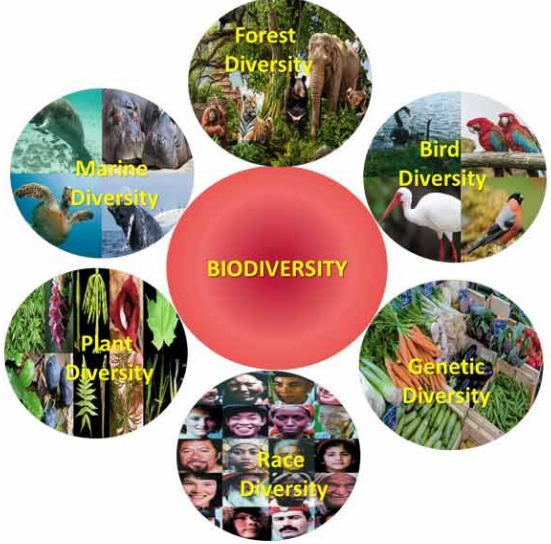


Measuring Biodiversity in Our Neighborhood
Math Lopes

Essential Questions:

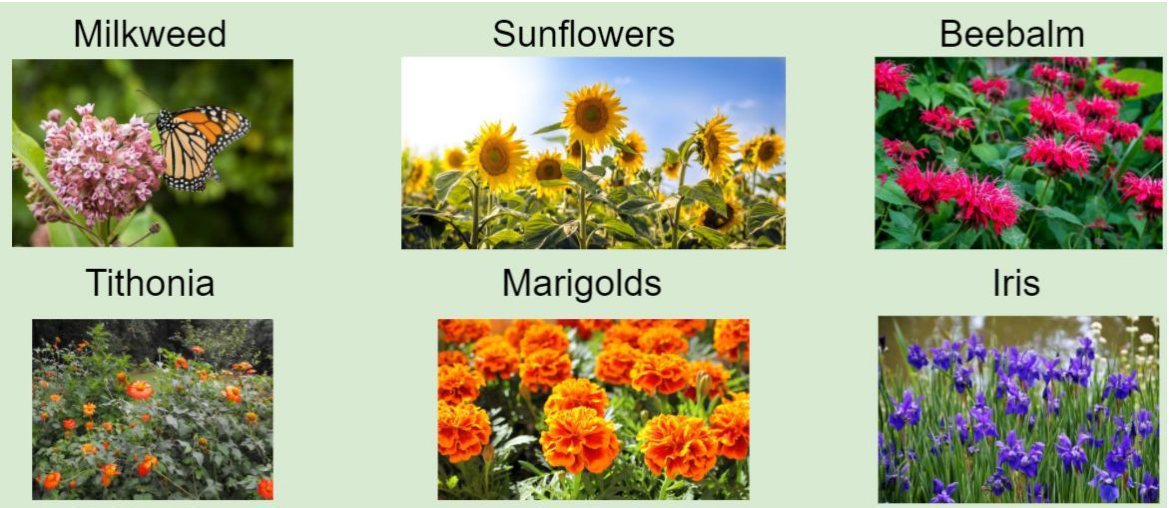
What does biodiversity mean to you?

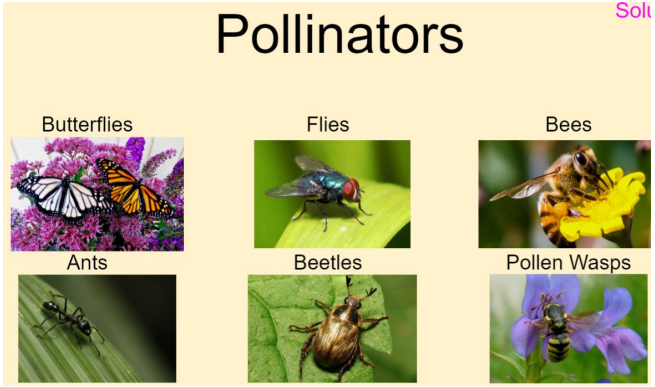
Why is it important to measure biodiversity in our community?

Which site has the highest species richness?

Which site is the most diverse species ?

What is the best measure of biodiversity?





OBJECTIVE:

Students will be able to take sample size measurements of the biodiversity found in there community, so they can collect and graph data using a mathematical tables and graphs.

Biodiversity is basically the variety within and among life forms on a site, ecosystem, or landscape. Biodiversity is defined and measured as an attribute that has two components — **richness** and **evenness**.

Richness = The number of groups of genetically or functionally related individuals. In most vegetation surveys, richness is expressed as the number of species and is usually called **species richness**.

Evenness = Proportions of species or functional groups present on a site. The more equal species are in proportion to each other the greater the evenness of the site. A site with low evenness indicates that a few species dominate the site.

Diversity can be use to describe variation in several forms:

- Genetic (species, varieties, etc.)
- Life form (grasses, forb, trees, mosses, etc.)
- Functional group (deep rooted, nitrogen-fixing, soil crust, evergreen, etc.)

WHAT IS BIODIVERSITY?

WHY IS BIODIVERSITY IMPORTANT?

