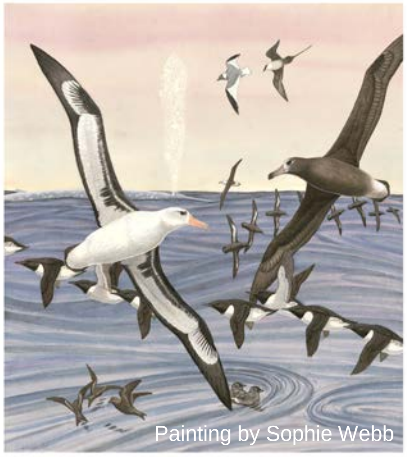
Office of National Marine Sanctuaries
National Oceanic and Atmospheric Administration
in collaboration with Oikonos Ecosystem Knowledge

Education


Painting by Sophie Webb

Grade Level

- 6-8, with options for 9-12

Timeframe

- Two 45-minute class periods

Materials

- Meter sticks, rulers or tape measures
- Student worksheets
- Lesson 1 Presentation

Key Words

- Seabird
- Albatross
- Adaptation
- Life Cycle
- Food Web
- Microbes

WINGED AMBASSADORS

OCEAN LITERACY THROUGH THE EYES OF ALBATROSS

Lesson 1: Introduction to Seabirds

Activity Summary

This lesson serves as an introduction to seabirds, particularly albatross. Spending their entire lives at sea, these amazing birds have many adaptations that allow them to live away from land. Their bodies are both similar to and different from those of humans, making them an interesting way for students to consider anatomy and other life functions. Through the art and photography of Sophie Webb and others and maps displaying real scientific data, students will learn about the unique life history and adaptations of albatross. This foundational understanding will prepare them to study the movements and habitats of these birds in the following lessons.

Learning Objectives

Students will be able to:

- Illustrate the life cycles of the albatross.
- Give examples of adaptations that allow seabirds to make a living at sea and fly thousands of miles.
- Compare the bodies of albatross and humans.
- Analyze a sample albatross food chain and explain how food chains depict the transfer of energy in ecosystems.

Outline

Engage – Introduction to Seabirds
Explore – Wingspan Activity
Explain – Life Cycle & Adaptations
Elaborate – Marine Food Webs
Evaluate –Albatross Adaptations

Background Information

Adaptations

To earthlings, birds are ubiquitous. They are found in almost every environment, from deserts to rainforests, lakes to marshes, and of course, the ocean. Those birds that meet their energy needs by feeding on food (prey) extracted from the ocean are defined as seabirds. This categorization is not based on taxonomy. Seabirds include many groups: penguins, albatrosses, terns, petrels, frigate birds, boobies, gulls and more. Yet these diverse birds share a series of adaptations for life at sea.

Adaptation is often a difficult concept for students. Over time, populations of organisms adapt to their environment. That is, those individuals that have genetic characteristics that make them better able to survive and reproduce, are more likely to pass on these characteristics to future generations. These characteristics are called adaptations, and may be behavioral or structural.

Albatross have many adaptations. They can traverse the oceans using the wind and swell through a process called dynamic soaring, whereby they are lifted by the wind and then glide downwards and attain great speed. Albatross can lock their "elbows and shoulders" with special tendons and glide with little effort. These adaptations allow albatross to fly thousands of miles without stopping, at over eighty miles an hour, at very low energetic cost.

Food Web

While albatross are at sea, they use their strong sense of smell to find food, such as dead squid, fish eggs and small fish. Because they have tubular nostrils on each side of their bill, their taxonomic group is known as tubenoses (order procellariiformes). Albatross drink seawater, remove the excess salt thanks to a special gland and eject the brine through their nose. They can be seen rinsing their nose at sea.

Most of our Blue Planet, 71%, is covered by sea water. The ocean, however, is three-dimensional, and organisms are found at the surface and at great depths. Most marine organisms are microbes, including the tiny plants (primary producers) called phytoplankton. They thrive and multiply in the ocean's photic zone, where sunlight penetrates, and move around at the mercy of currents and tides. Just like land plants, these organisms convert the sun's light into high-energy sugar compounds through the process of photosynthesis. This energy is then passed up the food web to zooplankton (tiny animals), and then to other larger consumers (fish,

Vocabulary

SEABIRD – a bird that spends most of its life at sea and relies on the ocean for meeting its needs

LIFE SPAN– typical length of an individual's life

LIFE CYCLE – the different stages an organism experiences throughout its lifetime (e.g., chick, adult)

