

STATEN ISLAND
MUSEUM

Staten Island Museum Presents

NIGHT SCIENCE

Discovery Kit 2021





Demystify the nocturnal world of science right from your windowsill or backyard!

With instructional videos, closer-looks, games and art activities, this interactive guidebook helps you explore the wonders of the scientific world that come alive when the sun goes down.

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Y'all Need Science: What is Nighttime?



Let there be night!

Yesenia explores the world-turning science behind the dark half of a day on Earth. Do other planets experience “nighttime” the way Earthlings do? Can you tell when it’s bedtime in space? Tune in to find out.



Yesenia is a geologist, host of the YouTube series “Y’all Need Science”, and fab lab instructor at the Melrose Center in Orlando, Florida. Yesenia loves to teach STEM classes in informal education settings, like museums and libraries. They are enthusiastic about making science accessible for everyone by focusing on big science concepts that they believe everyone knows intuitively.

Keep learning from Yesenia by going [here](#)

After Dark Scavenger Hunt

Using your senses helps you experience the world outside when it starts to get dark. As you walk around your yard or neighborhood, use your eyes, ears, nose, and hands to find the following.

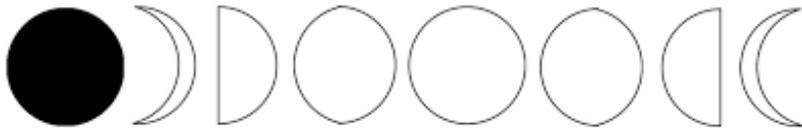
Remember to ask your adult for help when touching things in the natural world. Let's get started!

What to Bring:

- Flashlight
- Adult chaperone
- Your eyes, ears, nose, and hands
- Pencil and paper
- Sense of adventure!

1. Look up at the sky.

a. Can you see the moon? What shape is it?



"In North America, we often call the July full moon the Buck Moon, Hay Moon or Thunder Moon. That's because, at this time of year, buck deer begin to grow velvety antlers. Meanwhile, farmers are loading hay in their barns, amid the summer season's frequent thunder showers. On the night of July 23-24, watch as the planets Saturn and Jupiter follow the moon westward across the nighttime sky." [Learn more here](#)

2. Do you see any shadows around you? Draw the shape of the shadow in the box below. What do you think is making the shadow?

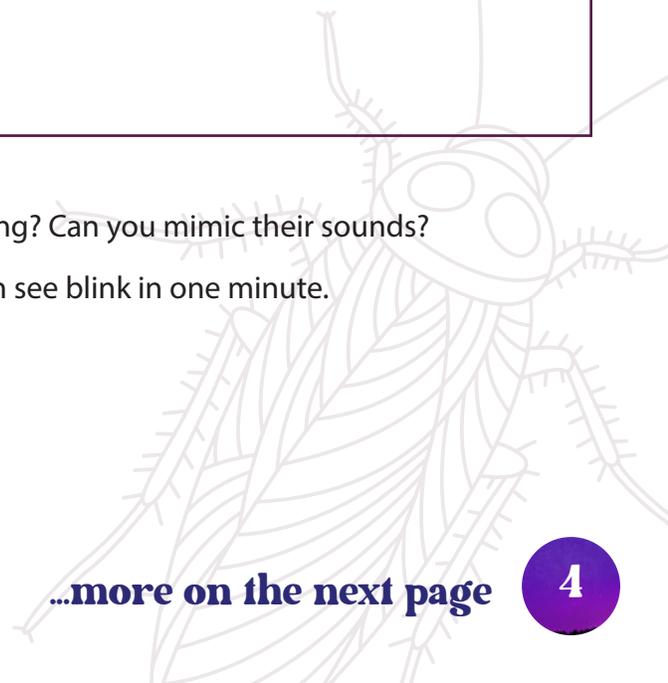
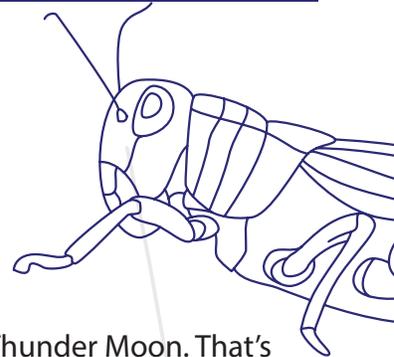
3. Are the stars visible? How many can you see?