BILL NYE

MEASURING BIODIVERSITY

SPECIES (Name plant,tree,bird, animal,insect,ect.)	SITE:1 BACK/FRONT YARD	SITE:2 PARK (NAME THE LOCATION IN THE PARK)	SITE:3 YOU PICK LOCATION

Table 2 Number of Salamanders at Selected Locations in the Great Smoky Mountains National Park

Species	Lower Dorsey Stream	Pig Pen Stream
Spotted dusky salamander	7	18
Imitator salamander	6	3
Seal salamander	5	15
Black-bellied salamander	7	11
Desmognathus spp. salamander	4	17
Blue Ridge two-lined salamander	1	31
Spring salamander	2	1
Northern slimy salamander	0	1
Black-chinned red salamander	0	0
Santeetlah salamander	1	0
Southern red-backed salamander	2	0

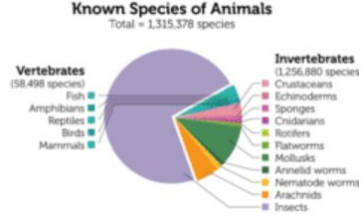
Note: These salamanders were identified in submerged bags filled with leaf litter from two different streams (Lower Dorsey and Pig Pen) in 2008. Data were collected as part of a citizen science program at the Great Smoky Mountains Institute at Tremont. After your students explore these data, have them look for more data on the Web or ask them to collect their own.

Table 1 Number of Trees

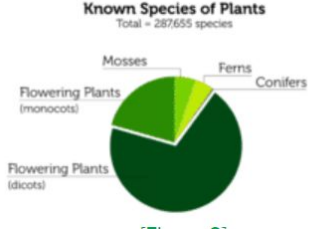
Species	Yard A	Yard B
Eastern redbud	3	5
Black oak	4	5
Post oak	5	5
White pine	3	5
Honey locust	1	5

EXAMPLES

B



C



Species	Plot 1: Woods	Plot 2: Field
Pillbug	50	10
Monarch butterfly	36	50
Seven-spotted lady beetle	35	0
Western honeybee	55	39

Insects	Back Yard	Front Yard	Totals
Western honeybee	10	35	
Seven-spotted lady beetle	50	40	
Totals			

Lesson Title: Measuring Biodiversity in Our Neighborhood

Objective: Students will be able to take sample size measurements of the biodiversity found in there community, so they can collect and graph data using a mathematical tables and graphs.

Essential Questions:

- What does biodiversity mean to you?
- Why is it important to measure biodiversity in our community?
- Which site has the highest species richness?
- Which site is the most diverse species ?
- What is the best measure of biodiversity

Learning Activities:

1. Introduction to biodiversity using teacher created slides and YouTube videos
2. Discuss essential questions as a class
3. Review how people collect data, and review data collection samples
4. Collect biodiversity sample from 3 sites in the neighborhood
5. Discuss data and analyze what type of math graph will display data more efficiently
6. Create math graph

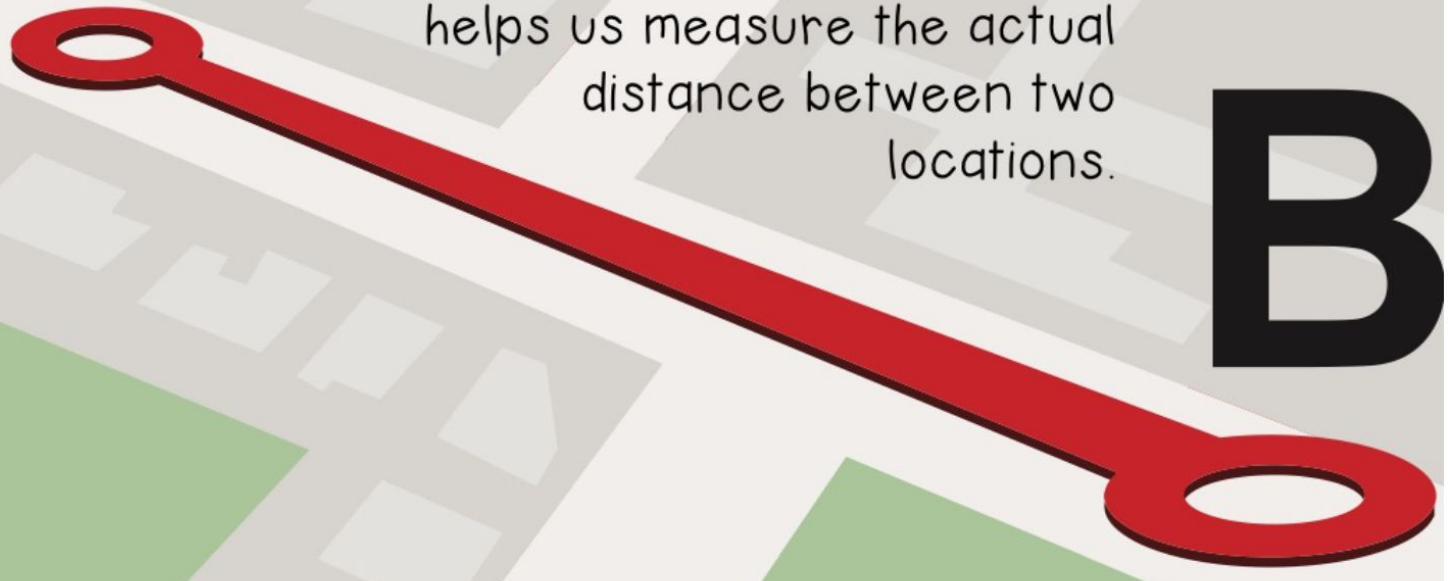
Math - Choi

What is a map scale?

