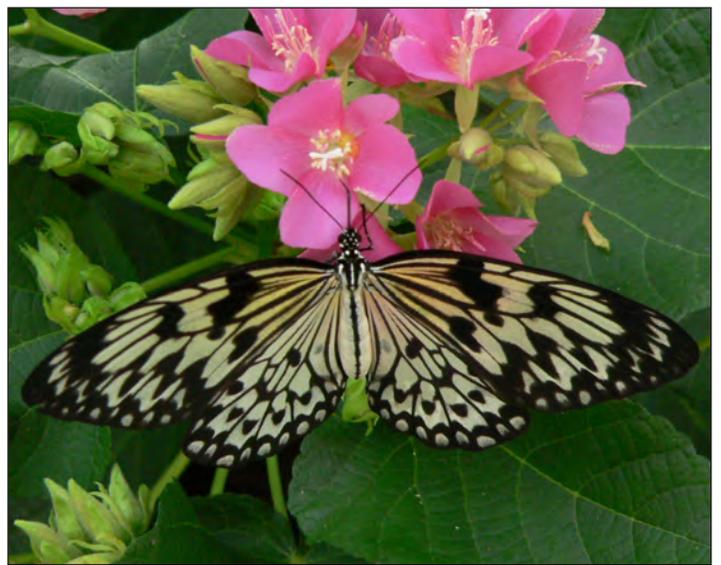




# BUTTERFLIES AND POLLINATION



# Welcome!

Welcome to Fairchild Tropical Botanic Garden! We ask that you please read the following rules to your group before you begin your visit.

- Stay with your group during your entire visit.
- Respect our wildlife; do not touch, chase, or feed the animals.
- Walk only on designated paths or grass.
- Do not climb trees or pick flowers or fruits from plants.
- Keep your voices low to respect other guests.
- Self-guided groups are not allowed at the Garden Cafe, in the Gift Shop or on the Tram.

In your backpack, you will find the materials needed for this program. Before leaving the Garden, we ask you to please ensure that all the materials are back in this backpack. At the end of your visit, return this backpack to the Visitor Center. If any materials are lost or damaged, the cost will be deducted from your deposit.

## ACTIVITY SUPPLIES:

- 3 Butterfly Program booklets

### Butterfly Background Information Activities

- *Comparing Butterflies and Moths* pictures - 10
- *Butterfly vs. Moth Venn Diagram* worksheets - 10
- *Butterfly Life Cycle* worksheets - 10
- *Butterfly Antomy* worksheets - 10

### Lisa D. Anness Butterfly Garden

- *Lepidopterist For A Day* worksheets - 10
- South Florida Butterfly Guides - 10

### Wings of the Tropics: Butterfly Conservatory

- *Wings of the Tropics Butterfly Guide* - 6
- *Exotic Butterflies in the Wings of the Tropics Conservatory* - 6
- *Butterfly Behavior Guide* - 6

### Whitman Tropical Fruit Pavilion

- *Pollination Match* cards - 3 sets of 12 cards

- Optional: clipboards - 10

# Get Started

1. Review the Introduction, Vocabulary List, activity descriptions, and butterfly field guides included in the backpack. If you are going to the butterfly conservatory please review the *Wings of the Tropics: Butterfly Conservatory Guidelines* with your students before entering the butterfly conservatory.
2. Activities in this program will take place at the Lisa D. Anness South Florida Butterfly Garden, the Clinton Family Wings of the Tropics Exhibit and the Whitman Fruit Pavillion. Using the map, proceed to the activity location in the Garden.
3. While there, complete the corresponding activities.
4. When you finish the activities, use the map to proceed to the next activity area.

## **Before leaving the Garden, don't forget to:**

1. Look for the survey that is inside the backpack. Your feedback is appreciated and it helps us improve our program! Please make sure to complete the survey and put it back in the program backpack.
2. Return the backpack to the Visitor Center entrance where you picked it up.

## **Program Objectives**

- Students learn about butterflies and their importance.
- Students identify a variety of butterflies.
- Students understand the lifecycle of the butterfly.
- Students learn what pollination is.
- Students are introduced to botanical terminology and use it to describe scientific observations.

## EXHIBITS

- 1 Garden Club of America Amphitheater and Lougheed Palm Grove
- 2 Coconut Palm Collection
- 3 Palm Collection
- 4 Keys Coastal Habitat and Trail
- 5 Bamboo Collection
- 6 Caribbean Dry Forest
- 7 Caribbean Palm Savannah
- 8 Pine Rockland Habitat
- 9 Geiger Tropical Flower Garden
- 10 Danielson Vine Pergola
- 11 Sibley *Amazonica* Pool

