

Butterflies, Biodiversity and the Big Thicket

Lesson Plan

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Objective: High School students will explore **Butterflies, Biodiversity and the Big Thicket** and the amazing Monarch butterflies through art, science, technology and foreign language. They will view butterfly migrations, assess trends over time, and analyze the connection between international research and a local project, the Thicket of Diversity All Taxa Biodiversity Inventory. Student work will be exhibited in the public library during Earth Day week.

ENGAGE:

Have any of you noticed butterflies or “mariposas” this time of year? In this project we will learn about mariposas, international inventory work, and research being conducted on butterflies here in our backyard.

Using the Smartboard the students will be introduced to Youtube clips. Select clips to view in classroom as time allows. Begin with the PBS overview.

Incredible Journey of Monarch Butterflies- PBS narration, 5 min

<http://www.youtube.com/watch?v=WdfIuVcwcQs>

Mariposa Monarca (In Spanish) – 6 min 59

<http://www.youtube.com/watch?v=fLmiX-MbNsE>

Magnificent Monarchs (from Mexico)- 4 min 29

<http://www.youtube.com/watch?v=adB638SIE1k>

http://www.youtube.com/results?search_query=monarch%20butterflies%20in%20mexico&sm=1

Magnificent Monarchs in Michoacan Mexico- 4 min 19

<http://www.youtube.com/watch?v=adB638SIE1k>

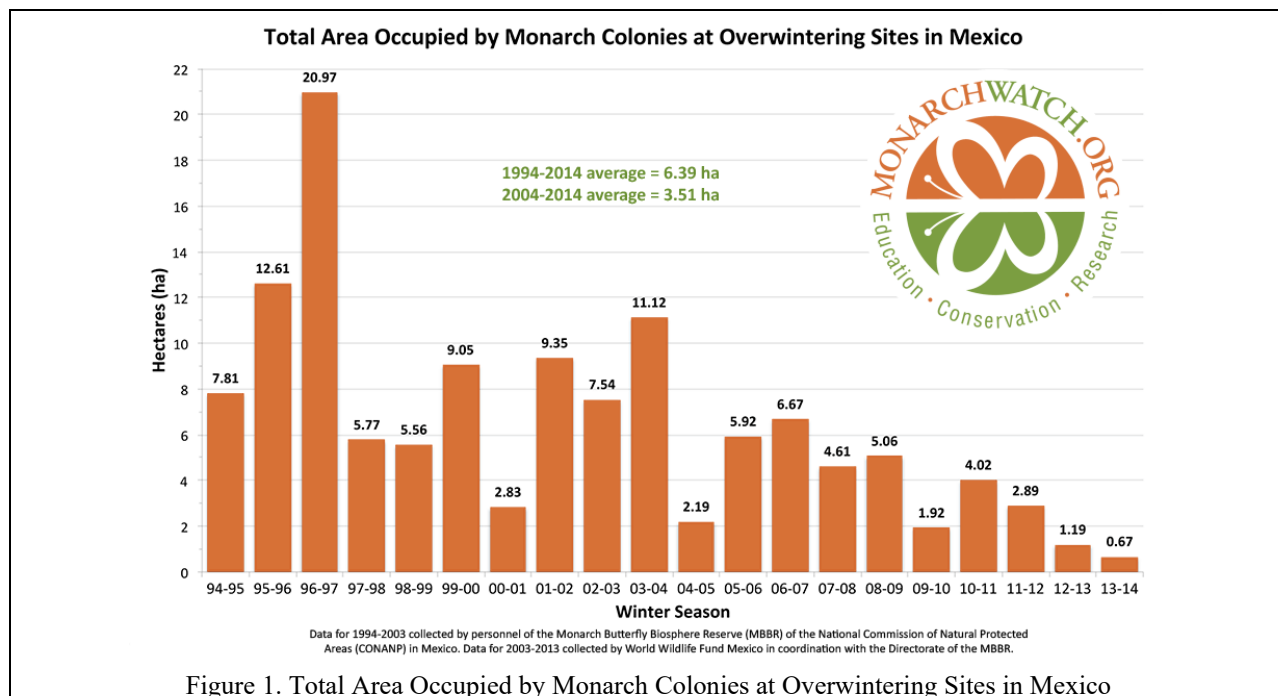
EXPLORE:

In Southeast Texas one can see examples of butterfly migration. Concerned individuals can be involved in a program for Citizen Scientists called *Monarch Watch*.

On Smartboard explore Monarch Watch website and its activities and services.

<https://www.monarchwatch.org/>

From Monarch Watch main page, click on Monarch Population Status to show graph or share copies of Monarch Population Status Worksheet.



