

## Plants Guided Tour, Cedar Bog

### Description and Curriculum Resources

<b>Tour:</b>	Plants Guided Tour
<b>Availability:</b>	Wednesday, Thursday, and Friday September, October, April, May June 9:30 a.m. – 2:30 p.m.
<b>Time Allowance:</b>	1½ to 2 hours on site
<b>Cost:</b>	\$3.00 admission per student
<b>Grades:</b>	Adaptable to all grades Maximum 100 students

#### **Description:**

This guided tour will focus on keying out plants, solar powered sugar factories; life cycles; adaptations; structures related to function; interactions with other plants and animals, and sexual and asexual reproduction..

#### **Science Academic Content Standards Addressed:**

##### **Earth and Space Sciences (Earth Systems)**

1<sup>st</sup>. Identify that resources are things the we get from the living (e.g., forests) and nonliving (e.g., minerals, water) environment and that resources are necessary to meet the needs and wants of a population.

1<sup>st</sup>. Explain that the supply of many resources is limited but the supply can be extended through careful use, decreased use, reusing, and/or recycling.

5<sup>th</sup>. Investigate ways Earth's renewable resources (e.g., fresh water, air, wildlife and trees) can be maintained.

##### **Earth and Space Sciences (Processes that Shape Earth)**

**K.** Explore that animals and plants cause changes to their surroundings

**K.** Observe and describe seasonal changes in weather

1<sup>st</sup>. Explain that all organisms cause changes in the environment where they live; the changes can be very noticeable or slightly noticeable, fast or slow (e.g., spread of grass cover slowing soil erosion, tree roots slowly breaking sidewalks).

4<sup>th</sup>. Identify and describe how freezing, thawing and plant growth reshape the land surface by causing the weathering of rock.

##### **Life Sciences (Characteristics and Structure of Life)**

**K.** Explore differences between living and non-living things.

**K.** Discover that stories sometimes give plants and animals characteristics they really do not have.

1<sup>st</sup>. Explain that food comes from sources other than grocery stores (e.g., farm crops, farm animals, oceans, lakes and forests).

1<sup>st</sup>. Explore that organisms, including people, have basic needs which include air, water, food, living space and shelter.

2<sup>nd</sup>. Explain that animals, including people, need air, water, food, living space and shelter; plants need air, water, nutrients (e.g., minerals), living space and light to survive.

2<sup>nd</sup>. Identify that there are many distinct environments that support different kinds of organisms.

2<sup>nd</sup>. Explain why organisms can survive only in environments that meet their needs (e.g., organisms that once lived on Earth have disappeared for different reasons such as natural forces or human-caused effects).

6<sup>th</sup>. Explain that multi-cellular organisms have a variety of specialized cells, tissues, organs and organ systems that perform specialized functions.

6<sup>th</sup>. Identify how plant cells differ from animal cells (e.g., cell wall and chloroplasts).

### **Life Sciences (Heredity)**

K. Investigate observable features of plants and animals that help them live in different kinds of places.

K. Describe how plants and animals usually resemble their parents

K. Investigate variations that exist among individuals of the same kind of plant or animal.

2<sup>nd</sup>. Compare similarities and differences among individuals of the same kind of plants and animals, including people.

4<sup>th</sup>. Compare the life cycles of different plants including germination, maturity, reproduction and death.

6<sup>th</sup>. Recognize that an individual organism does not live forever; therefore reproduction is necessary for the continuation of every species and traits are passed on to the next generation through reproduction.

6<sup>th</sup>. Describe that in asexual reproduction all the inherited traits come from a single parent.

6<sup>th</sup>. Describe that in sexual reproduction an egg and sperm unite and some traits come from each parent, so the offspring is never identical to either of its parents.

8<sup>th</sup>. Describe that asexual reproduction limits the spread of detrimental characteristics through a species and allows for genetic continuity.

8<sup>th</sup>. Recognize that in sexual reproduction new combinations of traits are produced which may increase or decrease an organism's chances for survival.