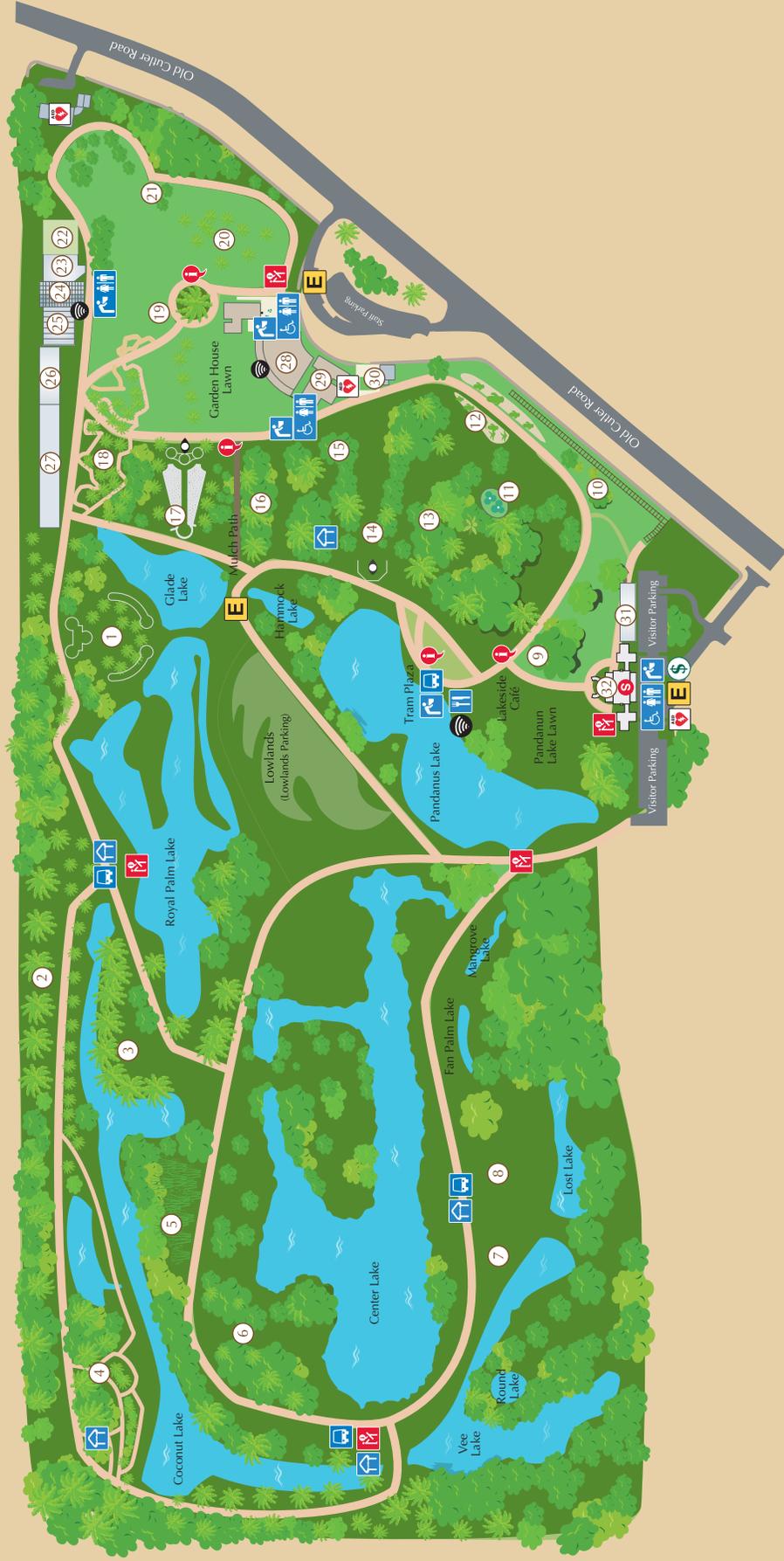
- 12 Lougheed Spiny Forest of Madagascar
- 13 Fairchild Arboretum
- 14 Allée and Overlook
- 15 Anness South Florida Butterfly Garden
- 16 Bank of America Learning Garden
- 17 Bailey Palm Glade Vista
- 18 Simons Rainforest
- 19 Cycad Circle and Vista
- 20 Palm and Cycad Collection in the Montgomery Palmetum
- 21 The Sunken Garden
- 22 The Edible Garden

## BUILDINGS

- 23 Whitman Tropical Fruit Pavilion
- 24 Tropical Plant Conservatory
- 25 The Glasshouse Café
- 26 The Clinton Family Conservatory featuring the Wings of the Tropics Exhibit
- 27 DiMare Science Village
- 28 The Garden House
- 29 The Corbin Building
- 30 The Gate House
- 31 Future Site of The Adam R. Rose and Peter R. McQuillan Arts Building
- 32 Shehan Visitor Center

## SERVICES

- Entrance/Exit
- Water Fountain
- Tram Stop
- Restrooms
- Food & Beverages
- Shelter
- Map
- The Shop at Fairchild
- Information
- ATM
- WiFi Spot
- Vistas
- Automated External Defibrillator



# Introduction

Today you will learn about butterfly characteristics, life cycle and anatomy. The hands-on activities found in this packet will immerse you in the beautiful world of butterflies.

## **Introduction**

There are more than 115,000 different species of butterflies and moths in the world. Sixty species of butterflies have been sighted at Fairchild Tropical Botanic Garden, not including those in the Wings of the Tropics Conservatory. Additionally, inside the Wings of the Tropics Conservatory you can see more than forty-five different species of exotic butterflies from all over the world.

You can expect to see some of the following species in our Lisa D. Anness Butterfly Garden: Zebra Longwing, Monarch, Swallowtail, Cloudless Sulphur, Gulf Fritillary, Julia, and Atala. In our new butterfly conservatory, The Wings of the Tropics, you will see thousands of exotic butterflies including the following species: Blue Morpho, Owl, Bamboo Page, Leopard Lacewing and many more.

Butterfly life spans vary greatly according to species and are dependent on weather patterns and predators; however most butterflies live between 2 days and 11 months after emerging from the chrysalis. It is more common to see butterflies on warm, sunny days, as they are cold-blooded and need warmth and sun to fly.

Butterflies and plants have co-evolved over time and depend on each other for survival. Flowering plants provide butterflies with food and shelter; butterflies lay their eggs on the underside of leaves; caterpillars eat the foliage; leaves provide camouflage and protection for butterflies during the pupal stage; and butterflies drink nectar and sometimes pollen from flowers. In return, butterflies help flowering plants to reproduce through pollination. When a butterfly lands on a flower to drink nectar, the flower's pollen becomes attached and as the butterfly moves from flower to flower drinking more nectar, the pollen is transferred. Once the pollen from one flower is brushed off onto another flower, it is caught on the female part of the flower, called the pistil. The pollen then grows down the pistil to fertilize the ovule, located at the end of the pistil. A fertilized ovule becomes a seed, and the ovary swells up to produce a fruit.

Each species of butterfly has a particular host plant and nectar plant, the former being the plant on which it lays its eggs and caterpillars eat, and the latter being the plant from which butterflies drink nectar. This is why it is extremely important to conserve the native biodiversity of each ecosystem; if a butterfly species loses either its host or nectar plant, it can no longer survive and vice versa.

# Vocabulary

**Anther:** the pollen-bearing part of the stamen.

**Chrysalis:** the hard shelled pupa of a butterfly.

**Host Plant:** the plant on which a certain species of butterfly lays its eggs, as well as the plant that the caterpillar feeds on.