Activity: Either orally or in writing, analyze migration trends from Monarch Watch graph and factors that may contribute to declining numbers of butterflies. The studies were conducted between 1994 to 2014.

EXPLAIN (Spanish Class):

Costa Rica is a leader in environmental research. The small country is recognized for its biodiversity and for strong conservation values that have resulted in protection of its natural resources. Dr. Daniel Janzen has spent a lifetime studying biodiversity in Costa Rica and was recognized for his lifetime achievement.

On Smartboard view clip:

Daniel Janzen- Inspiration for Saving Biodiversity in Costa Rica

<https://www.youtube.com/watch?v=jh1Cz5bk2vo>

Butterfly lecture in Spanish:

<http://www.youtube.com/watch?v=y5pwGnYJ3iU>

The work of Dr. Janzen has inspired others around the world. His research served as the role model for Great Smoky Mountains National Park's Discover Life in America. Researchers inventory species and document them into a national database for use by resource managers in critical decision making. The inventory, called ATBI (All Taxa Biodiversity Inventory) has been replicated in over 12 National Parks around the country including the Thicket of Diversity ATBI located here in Southeast Texas in the region of the Big Thicket. Show students a map of the Big Thicket region.

Demonstrate www.thicketofdiversity.org website.

Note: Look at the Taxa Tally and the total numbers of species collected and identified. Marvel at the numbers that are *New to Park*, *New to State*, *New to US*, and *New to Science*. The Thicket of Diversity uses Taxonomic Working Inventory Groups (TWIGs) to collect data. Groups must secure a collecting permit and use strict, standardized identification criteria. They are guided by a specialist, a recognized scientist, researcher or university professor who is responsible for conducting and reporting the research. Nowadays, GPS is used to identify the exact locations of species and for mapping. If a species appears to be rare or *New to Science*, DNA may be utilized to narrow down and identify and name the species. Volunteers, called Citizen Scientists, participate and help as part of the TWIG team with the labor-intensive inventory work. Students across the country do get involved in All Taxa Biodiversity Inventories!

The ToD also compiles historical data that document species. Here in the Big Thicket researchers from the Houston Museum of Natural Science, the Houston Zoo, and Dr. Pogue from the US Department of Agriculture at the Smithsonian Museum in Washington D.C. have participated in butterfly and moth inventories.

Activity: Define Lepidoptera and Noctuidae. Lepidoptera (Butterflies) and Noctuidae means (Moths).

These two groups have been inventoried in the Big Thicket. Ask, "What is an inventory? To relate the concept of inventories to the student's personal lives ask them to give an example of an inventory in a retail store such as a local grocery store.

What would be the value of inventories in the natural world? Inventories are needed to determine the status of living species. After counting can one determine if the species are common, threatened or endangered? Are exotic species in the area? Are they overtaking the native species? Is pollution negatively affecting species? Inventories provide answers to these questions.

Show copies of inventory document: Big Thicket Butterfly Count May 5, 2007

Small Group Pre-activity: A few students who have completed work are sent to the library to search for images of individual butterflies using the butterfly names from the 2007 Butterfly

Count. Each one is printed on a separate sheet of paper, labeled and numbered using the same number that is on the inventory. These papers and/or personal cellphones are used to assist students in design of their butterfly.

Activity: Students are assigned a Big Thicket butterfly and tasked to illustrate it using any medium. They are to write their name and the number of the butterfly on the back. Art work is cut out, glued to black construction paper and matted. The teacher assists with matting and the creation of labels that include: Common Name of Butterfly and the student- artist's name. Student art is evaluated.

EXPLAIN (Technology Class)

This butterfly project relates to Spanish because of the unusual migration of Monarchs from Canada to Mexico. Students in Technology Lab are tasked to research Monarch Butterflies and design a flyer using Publisher.

On Publisher- Choose a flyer template and open. Student is to list the title "Mariposa Monarca." This is the common name. Student is to research and list the scientific name. It is to be typed using the correct format with capital letters and italics. The student is to research and type a one sentence description of Monarchs. He/she should highlight the description and copy. Do search for Google Translator on the internet and choose English to Spanish. Paste the English sentence and get the Spanish translation. Copy and paste the Spanish translation into the Publisher project. Add a graphic image of the Monarch and a border. Cite references and type student name for credit. Print the Publisher project on yellow copy paper. Save the work in the student folder on the server. Student work is evaluated.

ELABORATE

Activity: Students that complete their artwork are tasked to illustrate a Monarch Butterfly. This will be used on a separate display and keeps all the students busy. The teacher selects individuals to help with creation of display with bulletin board letters.

