



What is Happening to the Monarch Butterflies' Habitat?

Subject: Science **Grade Level:** 6th8th /

Materials:

- Pictures of deforestation for student viewing
- Paper for students to write on
- Pencils/pens for students to write with
- Technology, articles, and books for students to research with
- Poster board for students to do their group work on, such as their proposed plans with both pros and cons
- Computer, iPads, and other technology
- dnr.mo.gov/education/monarchs

Vocabulary:

Habitat: It is the natural environment in which an organism lives that includes the organisms' preferred food, water, and shelter resources

Deforestation: the act or result of cutting down or burning all the trees in an area

Native Species: a plant or animal that originates from a particular area

Natural Disaster: Something such as a flood or earthquake that has negative impacts on people's lives and land

Herbicide: A substance that kills plants and unwanted weeds

Glyphosate: A popular compound used to kill different plants. Farmers use it to kill the weeds among their crops

Milkweed: A native plant that Monarch butterfly caterpillars need to grow.

Learning Targets:

Students will be able to:

- Understand the concept of deforestation. Students will achieve this through looking at pictures of deforestation and researching what is happening to Monarch butterflies' habitat
- Use the correlation and causation relationship between the application of herbicides on crops and lawns in Missouri and the decline in the Monarch butterfly population. Students will demonstrate understanding of different positions on the issue, including those of farmers, homeowners, environmentalists, and other citizens by conducting research, class discussion, and sharing out the pros and cons of herbicide application in the Midwest
- Relate natural disasters that students might be familiar with to the Monarch butterfly and its habitat. This will be achieved through the research of natural disasters such as the Joplin tornado, the 1993 flood, or the 1811-1812 earthquakes in New Madrid

Lesson Objective(s):

Students will know that:

- Deforestation and herbicides application are two of the main contributing factors in the loss of Monarch butterflies' habitat
- The characteristics of ecosystems can vary over time

Students will understand that:

- To make good decisions, you need to research different perspectives and include a variety of stakeholders in the decision
- One of the most significant ways that humans impact wildlife is the destruction of habitat



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ENGAGE (Picture Viewing): Access prior learning / Stimulate interest / Generate Questions

One of the main reasons for Monarch butterfly habitat loss in Mexico is deforestation. Deforestation is the process of cutting down or burning all the trees in an area. To engage students, first show pictures of deforestation but do not tell them what they are looking at. In discussion, ask students what is happening in the pictures and allow time for them to discuss the photos with a partner. Ask questions such as:

- What is happening in this picture?
- Why is this happening?
- What problems could this cause in the environment?
- How will this happening impact Monarch butterflies?

Having discussions about one of the main reasons for habitat loss for Monarch butterflies will get students in the mindset of habitat loss for the rest of the lesson. At this time, start to talk about what is happening to the Monarch butterflies' habitat in Mexico.





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EXPLORE (Research of habitat loss in MO + simulated stakeholder meeting): Concrete experiences / Describe hand-on, minds-on activities / Describe appropriate background

This activity will help students understand multiple points of view. In this stakeholder simulation, the class will hear arguments relating to the use of herbicides in agriculture and their negative impact on Monarch butterflies and other pollinators. By the end of the activity, the class should create a proposal to regulate the use of herbicides that meets the needs of all stakeholders.

Assign students to one of the two stakeholder groups. The two stakeholder groups will be the Monarch Butterfly Society and Farmers of Missouri

In their groups, students will research what is happening to the Monarch butterfly in the state of Missouri .

Each group should be able to make claims and back them up with evidence. Students should be persuasive and



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argumentative in their ideas. Ideally there will be a little negotiation because neither side will get exactly what they want; compromise is needed to benefit both sides.

EXPLAIN (craft a poster): Focus student understanding on concepts / Brief and direct explanation of concepts, skills, or abilities

Now that students have looked at deforestation in Mexico, and taken part in the stakeholder meeting about Monarch butterflies in Missouri, the students will get into their groups to make a poster presentation of proposed land uses.