**Lepidopterist:** a scientist who studies butterflies and moths.

**Life Cycle:** the various life stages through which an organism passes in its development.

**Metamorphosis:** transformation; an abrupt physical change in an animal's body structure from one stage or form to another.

**Migration:** movement of a group of people or animals from one location to another.

**Navigation:** the act or science of directing the course of a traveling object.

**Nectar Plant:** the plant from which a certain species of butterfly drinks nectar of flowers.

**Pistil:** the ovule-bearing or seed-bearing female organ of a flower, consisting of the ovary, style, and stigma.

**Pollination:** the transfer of pollen from the flower of one plant to the flower of another plant of the same species.

**Proboscis:** the elongate, protruding mouth part of certain insects, adapted for sucking or piercing.

**Pupa:** an insect in the non-feeding, usually immobile, transformation stage between the larva and the adult.

**Stamen:** the pollen-bearing organ of a flower, consisting of the filament and the anther.

**Stigma:** the part of a pistil that receives the pollen.

# Comparing Butterflies and Moths

Before entering the Wings of the Tropics Conservatory, we encourage you to do the following activities: *Comparing Moths and Butterflies*, *Butterfly Life Cycle* and *Butterfly Anatomy* to learn about the wonderful world of butterflies and get the most out of your educational experience at the conservatory. Please note that there is not a suitable area inside the butterfly conservatory to do these activities. Find an open area in the Garden on your way to the Wings of the Tropics Conservatory and stop there to do these activities.

## Comparing Butterflies and Moths Activity

### Supplies

- *Comparing Butterflies and Moths* pictures - 10
- *Butterfly vs. Moth Venn Diagram* worksheets - 10
- Pencils or pens
- Optional: clipboards

### Procedure

1. Ask students what are some of the differences between butterflies and moths.
2. Using the *Comparing Butterflies and Moths* pictures, explain that there are four major differences between moths and butterflies:
  - Most butterflies have club-shaped antennae or antennae with knobs on the end while a moth's antennae are feather-like or taper to a point.
  - Butterflies rest with their wings upright, moths rest with wings folded.
  - Butterflies are often more colorful than moths because butterflies are active during the day. Moths are active at night and have earthy colors to camouflage them while they sleep during the day.
  - Moths have a thicker coating of scales than butterflies, giving them a furry appearance. These heavy scales help keep them from losing heat during the night when they are most active.
3. Divide students in groups of 3 and distribute the *Butterfly vs. Moth Venn Diagram* worksheet. Give students time to complete the worksheet and review the answers with them.

