



Surrounded by Sharks

Kentucky Academic Standards (Grades 3-8)

Below is a list of Kentucky Academic Standards discussed during the teaching of **Surrounded by Sharks**.

KENTUCKY CORE CONTENT FOR ASSESSMENT

End of Primary

- MA-EP-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, tally tables, pictographs, bar graphs, circle graphs with two or three sectors, line plots, two-circle Venn diagrams).
- MA-EP-4.1.2 Students will collect data.
- MA-EP-4.1.3 Students will organize and display data.
- SC-EP-3.4.1 Students will explain the basic needs of organisms.
Organisms have basic needs. For example, animals need air, water and food; plants need air, water, nutrients and light. Organisms can survive only in environments in which their needs can be met.
- SC-EP-3.4.2 Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).
- SC-EP-3.4.3 Students will describe the basic structures and related functions of plants and animals that contribute to growth, reproduction and survival. Each plant or animal has observable structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. These observable structures should be explored to sort, classify, compare and describe organisms.
- SC-EP-3.5.1 Students will describe fossils as evidence of organisms that lived long ago, some of which may be similar to others that are alive today.

Fossils found in Earth materials provide evidence about organisms that lived long ago and the nature of the environment at that time. Representations of fossils provide the basis for describing and



drawing conclusions about the organisms and basic environments represented by them.

- SC-EP-4.6.1 Students will describe basic relationships of plants and animals in an ecosystem (food chains).
- SC-EP-4.7.1 Students will describe the cause and effect relationships existing between organisms and their environments.
- SS-EP-1.3.2 Students will identify and give examples of good citizenship at home, at school and in the community (e.g., helping with chores, obeying rules, participating in community service projects such as recycling, conserving natural resources, donating food/supplies) and explain why civic engagement in the community is important.

Fourth Grade

- MA-04-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, tally tables, pictographs, bar graphs, circle graphs, line plots, Venn diagrams).
- MA-04-4.1.2 Students will collect data.
- MA-04-4.1.3 Students will construct data displays (pictographs, bar graphs, line plots, Venn diagrams, tables).
- SC-04-3.4.1 Students will:
- compare the different structures and functions of plants and animals that contribute to the growth, survival and reproduction of the organisms;
 - make inferences about the relationship between structure and function in organisms.

Each plant or animal has structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. Evidence about the relationship between structure and function should be used to make inferences and draw conclusions.

- SC-04-3.4.2 Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).



- SC-04-3.5.1 Students will use representations of fossils to:
- draw conclusions about the nature of the organisms and the basic environments that existed at the time;
 - make inferences about the relationships to organisms that are alive today.

Fossils found in Earth materials provide evidence about organisms that lived long ago and the nature of the environment at that time. Representations of fossils provide the basis for describing and drawing conclusions about the organisms and basic environments represented by them.

- SC-04-4.6.1 Students will analyze patterns and make generalizations about the basic relationships of plants and animals in an ecosystem (food chain).
- SC-04-4.7.1 Students will make predictions and/or inferences based on patterns of evidence related to the survival and reproductive success of organisms in particular environments.
- SC-04-4.7.2 Students will describe human interactions in the environment where they live; classify the interactions as beneficial or harmful to the environment using data/evidence to support conclusions.

Fifth Grade

- MA-05-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, tally tables, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs).
- MA-05-4.1.2 Students will collect data (e.g., tallies, surveys) and explain how the skills apply in real-world and mathematical problems.
- MA-05-4.1.3 Students will construct data displays (pictographs, bar graphs, line plots, line graphs, Venn diagrams, tables).
- SC-05-3.4.1 Students will describe and compare living systems to understand the complementary nature of structure and function. Observations and comparisons of living systems at all levels of organization illustrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissues, organs, organ systems, organisms (e.g., bacteria, protists, fungi, plants, animals), and ecosystems. Examining the relationship between structure and function provides a basis for comparisons and classification schemes.



