

Savage Ancient Seas Exhibit and SAS Education Packet
Addressed Common Core/Next Generation National Education Standards

Savage Ancient Seas is a worthwhile and justifiable experience for learners of all ages. The exhibition is stocked with educational and informative signs, labels and kiosks including a 46" multimedia touch screen. These interpretive graphics and interactive stations directly address formal education standards at the state and national levels including those outlined in the Common Core. Immersed in the context of the exhibit, surrounded by mind-blowing fossil organisms, the science of paleontology is interpreted through models and diagrams of extinct ecosystems, geologic time, and other concepts directly reinforcing the Common Core's standards for integration of knowledge and ideas at every grade level.

To assist educators with extending the experience to their classroom we can provide a digital specimen guide customized to fit your layout and branded specifically for your location, to be distributed and/or printed as you see fit. Also for educators, we can provide an extensive list of classroom activities adaptable across many grade levels, and reputable outside resources to connect with online.

The Common Core standards for science are integral in the English Language Arts Standards for K-12. A visit to Savage Ancient Seas offers students a chance to become engrossed in a series of didactic experiences that directly reinforce the following Key Ideas and Details:

- Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
- Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
- Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
- Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.
- Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
- Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.
- Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.
- Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.

Next Generation Science standards are typically outlined by discipline, and *Savage Ancient Seas* addresses standards across a number of disciplines in the exhibition as well as the educator resources we offer. The following are performance expectations from across grade levels that are addressed by components of *Savage Ancient Seas*:

Life Sciences

- Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.
- Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
- Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
- Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.
- Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
- Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.
- Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
- Construct an explanation based on evidence that describes how genetic variations of traits in a population increasesome individuals' probability of surviving and reproducing in a specific environment.
- Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
- Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
- Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

- Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
- Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
- Use evidence to support the explanation that traits can be influenced by the environment.
- Construct an argument that some animals form groups that help members survive.
- Make observations of plants and animals to compare the diversity of life in different habitats.
- Use observations to describe patterns of what plants and animals (including humans) need to survive.

Earth and Space Sciences

- Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.
- Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
- Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
- Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
- Analyze and interpret data from maps to describe patterns of Earth's features.
- Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- Identify evidence from patterns in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time.
- Develop a model to represent the shapes and kinds of land and bodies of water in an area.

- Use information from several sources to provide evidence that Earth events can occur quickly or slowly.