

# ***Whale Watch Program***

## ***At Sea Portion***

### **GRADE TWO**

#### Life Sciences

**2. Plants and animals have predictable life cycles. As a basis for understanding this concept:**

- a. Students know that organisms reproduce offspring of their own kind and that the offspring resemble their parents and one another.—**

*Students learn that whales have few offspring and much is invested into reproduction. The life cycle of the grey whale is discussed. Often, whales are observed, and students directly view anatomical similarities between whales within a species.*

- c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.—**

*Students learn that whales, like other organisms, have many characteristics inherited from the parents. Yet, these characteristics may be influenced by the environment in that some are expressed while others are not. Those expressed characteristics are necessary or beneficial to the survival of the whale.*

- d. Students know there is variation among individuals of one kind within a populations.—**

*Although similarities between whales of a species may be obvious to students, it is also explained that slight variations of the animals in a population are essential to the survival of the population. Without these variations, changes in the environment may lead to the eradication of entire populations. Historical whaling along with low fecundity make this genetic variation among whales in a population essential to their survival.*

### **GRADE THREE**

Physical Sciences

**2. Light has a source and travels in a direction. As a basis for understanding this concept:**

**a. Students know sunlight can be blocked to create shadows.—**

*Students learn that large animals create long-casting shadows that are exaggerated in a water environment. The importance of these shadows is demonstrated with regard to view by predators and prey of the organism. Many large animals, such as whales, have evolved keels to reduce this shadow effect.*

**GRADE FOUR**

Life Sciences

**2. All organism need energy and matter to live and grow. As a basis for understanding this concept:**

**b. Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.—**

*Students learn that whales are often apex predators, meaning they are not considered as prey to other animals because they are the top of the food chain. Whales and other organisms may compete for food, however, when prey is limited in quantity and availability.*

**GRADE FIVE**

Life Sciences

**2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:**

**a. Students know many multicellular organisms have specialized structures to support the transport of materials.—**

*Students learn about the anatomy of the gray whale along with feeding habits of various whales. Differences between baleen whales and predatory whales are discussed. Major anatomical features are compared among these whales, such as the baleen and teeth utilized in the feeding process.*

Earth Sciences

**3. Water on Earth moves between the oceans and land through the processes of evaporation and condensation. As a basis for understanding this concept:**

**a. Students know most of Earth’s water is present as salt water in the oceans, which cover most of Earth’s surface.—**

*Students learn most of the Earth’s water contains salt and is located in the oceans. From this, students are encouraged to think about methods of salt removals that organisms living in the marine environment, such as whales, utilize to obtain necessary water from their environment.*

**GRADE SIX**

Focus on Earth Sciences

**Heat (Thermal Energy) (Physical Sciences)**

**4. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:**

**a. Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.—**

*Students learn that warm-blooded animals, such as mammals, require special mechanisms to maintain sufficient body temperature for survival in the cold ocean water. Ocean water is colder than warm-blooded animals, and therefore heat from these animals dissipates into the surrounding water. Students are encouraged to critically think about this topic. Students learn that whales have a low surface area to volume ratio, therefore heat is lost*

*to the environment at a slower rate than animals with a higher ratio. Also, a thick layer of blubber near the surface of the body helps to insulate the body.*

## Ecology (Life Sciences)

**5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:**

**a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.—**

*Students learn basic aspects of the food web. Food of whales is discussed in more detail. Baleen whales and their major source of food, krill, are discussed. Also, students learn about predatory whales, such as the well known killer whale.*

## GRADE SEVEN

### Genetics

**2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences. As a basis for understanding this concept:**

**a. Students know the differences between the life cycles and reproduction methods of sexual and asexual organisms.—**

*Students learn about the life cycle of the gray whale. They also learn that whales reproduce sexually. Importance of low fecundity and length of time to sexual maturity are discussed with respect to whales. The history of whaling only compounds this importance.*

### Evolution

**3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:**

**e. Students know that extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient for its survival.—**

*Students learn that many whale species are susceptible to extinction in the near future. Due to historical whaling pressures and low fecundity, these species continue to hover near extinction.*

## **GRADES NINE THROUGH TWELVE**

Biology/Life Sciences

Evolution

**8. Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept:**

**b. Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment.—**

*Students learn that whales in general are at a disadvantage to many other ocean organisms with respect to long-term species survival. Historical whaling pressures, along with other factors, have diminished the great diversity of species of whales once present in the oceans. Therefore, whales would be less likely to survive major changes today in their environment than prior to these pressures.*

## GRADE THREE

### History

3.1 – Students describe the physical and human geography and use maps, tables, graphs, photographs, and charts to organize information about people, places, and environments in a spatial context.

1. Identify geographical features in their local region (e.g., deserts, mountains, valleys, hills, coastal areas, oceans, lakes).—

Students learn about nearby Channel Islands and the Santa Barbara Channel and the importance of both historically. This importance is reflected as common guideposts on the migratory routes of whales, and the historic civilizations of American Indian nations.

3.2 – Students describe the American Indian nations in their local region long ago and in the recent past.

1. Describe national identities, religious beliefs, customs, and various folklore traditions.—

Students learn about local American Indian nations, and their historical impact on the local environment. Local tribes were able to utilize their environment, including the local Channel Islands. We are left today with some knowledge and insight about their history. Students learn about this history by observing the islands on the class trips.