

## Standards Taught in Middle School That Could Relate to the Pocket Forest

### **6th grade:**

**6.MS-LS1-2.** Develop and use a model to describe how parts of cells contribute to the cellular functions of obtaining food, water, and other nutrients from its environment, disposing of wastes, and providing energy for cellular processes.

Clarification Statement:

- Parts of plant and animal cells include (a) the nucleus, which contains a cell's genetic material and regulates its activities; (b) chloroplasts, which produce necessary food (sugar) and oxygen through photosynthesis (in plants); (c) mitochondria, which release energy from food through cellular respiration; (d) vacuoles, which store materials, including water, nutrients, and waste; (e) the cell membrane, which is a selective barrier that enables nutrients to enter the cell and wastes to be expelled; and (f) the cell wall, which provides structural support (in plants).
- 

### **7th grade:**

**7.MS-ESS3-4.** Construct an argument supported by evidence that human activities and technologies can mitigate the impact of increases in human population and per capita consumption of natural resources on the environment.

Clarification Statements:

- Arguments should be based on examining historical data such as population graphs, natural resource distribution maps, and water quality studies over time.
- Examples of negative impacts can include changes to the amount and quality of natural resources such as water, mineral, and energy supplies.

**7.MS-LS1-4.** Construct an explanation based on evidence for how characteristic animal behaviors and specialized plant structures increase the probability of successful reproduction of animals and plants.

Clarification Statements:

- Examples of animal behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalizations and colorful plumage to attract mates for breeding.
- Examples of animal behaviors that affect the probability of plant reproduction could include (a) transferring pollen or seeds and (b) creating conditions for seed germination and growth.
- Examples of plant structures that affect the probability of plant reproduction could include bright flowers attracting butterflies that transfer pollen, flower nectar, and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.

**7.MS-LS2-2.** Describe how relationships among and between organisms in an ecosystem can be competitive, predatory, parasitic, and mutually beneficial and that these interactions are found across multiple ecosystems.

Clarification Statement:

- Emphasis is on describing consistent patterns of interactions in different ecosystems in terms of relationships among and between organisms.

**7.MS-LS2-3.** Develop a model to describe that matter and energy are transferred among living and nonliving parts of an ecosystem and that both matter and energy are conserved through these processes.

Clarification Statements:

- Cycling of matter should include the role of photosynthesis, cellular respiration, and decomposition, as well as transfer among producers, consumers (primary, secondary, and tertiary), and decomposers.
- Models may include food webs and food chains.

**7.MS-LS2-4.** Analyze data to provide evidence that disruptions (natural or human-made) to any physical or biological component of an ecosystem can lead to shifts in all its populations.

Clarification Statement:

- Focus should be on ecosystem characteristics varying over time, including disruptions such as hurricanes, floods, wildfires, oil spills, and construction.

**7.MS-LS2-5.** Evaluate competing design solutions for protecting an ecosystem. Discuss benefits and limitations of each design.

Clarification Statements:

- Examples of design solutions could include water, land, and species protection and the prevention of soil erosion.
- Examples of design solution constraints could include scientific, economic, and social considerations.

**7.MS-LS2-6.** Explain how changes to the biodiversity of an ecosystem—the variety of species found in the ecosystem—may limit the availability of resources humans use.

Clarification Statement:

- Examples of resources can include food, energy, medicine, and clean water

## **8th Grade:**

**8.MS-ESS3-5.** Examine and interpret data to describe the role that human activities have played in causing the rise in global temperatures over the past century.

Clarification Statements:

- Examples of human activities include fossil fuel combustion, deforestation, and agricultural activity.
- Examples of evidence can include tables, graphs, and maps of global and regional temperatures; atmospheric levels of gases such as carbon dioxide and methane; and the rates of human activities.

**8.MS-LS1-5.** Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms.

Clarification Statements:

- Examples of environmental conditions could include availability of food, light, space, and water.
- Examples of genetic factors could include the genes responsible for size differences in different breeds of dogs, such as Great Danes and Chihuahuas.
- Examples of environmental factors could include drought decreasing plant growth, fertilizer increasing plant growth, and fish growing larger in large ponds than they do in small ponds.
- Examples of both genetic and environmental factors could include different varieties of plants growing at different rates in different conditions.

**8.MS-LS4-4.** Use a model to describe the process of natural selection, in which genetic variations of some traits in a population increase some individuals' likelihood of surviving and reproducing in a changing environment. Provide evidence that natural selection occurs over many generations.

Clarification Statements:

- The model should include simple probability statements and proportional reasoning.
- Examples of evidence can include Darwin's finches, necks of giraffes, and peppered moths