A

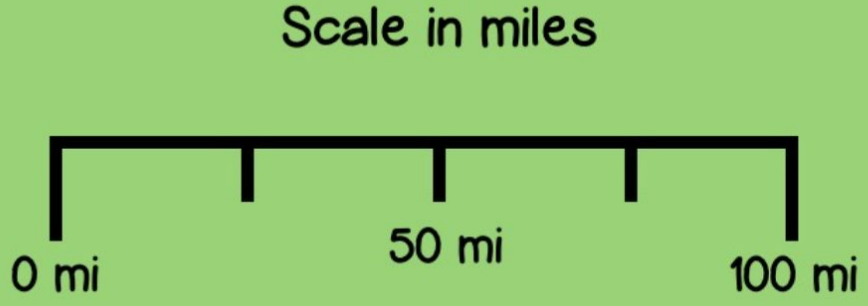
Every map has a map scale.

The map scale is a tool that helps us measure the actual distance between two locations.



B

What does it look like?



Some map scales look like a ruler.

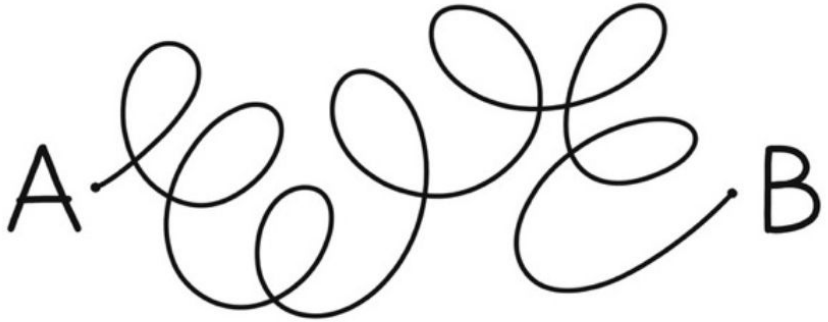
The lines on the scale represent actual distances, such as miles.

Press Esc to exit full screen

How do I measure?

Always measure using a straight line.

A straight line is the shortest distance between two places.



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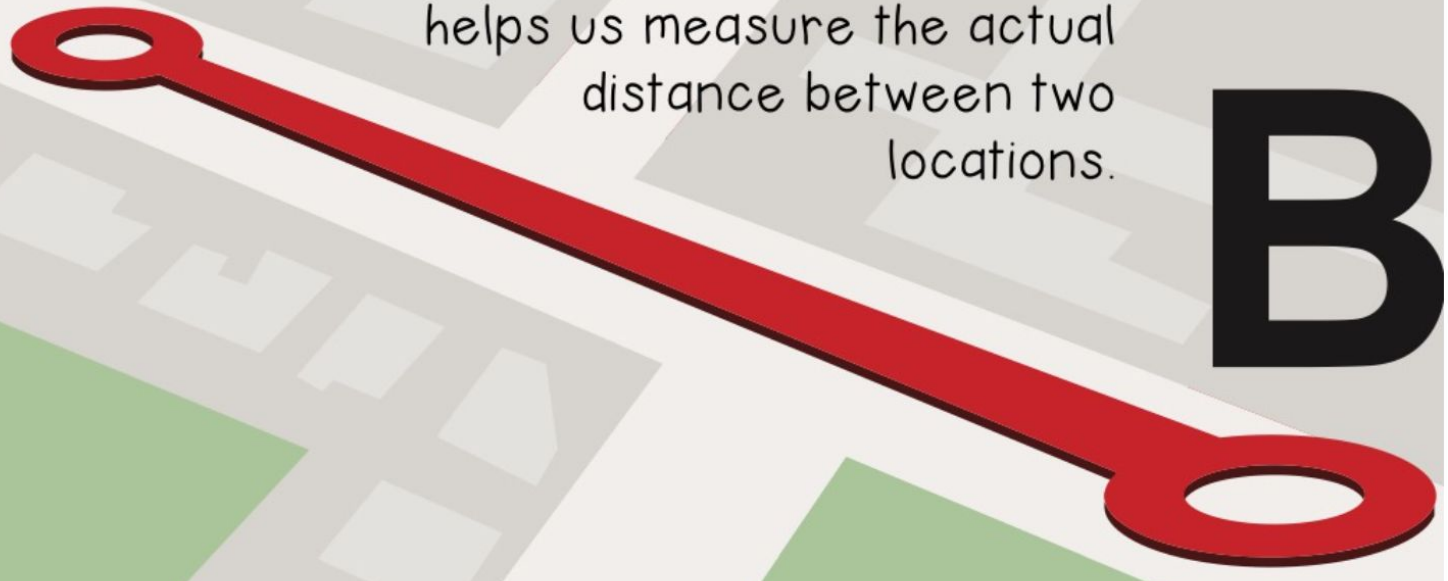

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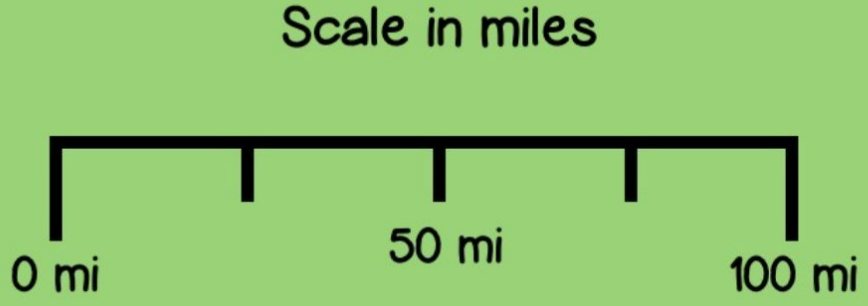

