

Milkweed and Monarch Migration

Overview: Students will observe and identify plants (milkweed) and any monarch presence in an outdoor habitat, and map the migration of monarchs east and west of the Rocky Mountains. Students will explain the impacts humans have had on monarch populations and determine ways to help the population recover.

National Geography Standards:

Standard 1: How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information.

Standard 14: How human actions modify the physical environment

Oregon Geography Content Standards:

5.7. Identify, locate, and describe places and regions in the United States.

5.8. Use various types of maps to describe and explain the United States.

Oregon Science Content Standard (if appropriate).

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Connections to Common Core:

CCSS.ELA-LITERACY.RI.5.9. Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

Objectives:

In completing this lesson, students should be able to:

- Identify milkweed (or substitute another plant that is essential for another migrating species in your area) in the field, while also recording any evidence of the migrating species (monarchs).
- Explain the migration patterns of monarchs by drawing and using a map, and explain the impact of humans on the decline (and potential recovery) of the monarch population.

Grade Levels: 5th-6th

Time: 45-60 minutes, plus assessment

Materials:

For each group:

- string (40' lengths, marked at 10' intervals)
- 4 stakes to mark plots for observation
- rubber mallets to pound stakes
- directions and 10x10 grid on back (Appendix A)
- pencils
- clipboards with paper
- field guides--*A Guide to the Native Milkweeds of Oregon* can be found at http://www.xerces.org/wp-content/uploads/2011/10/OR-milkweed-guide_XercesSoc2.pdf (You may want to replace this with materials for your state. An excellent resource can be found at: <http://www.xerces.org/milkweed/>) (Appendix B)

For each student:

- One of several reading handouts (Appendix C lists several website options for these handouts) --laminated for durability, so they can be re-used)
- One copy of the classroom assessment (Appendix E) and rubric (Appendix F)

For the teacher:

- One copy of Key Questions and Information Graph (Appendix D)

Background: Students need to be able to identify monarch butterflies and explain the life cycle of a butterfly. They need an understanding of plant growth and plant identification skills. They also need basic map skills, a general knowledge of climate and temperature variances across the USA, some practice with staking a plot of land, and an elementary knowledge of herbicides and pesticides and farming practices.

Procedures:

1. Divide students into groups of 3-5 people.
2. Give students the reading handouts (one per student, so that each group has at least one copy of three different readings—given out according to their reading skill level), and summarize the key things they learn about monarch migration for their group mates (5-10 minutes).
3. Have student groups return the handouts to you and give you a quick oral summary of their readings.
4. Give each group a string, mallet, and 4 stakes, along with a direction sheet (Appendix A), field guide (Appendix B), clipboard, paper, and pencil.
5. Assist students as they choose their plots (5 minutes).
6. Give students 15 minutes to map their plot and search for any milkweed plants (or substitute species) within the plot.
7. Gather in a circle to share findings from plot observations. (5 min.)
8. On a roughly-to-scale “map” of North America (scratch an outline into the soil or mark out with string and stakes ahead of time), have students identify where the Rocky Mountains would be. Have adult volunteers stand on the map to represent the mountains. Then, have students choose locations and walk the “migration” routes to their winter location, as if they were monarch butterflies. (5 min).
9. Discuss key questions (Appendix D) about migration and changing monarch populations. (5-20 min.)

Assessment: There is a brief informal assessment in step 3, when students give an oral summary of what they read. A formal assessment can be given later, back in the classroom.

Given a prompt (Appendix E), students will be able to sketch a map of North America and indicate the migration patterns of monarch butterflies. They will also write a paragraph explaining the concerns about monarch decline and ways that humans can help the population recover. This assessment can be evaluated using the rubric (Appendix F).

Extensions and/or Adaptations:

Extensions:

- Have students grow a monarch habitat or waystation at school and observe over time whether monarchs find their new plants.
- Consider raising monarchs in your classroom (make sure you have a source of milkweed).
- Have students do additional research and write persuasive essays about whether farming methods (or other land use practices, such as keeping habitat along roadways) should change to help milkweed return.
- Have students research, compare and contrast monarch migration with migration of another local species (such as cranes).
- Have students research and consider the impact of political systems on migrating species, i.e. how do Mexico's decisions affect monarch populations?

Adaptations:

- Assign the reading tasks at appropriate levels (high, average, low texts are included), and have struggling students read with a partner rather than independently.

- If a large-scale map of North America is not a possibility, have individual or group laminated maps and sharpies for students to sketch the migration routes from various locations, based on their readings.
- If space is limited, or student mobility is limited, hula hoops could be used to quickly provide a plot boundary.
- If botany is the focus, students could simply observe what plant life is found in their 10'x10' plot.
- Students who struggle with mental maps could be provided a blank outline map for question #1 on the formal assessment.