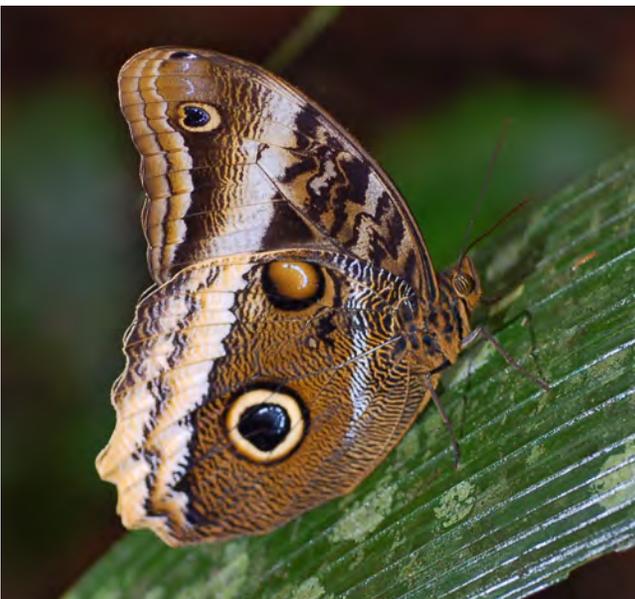
# Comparing Butterflies and Moths



**BUTTERFLIES**  
have clubbed antennae



**MOTHS**  
have feathery antennae



**BUTTERFLIES**  
rest with wings upright



**MOTHS**  
rest with wings folded

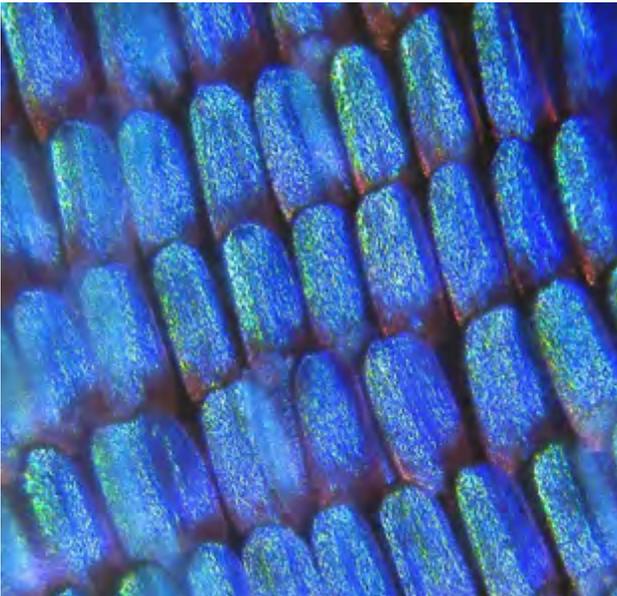
# Comparing Butterflies and Moths



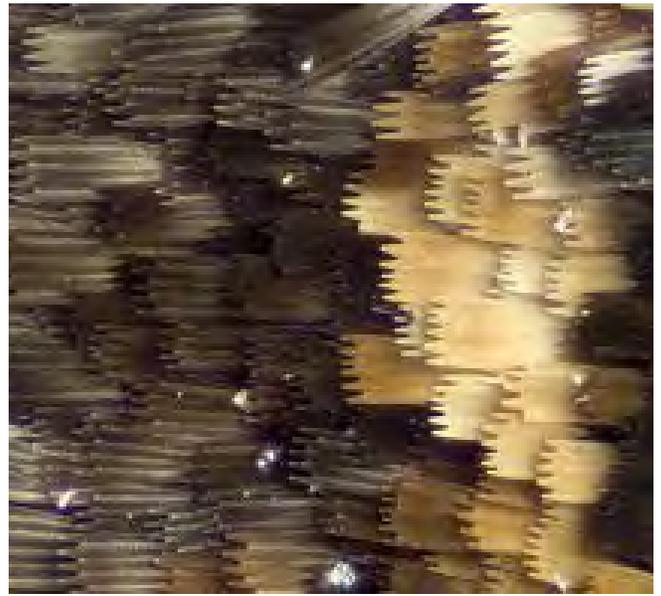
**BUTTERFLIES**  
are brightly colored



**MOTHS**  
have dull colors



**BUTTERFLIES**  
scales are thin



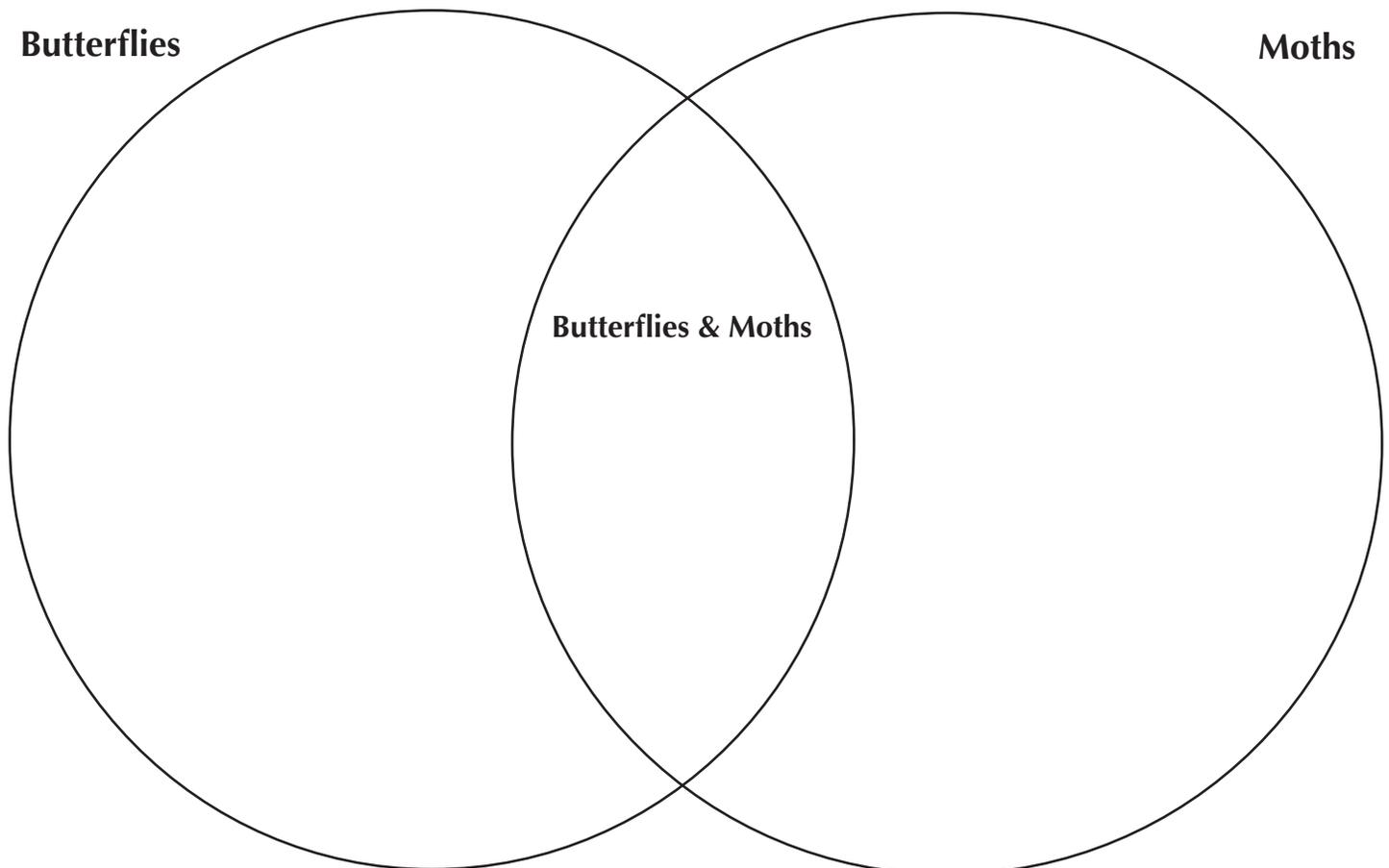
**MOTHS**  
scales are thick

# Butterfly vs. Moth Venn Diagram

Listed below are some traits of butterflies and some traits of moths. Write the letter corresponding to butterfly traits in the left circle, and write the letter corresponding to moth traits in the right circle. Write the letter of traits they both have in the shared area.

- A. six legs
- B. compound eyes
- C. head, thorax, abdomen
- D. two pairs of wings
- E. hatches from an egg
- F. two antennae
- G. usually active at night
- H. usually active during the day
- I. usually brightly colored
- J. usually colored in earth tones

- K. body is thick and looks hairy
- L. body is thin and doesn't look hairy
- M. makes a cocoon
- N. makes a chrysalis
- O. mouth is a proboscis
- P. is an insect
- Q. antennae are often thick and feathery
- R. antennae are club-shaped at the end
- S. undergoes complete metamorphosis



Source: Enchanted Learning, Butterfly / Moth Venn Diagram, [www.enchantedlearning.com](http://www.enchantedlearning.com)

# Butterfly Life Cycle

## Supplies

- *Butterfly Life Cycle* worksheets - 10

## Procedure

1. Explain to the students that butterflies go through a “life cycle”, which consists of four “life stages”: egg, caterpillar, chrysalis, and butterfly.
2. Using the visual depiction of the life cycle below, ask students to explain what happens at each stage.
3. Make sure students understand that butterflies lay their eggs on a “host plant” – each species has a specific host plant – which is the plant the caterpillar will eat once it hatches from the egg. Caterpillars simply eat and store energy, while butterflies drink nectar, mate, and females lay new eggs. Once full grown, a caterpillar will turn into a “chrysalis” to undergo “metamorphosis” to change into a butterfly.
4. Using the same small groups of 3 students, hand out the *Butterfly Life Cycle* worksheets and have students label the different life stages of the butterfly and if you have time color in the pictures.