Listen closely, can you hear insects buzzing, humming or chirping? Can you mimic their sounds?

4. Are the lightning bugs or fireflies out? Count how many you can see blink in one minute.

5. **Find:** A flying insect
What does it look like? _____

6. **Find:** A crawling insect
Where did you find it? _____



...more on the next page

After Dark Scavenger Hunt

7. Find: A street sign that glows

Unlike other shiny surfaces that reflect light according to the angle of the light emitting source, road signs are designed to reflect light in all directions, no matter what angle the light is approaching from. This type of reflectiveness is called "retroreflection," and it is achieved by manufacturing road signs with a coating of prismatic reflectors or glass beads on the sign's surface.

8. Find: A spider web. What kind is it?



Tangle Web



Sheet Web



Funnel Web



Orb Web

9. Find: A Flower.

Is the blossom open or closed? Open Closed

Fact: Plants that tuck themselves in for bedtime exhibit a natural behavior known as nyctinasty. In cool air and darkness, the bottom-most petals of certain flowers grow at a faster rate than the upper-most petals, forcing the flowers shut. But scientists are not quite sure why some plants, particularly flowers, evolved this way. [Learn more here](#)

Some types of nyctinastic plants are morning glory (Convolvulaceae) and rose of sharon



Morning Glory



Rose of Sharon

When you're done...

1. What new things did you discover using your senses?

2. What did you find that wasn't on the list?



Glow in the Dark Mushrooms



Did you know that some mushrooms glow in the dark?

Learn all about bioluminescent fungi, and learn how to identify some that may even grow in your neighborhood!



Jules Amanita is an amateur mycologist and nature educator with a passion for demystifying fungi. They create videos about mushroom identification, terminology, field guide literacy, and safe foraging. Additionally, they lead virtual and in-person mushroom hunting workshops. Located in Louisa, VA, they live at Twin Oaks Community—the oldest and largest egalitarian commune in North America—where they teach a weekly Forest School for kids between the ages of two and eight. Their mission is to help people develop a personal connection with the ecosystems around them.

Keep learning with Jules by following them on [Instagram](#)