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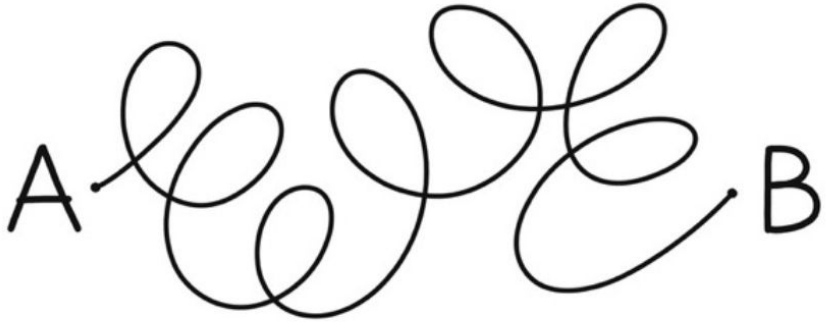


How to use the map scale

How to use the map scale

Measuring Distances in the United States

Use the map of the United States and its scale bar to measure the distances between the cities listed below.

Part 1. Measure the following distances in miles.

1. Boston to New York _____
2. Washington D.C. to Atlanta _____
3. Chicago to Denver _____
4. Los Angeles to Phoenix _____

Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Part 3. Follow the instructions below.

On the U.S. Map, draw a triangular route from one city to two other cities and back again to where you started. Measure the miles you'd travel for each leg of the trip and mark them on the triangle. Add the numbers to find out your total miles.

Three cities: _____, _____, and _____

Total miles to travel to all three and back to start: _____

Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Part 2. Measure the following distances in kilometers.

5. Seattle to San Francisco _____

6. New Orleans to Washington D.C. _____

7. Dallas to Atlanta _____

8. Philadelphia to New York _____

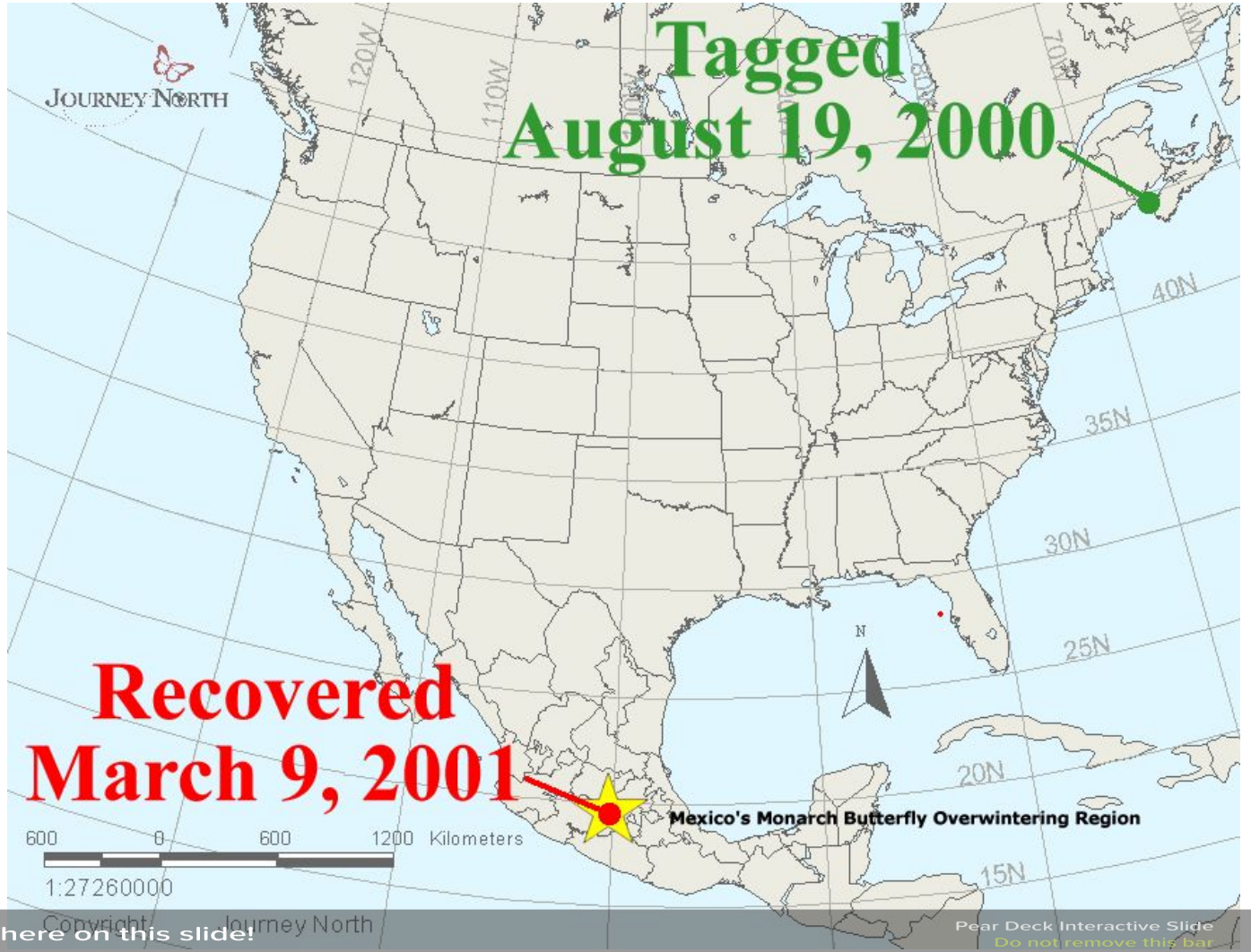
Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