### **Life Sciences (Diversity and Interdependence of Life)**

K. Investigate the habitats of many different kinds of local plants and animals and some of the ways in which animals depend on plants and each other in our community.

1<sup>st</sup>. Investigate that animals eat plants and/or other animals for food and may also use plants or other animals for shelter and nesting.

1<sup>st</sup>. Recognize that seasonal changes can influence the health, survival or activities of organisms.

2<sup>nd</sup>. Explain that food is a basic need of plants and animals (e.g., plants need sunlight to make food and to grow, animals eat plants and/or other animals for food, food chain) and is important because it is a source of energy (e.g., energy used to play, ride bicycles, read, etc.).

2<sup>nd</sup>. Investigate the different structures of plants and animals that help them live in different environments (e.g., lungs, gills, leaves and roots).

2<sup>nd</sup>. Compare the habitats of many different kinds of Ohio plants and animals and some of the ways animals depend on plants and each other.

2<sup>nd</sup>. Compare Ohio plants during the different seasons by describing changes in their appearance.

4<sup>th</sup>. Relate plant structures to their specific functions (e.g., growth, survival and reproduction).

4<sup>th</sup>. Classify common plants according to their characteristics (e.g., tree leaves, flowers, seeds, roots and stems).

4<sup>th</sup>. Describe how organisms interact with one another in various ways (e.g., many plants depend on animals for carrying pollen or dispersing seeds).

5<sup>th</sup>. Describe the role of producers in the transfer of energy entering ecosystems as sunlight to chemical energy through photosynthesis.

5<sup>th</sup>. Explain how almost all kinds of animals' food can be traced back to plants.

6<sup>th</sup>. Describe how organisms may interact with one another.

7<sup>th</sup>. Investigate how organisms or populations may interact with one another through symbiotic relationships and how some species have become so adapted to each other that neither could survive without the other (e.g., predator-prey, parasitism, mutualism and commensalism).

7<sup>th</sup>. Explain how the number of organisms an ecosystem can support depends on adequate biotic (living) resources (e.g., plants, animals) and abiotic (non-living) resources (e.g., light, water and soil).

7<sup>th</sup>. Explain that photosynthetic cells convert solar energy into chemical energy that is used to carry on life functions or is transferred to consumers and used to carry on their life functions.

10<sup>th</sup>. Describe that biological classification represents how organisms are related with species being the most fundamental unit of the classification system. Relate how biologists arrange organisms into a hierarchy of groups and subgroups based on similarities and differences that reflect their evolutionary relationships.

10<sup>th</sup>. Explain that the variation of organisms within a species increases the likelihood that at least some members of a species will survive under gradually changing environmental conditions.

10<sup>th</sup>. Relate diversity and adaptation to structures and their functions in living organisms (e.g., adaptive radiation).

### **Life Sciences (Evolutionary Theory)**

8<sup>th</sup>. Explain how variations in structure, behavior or physiology allow some organisms to enhance their reproductive success and survival in a particular environment.

### **Physical Sciences (Nature of Matter)**

**K.** Examine and describe objects according to the materials that make up the object (e.g., wood, metal, plastic and cloth).

**K.** Describe and sort objects by one or more properties (e.g., size, color and shape).

1<sup>st</sup>. Classify objects according to the materials they are made of and their physical properties.

6<sup>th</sup>. Describe that chemical and physical changes occur all around us (e.g., in the human body, cooking and industry).

### **Physical Sciences (Nature of Energy)**

1<sup>st</sup>. Recognize that the sun is an energy source that warms the land, air and water.

1<sup>st</sup>. Describe that energy can be obtained from many sources in many ways (e.g., food, gasoline, electricity or batteries).

6<sup>th</sup>. Describe how renewable and nonrenewable energy resources can be managed (e.g., fossil fuels, trees and water)

### **Scientific Inquiry (Doing Scientific Inquiry)**

K. Ask "what if" questions.

K. Use the five senses to make observations about the natural world.

K. Make new observations when people give different descriptions for the same thing..

1<sup>st</sup>. Ask "what happens when" questions

2<sup>nd</sup>. Ask "how can I/we" questions.