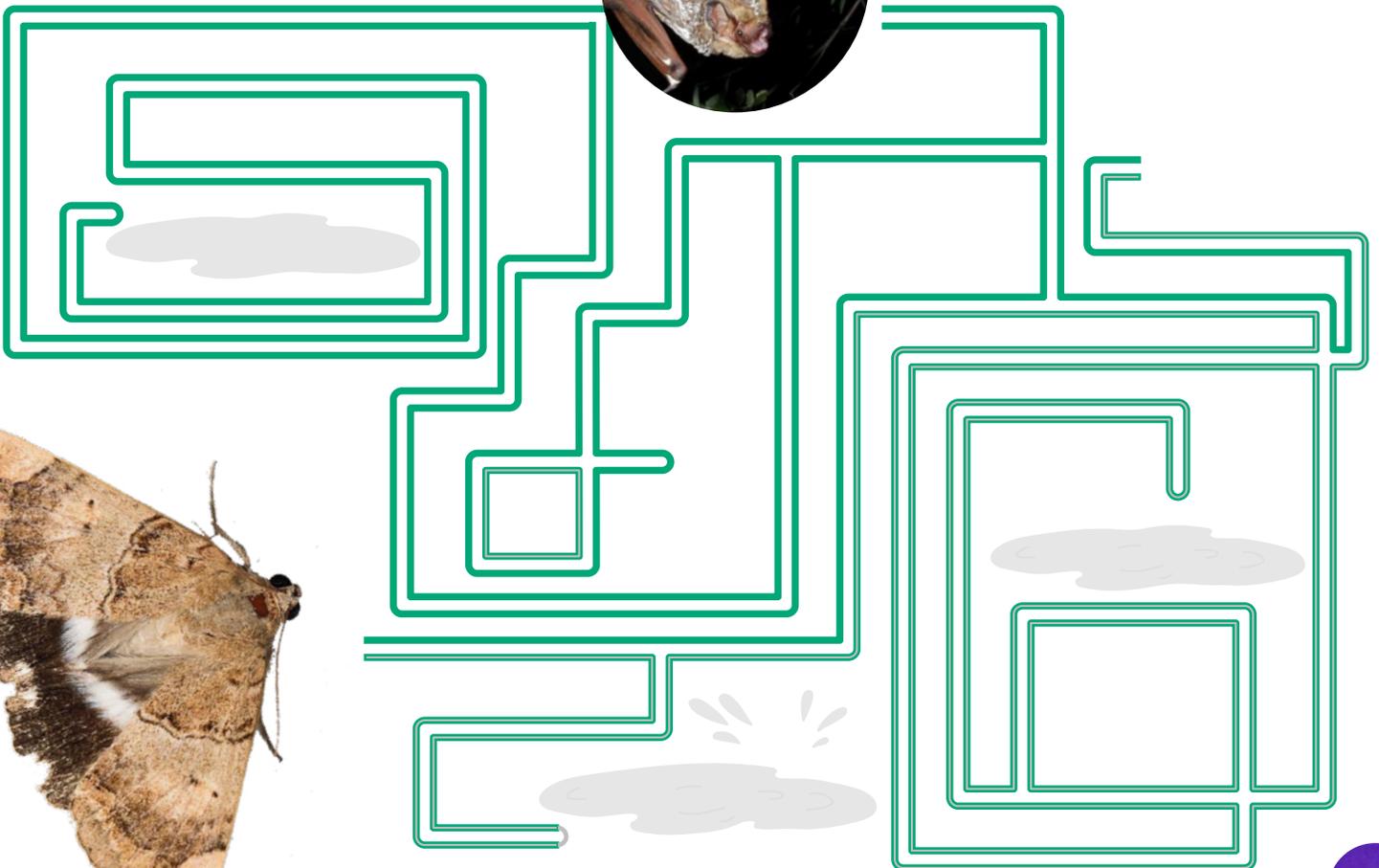
Audio Battle: Bat Maze

Call it a classic cat-and-mouse game, predators are always seeking to capture their prey and prey are always trying to avoid that seemingly inevitable fate.

Over time predators and prey have evolved special tools and defenses that help them toward their evolutionary goal. A great example of this is in the relationship between bats and moths. Some bats eat fruit, fish, or even small mammals, but the majority of bat species primarily eat insects and some prefer moths!