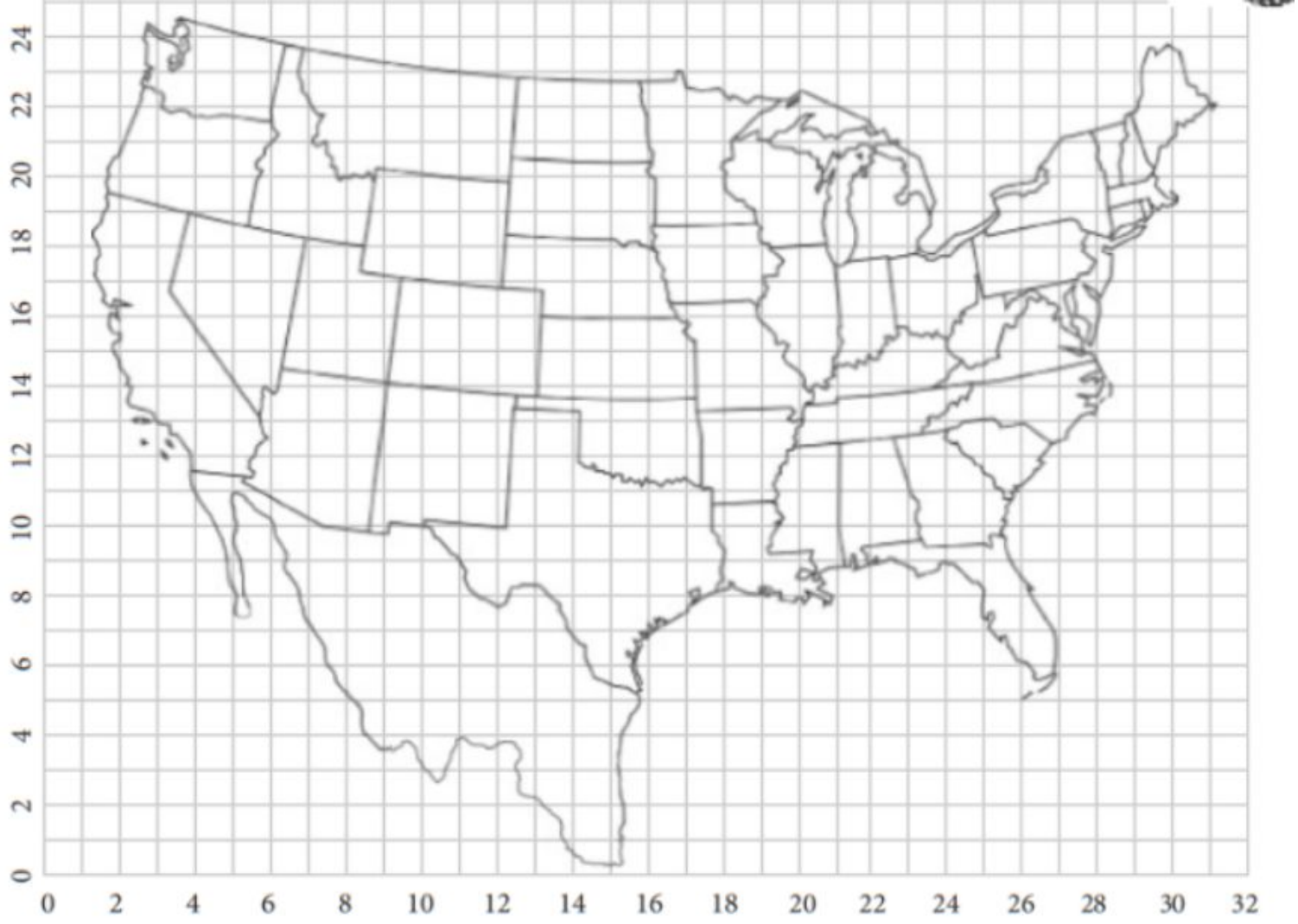
Monarch Migration Map

A monarch that was tagged on Grand Manan Island, in New Brunswick, Canada, was recovered in the sanctuaries in Mexico! The monarch was tagged on August 19, 2000, and recovered on March 9, 2001.

Of all the monarchs recovered in Mexico, this one has flown the farthest. How far did the monarch fly from Canada to Mexico?



Students, draw anywhere on this slide!
Pear Deck Interactive Slide
Do not remove this bar


0 2 4 6 8 10 12 14 16 18 20 22 24
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32

Directions: plot each coordinate point on the US-Mexico map and connect the lines to make a map of the monarch butterflies spring migration.

Day	Coordinate Point
Start	9,8
Day 1	10,7
Day 3	11,8
Day 5	12,9
Day 7	12,10
Day 9	13,11
Day 11	14,10
Day 13	15,10
Day 15	16,11
Day 17	17,11
Day 19	18,12
Day 21	19,12
Day 23	21,13
Day 25	22,12
Day 27	23,13
Day 29	24,13
Day 31	25,14
Day 33	26,15
Day 35	26,17
Day 36	27,18

The Migration of the Monarch Butterfly

Every year, monarch butterflies leave their summer grounds in the US and go on an amazing journey that takes them 3000 miles south to Mexico. Monarch butterflies have to migrate because they unable to survive the cold northern winters. Although most butterflies can survive winter in the north as a larva or pupa, monarch butterflies can not. They are the only butterflies that migrate long distances.

