

Activity 3.1: Migration, Adaptation, and Changing Climates

Grades 7 – 9

Description: In this activity students will discuss the various ways that living things deal with changing climates including adaptation and migration. Later, students will reflect on these ways and determine which adaptations could benefit a plant that is exposed to a changing climate.

Time: 20 – 30 minutes

Materials:

- Journals
- Pens/pencils

National Science Education Standards:

C3.A All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

C3.C Behavior is one kind of response an organism can make to an internal or environmental stimulus.

C3.D An organism's behavior evolves through adaptation to its environment.

C5.C Extinction of a species occurs when the environmental changes and the adaptive characteristics of a species are insufficient to allow its survival.

AAAS Benchmarks:

5D/E1 For any particular environment, some kinds of plants and animals thrive, some do not live as well, and some do not survive at all.

5D/E4 Changes in an organism's habitat are sometimes beneficial to it and sometimes harmful.

5F/H6c When an environment, including other organisms that inhabit it, changes, the survival value of inherited characteristics may change.

5F/M4 Most species that have lived on the Earth are now extinct. Extinction of species occurs when the environment changes and the individual organisms of that species do not have the traits necessary to survive and reproduce in the changed environment.

Guiding Questions:

- What are the ways that plants and animals can deal with changing climates?
- What are the conditions under which each of these ways occurs? (coping, migration, adaptation, extinction)
- What are differences between coping, migration, and adaptation?

Vocabulary – Responses to changing climates

- **Coping:** Some plants and animals are individually responsive (their life cycles adjust) to changing conditions.
- **Migration:** The long-distance movement of plants and animals is often due to seasonal changes.
- **Adaptation:** An adaptation is a feature of an organism that has developed over time that helps it survive in its environment.

- **Extirpation:** When a species dies out or becomes extinct in a particular region, but still exists elsewhere.
- **Extinction:** When a species dies out entirely.

Procedure:

1. Ask students: What do you do when you get too cold? What about when you get too hot? When it rains? Students may say:
 - Put on a sweater/coat
 - Go inside
 - Turn up the heat
 - Go swimming
 - Wear shorts
 - Put on a raincoat
2. Point out that these are ways that we cope with the changing conditions in which we live. Say that it is easy for us because we have inventions that let us live in different, sometimes extreme, conditions comfortably.
3. Ask students: Since animals can't put on a coat, how do they deal with temperature changes? Write any answers on the board (examples: they may hibernate, they may move to a warmer area or go "inside" to a cave or tree, or burrow in the ground, or sit in the sun, or they may have fur to keep them warm).
4. Review or introduce three terms, "coping," "migration" and "adaptation" (see vocabulary above). Go back to the student's lists, and discuss whether each example they gave falls under coping, migration, or adaptation (note that some characteristics of organisms could arguably fall under more than one category). Emphasize that adaptations develop in species over long periods of time.
5. Next, ask students about plants. Not only can't they put on a coat, they also cannot move. Ask them how plants survive the winter in colder climates? Characterize their answers as being coping, adaptation, or migration,
6. Then, talk with the students about adaptations in general. Ask them why adaptations are important. Have students give examples of some adaptations animals and plants have to different conditions, and how those adaptations help them survive in their environment. You might prompt them by naming specific organisms, showing images of different animals, or by showing different ecosystems. The desert is a good example to use. Ask the students what sorts of adaptations are common to desert animals or to desert plants.
7. Introduce or review the concept of "extinction." In changing conditions, if a population or species cannot cope, migrate, or adapt, they may go extinct, either locally or globally.
8. Summarize the possible responses organisms have to changing conditions. Then ask what will happen to plants and animals if there are long-term climate changes. Will they be able to



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cope, migrate, or develop the adaptations to survive in a different climate from the one they are adapted for now? Ask students if they think species' responses will differ if the climate change happens gradually or rapidly. You may wish to have students record their reflections on this activity in their journals.

Extension: Project BudBurst's activity "Plant Part Adaptation Charades" is an interactive classroom activity in which students act out various plant adaptations. Available at http://neoninc.org/budburst/educators/pdf/PBB_plantcharades.pdf