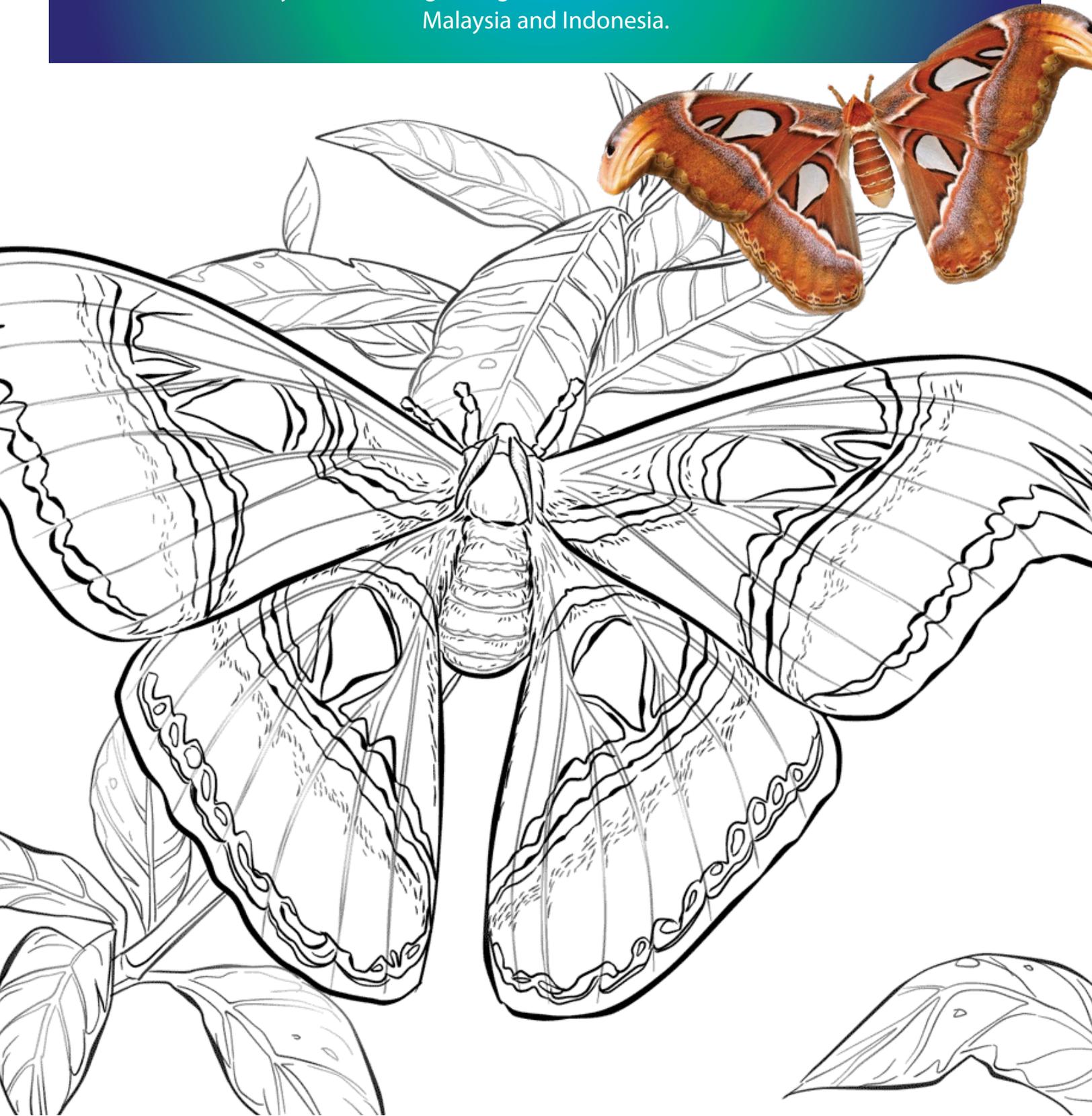
Moths evolved eardrums on their thorax which allow them to hear bat echolocation, know when they're coming, and avoid being eaten. To help narrow their chances at capturing prey, some bats have tuned their echolocation to frequencies that some moths simply can't hear. In the maze below there is one bat, one moth, and one clear escape. Choose the path that helps the moth evade the bat!

To learn more about this "evolutionary arms race" go [here](#).



Coloring Page - Atlas Moth

The Atlas moth (*Attacus atlas*) is one of the largest insects on the planet with a wingspan of approximately 10.5". The caterpillars are equally big reaching almost 5 inches long and they spend every second of their lives eating. Some of their favorites include leaves from cinnamon trees, citrus fruit trees, guava trees and Jamaican cherry trees. These gentle giants are native to the forests of China, India, Malaysia and Indonesia.



Can You Hear Me Now? Echolocation Activity



IO MOTH



We need to know where things are, and many times we need to be able to “see” something even when it’s dark outside. Have you ever wondered how bats are able to find food at night? When a bat is flying, it makes a series of squeaks too high-pitched for humans to hear. The sounds hit an object and bounces, like an echo. The bat is able to tell the size and distance of the object just from the echo. How does this work? Enjoy this fun challenge about echolocation to learn more. **Let’s get started!**

Materials: Blindfold

Fact: Most bats are insectivores. They like to eat moths, mosquitoes, beetles and more. And they sure do eat a lot of them! Did you know that a single little brown bat can eat up to 500 mosquito-sized insects in an hour?

