Water & Forest Ecology Classes

MEET A TREE

Themes: Energy; Adaptations; Connections, Cycles, and Systems; The Earth Provides
Lesson Overview: Learners explore the relationship of Earth's four spheres to one of the forest's principal plants: the tree. Students discuss how energy cycles in trees, the structure and functions of trees in the forest ecosystem, and identify common Alabama tree species.

Total Time: 3 hours
Hiking Distance: ~.75 miles
Activity Level: Low to moderate; can be modified for all abilities
Learning Goals: By the end of this session, learners will be able to describe the value of Alabama trees to the forest ecosystem in the following ways:

1. Tree species have unique physical characteristics that can be used to identify them, and all trees have specific parts that function together to transfer energy and nutrients, allowing the tree to grow.
2. Trees are an important component of forest ecosystems that impact and are impacted by the atmosphere, biosphere, geosphere, and hydrosphere.
3. Energy can be traced throughout the life cycle of a tree.

Scientific Practices Highlighted: Asking Questions, Developing and Using Models
Crosscutting Concepts Addressed: Energy and Matter, Structure and Function

VALUE OF A TREE

Themes: Adaptations; The Earth Provides; McDowell Stewards
Lesson Overview: Learners will explore the economic, ecologic, and recreational value of forest communities while hiking through a variety of types of forests at Camp McDowell. Learners will discuss and observe the impact of using forests as resources, and explore aspects of forestry management.

Total Time: 3 hours
Hiking Distance: 1 mile
Activity Level: Can be modified to meet some accessibility needs with notification
Learning Goals: At the end of this session, learners will be able to discuss the role of forests as resources, and how forest ecosystems are impacted by use in the following ways:

1. Forests are a renewable resource that are harvested for production of lumber and paper products, but different methods of harvesting impact forest health in different ways.
2. Forest ecosystems are always changing as a result of natural and human impacts, but healthy forests are characterized by high biodiversity and dominance of regionally important tree species. Some species have specific reproductive strategies that are interrupted by human interactions.
3. Forests are economically valuable beyond traditional harvesting, and sustainable forestry management considers economic, environmental, and recreational activities associated with forest resources.

Scientific Practices Highlighted: Obtaining, Evaluating, and Communicating Information, Constructing Explanations
Crosscutting Concepts Addressed: Energy and Matter, Structure and Function

AQUATIC ADVENTURES

Themes: Adaptations; Connections, Cycles, and Systems; McDowell Stewards
Lesson Overview: Learners will predict how different characteristics of freshwater environments impact the types of organisms found in the environment, observe adaptations specific to those aquatic environments, and identify macroinvertebrates. ***Students should come prepared to get wet in this class. Students must wear appropriate closed toed shoes such as old shoes or rain boots.***

Total Time: 1.5 or 3 hours
Hiking Distance: Highly variable; ranges from vehicle transportation to site, small, steep hike to stream bed, or .5 to

.75 mile hike.
Activity Level: Varies with site(s) selected by instructor. Accommodations for all abilities available, but requires notice.
Learning Goals: By the end of this session, learners will be able to conduct an experiment on a freshwater environments using observation of, abundance of, and or diversity of macroinvertebrates. They will gain skills in the following areas:

1. Making observations of and characterizing unfamiliar organisms.
2. Considering how changing conditions in freshwater environments (naturally or human-induced) can change the composition of aquatic life in that environment.
3. Constructing a reasonable hypothesis about macroinvertebrates and their aquatic habitats, testing it, and discussing the results.

Scientific Practices Highlighted: Planning and Carrying Out Investigations
Crosscutting Concepts Addressed: Structure and Function, Patterns

STREAM STUDIES

Themes: Adaptations; Connections, Cycles, and Systems; McDowell Stewards
Lesson Overview: Learners will assess the water quality of a stream using chemical testing and bioassessments, and discuss the human and natural impacts to stream quality. Learners will relate the stream to local and regional watersheds, and discuss how changes to individual streams can impact water quality in the watershed. ***Students should come prepared to get wet in this class. Students must wear appropriate closed toed shoes such as old shoes or rain boots.***
Total Time: 3 hours
Hiking Distance: .5 - 1 mile
Activity Level: Moderate with a short, steep hike up a stream; not easily modified for all abilities
Learning Goals: By the end of this session, learners will be able to discuss the relationship among biodiversity, water chemistry, and watershed health in the following ways:

1. Stream health is a combination of natural (biologic, geologic, atmospheric, and hydrologic) and human induced (pollution, diversion) factors.
2. Stream health can be monitored using biotic and abiotic assessments.
3. Stream health is an important component of watershed health, and watershed health can be strongly impacted by regional land use choices.