Activity: Students in other classes such as Floral Design may choose to create a Native Plant exhibit with information on butterfly loving plants. Photos from old Native Plant seed catalog can be used.

Activity: Students in Horticulture classes can plant Milkweed from seeds. Milkweed is the sole food of Monarch butterflies. It can be ordered through Native American Seed, 3792 US Hwy 337, Junction, TX, 76949, PHONE- 800-728-4043; FAX- 800-728-3943, www.seedsource.com.

Activity: Students will observe metamorphosis from larvae stage to adult in the classroom. Students will raise butterflies using the Live Butterfly Pavilion School Kit available through InsectLore.com. Note: The teacher will need to pre-order the larvae by mailing a card to the company after comparing the dates needed for hatching and the school calendar.

Activity: Students in art classes will be invited to participate. They will divide into groups and brainstorm sculpture ideas. Student must plan their project including its design and the materials needed and how they will be acquired. Sculptures will provide an interesting, creative focus for the public exhibit.

MATERIALS

Classroom set of Thicket of Diversity brochures, Big Thicket Field Research Station, PO Box 198, Saratoga, TX 77585, FRS@bigthicket.org

Map of Big Thicket National Preserve, 6044 FM 420, Kountze, TX 77625

Copy of 2007 Butterfly Count

Art Supplies

Black construction paper and white poster board for matting

Individual pictures of Big Thicket butterflies (Student created from internet- for use in artwork)

Ream of yellow copy paper

Exhibit Boards

Plastic tablecloths, skirting, tape, stapler

Live Butterfly Pavilion School Kit from InsectLore.com

Butterfly books, posters

CELEBRATE

Student artwork, exhibits, live butterflies and native plants are displayed at a local public library during Earth Day week and in the school library. The project is promoted in newspapers and on-line calendars. A slideshow can be created with photographs to document efforts and the excitement. Students who attend the **Butterfly, Biodiversity and the Big Thicket** exhibit at the public library after school hours receive a 100 test grade. It is important for students to feel pride in quality work and to see how networking with partners contributes to a stronger project. Key partners, the grant funders, and Administration are invited to the event for photo opportunities. Kountze High School sincerely appreciates our 2014 sponsor, Entergy, Texas!

Name:

Period:

Date:

Monarch Population Status Worksheet

Wednesday, January 29th, 2014 at 12:10 pm by Chip Taylor, www.monarchwatch.org

The overwintering numbers are in from Mexico and once again it's bad news. The numbers are not a surprise; as early as May, we predicted that the population would be lower this winter. I'll discuss our reasons for this expectation and the overall decline seen throughout the last decade, but first, let's look at the numbers reported by World Wildlife Fund, Mexico.