Monarch butterflies do not migrate in groups like birds. The butterflies travel by themselves during the day. When night time approaches, the butterflies stop and try to find other monarch butterflies. Usually there will be butterflies feeding near certain flowers, so the monarchs will be looking for these flowers. At night time, the butterflies roost overnight. Roosting is when butterflies huddle together for the night. Scientists think that roosting helps keep the butterflies warmer, but there may be other reasons as well.

Monarch butterflies cannot survive without the milkweed plant. The adult monarch butterfly will only lay eggs on milkweed plants. Milkweed is the only food for the monarch caterpillar.

The monarch's final destination is the southern forests of Mexico and California. There they hibernate until spring. During February and March, the butterflies become active and migrate back up north and east to lay their eggs on the leaves of a milkweed plant.

Name_____

The Migration of the Monarch Butterfly

1. Write a one sentence summary of this article.

_____

_____

2. Why can't monarch butterflies survive the winter like other butterflies?

_____

_____

3. What is roosting? Why do butterflies do this?

_____

_____

4. Why do monarch butterflies need milkweed to survive?

_____

_____

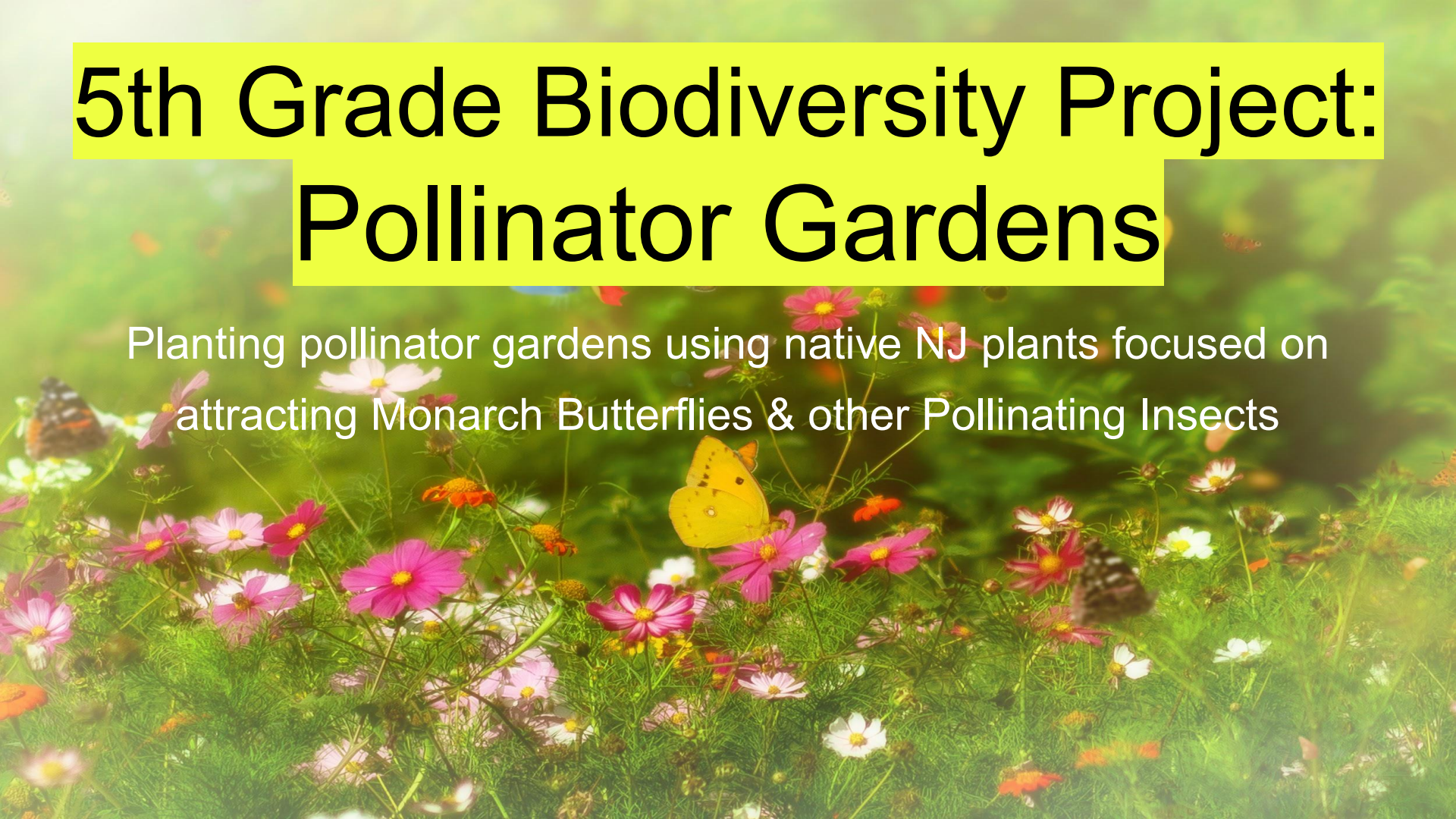
5. What do monarch butterflies do in spring?