Put students into groups of four to investigate the effect of planting and maintaining crops on what has been a historically important Monarch butterfly habitat, or investigating putting herbicide on neighborhood yards. As they conduct more research on what is happening to the habitat, look at information from the stakeholder meeting, and the pros and cons of each side. The students should develop a land-use plan that benefits farmers and pollinators wherever possible. After crafting the poster of proposed land uses, the students will share their findings to the rest of the class backed up with evidence from the research and discussion during the stakeholder meeting. The posters should be made in a way that is visually appealing so, the posters can be hung up in the classroom, hallway, or used at the school science fair to show research that the students have done.

Depending on the grade and the types of students that you have, the stakeholder meeting and the poster will be different each time the lesson is taught.

ELABORATE (Relate Monarch butterfly habitat loss to human habitat loss): Confronted with a related, but new activity / Requires transfer of concepts, skills, or abilities / Student develops a deeper and broader understanding / Apply to daily life / Introduce vocabulary

Now that students have explored something that is happening to the Monarch butterfly in their own backyard, students will then explore human habitat loss and the effects of it. Students will take natural disasters in Missouri and relate it to what they have learned about habitat loss with the Monarch butterfly. This will help students relate what they are learning to real-life situations happening to the people around us. The students should get back into the same groups that they were a part of during the explore phase of the lesson. The teacher should supply students with natural disasters, such as:

- The New Madrid earthquake (http://earthquake.usgs.gov/earthquakes/states/events/1811_overview.php, <http://www.new-madrid.mo.us/index.aspx?nid=132>, <http://dnr.mo.gov/geology/geosrv/geores/techbulletin1.htm>, <http://www.smithsonianmag.com/science-nature/the-great-midwest-earthquake-of-1811-46342/?no-ist>)
- The 1993 Missouri flooding (<http://mo.water.usgs.gov/Reports/1993-Flood/>, <http://www.livescience.com/7508-history-repeats-great-flood-1993.html>)
- The Joplin tornado (<http://www.ustornadoes.com/2013/05/22/joplin-missouri-ef5-tornado-may-22-2011/>, <http://www.cnn.com/2011/US/05/23/missouri.tornado/>, <http://fox2now.com/2016/05/22/joplin-missouri-tornado-5-years-later/>)

If students are having trouble comprehending these articles, pick the important information out of them and supply



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“new” articles to make them more accessible to the students.

As students are going through each of these natural disasters, they will start to think of ways that it relates to habitat loss for the Monarch butterfly. Students will not only look up information and provide facts about the natural disaster, but they should supply an answer on how it relates to what is happening to the Monarch butterfly (e.g. the people during the natural disaster and the Monarch butterfly are losing/lost their homes and have nowhere to go). Not only will students look how these two things are related, but they should also be able to differentiate between the two and describe how they are different.

EVALUATE (Writing a news story): Throughout / Used to reveal the adequacy of their understanding / New, but related activity that requires knowledge and abilities developed in the instructional sequence

After looking at habitat loss of Monarch butterflies and human habitat loss in Missouri, create a school newspaper within the classroom. Have students write an informational piece, or an argumentative piece on what we can do as citizens to help the Monarch butterfly. Students should provide evidence and research information to back up their claims.

OR

The second piece of writing that students can take on involves a persuasive piece to facilitate change. For example, the teacher can allow the students to write about herbicides or deforestation. They could write to a politician, a farmer, a logging company, or someone who owns an herbicide business. In their writing, students should make claims and be able to back up their claims with evidence.

The teacher will be able to assess what the students learned about habitat loss and the effects that it has on an organism's population.

