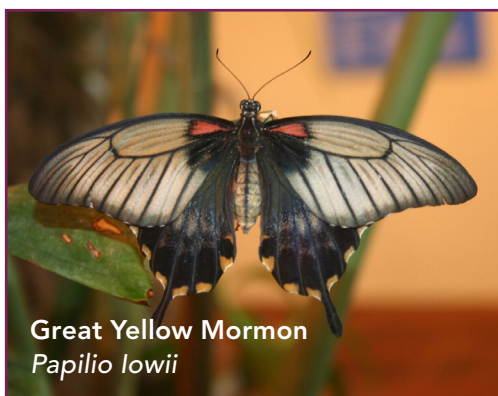
Wing patterns and colors may also be used for mating display.

Wing Tails – Tails are not for flying ability, but help draw predators' attention away from the more vulnerable body parts. If the butterfly loses its tail, it can still fly effectively. The luna moth is a cool example:

When bats aim their sonar at insects, they analyze the rebounding echoes for the distinctive signatures of beating wings. But the luna moths tails, which spin behind them as they fly, also produce echoes that resemble wingbeats. To the bat, they either sound like a very conspicuous part of their target, or like a different target entirely. As a result, they fumble their attacks. With tail, bats only caught 35% of luna months. Without tails, they caught 81%. Tails distract the predator. They also make the butterfly bigger.

<http://phenomena.nationalgeographic.com/2015/02/16/why-do-luna-moths-have-such-absurdly-long-tails/>

There is still a lack of clarity about what other functions, if any, butterfly tails serve. Not every attribute of living things necessarily serves an evolutionary function.



Great Yellow Mormon
Papilio lowii



Luna Moth
Actias luna



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GOING FURTHER

Natural predators of butterflies include birds, ants, wasps, bats, spiders, amphibians... even fungi and bacteria! Research some of the natural predators of the butterflies your class saw. How might the wings help protect butterflies?

What **New England butterflies** have wing adaptations that help them to survive?

Do any of our **local butterflies** have **similar camouflage/patterns/spots** to the tropical butterflies you saw at the Science Center? Why might butterflies here in New England have wing designs similar to those in the tropics?

Butterfly wings **reflect UV light**. Why might this be a useful adaptation?

Most of Wild Wings you saw in the Butterfly Encounter get their **color** from pigment. The Blue Morpho, however, gets its color from how light interacts with the unique structure of the wing scales. Refracted light gives the Morpho its iridescent blue color. While pigment will get duller over time, the structural color of the Blue Morpho will not fade! Your students may be interested in further researching the topic of light, color and the Blue Morpho's scale structure.



Blue Morpho
Morpho peleidis

ADDITIONAL RESOURCES

Butterfly Nectar Sources: Nectar-Rich Connecticut Native Plants https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ct/technical/ecoscience/invasive/?cid=nrcs142p2_011119

Where to Buy Butterflies

http://www.butterflybreeders.org/public/butterflies-where_to_buy.cfm?country=USA

Monarch Curriculum

<http://www.nwf.org/Eco-Schools-USA/Our-Partners/LEGO/Monarch-Mission-Lessons.aspx>