ADAPTATIONS – genetically programmed structures or behaviors that increase an organism's chances of survival and/or reproduction, and are passed to their offspring

MICROBES – tiny (microscopic) organisms that are seen only through microscopes; often consist of only one cell

ORGANISM – a living thing: plant, bacteria, fungi or animal

PHYTOPLANKTON – plant-like photosynthetic organisms found in the ocean

PHOTOSYNTHESIS – the process by which sunlight is converted into chemical energy, sugar

ZOOPLANKTON – animal-like plankton that cannot photosynthesize, but eat phytoplankton or other zooplankton

FOOD WEB – a linear or web-like diagram that illustrates the transfer of energy, from primary producers to top consumers, in a terrestrial of aquatic ecosystem squid, large predatory fish, whales, … and people). Food webs connect organisms in an ecosystem and illustrate the transfer of energy. Phytoplankton are important to seabirds because they are the base of their food chain.

Life Cycle

Adult albatross form strong pair bonds, usually only broken upon the death of one partner, because both parents are required to feed a chick. They usually return to the same nesting area where they were born (they have high natal philopatry) and nest in almost the same location where they raised a chick in previous years (they have high nesting site fidelity). There are 22 species of albatross in the world and three species breed in Hawai‘i : Black-footed, Laysan and the rare Short-tailed Albatross. Around October Hawaiian albatross return to protected breeding colonies to find their mate. They perform an elaborate dance for one another before reproducing sexually. Each female lays one egg in a ground nest, during late November or early December. If a nest has two eggs, it is likely that the mates are both female and only one egg will end up being incubated. Both parents take turns incubating the egg for 2 months, before the chick hatches in January or February. Once a chick emerges from its egg, the adults take turns feeding the young hatchling. The birds fly great distances to collect food, which they regurgitate directly into the mouth of their chick. The adults care for the chick for several months, until it grows adult feathers and is physically able to fledge in late June or early July. The young birds, termed fledglings, spend at least 3-5 years at sea prior to returning to the nesting colony to find a mate. At age 6 to 12 most Hawaiian albatross will breed for the first time and can continue to breed on average every other year for up to 60 years or more.


Photo by Sophie Webb

Learning Procedure

Engage

(15 minutes)

Ask students:

? What do you know about birds?
List some student ideas on the board. Answers might include: they have feathers, most can fly, they live in diverse habitats, etc.

? How far do you think typical birds fly?
Allow students to share their ideas. Some students may note that flight distance varies widely by bird species.

Using the Presentation, show students the slides for the Engage section, which introduces them to seabirds and albatross.

Explain to students that the two species we will be focusing on are the Laysan Albatross and the Black-footed Albatross.

Show students the slides of albatross tracks.

Distribute the student worksheets and read the passage under the “Engage” section of the student worksheet together as a class.

Explore (30 minutes)

Explain to students that it is sometimes hard to picture the size of these animals without comparing them to something else for scale.

Direct students to work in pairs or trios. Using the meter sticks, they will measure each other's height and "wingspan" and compare their measurements to those of the Black-footed and Laysan Albatross.

> **Differentiation:** Have advanced students determine the mean, median, mode and range of the class wingspan data.

Discuss students' findings as a class. Determine which students have the largest "wingspan," and ratio of wingspan to height.

Make connections to albatross morphology and flight, i.e., large wingspan allows the birds to soar.

Explain (30 minutes)

Using the Presentation, passages in the student worksheet, and discussion questions, discuss the life cycle of albatross as a class.

Discuss:

? What is a life cycle?
The different stages an organism goes through over the course of a lifetime.

? What is the human life cycle like?
Humans begin as babies, then experience childhood and adolescence. As adults, humans can produce babies.

As you show the slides and video of an albatross mating dance, incubation, chick stages, feeding and fledging, ask students to read the student worksheet aloud.

Discuss:

? What are the advantages of albatross parents spending so much time and energy on raising a chick? They spend about 2 months dancing and preparing to lay an egg, 2 months incubating the egg, and 5 months feeding their chick!
The parents protect the chicks from harm, and ensure that they are fed. This behavior ensures that parents' genes are passed on.

? What are disadvantages of albatross parents spending so much energy on raising a chick?
The parents cannot focus as much on their own needs. Since they only have one chick, reproductive rates are slower.

Note to students that unless they are incubating an egg or caring for a very young chick, the majority of an adult albatross' time is spent at sea.

Discuss:

? How is it possible that these birds return to land only for breeding purposes?
Accept all answers at this point.