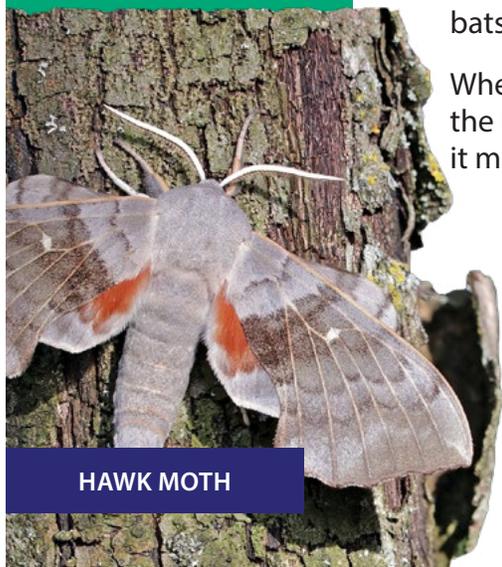
Directions:

1. Choose an open and safe location like a yard
2. Work with at least one other family member or friend
3. Designate one person to be the bat and blindfold them
4. The other person will be the bat’s prey. If working with more than 2 people, additional participants can gather in a circle around the bat.
5. The bat should clap from one side of the yard. The prey should clap back in response.
6. The bat claps, moving slowly toward the location of the prey.
7. Once the bat has found the prey, they can take off their blindfold. Were they right?

Variations:

1. Use “bat ears.” The next time you try the activity, the person who is playing the role of the bat can cup their hands behind their ears to simulate the large ears bats have. Does this help in locating the prey?

When working with a larger group of friends or family, participants other than the bat can make different noises and the group can change positions making it more difficult to locate prey.



