

Morphing Butterfly

Is a Blue Morpho butterfly really blue?

Description

In this activity, kids explore how nano-sized structures can create brilliant color.

Suitable for kids ages 7 and up. (Younger kids can observe the butterfly, but it may be too fragile for them to handle.)



Materials

Blue Morpho butterfly specimen
Brightly-lit window or light box
Isopropyl alcohol (rubbing alcohol)
Eyedropper

Note: Blue Morpho butterfly specimens are available on the internet. The exact species doesn't matter—just look for a brilliant, iridescent blue.



Time

Preparation: 5 minutes

Activity: 15 minutes

Cleanup: 5 minutes

Safety

Do not drink the isopropyl alcohol or get it in your eyes. Supervise children at all times.

Step 1

Look at the front and back of the butterfly.

TIP

Handle the butterfly carefully—it's fragile!



Step 2

Hold the butterfly up to a bright window, so light passes through it. When you're looking at the brown side, does it change color? What about when you're looking at the blue side?



Step 3

Set the butterfly down on a table.

Use the eyedropper to drip one small drop of alcohol onto the blue side of the wing. What happens?

Wait a little while—does anything change?

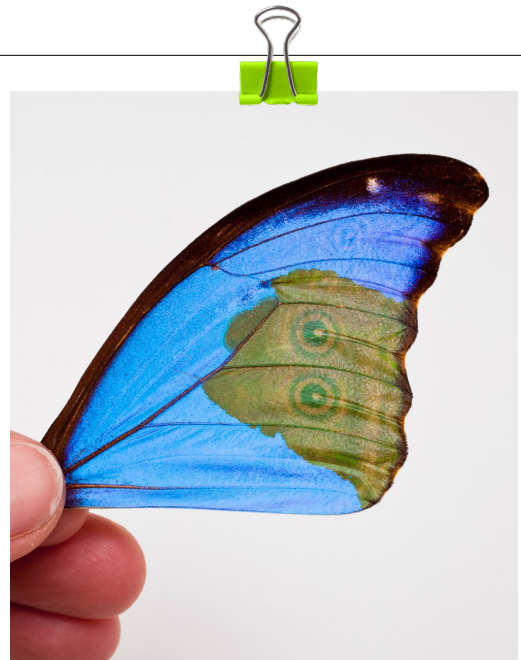


What's going on?

When you hold the butterfly up to the light, the blue side of the wings looks brown! That's because the blue color is created by the interference of light bouncing off tiny, colorless nano-sized structures, while the brown color is created by pigment.

When bright light passes through the butterfly, the reflective effect is lost on the blue side, and you see the brown pigment from the back side of the wings.

When you put the alcohol on the butterfly's wing, it fills up the spaces between the tiny nanostructures, so they reflect green light, not blue. When the alcohol evaporates, the wings look blue again.

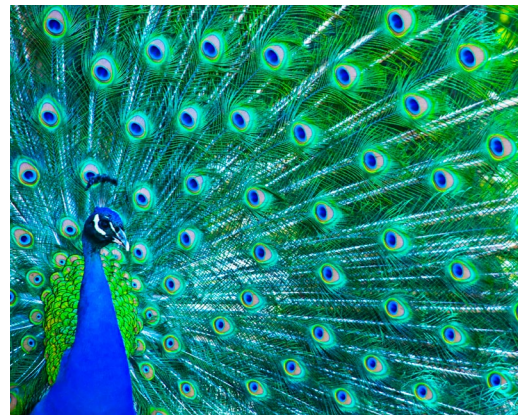


A drop of alcohol makes the Blue Morpho's wing green

How is this nano?

The Blue Morpho's wings reflect light in special ways, because it has special structures that are only a few hundred nanometers thick. That's in the same size range as the wavelength of visible light.

Soap bubbles, peacock feathers, and oil slicks are some other examples of nanostructures that create beautiful, iridescent colors.



Nanotechnology

Nanotechnology takes advantage of the way things behave differently at the nanoscale to make new products and applications.

Researchers have created low-energy electronic displays inspired by the wings of Blue Morpho butterflies.

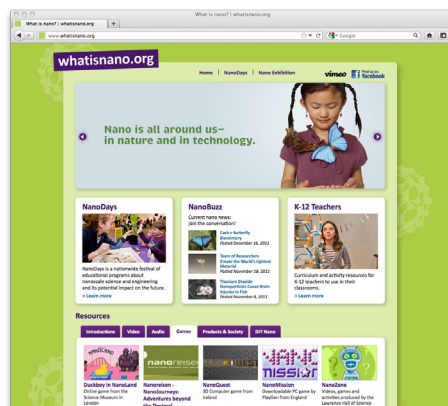


Low-energy electronic display

Learn more

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Credits



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