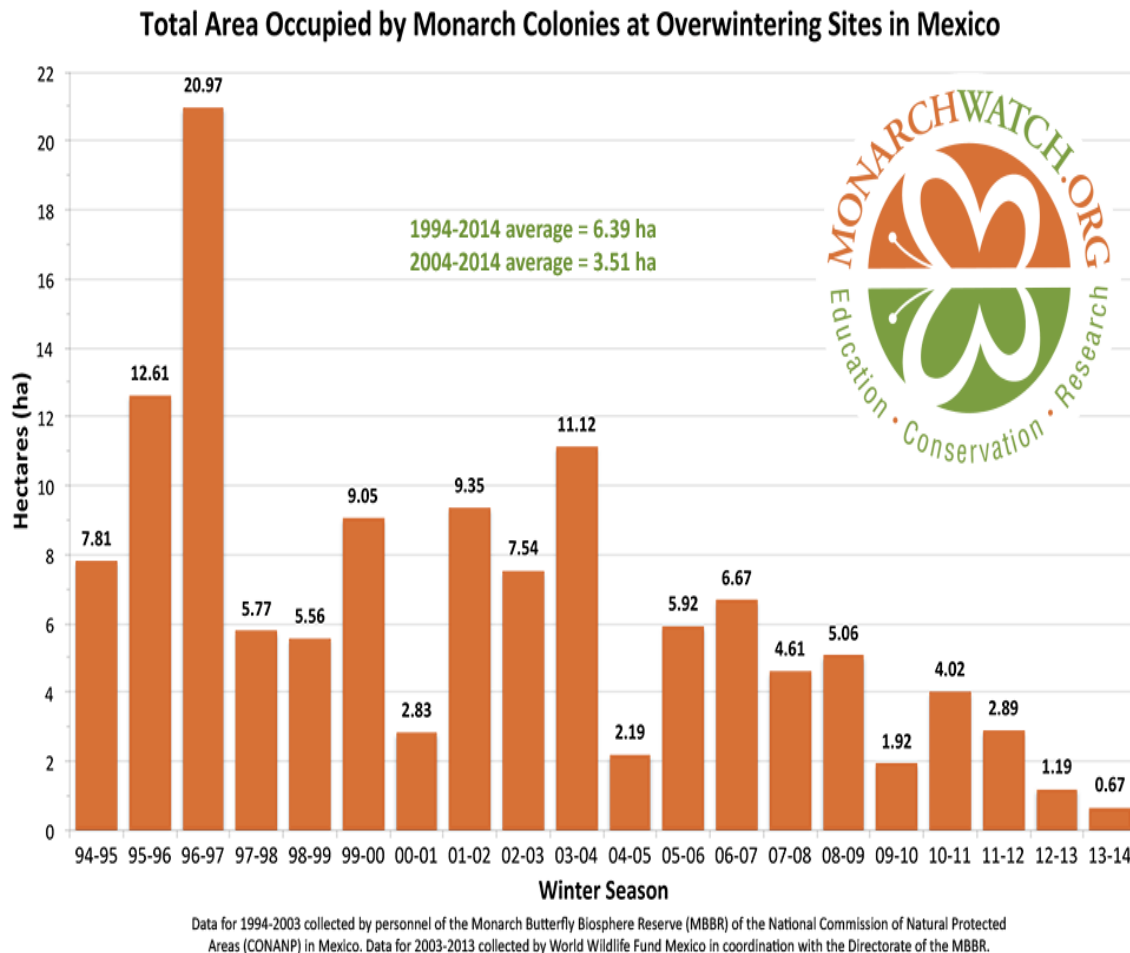


Figure 1. Total Area Occupied by Monarch Colonies at Overwintering Sites in Mexico

Analyze migration trends from this Monarch Watch graph and hypothesize and research factors that may contribute to declining numbers of butterflies.

FILE
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Big Thicket Butterfly Count

May 5, 2007

Participants:

Steve Abbey, Jennifer Backo, Karen Cambias,
Carlton Collier, Anissa Curtis, Dan Day, Don DuBois, David Henderson, Pat Lee, Diane Milano,
Kelly Walker, and Hugh Wedgeworth

It was to be a terrific count. Situated as it were - squarely in the center of the most biodiverse area in the entirety of Southeast Texas - or much of the eastern U.S., for that matter - one should expect no less. So it was on Saturday morning, May 5, the large crew of Steve Abbey, Jennifer Backo, Karen Cambias, Carlton Collier, Anissa Curtis, Dan Day, Don DuBois, David Henderson, Pat Lee, Diane Milano, Kelly Walker, and Hugh Wedgeworth were all looking forward to scoring a triple crown - seeing three new species never before seen on a BEST count. So despite a late start and a later-arriving sun, our hopes remained high - and we were not disappointed, only surprised.

First, Diane, in a vain search for Little Metalmarks, found Twin-spot Skippers instead! Then, disappointed in not getting to go to the Pitcher Plant Trail for the Georgia Satyr, she instead found one in a roadside ditch! Later it was Don's turn as he turned up a Mourning Cloak. The rest of the crew, divided as we were into 3 parties, did a good job of covering the circle fairly well. Aside from the three new additions, other highlights included a tour of Watson Pinelands Preserve by Mrs. Watson herself; a huge ligustrum grove replete with American Ladies; Georgia Satyrs dancing in the sedges; and a Swallow-tailed Kite soaring languidly over the town of Warren.

So, despite being cut short by an hour on each end and being teased by a very coy morning sun and pummeled by some strong southerly winds, the crew gathered at the Tree Restaurant in Hillister. Over mouthwatering rib eyes and southern fried chicken, we tallied up 342 individuals of 44 species - not a bad number considering the circumstances, and a very good beginning for a count that holds huge promise. Here is what we saw...

Papilionidae (another swallowtail sweep!)

Pipevine Swallowtail *Battus philenor* 19
Zebra Swallowtail *Eurytides marcellus* 10
Black Swallowtail *Papilio polyxenes* 12
Giant Swallowtail *Heracles crestaphontes* 1
Eastern Tiger Swallowtail *Pterourus glaucus* 3
Spicebush Swallowtail *Pterourus troilus* 8
Palamedes Swallowtail *Pterourus palamedes* 24

Peiridae

Checkered White *Pontia protodice* 4
Cloudless Sulphur *Phoebis sennae* 29
Little Yellow *Eurema lisa* 2
Dainty Sulphur *Nathalis iole* 1

Lycaenidae (a pathetic showing!)