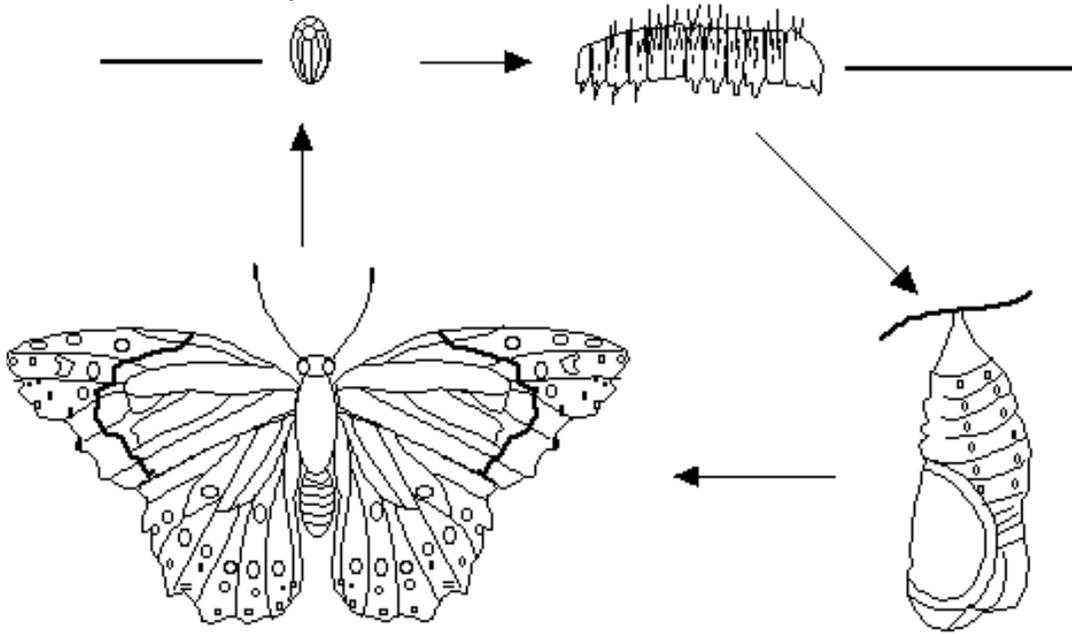
## Vocabulary

**Adult** - the winged adult which will mate and reproduce. Adults do not eat, they only sip liquids through a straw-like proboscis.

**Larva** - (also called the caterpillar) this stage hatches from the egg. The larva spends its time eating, growing and molting (shedding its outgrown exoskeleton).

**Pupa** - the stage in a butterfly's life when it is encased in a **chrysalis** and undergoes **metamorphosis** into the adult, winged form.

**Egg** - the tiny orb laid by a female butterfly. Eggs are usually laid on the underside of leaves - they hatch into larvae.



Source: Enchanted Learning, Butterfly / Moth Venn Diagram, [www.enchantedlearning.com](http://www.enchantedlearning.com)

# Butterfly Anatomy

## Supplies

- *Butterfly Anatomy* worksheets - 10

## Procedure

1. Pair students and hand out the *Anatomy of a Butterfly* worksheet.
2. Using the definitions below, ask students to label the anatomical parts of the butterfly.
3. As a group review the answers and tell students they will be able to see butterflies inside the Wings of the Tropics Conservatory and might be able to identify some of the anatomical parts they just learned about.

**Abdomen** - The abdomen is the segmented tail area of an insect that contains the heart, trachea (breathing tubes), reproductive organs, and most of the digestive system.

**Antenna** - An antenna is a sensory appendage that is attached to the head of adult insects. Antennae are used for the sense of smell and balance. Butterflies have two antennae with clubs at the end.

**Compound Eye** - Insect compound eyes are made up of many hexagonal lenses.

**Forewing** - The forewings are the two upper wings.

**Hindwing** - The hindwings are the two lower wings.

**Head** - The head is the part of the insect that contains the brain, two compound eyes, the proboscis, and the pharynx (the start of the digestive system). The two antennae are attached to the head.

**Leg** - Adult butterflies and moths have six legs. The two forelegs of some butterfly species are tiny.

**Proboscis** - Adult butterflies sip nectar using a spiral, straw-like proboscis located on their head.

**Spiracles** - A breathing orifice in the side of a butterfly which opens into the trachea. The trachea takes oxygen directly to the tissue of the insect.

**Thorax** - The thorax is the body section between the head and the abdomen to which legs and wings attach.

# Butterfly Anatomy Worksheet



# Lisa D. Anness Butterfly Garden

## Procedure

1. Using the map, find the Lisa D. Anness Butterfly Garden.
2. Read the description of the Lisa D. Anness Butterfly Garden below to your students.

## Description

In the butterfly garden, you will be able to observe butterflies that are native to South Florida and both the host and nectar plants that provide habitat and ensure their survival. Butterflies and plants have a symbiotic relationship, meaning they depend on each other for survival. Plants provide caterpillars and butterflies with food and shelter, while butterflies pollinate flowering plants, facilitating their reproduction. This interdependence highlights the importance of the conservation of biodiversity; the loss of an individual species can have devastating impacts on an entire ecosystem.

Butterflies lay their eggs on “host plants,” which provide food for caterpillars after they hatch. In some cases, butterflies are very particular about the plants on which they lay their eggs and will only lay them on a certain species or a group of closely related species. In our butterfly garden we have provided host plants for a variety of butterfly species. Many adult butterflies drink nectar from the flowers of “nectar plants.” These are usually more general, although some butterflies do have preferences. A variety of nectar plants is also important to attracting and keeping butterflies.

Many of the plants found in this butterfly garden are native to South Florida. Some plants that are commonly considered weeds are essential to butterflies’ survival. Common examples include *Bidens alba* (Spanish needle), a popular nectar source and *Phyla nodiflora* (frogfruit), another popular nectar source which is also a host plant for the Phaon Crescent and White Peacock butterflies. Also, *Asclepias curassavica* (scarlet milkweed), which is the host for Monarch, Queen, and Soldier larvae; the flowers also provide nectar for a variety of butterflies.