Scientific Practices Highlighted: Asking Questions, Planning and Carrying Out Investigations
Crosscutting Concepts Addressed: Cause and Effect, Systems and System Models

FOREST CONNECTIONS

Themes: Energy; Adaptations; Connections, Cycles, and Systems; The Earth Provides; McDowell Stewards
Lesson Overview: Students will hike through the forest observing the connections between Earth's spheres. Particular focus on specific adaptations and connections among plants and animals in the biosphere. Students will play games to better understand the reason for typical adaptations expressed by forest organisms.

Total Time: 1.5 or 3 hours
Hiking Distance: ~.75 mile
Activity Level: Can be modified for universal accessibility with notification
Learning Goals: At the end of this session, learners will be able to relate the biosphere at Camp McDowell to other spheres in the following ways:

1. Articulate ways in which organisms in the forest are connected to one another through specific adaptations, integrated food webs, and by exploiting specific niches.
2. Link the non-living habitat (atmosphere, geosphere, hydrosphere) to the biosphere.
3. Understand that removing something - living or not - from the habitat can have major consequences for that area.
4. Insects display a wide variety of adaptations tailored to their environment, are vital to the health of ecosystems, and have changed over time to suit specific roles within that environment.

Scientific Practices Highlighted: Constructing Explanations, Planning and Carrying Out Investigations
Crosscutting Concepts Addressed: Structure and Function, Systems and System Models

CONNECTIONS

Themes: Community; Connections, Cycles, and Systems; McDowell Stewards
Lesson Overview: Learners reinforce their understanding of connections between Earth's spheres, human stewardship, and principles of conservation. Learners connect their experiences at McDowell with their lives, and consider ways to share their knowledge when they return home.

Total Time: 1.5 or 3 hours
Hiking Distance: Varies
Activity Level: Low; Can be modified for all abilities
Learning Goals: By the end of this session, learners will be able to relate the classes they have taken to one another and to their own lives in the following ways:

1. All Earth's spheres are intricately connected to one another.
2. Humans play an important role in the health of all ecosystems, and we are stewards of our environment.
3. Small changes in our personal behaviors can have a major impact on the environment.

Scientific Practices Highlighted: Obtaining, Evaluating, and Communicating Information
Crosscutting Concepts Addressed: System and System Models

NATURE HIKE

Themes: Can be varied to match any theme.
Lesson Overview: Learners hike through the forest on a favorite trail of their instructor's choosing. On the trail, open exploration and inquiry are highly encouraged and learners can practice their observation and interpretive skills on plants, animals, insects, and tracks! May include the use of field guides, dichotomous keys, hand lenses, and nature journals.

Total Time: 1.5 or 3 hours
Hiking Distance: varied, usually .75 mile
Activity Level: Can be modified for universal accessibility with notification
Learning Goals: Vary based on chosen theme, but are integrated with those from other classes chosen by instructor. Each experience is unique and tailored to the interest of the field group.

Scientific Practices Highlighted: varied
Crosscutting Concepts Addressed: varied

MYSTERIOUS MEDLEY

Themes: Can be varied to match any theme.
Lesson Overview: Learners get a unique opportunity to experience Camp McDowell like no other group. Instructors build a class tailored to their interests and expertise and correlated to the chosen theme. Learners will explore a topic with their instructor, and experience the excitement of natural investigation and inquiry. The combination of the skillset of the instructor, the passion they bring toward the subject, and the opportunity for open inquiry and investigation result in a one-of-a-kind experience that creates future naturalists.

Total Time: 1.5 or 3 hours
Hiking Distance: Varied
Activity Level: Can be modified for universal accessibility with notification
Learning Goals: Vary based on chosen theme, but are integrated with those from other classes chosen by instructor. Each experience is unique and tailored to the interest of the field group.

Scientific Practices Highlighted: Varied
Crosscutting Concepts Addressed: Varied