



Effective Climate Change Education

Climate change education offers students an opportunity to use systems thinking to build ecological knowledge, explore values, respect other cultures, and develop skills to engage in personal actions toward a sustainable future. Discussions of the causes of recent climatic changes, however, have generated emotional and political debates, to the point where some educators may avoid the topic for fear of bringing advocacy or politics into the classroom.

Discussion of the effects of a changing climate on populations of fish, wildlife, and marine species and their habitats can potentially avoid the politically fraught discussion of cause and instead shift the focus of the conversation to concrete conservation and adaptation actions that can be taken by all responsible stewards of our natural resources.

Earth's climate has changed considerably throughout the planet's history, from steamy coal forests to frigid ice ages. However, scientific evidence indicates that the planet's climate is now changing at a faster rate than at any point in last 10,000 years (National Oceanic and Atmospheric Administration). Global average temperature is rising, snow and rainfall patterns are shifting, ice sheets and glaciers are shrinking, wildfires and droughts are more intense, and extreme weather events are occurring more frequently. Scientists are also observing changes in the oceans, including rising sea levels and increased ocean acidity. (National Aeronautics and Space Administration, National Climate Assessment, and United States Environmental Protection Agency).

Warming global temperatures are resulting in changes to the geographic ranges for many species, as the lower temperature ranges to which many organisms are adapted shift toward the Earth's poles and to higher elevations. Temperature changes are also altering the timing of life cycle events in nature. This accelerated increase allows little time for plants and animals to adapt to the new conditions, especially for already threatened or endangered species.

There are many opportunities to connect natural resource conservation to human well-being through a better understanding of climate science and climate adaptation. For example, scientists are now studying the capacity of healthy ecosystems to buffer the impacts of extreme events such as fires, floods, and severe storms. And climate-driven movements of species populations, such as lobsters in the Atlantic Ocean, can have cascading effects on local economies.

How can an educator most effectively teach about the effects of climate change? And how can Project WILD help?

Separate action from advocacy. The Association of Fish and Wildlife Agencies defines natural resource stewardship as informed, responsible action/behavior on behalf of the environment and future generations. Climate adaptation actions are an important component of natural resource stewardship, increasing the efficiency and effectiveness of conservation activities by reducing the negative impacts and taking advantage of the potential benefits of a changing climate.

Sound environmental education takes into account knowledge and awareness, personal values, community norms, emotions and a perception of control—believing you can make a difference. Social studies education emphasizes preparedness for college, careers and civic life (the C3 Framework) through skills of critical thinking, problem solving and participatory skills to become engaged citizens. These approaches do not prescribe action, but encourage the knowledge and skills to deal with information and make informed choices.



Make education relevant and engaging. Experts such as Monroe *et al* in the *Journal of Environmental Education Research* (2017), the North American Association for Environmental Education, and others, agree that effective education should focus on personally relevant and meaningful information. Local examples, such as exploring the impacts of climate change on local species and their habitats, are an excellent way to bring relevancy and meaning to a concept. Experts also emphasize using active and engaging teaching methods, which Project WILD provides through hands-on activities.

Explore the natural world. Offer students opportunities for local, observable experiences. Since changing ecosystems is one of the key indicators of climate change, it is ideal for climate change education.

Reinforce the difference between weather and climate. Weather is the state of the atmosphere at any given time and place, such as temperature, precipitation, clouds, and wind that people experience throughout the course of a day. Climate describes the long-term averages and variations in weather measured over a period of several decades. Recent weather experiences often confuse the public about the facts of climate trends.

Effective climate change education should:

- Incorporate nature-based, systems thinking
- Research and explore local ecosystems and issues to make relevant and personal connections
- Focus on opportunities for students to take action to safeguard fish, wildlife, and habitats over the long-term, taking into account possible future climatic shifts
- Address misconceptions; use validated sources of information
- Engage in deliberative discussions; consider possible actions and their effects
- Interact with scientists when possible
- Implement school or community projects
- Explore values and beliefs
- Be age appropriate and hopeful. Climate change topics can be complex and overwhelming. Children develop at their own pace; however, in general:



- Ages 5-9 years old think concretely rather than abstractly and learn by experience. Provide small group activities and lots of opportunity for them to be active and take age-appropriate steps to help.
- Ages 10-12 years old love to learn facts, especially unique ones, and they want to know how things work and what sources of information are available to them. They still think in terms of concrete objects and handle ideas better if they are related to something they can do or experience with their senses. They are beginning to move toward understanding abstract ideas. This age loves to help.
- Ages 13-15 years old are moving from concrete to more abstract thinking. Use small groups for in-depth, longer learning experiences. They can begin to deal with abstractions and the future. They are ready to test making a difference.

- High school students are future-oriented and can engage in abstract thinking. Teenagers continue to be group-oriented, and belonging to the group motivates much of their behavior and actions. Let them plan their own projects, providing suggestions and guidance only as needed.

Project WILD provides a variety of experiences that lend themselves to discussions regarding critical trends and current topics in the environment. Natural resource agencies worldwide are currently investigating adaptive management and conservation efforts in response to our changing climate. Project WILD encourages students to become part of this discussion through classroom activities, projects, and field experiences.

Sources:

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