2<sup>nd</sup>. Ask "how do you know" questions (not "why" questions) in appropriate situations and attempt to give reasonable answers when others ask questions.

### **Scientific Ways of Knowing (Nature of Science)**

4<sup>th</sup>. Record the results and data from an investigation and make a reasonable explanation.

### **Scientific Ways of Knowing (Ethical Practices)**

4<sup>th</sup>. Explain why keeping records of observations and investigations is important.

6<sup>th</sup>. Describe why it is important to keep clear, thorough and accurate records.

## **Social Studies Academic Content Standards Addressed:**

### **History (Chronology)**

5<sup>th</sup>. Create time lines and identify possible relationships between events.

5<sup>th</sup>. Explain the impact of settlement, industrialization and transportation on the expansion of the United States.

### **People in Societies (Cultures)**

5<sup>th</sup>. Compare the cultural practices and products of diverse groups in North America including: artistic expressions; religion; language; food; clothing; shelter.

### **Geography (Places and Regions)**

4<sup>th</sup>. Describe and compare the landforms, climates, population, vegetation and economic characteristics of places and regions in Ohio.

5<sup>th</sup>. Describe and compare the landforms, climates, population, culture and economic characteristics of places and regions in North America.

5<sup>th</sup>. Explain how climate is influenced by: Earth-sun relationships; landforms; vegetation.

### **Geography (Human Environmental Interaction)**

4<sup>th</sup>. Identify how environmental processes (i.e., glaciation and weathering) and characteristics (landforms, bodies of water, climate, vegetation) influence human settlement and activity in Ohio.

4<sup>th</sup>. Identify ways that people have affected the physical environment of Ohio including: use of wetlands, use of forests; building farms, towns and transportation systems; using fertilizers, herbicides and pesticides; building dams.

5<sup>th</sup>. Explain how the characteristics of different physical environments affect human activities in North America.

5<sup>th</sup>. Analyze the positive and negative consequences of human changes to the physical environment including: Great Lakes navigation; highway systems; irrigation; mining; and introduction of new species.

#### **Citizenship (Rights and Responsibilities)**

5<sup>th</sup>. Explain the obligation of upholding the U.S. Constitution including: obeying laws; paying taxes; serving on juries.

#### **Social Studies Skills and Methods (Thinking and Organizing)**

5<sup>th</sup>. Draw inferences from key relevant information.

#### **Social Studies Skills and Methods (Problem Solving)**

5<sup>th</sup>. Use a problem-solving/decision-making process which includes: identifying a problem; gathering information; listing and considering options; considering advantages and disadvantages of options; choosing and implementing a solution; developing criteria for judging its effectiveness; evaluating the effectiveness of the solution.

#### **Plants Glossary:**

**asexual reproduction.** Involving or reproducing by reproductive processes (as cell division, spore formation, fission, or budding) that do not involve the union of germ cells or egg and sperm.

**biological evolution.** Changes in the genetic composition of a population through successive generations.

**biomass.** The amount of living matter.

**biome.** Major ecological community (tropical rain forest, grassland, or desert).

**cell.** The smallest structural and functional unit of an organism.

**cell respiration.** Metabolic processes which break down nutrients into usable energy.

**cell wall.** A structure external to the plasma membrane of a plant cell. It provides structure and support.

**characteristic.** A distinguishing trait, feature, quality, or property.

**chloroplast.** A plastid that contains chlorophyll and is the site of photosynthesis.

**chromosome.** A threadlike structure of nucleic acids and protein found in the nucleus of most living cells, carrying genetic information in the form of genes.

**classification.** Systematic arrangement in groups or categories according to established criteria.

**conservation.** A careful preservation and protection of something; especially planned management of a natural resource to prevent exploitation, destruction, or neglect.

**DNA.** Deoxyribonucleic acid, a double strand of nucleotides, that is a self-replicating material present in living organisms as the main constituent of chromosomes. It contains the genetic code that transmits the heredity pattern.