Throughout the year, a variety of butterflies can be seen in the Lisa D. Anness Butterfly Garden. May through October are the months of most abundance here and throughout the rest of South Florida. Butterflies are always present, but may not be in their most conspicuous phase. During cold, dry or other unfavorable conditions, butterflies either migrate or go through diapause, a period when development is suspended. Depending on the species, diapause can take place during different stages of the butterfly lifecycle.

Many butterflies are imperiled by the effects of over-collection, pesticides such as mosquito spray, and habitat loss.

# Lepidopterist For A Day

## Supplies

- *Lepidopterist For A Day* worksheets - 10

## Procedure

1. Break students into groups of 3.
2. Hand each group a clipboard and a *Lepidopterist for a Day* worksheet.
3. Tell students to imagine that they are a lepidopterist, a scientist who studies butterflies and moths.
4. Ask students to observe plants in the butterfly garden for 10 minutes and answer the questions on the worksheet.
4. Students return to the larger group and share their results. You can use the following questions, to guide a discussion:
  - What did your flower look and smell like?
  - What visitors did you see at your flower?
  - Did you notice trends? What? Why?

# Lepidopterist For A Day

- Walk around the butterfly garden and find one butterfly to observe.
- Identify your butterfly and the plant where you found your butterfly.
- Fill out the chart below based on your observations.

<b>Butterfly Species</b>										
<b>P L A N T</b>	<b>Common Name</b>									
	<b>Botanical Name</b>									
	<b>Is this a nectar or a host plant?</b>									
<b>F L O W E R</b>	<b>Circle the color(s) you observe</b>	YELLOW				RED			PURPLE	
		BLUE		PINK			BLACK		WHITE	
	<b>How many petals did you see?</b>	2	3	4	5	6	7	8		
		Too many to count								
	<b>Circle the flower shape</b>	 Bell-Shaped	 Funnel-Shaped	 Trumpet-Shaped						
	 Bowl-Shaped	 Saucer-Shaped	 Urn-Shaped							
	 Star-Shaped	 Cross-Shaped	 Lip-Shaped							
	 Strap-Shaped	 Tube-Shaped	 Tray-Shaped							
	<b>Circle what your flower smells like</b>	SWEET				STRONG			SPICY	
		ROTTEN				FRESH			NOTHING	

# Wings of the Tropics Butterfly Conservatory Guidelines

Our new Wings of the Tropics Exhibit in The Clinton Family Conservatory is home to more than 2,000 exotic butterflies in 10,000 square feet of tropical paradise. At any given time you will be able to see between 30 and 40 different species of butterflies.

What to expect while you are in the butterfly conservatory:

- Before entering the conservatory, you will be asked to form a single file line outside of the building. A volunteer at the door will give important instructions; please be sure to listen carefully and follow all directions.
- A maximum of 5 people will be allowed to enter and exit the building at a time due to the strict USDA containment rules. Groups will be able to meet up once through the doors of the conservatory. For this reason, it is very important to follow the required 1:10 student to adult ratio.
- There may be as many as 2,000 butterflies in the building at any given time, therefore there may be butterflies flying in close proximity. If any student is scared or uncomfortable, please ask the student not to panic; butterflies are not harmful.
- Volunteers are there to give you important information and answer questions about the exhibit. Please listen to them carefully to ensure a safe learning experience.

Please help us keep our butterflies safe by following these important rules:

- Do not tap the glass at the laboratory window.
- Do not touch or feed animals. Please note that you might see trained staff and volunteers handling animals in the conservatory.
- Food and drink are not permitted in the conservatory.
- Watch your step! Butterflies sometimes land on the ground.
- Butterflies are very fragile, please do not pick them up. If they land on you, it's ok. Butterflies might tickle, but they do not bite.
- Do not run.
- Do not yell.
- Stay on the path.
- Do not pick plants.
- Check your clothing and belongings before exiting the conservatory to ensure no butterflies leave with you.

Thank you in advance for your attention to this information, and we look forward to your visit to the Wings of the Tropics in the Clinton Family Conservatory!

# Wings of the Tropics Conservatory

## Supplies

- *Wings of the Tropics Butterfly Guide* - 6
- *Exotic Butterflies in the Wings of the Tropics Conservatory* - 6
- *Butterfly Behavior Guide* - 6

## Procedure

1. Using the map, find the Wings of the Tropics Conservatory.
2. Read the description of the Wings of the Tropics Conservatory below to your students.

### **Description**

Explore a whole new world of fluttering colors in the new Wings of the Tropics Conservatory. Enjoy thousands of exotic butterflies along with fish and some of the world's most beautiful rare plants. You'll see the famous Blue Morpho butterfly, Owl butterflies, Bamboo Page butterflies, Leopard Lacewing butterflies hovering overhead. Make sure to stop by the Butterfly Metamorphosis Lab where you will see displays of hundreds of butterfly chrysalids and can experience the butterfly emerging process.

3. As you are walking inside the Wings of the Tropics exhibit, see if you can:
  - differentiate butterflies and moths
  - identify various butterfly parts
  - identify butterflies
  - observe various butterfly behaviors
  - observe the iridescent and shimmering qualities of some butterfly wings
  - see how a butterfly drinks nectar from a flower using its proboscis
  - watch a butterfly emerging from its chrysalis at the metamorphosis lab
  - discover the diversity of chrysalis and butterfly shapes, colors and sizes

Please use the attached *The Wings of the Tropics Butterfly Guide*, *Butterfly Behavior Guide* and *Exotic Butterflies in the The Wings of the Tropics Conservatory* as references.

# Wings of the Tropics Butterfly Guide



*Morpho peleides*  
**Common Morpho**



*Caligo atreus*  
**Magnificent Owl**



*Parides iphidamas*  
**Transandean Cattleheart**



*Heliconius cydno*  
**Cydno Longwing**



*Idea leuconoe*  
**Paper Kite**



*Graphium agamemnon*  
**Tailed Jay**



*Myscelia ethusa*  
**Mexican Bluewing**



*Hypolimnas bolina*  
**Great Egg-fly**



*Heliconius doris*  
**Doris Longwing**



# Exotic Butterflies in the Wings of the Tropics Conservatory



## **Paper Kite** (*Idea leuconoe*)

There are 12 *Idea* species of which 5 occur in West Malaysia. The *Idea leuconoe* occurs in West Malaysia, and possibly in Taiwan and the Philippines. This is a relatively common species occurring in coastal mangrove forest and lowland rainforest. The Paper Kite butterfly wingspan ranges from 9.5–11.0 cm (3.7–4.3 in).