Conduct a short "Think, Pair, Share" activity related to the following question: What needs must albatross meet at sea? Students first consider the question quietly, and then discuss it with a partner. Finally, the pairs share their thoughts with the class.

Note on the board that, in general, animals need to meet the following needs: food, water, rest, mating, and protection.

Discuss:

? How is it possible for these birds to fly thousands of miles?
Accept all answers at this point.

Use the adaptation slides (tubenoses, wings, webbed feet) and passage on the student worksheet to discuss how albatross meet their needs while spending months or years at a time at sea.

Explain to students that, over time, species become adapted to their environments, or are unable to survive and reproduce.

Elaborate

(15 minutes)

Show slides of our Blue Planet. Ask students to identify the major ocean basins (Pacific, Atlantic, Indian, Arctic, and Southern). Note that all of the ocean basins are connected—in fact, the Earth has one global ocean which covers a sizable majority of its surface.

Discuss:

? What kinds of living things make their homes near the sea surface, i.e., in the top 250 meters of ocean?
Accept all answers at this point. Students will likely mention fish, marine mammals, seabirds, sea turtles, invertebrates, etc.

Read the passage, "Life at the Sea Surface," as a class, and show the accompanying slides.

As you read, discuss:

? Why are phytoplankton so important to albatross?
Phytoplankton convert sunlight into energy, which enters the food web and is passed up to other animals such as the albatross.

? What would happen if the phytoplankton populations were to decrease for some reason?
Less energy would be available to the rest of the ecosystem.

Direct students to answer the questions that follow the passage. Review the questions as a class.

Evaluate

(Homework)

Direct students to complete the Evaluate section of their worksheet. This task may also be assigned for homework.

Extension

- Have students conduct internet or book research on marine / lake / river food webs in environments near your school.
- Students should take notes on what they find and draw a diagram of the food web, indicating the direction in which energy flows through the ecosystem.

Resources

- Virtual Boat Trip at Cordell Bank: http://cordellbank.noaa.gov/oikonos_flashart_ocean_travelers
- Arkive – images and videos of albatross http://arkive.org
- C-MORE: Center for Microbial Oceanography Science Kits http://cmore.soest.hawaii.edu/education.htm
- Activity: Wearing Albatross Wings http://foam-friends-of-albatross-on-midway.blogspot.com/p/activity-wearing-albatross-wings.html
- Video: Midway - Enter the Heroes Chris Jordan's Midway Journeys http://vimeo.com/groups/120490/videos/36745838

Credits and More Information

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Please contact Oikonos or NOAA to request further use of any images, art, videos, data or text included in the Winged Ambassadors activities.

We appreciate feedback, corrections and questions. Please email WingedAmbassadors@oikonos.org

Free lessons and resources available at:

http://cordellbank.noaa.gov/education/teachers.html

http://oikonos.org/education

http://papahanaumokuakea.gov/education/wa.html

Education Standards

Ocean Literacy Principles

- 1a. The ocean is the dominant physical feature on our planet Earth— covering approximately 70% of the planet's surface. There is one ocean with many ocean basins, such as the North Pacific, South Pacific, North Atlantic, South Atlantic, Indian and Arctic.
- 5a. Ocean life ranges in size from the smallest virus to the largest animal that has lived on Earth, the blue whale.
- 5b. Some major groups are found exclusively in the ocean. The diversity of major groups of organisms is much greater in the ocean than on land.
- 5d. Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (such as symbiosis, predator-prey dynamics and energy transfer) that do not occur on land.
- 5e. The ocean is three-dimensional, offering vast living space and diverse habitats from the surface through the water column to the seafloor. Most of the living space on Earth is in the ocean.
- 7a. The ocean is the last and largest unexplored place on Earth—less than 5% of it has been explored. This is the great frontier for the next generation's explorers and researchers, where they will find great opportunities for inquiry and investigation.
- 7f. Ocean exploration is truly interdisciplinary. It requires close collaboration among biologists, chemists, climatologists, computer programmers, engineers, geologists, meteorologists, and physicists, and new ways of thinking.