_____

ELA AND VIRTUAL ASSEMBLY for the Entire 5th Grade

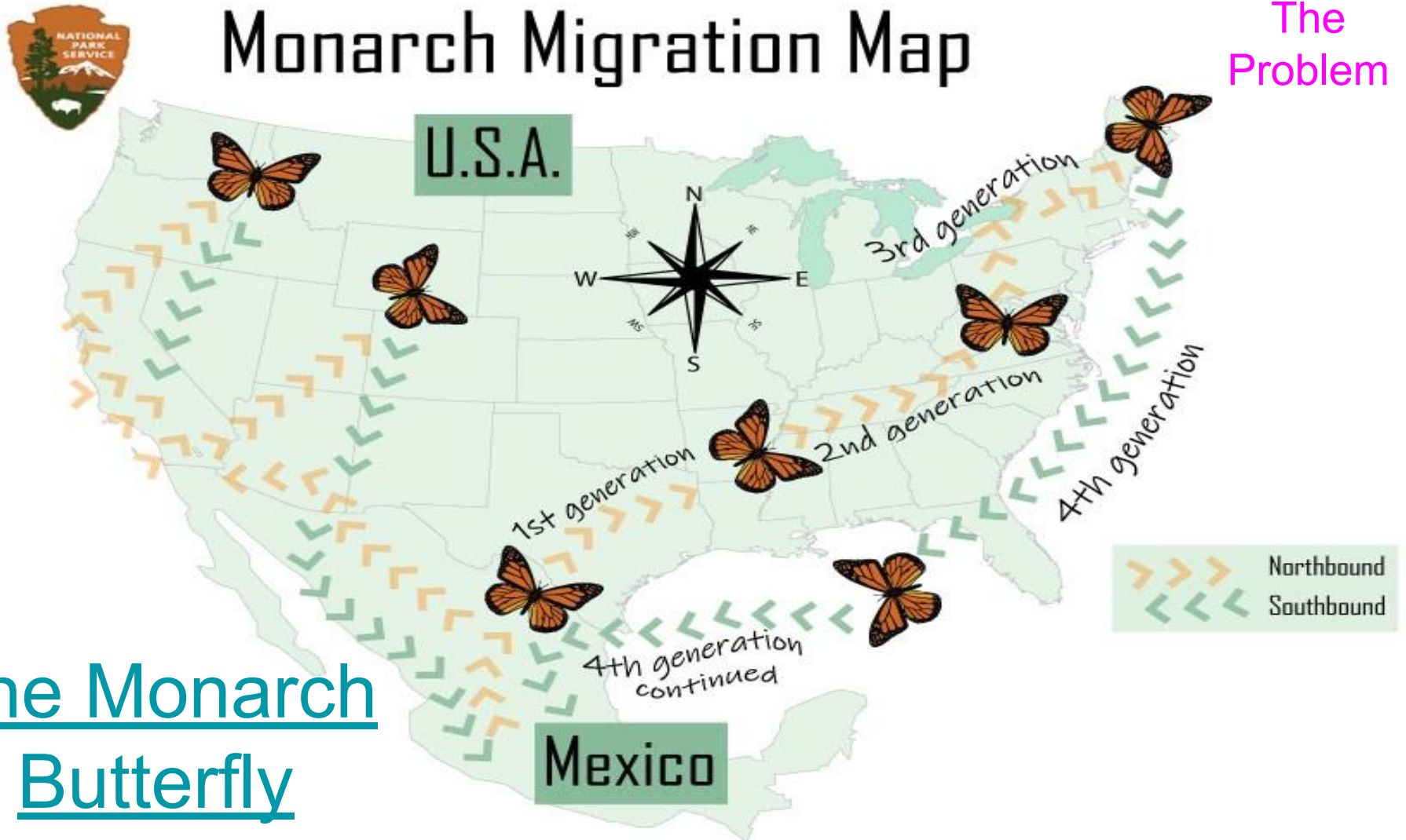
5th Grade Biodiversity Project: Pollinator Gardens

Planting pollinator gardens using native NJ plants focused on attracting Monarch Butterflies & other Pollinating Insects