SC-05-3.5.1 Students will describe cause and effect relationships between enhanced survival/reproductive success and particular biological adaptations (e.g., changes in structures, behaviors, and/or physiology) to generalize about the diversity of populations of organisms.

Biological change over time accounts for the diversity of populations developed through gradual processes over many generations. Examining cause and effect relationships between enhanced survival/reproductive success and biological adaptations (e.g., changes in structures, behaviors, and/or physiology), based on evidence gathered, creates the basis for explaining diversity.

SC-05-3.5.2 Students will understand that 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.

SC-05-4.7.1 Students will: describe and categorize populations of organisms according to the function they serve in an ecosystem (e.g., producers, consumers, decomposers); draw conclusions about the effects of changes to populations in an ecosystem.

SC-05-4.7.2 Students will understand that a population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.

Sixth Grade

MA-06-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots).

MA-06-4.1.4 Students will determine and construct appropriate data displays (bar graphs, line plots, Venn diagrams, tables, line graphs), and will explain why the type of display is appropriate for the data.

SC-06-3.4.2 Students will make inferences about the factors influencing behavior based on data/evidence of various organism's behaviors.

Behavior is one kind of response an organism may make to an internal or environmental stimulus. Observations of organisms, data collection/analysis, support generalizations/conclusions that a behavioral response is a set of



actions determined in part by heredity and in part from experience. A behavioral response requires coordination and communication at many levels including cells, organ systems and organisms.

- SC-06-3.5.1 Students will explain that biological change over time accounts for the diversity of species developed through gradual processes over many generations.

Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.

- SC-06-4.7.1 Students will describe the consequences of change in one or more abiotic factors on a population within an ecosystem.
The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition).

Seventh Grade

- MA-07-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots, scatter plots).

- MA-07-4.1.4 Students will determine and construct appropriate data displays (bar graphs, line plots, Venn diagrams, tables, line graphs, stem-and-leaf plots), and will explain why the type of display is appropriate for the data.

- SC-07-3.5.1 Students will:
- describe the usefulness of fossil information to make conclusions about past life forms and environmental conditions;
 - explain the cause and effect relationship of the extinction of a species and environmental changes.

Extinction of species is common and occurs when the adaptive characteristics of a species are insufficient to allow its survival. Most of the species that have lived on Earth no longer exist. Fossils provide evidence of how environmental conditions and life have changed.

- SC-07-4.7.1 Students will compare abiotic and biotic factors in an ecosystem in order to explain consequences of change in one or more factors.
The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic



resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.

Eighth Grade

MA-08-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots, scatter plots, histograms, box-and-whiskers plots).

MA-08-4.1.4 Students will:

- construct data displays (Venn diagrams, tables, line graphs, stem-and-leaf plots, circle graphs, scatter plots);
- explain why the type of display is appropriate for the data and
- explain how misleading representations affect interpretations and conclusions about data (e.g., changing the scale on a graph).

SC-08-3.4.3 Students will form or justify conclusions as to whether a response is innate or learned using data/evidence on behavioral responses to internal and external stimuli.

Behavioral responses to internal changes and external stimuli can be innate or learned. Responses to external stimuli can result from interactions with the organism's own species or other species, as well as environmental changes.

SC-08-3.4.4 Students will describe and explain patterns found within groups of organisms in order to make biological classifications of those organisms. Observations and patterns found within groups of organisms allow for biological classifications based on how organisms are related.

SC-08-3.5.1 Students will draw conclusions and make inferences about the consequences of change over time that can account for the similarities among diverse species.

The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms.



SC-08-4.6.5 Students will:

- describe the relationships between organisms and energy flow in ecosystems (food chains and energy pyramids);
- explain the effects of change to any component of the ecosystem.

Energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers.

SC-08-4.7.1 Students will describe the interrelationships and interdependencies within an ecosystem and predict the effects of change on one or more components within an ecosystem.

Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.