Sources:

---. *A Guide to the Native Milkweeds of Oregon*. Portland: Xerces Society for Invertebrate Conservation, 2012. Web. 11 Aug. 2016. http://www.xerces.org/wp-content/uploads/2011/10/OR-milkweed-guide_XercesSoc2.pdf

Conant, Eve. "As Dwindling Monarch Butterflies Make Their Migration, Feds Try to Save Them." *National Geographic*. National Geographic Society, 11 Oct. 2014. Web. 16 Aug. 2016. <http://news.nationalgeographic.com/news/2014/10/141010-monarch-butterfly-migration-threatened-plan/>

Hall, Shawn. "Oops! Effort to save Monarch Butterflies Hastens Their Possible Extinction." *The Lens*. N.p., 22 Jan. 2016. Web. 16 Aug. 2016. <http://thelensnola.org/2016/01/22/oops-effort-to-save-monarch-butterflies-hastens-their-possible-extinction/>

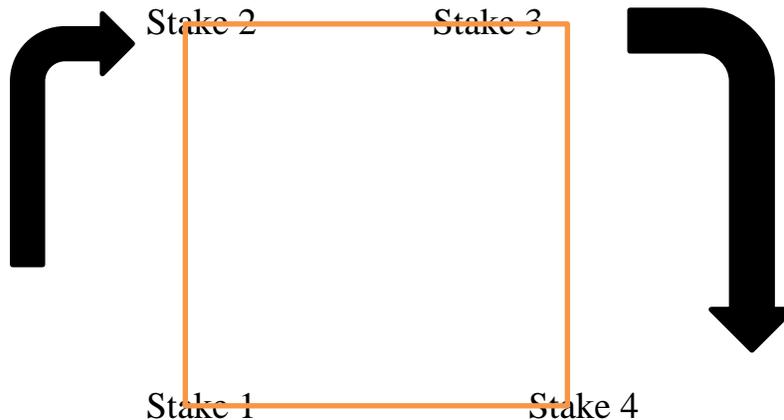
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Mizejewski, David. "Six Ways to Save Monarchs." *The National Wildlife Federation Blog Six Ways to Save Monarchs Comments*. National Wildlife Federation, 10 Feb. 2015. Web. 16 Aug. 2016. <http://blog.nwf.org/2015/02/saving-monarchs/>

Field Observation (appendix A)

1. Choose your plot.

Tie your string onto your first stake. Choose a place you'd like to plot, and put your stake into the ground. Then, note where the 10-foot mark is on the string, wrap the string around the second stake, and put it in the ground. Make a right angle, and continue mapping your plot by wrapping the string around the third stake and putting it in at the next 10-foot mark. Make another right angle, and put the fourth stake in the ground at the last 10-foot mark. Return to the beginning stake with the last section of your string and complete your plot boundary.



2. Sketch a map of your land, noting any key features (trees, rocks, streams, mounds, holes, etc.). Be sure to include a title, compass rose, and legend. You may use the 10 x 10 grid on the back of this page to help you.
3. Using the field guide, search carefully to see if there are any milkweed plants in your plot of land. If you find one or some, mark their location(s) on your plot map.
4. If you have time, see if there are other plant species you can identify. Map them if you find them.
5. Be prepared to share your observations when you hear the whistle to return to the meeting area.

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FIELD GUIDE (Appendix B) –

A Guide to the Native Milkweeds of Oregon can be found at
http://www.xerces.org/wp-content/uploads/2011/10/OR-milkweed-guide_XercesSoc2.pdf

(You may want to replace this with materials for your state. An excellent resource can be found at: <http://www.xerces.org/milkweed/>)

Appendix C—Grade Level Reading Handout Options (Accessed August 16, 2016)

http://fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/migration/index.shtml

http://fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/habitat/index.shtml

http://fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/biology/index.shtml

<http://news.nationalgeographic.com/news/2014/10/141010-monarch-butterfly-migration-threatened-plan/>

Particularly appropriate if you are located East of the Rocky Mountains:

http://fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/documents/MonarchButterfliesEasternUS.pdf

http://fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/documents/MonarchButterfliesNorthernGreatPlains.pdf

http://fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/documents/MonarchButterfliesSoutheastern.pdf

Challenging reading materials for advanced students:

http://fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/documents/FNN-Summer2014-PollinatorGardens.pdf

