Milkweed Mania!

ACTIVITY OVERVIEW

STEM Focus Area: Citizen Science

Facilitator Learning Goal: Youth will understand what research is and examples of research in wildlife conservation.

Youth Learning Targets:

- "I can learn about wildlife research. "
- "I can participate in wildlife conservation to help scientists better understand monarch populations."

LEARNING ENVIRONMENT

Activity Duration: 30 minutes

Class Size: Any size

Minimum Group Size: none

Type of Space: Outdoor in late spring, summer or early fall (late April-early October)

Age of Youth: Grades 3-4

Guiding Question: What is the question to explore OR the problem or challenge to solve?

What is research and what are some examples of research done by wildlife biologists?

Through this activity, youth will:

- Observe and record real scientific data of milkweed and monarchs
- Analyze data through counting the number of milkweed, eggs, caterpillars and butterflies present.
- Share and communicate data with fellow monarch researchers.

Facilitator Prep

Facilitators will need to create a free sightings account with Journey North (https://journeynorth.org/reg/) and familiarize themselves with the project by reading the website (https://journeynorth.org/monarchs). If facilitators are doing this activity in the Spring (April/May/June) they should complete the first part of the activity. At any other time of the year, complete the second part of the activity.

Youth will need to be able to find milkweed. If milkweed does not grow around your facility, consider planting some! Or find a park nearby where milkweed grows. Facilitators can check with local parks and recreation offices or county conservation boards for locations where milkweed should be present.

Literacy Connection: Great books to get youth support learning about *(available on Amazon).*

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- Citizen Scientists: Be a Part of Scientific Discovery in Your Own Backyard by Loree Griffin Burns
- Finding Wild by Megan Wagner Loyd
- What is Science? by Rebecca Kai Dotlich
- Monarch Butterflies: Explore the Life Journey of One of the Winged Wonders of the World by Ann Hobbie

DoS:

Predict and hypothesize
Develop and use models
Measure materials
✓ **Observe**
Investigate
✓ **Record observations**
Analyze and infer
Share and communicate data
Interpret data
Test and revise
Draw conclusions and relationships
✓ **Have voice and agency, make decisions and guide their own learning**

PREPARATION

Materials

Pencils, observation sheets and ID guides, device(s) with electronic access

Room

This activity will primarily take place outdoors. Computer work can take place indoors.

Content

Research is work that increases knowledge and uses this new knowledge to devise new applications. Wildlife research takes many forms. Research is done both in the native ranges of animals and in human care settings.

Zoos that are accredited by the Association of Zoos and Aquariums are required to be involved in some way with wildlife conservation and research. Many wildlife biologists collect data of wild animal populations through tools such as field cameras. These cameras take thousands of photos a day – more photos than any person or team of persons can possibly sort through. Many conservation organizations look for volunteers or citizen scientists to help collect data or analyze data.

By aiding the conservation and research organizations, regular citizens can help researchers better understand the populations they are trying to conserve.

Common misconceptions:

- Research is only done in a laboratory. – Research can be done anywhere!
- Research involves testing subjects. – Research is collecting information to increase knowledge. This can be done by testing subjects or things, making observations, recording information such as temperature, speed, etc., or by gathering information by looking things up in a book or on a computer.
- Research is difficult to do and requires advanced degrees. – Research can be done by anyone!

Inquiry:

Your primary goal as facilitator is to encourage youth to become field scientists, studying animals. You can prompt those discussions with questions like the following:

- Do you notice any butterflies? Where should we be looking for butterflies?
- Why do you think we are/are not seeing a lot of monarchs right now?
- What could we do to encourage more monarch butterflies to be in the area?
- What do you think are some of the challenges that researchers face in the field?
- Do you think it's easier to study animals in the wild or in human care?
- Why do you think it's important to study animals in their native habitats?

DoS:

- ✓ Organization: I practiced the activity/technology, prepared materials/extras/place to record youth ideas, completed an activity (including timings).
- ✓ Materials: Materials are appropriate for teaching the learning goals; youth will be able to use them and will think they are appealing.
- ✓ Space Utilization: The space is set up appropriately for the activity and there will be no safety issues or distractions.
- ✓ Relevance: I have researched why the content matters to youth's everyday lives.
- ✓ Content Learning: I have become familiar with the content.
- ✓ Inquiry: I have become familiar with how authentic, age-appropriate inquiry practices look in this activity.

INTRODUCTION TO ACTIVITY (5 MINUTES)

Lead a discussion with the group - What is research? What do you think of when you hear the word "research"?

Research - work to increase knowledge and use this new knowledge to devise new applications.

Think about rhinos. What do we know about rhinos?

- 5 different species
- Some are browsers, some are grazers
- Live alone
- Have bad eyesight
- Endangered

How do we know all of this information? Someone did the research! Scientists such as wildlife biologists, conservationists, college professors, etc. research animals to learn new things about those animals and their habitat.

How could wildlife research be helpful?