Score	4	3	2	1	NS
Purpose/Organization	<p>The response has a clear and effective organizational structure, creating a sense of unity and completeness. The response is fully sustained and consistently and purposefully focused:</p> <p>Claim is introduced, clearly communicated, and the focus is strongly maintained for the purpose, audience, and task</p> <p>Effective introduction and conclusion</p> <p>Logical progression of ideas from beginning to end</p>	<p>The response has an evident organizational structure and a sense of completeness, though there may be minor flaws and some ideas may be loosely connected. The response is adequately sustained and generally focused:</p> <p>Claim is clear, and the focus is mostly maintained for the purpose, audience, and task</p> <p>Adequate introduction and conclusion</p> <p>Adequate progression of ideas from beginning to end</p>	<p>The response has an inconsistent organizational structure, and flaws are evident. The response is somewhat sustained and may have a minor drift in focus:</p> <p>Claim is somewhat unclear, or the focus may be insufficiently sustained for the purpose, audience, task</p> <p>Introduction and conclusion may be weak</p> <p>Uneven progression of ideas from beginning to end</p>	<p>The response has little to no discernible organizational structure. The response may be related to the claim but may provide little to no focus:</p> <p>Claim may be confusing or ambiguous; response may be too brief or the focus may drift from the purpose, audience, or task</p> <p>Introduction and conclusion missing</p> <p>Frequent extraneous ideas may be evident, ideas may be randomly ordered or have unclear progression</p>	<ul style="list-style-type: none"> • Unintelligible • Off-topic • Copied text • Off-purpose



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Evidence/Elaboration	<p>The response provides thorough and convincing support/evidence for the argument(s) and claim that includes the effective use of sources. The response clearly and effectively expresses ideas, using precise language:</p> <p>Comprehensive evidence from sources is integrated; references are relevant and specific</p> <p>Vocabulary is clearly appropriate for the audience and purpose</p> <p>Effective, appropriate style enhances content</p>	<p>The response provides adequate support/evidence for the argument(s) and claim that includes the use of sources. The response adequately expresses ideas, employing a mix of precise with more general language:</p> <p>Adequate evidence from sources is integrated; some references may be general</p> <p>Vocabulary is generally appropriate for the audience and purpose</p> <p>Generally appropriate style is evident</p>	<p>The response provides uneven cursory support/evidence for the argument(s) and claim that includes partial or uneven use of sources. The response expresses ideas unevenly, using simplistic language:</p> <p>Some evidence from sources may be weakly integrated, imprecise, or repetitive; references may be vague</p> <p>Vocabulary is uneven or somewhat ineffective for the audience and purpose</p> <p>Inconsistent or weak attempt to create appropriate style</p>	<p>The response provides minimal support/evidence for the argument(s) and claim that includes little or no use of sources. The response's expression of ideas is vague, lacks clarity, or is confusing:</p> <p>Evidence from the source material is minimal or irrelevant; references may be absent or incorrectly used</p> <p>Vocabulary is limited or ineffective for the audience and purpose</p> <p>Little or no evidence of appropriate style</p>	<ul style="list-style-type: none"> • Unintelligible • Off-topic • Copied text • Off-purpose 	
	Score	2	1	0	NS	
Conventions	<p>The response demonstrates an adequate command of conventions:</p> <p>Adequate use of correct sentence formation, punctuation, capitalization, grammar usage, and spelling</p>	<p>The response demonstrates a partial command of conventions:</p> <p>Limited use of correct sentence formation, punctuation, capitalization, grammar usage, and spelling</p>	<p>The response demonstrates little or no command of conventions:</p> <p>Infrequent use of correct sentence formation, punctuation, capitalization, grammar usage, and spelling</p>	<ul style="list-style-type: none"> • Unintelligible • Off-topic • Copied text • Off-purpose 		

Differentiated Instruction / Modifications:

- Provide prepared links and materials for students to help research what is happening to Monarch butterflies in Missouri and the different natural disasters that have occurred in Missouri.
- Acquire materials that require different levels of reading skills when students are researching information. Having articles at students' reading level will allow for everybody to contribute to discussion
- Provide an outline for what should be included in a persuasive or informational piece of writing that a student who has difficulty organizing his/her thoughts can use to help them construct their argumentative paper.
- Allow students to work with a partner if needed on their paper at the end of the lesson

Higher Order Thinking Questions:

- What are the similarities and differences between the natural disasters in Missouri history and the Monarch butterfly habitat loss?
- How were you able to back up the claims that you made to make your writing piece to easily persuade the reader?
- Why is it beneficial to look at information from multiple perspectives before making a final opinion?
- If someone refuses to stop using herbicides, what other actions could you take instead of a written stance?
- What are the positive effects of herbicides and why should they continue to be used on our crops?