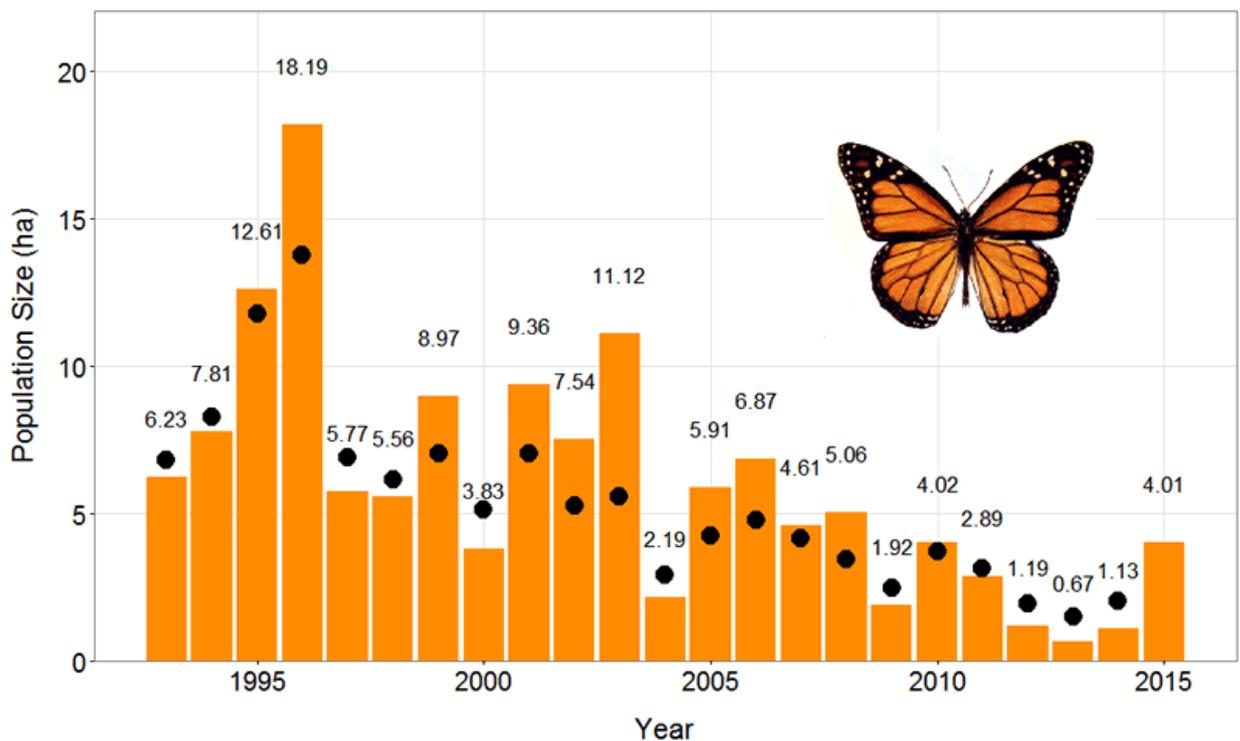
<http://thelensnola.org/2016/01/22/oops-effort-to-save-monarch-butterflies-hastens-their-possible-extinction/>

Easier reading handout option for struggling readers:

<https://www.fws.gov/savethemonarch/pdfs/migration-map.pdf>

Key Questions (Appendix D)

1. Where do monarchs migrate in winter if they are seen here in the summer?
2. To where do they migrate if they summer in Minnesota (or some other state across the Rocky Mountains from your location)?
3. How can you determine to where a monarch will migrate? (Location relative to the Rockies)
4. Why is the milkweed plant essential for monarchs?
5. What has happened to the monarch population in recent years? (Share graphed data)
6. Why do you think this is so?
7. What do you think has happened to the milkweed population?
8. Why do you think this is so?



<http://www.umesc.usgs.gov/management/dss/monarch.html>

Name: _____

Formal Assessment

(Appendix E)

Date: _____

1. Sketch a map of North America. Then indicate the patterns of monarch migration on your map.

2. On the back of this paper, write a paragraph explaining reasons why monarch decline might be a concern, and offer ideas of ways humans can help the monarch population recover. Include observations from your day at Outdoor School.

SCORING RUBRIC FOR MILKWEED AND MONARCH MIGRATION ASSESSMENT
(Appendix F)

Part 1. Map of migration. Are these included?

	Absent	Poor	Proficient	Outstanding
Rocky Mountains				
U.S.A.				
Mexico				
California				
Eastern Migration				
Western Migration				
Map Title				
Legend				
Compass Rose				

Part 2. Paragraph.

	Absent (not yet proficient)	One reason or example (partially proficient)	Two reasons or examples (proficient)	Three or more reasons or examples (outstanding)
Monarch decline				
Recovery ideas				
Examples from Outdoor School				