- Monitor populations
- Discover causation of population declines
- Understand how to care for populations in human care

DoS:

- ✓ Space Utilization: I will use the space informally avoiding the lecture hall format.
- ✓ Purposeful Activities: This intro section gets youth on track for the learning goal.
- ✓ Content Learning: If age appropriate, I will accurately present content.
- ✓ Inquiry: In this or another section of the activity, youth carry out one or more inquiry practices.
- ✓ Relationships: I will make each youth feel welcome.
- ✓ Relevance: In this or another section, I will guide the youth in a sustained discussion of how the activity relates to their everyday lives.
- ✓ Youth Voice: In this or another section, I will allow youth the opportunity to make decisions about their learning experiences.

ACTIVITY ENGAGEMENT (20 MINUTES)

Wildlife researchers have a question that they hope to answer through their research which acts as a guide for what they should be looking for. These questions should be fairly specific.

Examples of research questions might be:

- Do chimpanzees use tools? How? What kind? In what way?
- What materials do Iowa waterfowl use to build nests?
- How much activity do the giraffes at Blank Park Zoo get in the winter vs summer?

Some research can take years of collecting data! Sometimes wildlife researchers ask for help from "regular people" in collecting or analyzing data for their research. Examples of local citizen science projects are: Monarch Watch, North American Amphibian Monitoring Project, Bird Nest Monitoring Project (Bald Eagles, Osprey & Peregrine Falcon), and Acoustic Monitors for Bats.

Today we are going to help the scientists at Journey North with their research.

Assign youth to small groups and take them outside with their observation sheets and ID guides. Assign each group to an area to study. Instruct youth to record the number of milkweed present in an area, the number of adults, larva and eggs sighted.

After groups have collected their data, return inside and compile data so it can be entered on Journey North's website. Youth can work as a large group to tally the number of milkweed, adults, larva and eggs found.

DoS:

- ✓ Space Utilization: I will use the space informally avoiding the lecture hall format.
- ✓ Participation: All youth will have access to the activity.
- ✓ Purposeful Activities: This core section helps youth to move toward the learning goal.
- ✓ Engagement: This activity has youth physically engaged with their hands and their minds.
- ✓ Inquiry: In this or another section of the activity, youth carry out one or more inquiry practices.
- ✓ Reflection: If appropriate, I will ask youth questions during the core activity that will help them make sense of what they are learning.
- ✓ Relationships: I will take steps to share my enthusiasm and create a nurturing, safe learning environment.
- ✓ Relevance: In this or another section, I will guide the youth in a sustained discussion of how the activity relates to their everyday lives.
- ✓ Youth Voice: In this or another section, I will allow youth the opportunity to make decisions about their learning experiences.

FINAL REFLECTION AND RELEVANCE (5 MINUTES)

As a group, discuss the following:

- What kinds of information can we gather about monarch populations from the data we've collected?
- What should we do if we want to see more monarch butterflies in our area?
- Besides milkweed, what other things do monarchs need? (Shelter, protection from predators, water)
- How could we encourage our city/town to help us increase habitat for monarch butterflies?
- What other animals might benefit from monarch butterfly habitats?
- Why are monarch butterflies and other pollinators important for people?
- How is wildlife research different in the wild vs at the zoo? What are the benefits of doing research at the zoo? (Less cost, close proximity to animals, animals are easier to find, we have a history of the care of these animals, health records, birth data, etc.)
- What are the benefits of doing research in the wild? (wider range, observe interactions with other species, natural habitat)
- What kinds of research can we participate in with wildlife in our area?

DoS:

- ✓ Space Utilization: Again, I will use the space informally.
- ✓ Participation: I will prompt youth who do not have access to the activity to participate.
- ✓ Purposeful Activities: The closing section helps youth to reach the learning goal.
- ✓ Content Learning: I will help youth make connections between different ideas. I will create opportunities for youth to ask questions/provide ideas that show a deeper level of understanding.
- ✓ Inquiry: In this or another section of the activity, youth carry out one or more inquiry practices.
- ✓ Reflection. I will provide youth with a sustained opportunity to make sense of their learning.
- ✓ Relevance: In this or another section, I will guide the youth in a sustained discussion of how the activity relates to their everyday lives.
- ✓ Youth Voice: In this or another section, I will allow youth the opportunity to make decisions about their learning experiences.

Observation Sheets

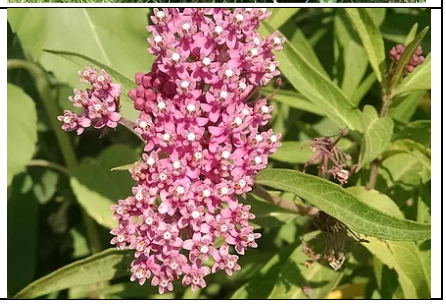
Category	Number Found (use tally marks)					Notes
Milkweed	Common	Butterfly	Swamp			
Eggs						
Caterpillars	1st Instar	2nd Instar	3rd Instar	4th Instar	5th Instar	
Pupa						
Butterflies						

Monarch Identification Guide

Monarch eggs: 	**Monarch 1st instar:** 
Monarch 2nd instar: 	**Monarch 3rd instar:** 
Monarch 4th instar: 	**Monarch 5th instar:** 
Monarch pupa: 	**Monarch adult:** 

Photos from: https://monarchjointventure.org/monarch-biology/life-cycle

Milkweed Identification Guide

Common Milkweed		
Butterfly Weed		
Swamp Milkweed		

Photos from: https://www.monarchparasites.org/milkweed-identification