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- What will happen if something does not change (deforestation and herbicide on yards/cropland) to the Monarch butterfly population, if anything?
- How can you persuade the school or community to build Monarch butterfly gardens?

Resources:

Monarch Information:

<http://dnr.mo.gov/education/monarchs.htm>

1993 Missouri Flood Information:

<http://www.livescience.com/7508-history-repeats-great-flood-1993.html>

<http://mo.water.usgs.gov/Reports/1993-Flood/>

1811-1812 New Madrid Earthquakes Information:

http://earthquake.usgs.gov/earthquakes/states/events/1811_overview.php

<http://www.new-madrid.mo.us/index.aspx?nid=132>

<http://dnr.mo.gov/geology/geosrv/geores/techbulletin1.htm>

<http://www.smithsonianmag.com/science-nature/the-great-midwest-earthquake-of-1811-46342/?no-ist>

2011 Joplin Tornado Information:

<http://www.ustornadoes.com/2013/05/22/joplin-missouri-ef5-tornado-may-22-2011/>

<http://www.cnn.com/2011/US/05/23/missouri.tornado/>

<http://fox2now.com/2016/05/22/joplin-missouri-tornado-5-years-later/>

Misconceptions:

- Herbicides are not killing Monarch butterflies directly. Herbicides kill the Milkweed plant, which is vital to Monarch butterfly reproduction. Monarch populations are negatively impacted by the loss of milkweed hosts plants due to broad herbicide application.
- Herbicides do not help crops grow larger or faster, but they kill undesirable plants so that farming is less labor intensive and they eliminate competition for resources for the crops.

Extensions:

After writing the persuasive or informational writing piece, each student will present their findings or arguments to the rest of the class. There can be class discussion regarding flaws in the information or plan, as long as it is done in a positive manner (e.g. why eliminating all herbicides is not plausible). Through this extension, students can go back and make revisions to the plan or argument to make it better.

Missouri Learning Standards: Grades 6-8 [K-5 Correlations]

Science Grade Level Expectations:

Life Sciences

LS2 - Ecosystems: Interactions, Energy, and Dynamics

Concept A: Interdependent Relationships in Ecosystems

- 6-8-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on individual organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]
- 6-8-LS2-2 Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem. [Clarification Statement: Relationships may include competition, predation, and symbiosis.]



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Concept C: Ecosystem 6-8 Dynamics, Functioning and Resilience

- M-LS2-4 Construct an argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making inferences about changes in populations, defining the boundaries of the system, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]
- M-LS2-5. Evaluate benefits and limitations of differing design solutions for maintaining an ecosystem. [Clarification Statement: Examples of design solutions could include water, land, and species protection, and the prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]

English Language Arts Standards:

2. Approaching the Task as a Writer

A. Development [K-5 correlation W1A, W1B, W1D, W2A, W2B, W2C]

- Follow a writing process to produce clear and coherent writing in which the development, organization, style, and voice are appropriate to the task, purpose and audience; develop writing with narrative, expository, and argumentative techniques.
 - B. Expository: Develop informative/explanatory writing to examine a topic with relevant facts, examples, and details.

C. Development [K-5 correlation W1A, W1B, W1D, W2A, W2B, W2C]

- Argumentative: Develop argumentative writing by introducing and supporting a claim with clear reasons and relevant evidence.

Speaking and Listening

2. Presenting

A. Verbal Delivery [K-5 correlation SL4A]

- Speak clearly, audibly, and to the point, using conventions of language as appropriate to task, purpose and audience when presenting including appropriate volume.

NGSS:

MS.Matter and Energy in Organisms and Ecosystems

MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]

For more information call or write:

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