Monarch Migration Mix-Ups

Ages: Grades 3-adult
Subjects: science, languages, arts, math, social studies, and physical education
Duration: 20-45 minutes
Group Size: 20 to 40 students or more
Setting: works best outdoors or in large room setting

Objectives
Students will learn about limiting factors that affect populations of migrating monarchs.

Method
Students role-play migrating monarchs traveling between hatching locations and migration destinations. They are subjected to hazards along the journey, and at either end of the migration path.

Background
Millions of monarch butterflies begin a migration south every fall. Locations along the migration routes often report thousands of monarchs gracing their trees at night, sometimes so dense, branches dip under the weight of the resting butterflies.

The monarchs from east of the Rocky Mountains are on their way to central Mexico for the winter. Some monarchs that make it to Mexico travel over 3,000 miles!
They roost there, using up their fat reserves to make it through the winter. The fat reserve not only sustains them over the winter, but also helps them migrate north again in the spring. High in the transvolcanic mountains of central Mexico, some 60 to 80 million monarch butterflies crowd small sections of Oyamel Fir tree stands, waiting to go back north to repopulate North America.

The populations of monarchs vary each year due to many factors. Human-created factors, in both their summer homes and overwintering sites create threats to the monarch populations. In the north, humans create problems for the monarchs by destroying their habitat. New roads, housing developments and agriculture all play a role in the decreasing amount of milkweed plants available for monarch reproduction. Developments also decrease the number of plants from which a nectaring monarch can gather food.

The overwintering sites have even greater threats for the monarchs. The oyamel firs, on which the monarchs cluster during the winter months, are a valuable tree to loggers and landowners. Logging in the few tiny areas the monarchs spend the winter can be a huge problem. Losing even one tree destroys the home for millions of the butterflies. It also opens the forest canopy, allowing snow and rain to reach the roosting monarchs.

In order for the monarch to survive, we must play an active role in creating and preserving habitats along the migration route.

Materials
- Large playing field, gymnasium or large room
- Placemats, carpet squares, or paper plates for every three students in group

Procedure
1. Set up a large playing area (70 ft. long if possible). Put placemats in two patches at each end of the playing field. You should have one plate for every three students at BOTH ends of the field.
2. Designate one end of the field as the winter habitat and the other end as the summer habitat. You will have one set of placemats at the winter habitat and one set of placemats at the summer habitat.
3. Have the students put one foot on a placemat in the summer habitat. Remember that three students can have a foot on each placemat.
4. Explain to the students that they are monarchs in their summer habitat. They are spending their summer nectaring on flowers in gardens and laying eggs on milkweed plants.
5. Explain that fall has come to the summer habitat. The days are getting shorter, nectar plants are dying back and temperatures are dropping. The student monarchs know it is time to migrate south. Tell them if they cannot put a foot on a placemat in the wintering site, that means they cannot find a suitable habitat to spend their winter. If that happens, they will “die” and move to the sidelines of the game – at least temporarily. You may want to tell the students to “flutter their wings,” moving their arms like butterflies in flight during their migration. Remind them that three of them can put a foot on each habitat area in Mexico.
6. Start the migration Have them “migrate” between the summer and winter sites. Remind

them that three of them can put a foot on each habitat area in Mexico. Have the students migrate slowly the first time, and make sure all the monarchs successfully make the migration so the students get familiar with the process.

7. After the first "migration" start to explain the limiting factors happening in the summer habitats while they are resting in Mexico. For example, a new shopping mall was built over a field where the monarchs used to find plenty of milkweed. Remove one placemat from the summer habitat. Repeat the instruction to migrate and send the butterflies to their summer habitat. The students that don't find a placemat should be rounded up and put on the sidelines.
8. Before the next migration, remove three or four placemats from the winter habitat. This represents a catastrophic loss of habitat. Tell the students loggers illegally removed several trees. Instruct the students to migrate. (A large number of students will be standing along the sidelines after this migration. Assure them they may be able to re-enter the game if someone in the summer habitat cares about monarchs and plants some milkweed to replace the loss last summer.
9. Repeat the process for several migrations to show changes in habitat conditions and limiting factors.

Suggested Limiting Factors for monarchs in Winter Habitat:

- Illegal logging
- Snowstorm
- Disease
- Pesticide use
- Unseasonal temperatures

Suggested Limiting Factors for monarchs in Summer Habitat:

- Expanded agriculture, eliminating milkweed plants
- Housing or business developments, creating habitat loss
- Very rainy summer, resulting in shorter growing season for nectar plants
- Pesticide use
- Drought, hurting both nectaring plants and milkweed

Suggested Factors Favoring Survival of monarchs in Winter Habitat:

- Moderate temperatures
- Human action, helping protect and restore sections of winter habitat
- New government regulations preserving winter habitat

Factors Favoring Survival of monarchs in Summer Habitat:

- Good weather
- Group of students plant a butterfly garden
- Group of students plant milkweed patches
- Road ditches with milkweed growing in them do not get mowed

After the game is over, ask the students to summarize what they learned about some factors that affect the success of monarch migration. Use this as a springboard to discuss what we can do to insure monarchs are around for our children to enjoy.

Extensions

Below are some suggestions for expanding students' knowledge about monarch migration.

- Suggest they join Monarch Watch (www.monarchwatch.org)
- Explore some ideas for preserving the habitat in Mexico. Would money help? Would education help? Would government regulations help?
- Find out what laws already exist to protect monarchs.
- Participate in a monarch tagging program to help monitor the migration. (see www.monarchwatch.org)
- Use a map to plot the migratory route of monarch butterflies.
- Find out who Lincoln Brower and Fred Urquhart are and what their contribution to monarch research has been.

References:

This activity adapted by Thea Miller Ryan from Project WILD activity *Migration Headache*. ©1983 Council for Environmental Education. Adapted with permission from Project WILD, *Project WILD K-12 Education Activity Guide*. The complete Activity Guide can be obtained by attending a Project WILD workshop. For more information, contact the South Dakota Project WILD office—Chad Tussing, SD Game, Fish & Parks, 523 E. Capitol Ave., Pierre, SD 57501-3182; phone (605) 773-2541; e-mail chad.tussing@state.sd.us OR contact Project WILD National Office, 5555 Morningside Dr. Suite 212, Houston, TX 77005; phone (713) 520-1936; website: www.projectwild.org.