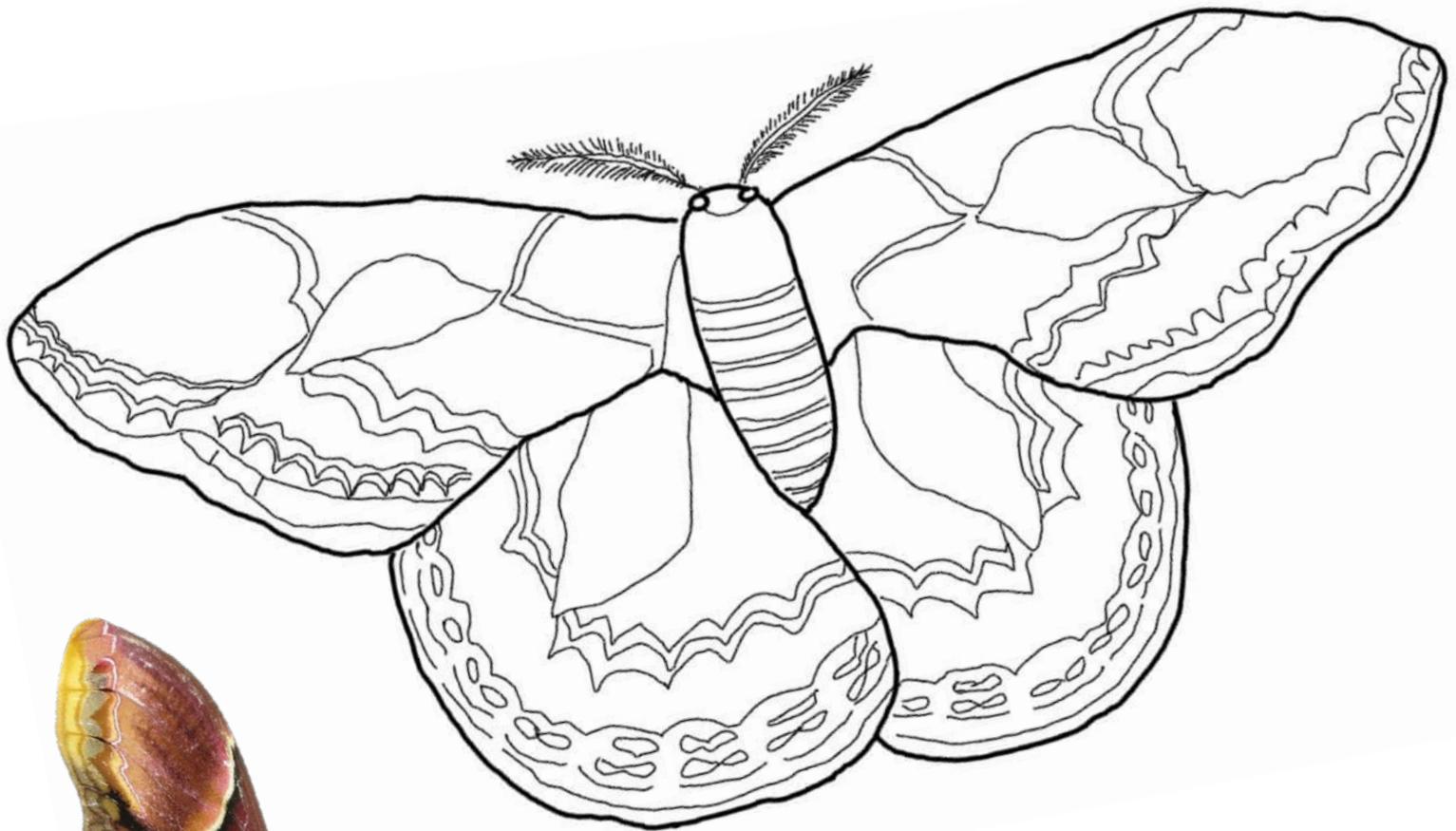
HAWK MOTH

BIG EARED BAT



Coloring Page - Rothschild's Silk Moth

Rothschild's silk moth (*Rothschildia erycina*), is among the largest of all moths with a wingspan of approximately 4-5 inches. Their habitat is tropical rainforest and wet savannah and can be found from Mexico to Brazil and Paraguay. Adult moths have transparent, triangular windows in each wing. These windows help the moth avoid predators by allowing light to pass through which visually breaks up the appearance of their wing profile. .





Collector Spotlight: Mr. Davis' Beetle Box



Many beetles are nocturnal, like lightning bugs! However, there are many different kinds of beetles (Order Coleoptera), so many in fact that they constitute the single largest group of animals on earth. Join Director of Natural Science Colleen Evans to take a look at Staten Island Museum founder William T. Davis's Beetle Box and learn what it can tell us about local biodiversity.



Colleen R. Evans is the Staten Island Museum's Director of Natural Sciences. A biologist who specializes in museum collections, Colleen also brings a wide knowledge of arthropods and science education to her post. She earned her BS and MS in Biology at the University of North Texas, where she specialized in natural history collection digitization. She previously served as the collections manager at Georgia Southern University where she managed the university's natural history collections, including the U.S. National Tick Collection.

Follow [@StatenIslandNatSci](https://twitter.com/StatenIslandNatSci) for outdoor adventures and behind the scenes collection finds with the Staten Island Museum's Director of Natural Science Colleen Evans.

The Summertime Insect Chorus

Cicadas are more often heard than seen. Adult males use a specialized organ, called a tymbal, to create their characteristic rattling sounds. Males use these calls to attract females to them in order to mate. These sounds are often species specific, making it possible for people to identify cicadas by their sound alone.

The northern dusk-singing cicada (*Megatibicen auletes*), giant oak cicada, or southern oak cicada, is a species of cicada found in the eastern United States and parts of southeastern Canada. It is the largest of the eastern and central cicadas and is aptly named for its habit of singing almost exclusively at dusk.

Listen to the northern dusk-singing cicada [here](#)



Contrast that to when Colleen Evans, Director of Natural Science went to visit Brood X in Princeton earlier this summer.

While cicadas produce one of the most iconic sounds of summer, these insects typically only join the choir at dawn and dusk. Then what is it we are hearing? Who is staying up all night making noise? To identify more key players in the summer sounds chorus, listen to Laurel Symes, an evolutionary biologist at Dartmouth College [here](#).



