



TRAINING MATERIAL

Morphing Butterfly

Materials

- Blue butterfly wing in protective sleeve
- Yellow butterfly wing in protective sleeve
- Mini LED light
- “Blue Morpho Butterfly” image sheet

Butterflies are available at www.butterfliesandthings.com

Notes to the presenter

If you’re doing this activity near a bright window or other light source, the mini-light may not be effective. You might be able to hold the butterfly up to the window or light source to get the same effect (and not use the mini-light at all), or you might need to relocate the activity to a less brightly lit area.

Extension: Visitors can experiment further by dropping alcohol onto an unprotected Blue Morpho butterfly wing. The alcohol fills up the spaces between the nanoscale structures of the wings, so they reflect green light waves rather than blue light waves. When the alcohol evaporates, the wings look blue again.

Staff training resources

Video: *Morphing Butterfly*, vimeo.com/album/3636993

Credits and Rights

This activity is a modified version of the NISE Network’s educational products *Exploring Structures—Butterfly* and *DIY Nano Morphing Butterfly*, available on www.nisenet.org. Images of blue morpho wing with reflected and non-reflected light, F. Nijhout, Duke University. Photo of low-energy display, Qualcomm Technologies, Inc. Image of structures in blue morpho wing, S. Yoshioka, Osaka University.



This project was supported by the National Science Foundation under Awards Nos. 0940143 and 0937591. Any opinions, findings, and conclusions or recommendations expressed in this program are those of the author and do not necessarily reflect the views of the Foundation.

Copyright 2015. Sciencenter. Published under a Creative Commons Attribution-Noncommercial-ShareAlike license:

<http://creativecommons.org/licenses/by-nc-sa/3.0/us/>

Tips for leading hands-on science activities

Greet your guests

Say “hello,” make eye contact, and smile. People will come over if you look welcoming, available, and friendly.

Let them do the activity

As much as possible, let your guests do the hands-on parts of the activity, and let them discover what happens. (If your activity has a surprise, don’t give it away!)

Encourage exploration

Provide positive feedback and assistance when people need it, but let them experiment and learn for themselves. Don’t insist people do things the “right” way—sometimes learning how something doesn’t work is just as valuable as learning how it does work.

Ask questions

Help people observe and think about the activity. Try to use questions that have more than one answer, such as: “What do you see happening?” “Why do you think that happened?” “What surprised you about what you saw?” “Does this remind you of anything you’ve seen before?”

Be a good listener

Be interested in what your guests tell you, and let their curiosity and responses drive your conversation forward.

Share what you know

Use clear, simple language. Focus on one main idea—you don’t need to explain everything at once! Keep the information basic for starters, and share more with interested learners.

Use examples from everyday life

Familiar examples can help explain abstract concepts. Be aware of different abilities, keeping in mind that children do not have the same skills or vocabulary as adults.

Offer positive responses

If people haven’t quite grasped a concept, you might say, “That’s a good guess,” or “Very close, any other ideas?” Never say, “No” or “Wrong.” You can offer hints or suggestions for things to think about or watch carefully.

Share accurate information

If you aren’t sure about something, it’s ok to say, “I don’t know. That’s a great question!” Suggest ways that people can learn more, by trying another activity or looking up information at the library or online.

Remain positive

Maintain an inviting facial expression, positive tone, and open body language throughout the interaction.

Thank your guests

As your interaction ends, suggest other activities that you think your guests might enjoy.

Have fun!

A positive experience will encourage learning.