**ecological.** The interactions and relationships between organisms and their environment.

**ecosystem.** The complex of a community of organisms and its environment functioning as an ecological unit.

**endothermic.** Characterized by or formed with absorption of heat.

**energy.** The capacity for doing work; can be in various forms such as nuclear, sound, thermal, and light.

**environment.** The complex of physical, chemical, and biotic factors that act upon an organism or an ecological community and ultimately determine its form and survival.

**evidence.** Facts of observations on which a conclusion can be based.

**evolution (biological),** Changes in the genetic composition of a population through successive generations.

**food chain.** An arrangement of the organisms of an ecological community according to the order of predation in which each uses the next usually lower member as a food source.

**food web.** The totality of interacting food chains in an ecological community; interacting food chains in an ecological community.

**fungi.** Any of a major group of saprophytic and parasitic spore-producing organisms including molds, rusts, mildews, smuts, mushrooms, and yeasts.

**gene.** A functional hereditary unit located at a particular point on a chromosome that controls or acts in the transmission of hereditary characteristics.

**germination.** The beginning of growth in a spore, seed, zygote, etc., especially following a dormant period.

**glaciation.** To subject to glacial action in which a large body of ice moves slowly down a slope or valley, or spreads outward on a land surface.

**habitat.** The place or environment where a plant or animal naturally or normally lives and grows.

**herbivore.** A plant-eating animal.

**life.** An organism that has the capacity for metabolism, growth, reaction to stimuli and reproduction.

**life cycle.** The series of stages in form and functional activity through which an organism passes from fertilized ovum to the fertilized ovum of the next generation.

**microorganisms.** An organism or microscopic or ultramicroscopic size.

**natural.** Existing in, or produced by nature.

**nutrient.** A nutritive substance or ingredient.

**observe.** To watch carefully, especially with attention to details or behavior for the purpose of arriving at a judgement.

**omnivore.** An animal that feeds on both animal and vegetable substances.

**organ.** A different structure (such as a heart, kidney, leaf, or stem) consisting of cells and tissues and performing some specific function in an organism.

**organ system.** Organs working together for a specific function.

**organic.** Compounds containing carbon and chiefly or ultimately of biological organ.

**organism.** An individual constituted to carry on the activities of life by means of organs separate in function but mutually dependent; a living being.

**parasite.** An organism living in, with or on another organism in which a parasite obtains benefits from a host that is usually injures.

**photosynthesis.** The chemical process by which chlorophyll-containing plants use light to convert carbon dioxide and water into carbohydrates, releasing oxygen as a byproduct.

**physical properties.** A property of a material that can be observed without changing the chemical makeup of material.

**physiology.** The biological science of essential and characteristic life processes, activities and functions.

**pollution.** A substance that, when added to the environment causes the environment to be harmful or unfit for living things.

**producer.** An of various organisms (such as carbon dioxide and inorganic nitrogen) and many of which are food sources for other organisms.

**property.** A quality or trait belonging to an individual or thing.

**reproduction.** The process by which organisms give rise to offspring and which fundamentally consists of the segregation of a portion of the parental body by a sexual or an asexual process, and its subsequent growth and differentiation into a new individual.

**respiration.** The physical and chemical processes by which an organism supplies its cells and tissues with the oxygen needed for metabolism and relieves them of the carbon dioxide formed in energy-producing reactions.

**species.** A group of organisms consisting of similar individuals capable of exchanging genes or interbreeding.

**structure.** The arrangement of particles or parts in a substance or body.

**system.** 1. A group of body organs that together perform one or more vital functions. W. An organized group of devices, parts or factors that together perform a functions or drive a process (weather systems, mechanical systems).

**tissue.** An aggregate of cells usually of a particular kind together with their intercellular substance that form one of the structural materials or organisms.

Cedar Bog is operated by the Ohio Historical Society, a nonprofit organization that serves as the state's partner in preserving and interpreting Ohio's history, archaeology, and natural history.