California

Grade 6:

- 5a. 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.
- 5b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
- 7b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

Grade 7:

- 2a. Students know the differences between the life cycles and reproduction methods of sexual and asexual organisms.
- 2b. Students know sexual reproduction produces offspring that inherit half their genes from each parent.
- 5c. Students know how bones and muscles work together to provide a structural framework for movement.
- 5d. Students know how the reproductive organs of the human female and male generate eggs and sperm and how sexual activity may lead to fertilization and pregnancy.
- 7a. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

Hawaiʻi

Grades 6-8:

- 1. Collect, organize, analyze and display data/ information, using tools, equipment, and techniques that will help in data collection, analysis, and interpretation.
- Develop conclusions and explanations showing the relationship between evidence and results drawn.
- Communicate and defend scientific procedure used and conclusion and explanation drawn from evidence.
- 4. Compare and contrast the body structures of organisms that contribute to their ability to survive and reproduce.
- 5. Illustrate and explain the relationships among producers, consumers, and decomposers in a food web.
- 6. Explain how plants use the energy from sunlight and matter from the atmosphere to make food that can be used for fuel or building materials.
- 8. Explain how heredity accounts for biological traits being passed on to successive generations.

Education Standards

Next Generation Science Standards (NGSS)

Standards	• MS-LS1-4. 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. • MS-LS1-6. 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.
Disciplinary Core Ideas	• LS1.B: Growth and Development of Organisms Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4) • LS1.C: Organization for Matter and Energy Flow in Organisms Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. • PS3.D: Energy in Chemical Processes and Everyday Life The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen.
Science & Engineering Practices	• Obtaining, Evaluating, and Communicating Information
CrossCutting Concepts	• Structure and Function • Energy and Matter

Common Core State Standards

English Language Arts	• CCSS.ELA-LITERACY.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.
Mathematics	• CCSS.MATH.CONTENT.6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. • CCSS.MATH.CONTENT.6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. • CCSS.MATH.CONTENT.6.RP.A.3.A Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. • CCSS.MATH.CONTENT.7.RP.A.2 Recognize and represent proportional relationships between quantities.

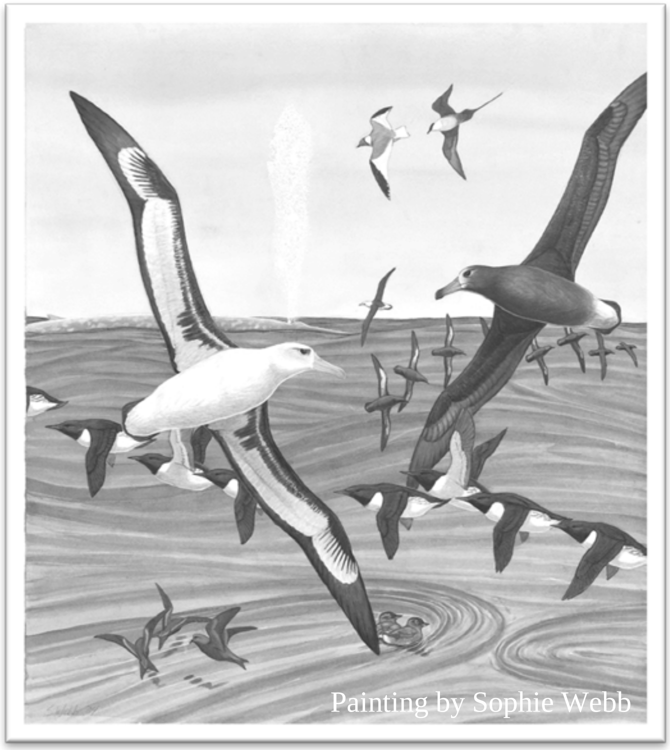
Lesson 1: Introduction to Seabirds *ANSWER KEY*

Name: ______________________________ **Date:** ______________________

Engage

Flights at Sea

We are all familiar with birds. These animals are found in many earth habitats, from the poles to the tropics, deserts to lush rainforests, and even towns and cities. Did you know that there are many species of birds that spend most of their lives at sea? This information is not that surprising, when you consider that 71% of the Earth's surface is covered by ocean, and that the ocean contains 97% of all of the water on the planet. The ocean is considered to be Earth's "final frontier" in terms of scientific exploration, because there is still so much for us to learn about the ocean, its features, and the creatures that depend on its habitats.



Albatross are one the largest and most beloved seabirds. In the Pacific Ocean, Laysan (left) and Black-footed (right) Albatross search the oceans for food, sometimes alone, and sometimes feeding in flocks with other seabirds.

This lesson will focus on two species of **seabirds,** birds that depend mostly on the ocean for their survival. The two species are the **Black-footed Albatross** (Hawaiian name: *ka*'*upu*) and the **Laysan Albatross** (*mōlī*). Both species are found throughout the Pacific Ocean, including near the Hawaiian Islands and California. From the tracking maps, you saw that these majestic birds travel thousands of miles. In a jet plane, which travels around 500 miles per hour, it takes roughly 5 hours to fly from California to Hawai'i. Powered by only their bodies and the wind, these birds cover the same distance in a matter of days flying over 80 miles per hour. In this lesson, we will learn more about these species and the unique features that allow them to fly thousands of miles at a time.

