

Ocean Program Outlines

- Short discussion of herbivores, carnivores, insectivores and omnivores and how plants are the foundation of most food chains. Lots of plants = lots of herbivores = lots of carnivores, etc.
 - Song 1: [Chimichanga Song](#)
- Discuss ocean niches and how prevalence of light and nutrients makes coastal ecosystems more densely populated than the deep ocean ones
 - Song 2: [Living in a Wetland](#)
- Provide example of a typical ocean food chain and show upper levels depend upon greater amounts of life in lower levels of the food chain.
 - Song 3: [Plankton Love Song](#)
- Tell story of the return of the endangered bald eagle
 - Song 4: [We Can Bring Them Back](#)
- Define symbiosis using clownfish and anemones as an example
 - Song 5: [Living In Symbiosis](#)

§112.16. Science, Grade 5, Beginning with School Year 2010-2011.

(a) Introduction.

(1) Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." ~Lucas discusses throughout how science is learning by *observing* and, through projected images and videos, provides students chances to make their own observations.

(2) Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include patterns, cycles, systems, models, and change and constancy. ~This program provides models of food chains in various ways and discusses the ocean as a global system supporting human and animal life in many ways.

(4) In Grade 5, investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world. ~the study of the return of the bald eagle provides examples of how scientific research helped us understand how they were affected by pesticides.

(A) Within the physical environment, students learn about the physical properties of matter, including magnetism, physical states of matter, relative density, solubility in water, and the ability to conduct or insulate electrical and heat energy. Students explore the uses of light, thermal, electrical, and sound energies. ~this is relevant in discussions of ocean currents

(B) Within the natural environment, students learn how changes occur on Earth's surface and that predictable patterns occur in the sky. Students learn that the natural world consists of resources, including nonrenewable, renewable, and alternative energy sources.

(C) Within the living environment, students learn that structure and function of organisms can improve the survival of members of a species. Students learn to differentiate between inherited traits and learned behaviors. Students learn that life cycles occur in animals and plants and that the carbon dioxide-oxygen cycle occurs naturally to support the living environment. ~adaptations are often defined in discussion of sharks, plankton and other sea life. CO₂/O₂ cycle is defined in introduction to *Plankton Love Song*.

(b) Knowledge and skills.

(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures and environmentally appropriate and ethical practices. The student is expected to:

(A) demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations; and

(B) make informed choices in the conservation, disposal, and recycling of materials. ~these kinds of topics are often covered through students' questions and/or the conclusion of the program.

(3) Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:

(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student; ~This is fostered throughout the presentation with questions posed to the students and the discussions between songs.

(D) connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists. ~this program highlights the career of scientist Rachel Carson and, often, Benjamin Franklin and others.

(5) Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. The student is expected to:

(A) classify matter based on physical properties, including mass, magnetism, physical state (solid, liquid, and gas), relative density (sinking and floating), solubility in water,

and the ability to conduct or insulate thermal energy or electric energy; ~states of matter and density are usually discussed in relation to ocean currents.

(D) identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving salt in water or adding lemon juice to water. ~often discussed in introductions to wetland and/or plankton songs

(6) Force, motion, and energy. The student knows that energy occurs in many forms and can be observed in cycles, patterns, and systems. The student is expected to:

(A) explore the uses of energy, including mechanical, light, thermal, electrical, and sound energy; ~the importance of solar energy to life on earth is a primary focus of this program

(7) Earth and space. The student knows Earth's surface is constantly changing and consists of useful resources. The student is expected to:

(A) explore the processes that led to the formation of sedimentary rocks and fossil fuels; ~This is covered in discussion of wetlands

(C) identify alternative energy resources such as wind, solar, hydroelectric, geothermal, and biofuels; and ~this topic frequently comes up through discussions and students' questions.

(D) identify fossils as evidence of past living organisms and the nature of the environments at the time using models. ~Often discussed during introduction to wetland song

(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:

(B) explain how the Sun and the ocean interact in the water cycle; ~this is often discussed in introduction to the program

(9) Organisms and environments. The student knows that there are relationships, systems, and cycles within environments. The student is expected to:

(A) observe the way organisms live and survive in their ecosystem by interacting with the living and non-living elements; ~This is a central theme of the program and many visual examples of ocean creatures help illustrate this concept.

(B) describe how the flow of energy derived from the Sun, used by producers to create their own food, is transferred through a food chain and food web to consumers and decomposers; ~basically THE central message of this program.

(C) predict the effects of changes in ecosystems caused by living organisms, including humans, such as the overpopulation of grazers or the building of highways;

and ~this topic often arises during discussion of bald eagles and conclusion of the program.

(D) identify the significance of the carbon dioxide-oxygen cycle to the survival of plants and animals. ~discussed in introduction to plankton song.

(10) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environments. The student is expected to:

(A) compare the structures and functions of different species that help them live and survive such as hooves on prairie animals or webbed feet in aquatic animals;

(B) differentiate between inherited traits of plants and animals such as spines on a cactus or shape of a beak and learned behaviors such as an animal learning tricks or a child riding a bicycle; and

(C) describe the differences between complete and incomplete metamorphosis of insects. ~this and (A) & (B) above are inserted when relevant to discussions. They are the primary topics of Lucas' programs on adaptations and ecosystems.