Owl Walk Through High Rock



Take a walk through the deep, dark corners of the Staten Island Greenbelt in search of the unique animals that call it home. Join Cliff Hagen and Deputy Borough President, Edward Burke in the night woods of High Rock Park as they elicit responses from our nocturnal neighbors by mimicking their hoots, whinnies and whistles.

Cliff Hagen, a life-long Staten Islander, is president of Protectors of Pine Oak Woods, Staten Island's all-volunteer environmental preservation organization. The mission of Protectors of Pine Oak Woods is two-fold, calling for an increased stewardship of park properties and the environmental education of our community to facilitate the preservation of open space on Staten Island. For more than two decades Cliff Hagen has been a teacher of special education with the Department of Education as well as On Your Mark and is concerned with the health and wellness of our community.

As Deputy Borough President, **Edward Burke** works closely with the Borough President and his staff on public policy, community issues and special projects for the office. Mr. Burke plays a role in a wide array of issues for the Borough President, including parks and recreation, cultural attractions, youth and quality of life issues. He also specializes in promoting Staten Island's special places, advancing the Island's motto as a "The Borough of Parks." Mr. Burke has served in government on Staten Island for 29 years.

To learn more about preserving Staten Island for owls and other wildlife visit Protectors of Pine Oak Woods at www.siprotectors.org.

Word Search

There's a lot of vocabulary in this Night Science Discovery Kit!
See if you can find some of the terms below in this word search:

Y O M P H F B N X C Q R G E M
I N O A R D E I H S O B C V B
T Y S N R E W B O T E H W F G
E C Q U K E Y L A L O M O J K
L T U X K Z T N F L O B O W E
T I I T F I I P O R A G U T A
E N T A V L D C O T N G I I H
E A O T L Y A T N D C K W S B
B S N O B T A D A C I C S O T
J T P N I D W F E Y X P F W P
V Y F O E R H N T U H N E I U
U M N R W T H G I L H S A L F
M X P J T G N O C T U R N A L
C A M O U F L A G E Y O I P K
T N E C S E N I M U L O I B F

Word Bank

Echolocation
Cicada
Antennae
Web
Predator

Camouflage
Moth
Mosquito
Bioluminescent
Lepidoptera

Pollinator
Nocturnal
Prey
Retroreflection
Nyctinasty

Bat
Biologist
Flashlight
Mushroom
Beetle



How To Make a Light Attractor



Entomologists use light attractors to study nocturnal insects in an area.

Artificial lights attract moths, flies, crane flies, mayflies, beetles, and all sorts of other insects. Make your own light attractor to uncover and study nighttime insects with a little help from Colleen Evans, Director of Natural Science.



Colleen R. Evans is the Staten Island Museum's Director of Natural Sciences. A biologist who specializes in museum collections, Colleen also brings a wide knowledge of arthropods and science education to her post. She earned her BS and MS in Biology at the University of North Texas, where she specialized in natural history collection digitization. She previously served as the collections manager at Georgia Southern University where she managed the university's natural history collections, including the U.S. National Tick Collection.



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Light Attractor Field Guide

These are just some of the insects you might draw to your light attractor:



ANOPHELES MOSQUITO



ANTLION



ASIAN TIGER MOSQUITO



IO MOTH



CAMEL CRICKET



CRANE FLY



EASTERN EYED CLICK BEETLE



FIREFLY



GRAPEVINE BEETLE

Light Attractor Field Guide Cont.



GREEN CUTWORM MOTH



GREEN JUNE BEETLE



JAPANESE BEETLE



KATYDID



LUNA MOTH



NON-BITING MIDGE



**AMERICAN
COCKROACH**



PLUME MOTH



GEOMETER MOTH



**WAVY-LINED
EMERALD**



Y'all Need Science: Auroras

Y'all Need Science *(with Yesenia)*

The Northern Lights have a complex recipe involving the Sun and the Earth's magnetic field. But, how do electrons come into play? Yesenia explores the night sky phenomenon in this charged segment of Y'all Need Science.



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Keep learning from Yesenia by going [here](#)

THANK YOU

Keep Learning With Us

www.statenislandmuseum.org for more information about upcoming programs and exhibitions.

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