## **Tailed Jay** (*Graphium agamemnon*)

The Tailed Jay is a tropical butterfly that belongs to the swallowtail family. It is a common, non-threatened species native to India, Sri Lanka through Southeast Asia and Australia. The Tailed Jay butterfly wingspan ranges from 8.0–9.0 cm (3.2–3.5 in). Strong and restless fliers, they are very active butterflies and flutter their wings constantly even when at flowers. The males are particularly fond of obtaining nectar from flowers such as Lantana, Ixora, Mussaenda, and Poinsettia.



## **Mexican Bluewing** (*Myscelia ethusa*)

This butterfly species is part of the Nymphalidae family. It is found in Colombia, Central America and Mexico. Strays can be found up to the lower Rio Grande Valley of Texas in the United States. The wingspan ranges from 6.4–7.6 cm (2.5–3.0 in) and they feed on overripe fruit.



## **Great Egg-fly** (*Hypolimnas bolina*)

It is found in Madagascar, Southeast Asia, the South Pacific Islands and parts of Australia, Japan, and New Zealand. This fairly common butterfly is found in lightly wooded areas and deciduous forests. The Great Eggfly butterfly wingspan ranges from 7.0–8.5 cm (2.8–3.3 in). This species is known for maternal care, with the females guarding leaves where eggs have been laid. Males are also very territorial.



## **Doris Longwing** (*Heliconius doris*)

This species is found from Central America to the Amazon. Usually individuals fly rapidly in the rainforest understory and canopy. The Doris Longwing butterfly wingspan ranges from 7.5–8.3 cm (3–3.2 in). They can live up to 9 months and they have the ability to ingest pollen as well as nectar for food.

# Exotic Butterflies in the Wings of the Tropics Conservatory



## **Common morpho** (*Morpho peleides*)

This iridescent tropical butterfly is found in Mexico, Central America, northern South America, Paraguay, and Trinidad. The brilliant blue color in the butterfly's wings is caused by the diffraction of the light from millions of tiny scales. By flashing its wings rapidly, the butterfly is able to ward off predators. The wingspan of the Common Morpho butterfly ranges from 7.5–20 cm (3.0–7.9 in). The entire Blue Morpho butterfly lifecycle, from egg to adult is 115 days. Morpho peleides drinks the juices from overripe fruits for food.



## **Magnificent Owl** (*Caligo atreus*)

This butterfly species is part of the Nymphalidae family. It can be found from Mexico to Peru. The wingspan of the Yellow-edged Giant Owl butterfly is 14.0–16.0 cm (5.5-6.2 in). The life span of *Caligo atreus* is 125-133 days. The larvae feed on *Musa* (banana) and *Heliconia* species and is considered a pest for banana cultivars. Adults feed on juices of overripe fruit.



## **Transandean Cattleheart** (*Parides iphidamas*)

This species is native to Central and South America. It occurs from southeastern Mexico to Costa Rica, Panama and Peru. It is common in various habitats, ranging from open lowlands to wooded areas and tropical forests, from sea level to 1,200 meters (3,900 ft). The wingspan of the Transandean Cattleheart butterfly is approximately 10 cm (3.9 in). The dorsal sides of the forewings are black, with a broad blue and white spot (completely white in females), while the dorsal sides of the hindwings show a broad red band or spot.



## **Cydnio Longwing** (*Heliconius cydnio*)

This species ranges from southern Mexico to western Ecuador. Usually individuals fly rapidly and in the understory-canopy layers. Cydnio Longwings are black with a variety of yellow or white bands or spots on forewings and/or hindwings and their wingspan ranges from 3.8-4.3 cm (1.4-1.6 in). *Heliconius cydnio* butterflies can live for six months. Both sexes prefer red and orange flowers and collect large pollen loads.

# Butterfly Behavior Guide



colored bodies.

## **BASKING**

Butterflies are "cold-blooded" or exothermic which really means that they do not generate enough heat from their own metabolism to provide them with the heat and energy they need to fly. Therefore, butterflies rely on heat absorbed from the sun. You might see butterflies with their wings outstretched sitting in a patch of sunlight. They can raise their internal temperature higher than the temperature around them in a way somewhat analogous to how the interior of a car heats up hotter than the air around it on a sunny day. This need to absorb heat from their environment is the reason why so many butterflies have darkly

## **FEEDING**

Butterflies do not have any chewing mouthparts. Instead, they eat by sipping liquids, most often nectar, through their proboscis. A butterfly's proboscis can be found curled neatly on the lower side of the head when the butterfly is not eating. When a butterfly does eat, the proboscis is extended through hydrostatic pressure into a relatively straight "straw" which it can then insert into the deep tubes of a flower in order to sip the nectar.



Some butterflies live in habitats such as rainforest understories, where there is not a constant supply of flowers with nectar for the butterflies to eat. In this case, the butterflies may instead eat the liquids from fermenting fruit found commonly on the forest floor. You may see that our Morpho and Owl butterflies are especially fond of the rotting fruit treats we provide them with in the exhibit!



# Butterfly Behavior Guide



## **PUDDLING**

Many male butterflies can be found sipping at the moisture in puddles or wet sand and soil. These butterflies are getting more than water when they sip! They are also benefiting from the salts dissolved in this water. It is thought that these salts help increase a male butterfly's fertility.



## **MATING**

The butterflies at the Wings of the Tropics Conservatory do mate. However, because there are no host plants in the exhibit for our butterflies to lay their eggs on, you will not find eggs or caterpillars here! Caterpillars are picky eaters, and butterflies are picky egg-layers. A female butterfly will usually choose to never lay her eggs instead of laying them on the wrong plant.