Gray Hairstreak *Strymon melinus* 2

Nymphalidae

Gulf Fritillary *Agraulis vanillae* 1
Phaon Crescent *Phyciodes phaon* 3
Pearl Crescent *Phyciodes tharos* 8
Eastern Comma *Polygonia comma* 1
Question Mark *Polygonia interrogatoris* 1
Mourning Cloak *Nymphalis antiopa* 1
American Lady *Vanessa virginiensis* 43
Red Admiral *Vanessa atalanta* 1
Red-spotted Purple *Limenitis arthemis astyanax* 1
Goatweed Leafwing *Anaea andria* 3
Tawny Emperor *Asterocampa clyton* 1
Carolina Satyr *Hermeuptychia sosybius* 3
Georgia Satyr *Neonympha areolata* 18
Little Wood-Satyr *Megisto cymela* 1
Monarch *Danaus plexippus* 3

Hesperiidae

Silver-spotted Skipper *Epargyreus clarus* 2
Horace's Duskywing *Erynnis horatius* 67
Funereal Duskywing *Erynnis funeralis* 4
Common Checkered-Skipper *Pyrgus communis* 1
Swarthy Skipper *Nastra iherminier* 10
Clouded Skipper *Lerema accius* 3
Least Skipper *Ancyloxypha numitor* 1
Fiery Skipper *Hylephila phyleus* 5
Whirlabout *Polites vibex* 18
Southern Broken-Dash *Wallengrenia otho* 4
Northern Broken-Dash *Wallengrenia egeremet* 1
Little Glassywing *Pompeius verna* 3
Yehl Skipper *Poanes yehl* 1

Dion Skipper *Euphyes dion* 1
Dun Skipper *Euphyes vestris* 4
Eufala Skipper *Lerodea eufala* 1
Twin-spot Skipper *Oligoria maculata* 3
Dark Swallowtail sp. - 8
Orange Skipper sp. – 1

Caterpillars observed:

12 Spicebush Swallowtail on Sassafras
1 American Lady (?) on Cudweed
1 Saltmarsh Moth on pavement

Egg observed

1 Goatweed Leafwing on Croton

Odonates of interest:

Ebony Jewelwing
Lilypad Forktail
Common Whitetail Blue Dasher
Slaty Skimmer
Great Blue Skimmer
Eastern Pondhawk
Calico Pennant

Herps of Note:

East Texas Toad
Eastern Narrow-mouthed Toad (heard)
Cottonmouth
Broad-headed Skink
Eastern Fence Lizard

Area Covered:

Northern Hardin and southern Tyler Counties in East Texas
Big Thicket National Preserve (Turkey Creek and Hickory Creek units)
Kirby State Forest
Watson Pinelands Preserve
Various roadsides



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Submitted by:
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April 25, 2014

Subject: Earth Week Exhibit- Butterflies, Biodiversity and the Big Thicket

Kountze High School's *Butterflies, Biodiversity and the Big Thicket* was exhibited at Kountze Public Library during Earth Day Week April 22-25. The project was sponsored by Entergy, Texas and spearheaded by teachers Megan Allen and Mary C. Johnston.

Kountze Spanish students were introduced to Costa Rican researcher Dr. Daniel Janzen whose work inspired All Taxa Biodiversity Inventories in at least 12 National Parks across the country including the Thicket of Diversity (ToD) in Southeast Texas. Students illustrated butterflies of the Big Thicket excerpted from a 2007 ToD list.

Students explored Monarch butterflies and their fascinating migration from Canada to Mexico through excellent You Tube videos and watched clips in both English and Spanish. In the Penland Lab students continued Monarch research. Using the Publisher program, students listed the Mariposa Monarca's Common Name, Scientific name, a short description in English and its Spanish translation and references. Students then added a graphic and a border.

A butterfly kit was acquired and students observed butterfly metamorphosis from larva to adult in the classroom.

Art students were divided into groups and brainstormed possible butterfly projects. They had to work cooperatively and plan for needed materials. Each group was tasked to create a sculpture. The final products were varied, creative and colorful.

Butterflies, Biodiversity and the Big Thicket enhanced awareness for the unique biodiversity in the region and its colorful flying insects. Many students returned to class to share observations of butterflies seen at home and in the woods. Kyle Swearingen was most excited. He had illustrated a Swallowtail and then captured a picture of one live on his cellphone. Students felt pride in the quality exhibit. Over 50 students attended the Earth Day opening at the library.



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