The Problem

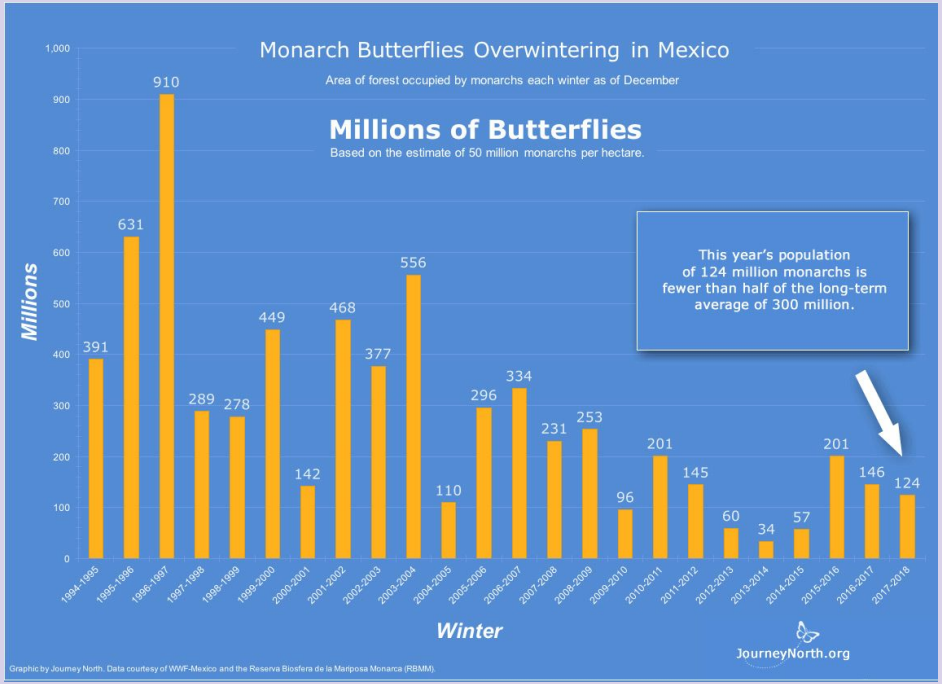
Monarch Migration Map



The Monarch Butterfly

The Problem

The Facts: Monarch Butterflies



- Numbers have dropped by 90% in the past 20 years.
- They're heading towards extinction due to threats from pesticides, development, and global climate change.
- In 2020, the yearly count of monarchs in Mexico's mountain forests showed a decrease of 53% from the previous year.

The Solution

Pollinator Gardens

We can help by planting a monarch habitat garden filled with native milkweed and nectar plants

The Solution

Pollinator Plants

Milkweed

Sunflowers

Beebalm

Tithonia

Marigolds

Iris

The Solution

Pollinators

Butterflies

Flies

Bees

Ants

Beetles

Pollen Wasps

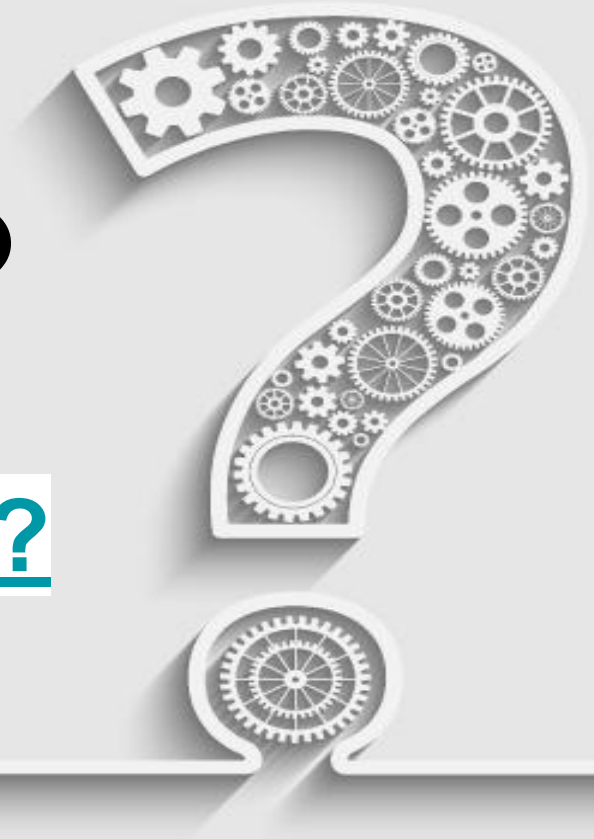
How to Get Your Pollinator Gardens Started

Mrs. Debbie Smith

Oceanport Garden Club President

Questions?

What Stuck With You?



Lesson Title: Biodiversity Lesson & Virtual Assembly: Pollinator Gardens

Objective:
- SWBAT identify the problem that Monarch Butterflies (a native and endangered species in NJ) are facing and the need for pollinator gardens in our community
- SWBAT identify the solution to help Monarch Butterflies in NJ by planting indigenious plants in the George L. Catrambone school's biodiversity garden, at home, and in the community to create local habitats
- SWBAT observe pollinator planting techniques on how to improve the schools biodiversity and how to get involved in a community ecological project that encompasses scientific, mathematical and technical skills

Essential Questions:
- How are the Monarch Butterfly populations being affected by pesticides, loss of habitat/indigenious plants, and climate change?
- What are the long term effects of losing local pollinating insects?
- What can we do to help the Monarch Butterflies and other native NJ pollinating insects?
- Which plants are the best to include in a Pollinator Garden in the local community?

Anticipatory Set/Direct Instruction:
- Monarch Butterfly Video- highlighting the forests they migrate to in Mexico, the problem the Monarch Butterflies are facing, and how we can solve it using indigenous plants to NJ
- Mini-Lesson on the Monarch Butterfly population decline, the benefit of planting Pollinator Gardens at school, home, and in the local community, a sample of indigneous Pollinator Plants we can use in our gardens, and the type of pollinator insects they will attract
- Live presentation from the Oceanport Garden Club President, Debbie Smith, on pollinator plants you can use in gardens and a tutorial on how to get your seeds to germinate using recycled materials at home to plant in the George L. Catrambone Pollinator Garden, at home, or in the Long Branch community gardens

Learning Activities:
- The ultimate goal is to ensure that indigenous flora and fauna can continue to thrive within the school grounds and the Long Branch community. Students will be using what they learned in the virtual assembly to establish a native species garden at the George L. Catrambone School, at home, and in the local community in Long Branch community gardens. These pollinator gardens will create food sources for Monarch Butterflies and other pollinating insects.

Closure:
- What Stuck with You Padlet- students and teachers will all contribute to the padlet on what stood out to them in the presentation and what they learned.