## **PERCHING & PATROLLING**

The perching and patrolling activities all have to do with mating. Usually, the male butterflies will seek out the female butterflies. This act is called patrolling and while butterflies do not have sharp vision, when a male spots a female that he may want to mate with, he swoops down on the perched female. Now, not all of the butterfly species go through the patrolling ritual, some butterflies perch instead. They will perch themselves on tall plants along a stream or a ridge. The males will wait for the females to come and as soon as these perched males spots one of the females, he will begin his courtship.

# Whitman Tropical Fruit Pavillion: Pollination Game

## Supplies

- 3 Decks of 12 *Pollination Match* cards

## Procedure

1. Using the map, find the Whitman Tropical Fruit Pavillion.
2. Read the description of the Whitman Tropical Fruit Pavillion below to your students.

### **Description**

Welcome to the the Whitman Fruit Pavillion and Fairchild Edible Garden, a living classroom conceived and tended for the gardener within us all. Bursting with practicality, taste and good nutrition, the Edible Garden teaches through example, nourishing the body and the soul through its harvest. It provides examples of tropical fruit, vegetables, medicinal plants and herbs in the urban landscape.

Our display is a formal landscape design using plantings of economically important species that grow in South Florida. But did you know that it is because of butterflies and other pollinators that you are enjoying delicious foods that would not be able to survive and become common? Plants make flowers depending on who they are trying to attract. You are now going to find out who helps which plant reproduce with this next activity.

3. Divide students in groups of 12 or less, making sure you don't have more than 3 groups.
4. Hand out a deck of *Pollination Match* cards to each of the 3 groups.
5. Explain that the objective is to match the plant to the pollinator it attracts.
6. Ask students to read the cards and work together to find the corresponding plant or pollinator match.
7. Tell the students to share their findings with their group.
8. Close the activity by having a discussion with your students. You can use the following questions as a guide.
  - Did you find any patterns in the relationships between plants and their corresponding pollinators?
  - Can you name 3 different types of pollinators?
  - What plant characteristics do the pollinators in your cards look for?
  - Can you think of other animals that are pollinators?
  - What type of biological relationship do plants and pollinators have?  
*Hint: Think of different types of biological relationships, such as competition, commensalism, parasitism, mutualism...*

# Conclusion

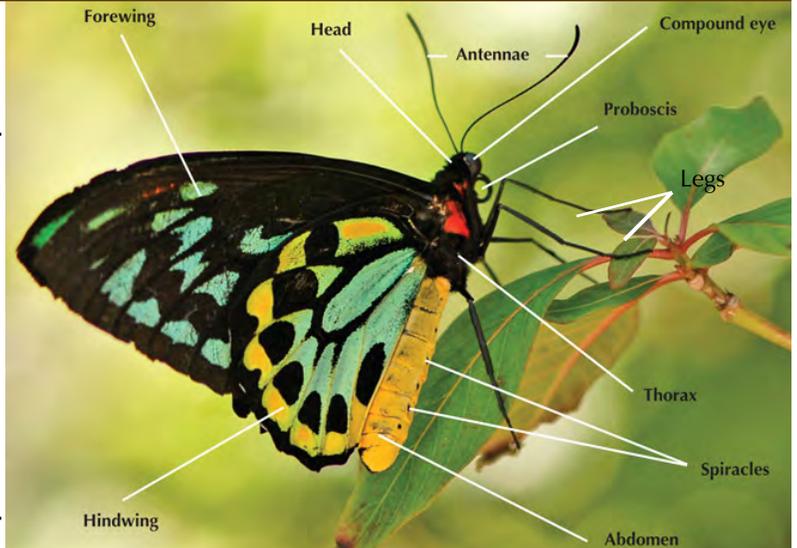
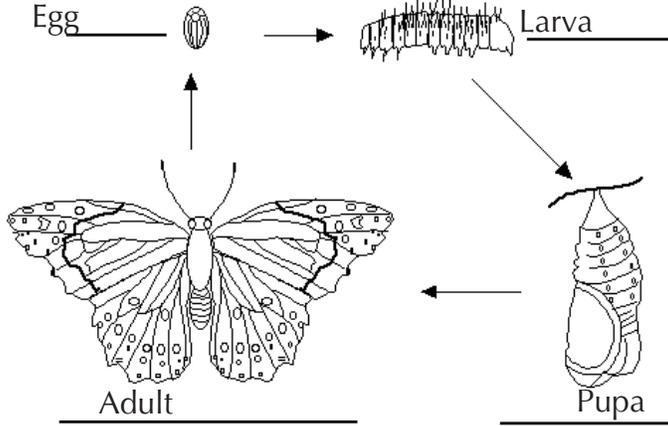
Thank you for participating in the Butterflies and Pollination program at Fairchild Tropical Botanic Garden. Today you learned about butterflies - their characteristics, anatomy, life cycle, behavior and identification. You experienced hands-on how a butterfly emerges from a chrysalis, how butterflies drink nectar from flowers using their proboscis, the iridescent and shimmering qualities of some butterfly wings, and the diversity in chrysalis shapes and colors. We hope that you enjoyed your visit and that you are leaving the Garden with a greater appreciation for the natural world!

Use the following questions to review and reflect on your visit:

- What is the difference between native and exotic butterflies?
- If you wanted to start a butterfly garden, what types of plants would you need?
- Can you say two characteristics that make moths and butterflies are different? Two characteristics that both butterflies and moths have?
- What are the different stages of the butterfly lifecycle?
- What makes butterflies special and unique compared to other insects?
- Can you share one thing that you learned today that surprised you?

# Answer Key

## Butterfly Life Cycle Worksheet:



## Venn Diagram

Butterflies

Moths

Butterflies  
and  
Moths

Has 6 legs  
Has compound eyes  
Has a 3-part body  
Has 2 pairs of wings  
Hatches from an egg  
Has 2 antennae  
Most active at night  
Most active during the day

Wide, furry body  
Thin, hairless body  
Makes a cocoon  
Makes a chrysalis  
Has a proboscis  
Is an insect

Antennae are thick and feathery  
Antennae have a knob on the end  
Wings upright when at rest  
Wings horizontal when at rest  
Wings are usually dull  
Wings are usually colorful  
Undergoes complete metamorphosis

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