Name: ______________________________ Date: ____________________

Explore


Sophie Webb

A bird's **wingspan** is described as the distance from the tip of one wing to the tip of the other. By measuring the distance from our fingertips to fingertips with arms outstretched, we can compare our "wingspan" with that of albatross.

Work with a partner or in a group of three for this activity. Follow the instructions and record your data in the data table provided.

1. One partner should stand with arms outstretched.
2. Another partner should measure the distance, in centimeters from the farthest fingertip to farthest fingertip. Record the measurement in the data table.
3. Next, measure the height, in centimeters of each partner, and record the measurements in the data table.
4. Repeat this process for the other partner(s).

Bird or Student	Wingspan Measurement	Length or Height	Ratio of Wingspan to Body Size
Black-footed Albatross	200 centimeters (typical)	70 centimeters (typical)	2.85
Laysan Albatross	215 centimeters (typical)	71 centimeters (typical)	*3.02*

Name: ______________________________ Date: ____________________

5. Find the ratio of wingspan to body length/height for each albatross and student and record your findings in the data table. To do this, divide the wingspan by the body length/height. The first one, Black-footed albatross, is done for you:

$$\frac{200 \text{ cm}}{70 \text{ cm}} = 2.85$$

6. How do human wingspans compare to albatross wingspans?
Human wingspans are much smaller than those of albatross. That is, the ration of wingspan to height for humans is around 1.0, whereas for albatross it is closer to 3.0.

7. Why do you think albatross wingspans matter?
Albatross fly thousands of miles each year. They use their long wings to soar on wind currents over the ocean.

Explain

The following passage accompanies the slideshow that your teacher will show you.

Albatross Life Cycles

Laysan and Black-footed Albatross are known to live, or have a **lifespan** of, up to 60 years or more. Birds typically begin mating between 6–12 years of age. The majority of albatross in Hawai‘i nest on sandy islands among the Northwestern Hawaiian Archipelago, or *Kūpuna* Islands. Most birds return to the same colony every year and nest at or near their former sites. Albatross attempt to mate for life, forming a strong pair bond that is typically only broken if one partner dies. Upon finding one another on their nesting island around October, albatross mates perform a dance for one another.

Laysan Albatross parent with its newly hatched chick.

Name: ____________________ **Date:** ____________________

These animals reproduce sexually; sperm and egg meet within the female's reproductive organ (oviduct). Females produce one egg a season, sometime skipping a year, usually in November or December. Both parents take turns incubating the egg for about 2–3 months, and then the chick finally hatches in January or February.

8. Upon hatching, the chick must be fed. Parents take turns feeding the chick. To do so, they must fly out to sea to collect food items, which are then regurgitated into chicks' mouths. The chicks grow, and both parents continue to care for and feed them for several months. In late June and July, the chicks take off, or **fledge.** These young chicks are called **fledglings** and now spend all their time at sea, soaring above the waves and never touching land for 3–5 years when they return to learn how to find a mate, dance, and nest. Draw a series of sketches that illustrate the typical albatross life cycle. Include the following:

    a. Relevant times of year and number of years

    b. Locations in which albatross are found during these times

    c. Other interesting information *Student answers will vary*

The following passage accompanies the slideshow that your teacher will show you.

> *"I now belong to a higher cult of mortals, for I have seen the albatross!"*
> *– Robert Cushman Murphy, American ornithologist*

Name: ______________________________ **Date:** ______________________

Meeting Needs at Sea

All living things must somehow get energy and nutrients. Albatross find their food at sea. These birds have a strong sense of smell, made possible by tubular nostrils and a large lobe in the brain for smelling (olfactory lobe). This is an unusual ability for birds. In fact, albatross belong to a family of birds known as tubenoses. Albatross eat fish eggs, squid, fish, and other items near the surface of the water. They also have webbed-feet, perfect for life on the sea surface. Albatross drink seawater. Unlike humans, they can survive just fine with this liquid, thanks to a special gland that removes excess salt in form of saline that drips out their tubenoses and off their bills.

Observing a flying albatross is quite a sight! They gracefully glide on sea surface wind, and can actually lock their "elbows and shoulders" to keep their wings stiff, ideal for catching the wind. The muscles and bones in their wings work together for flapping, but they also have special tendons and other tissues that keeps the wings outstretched. These features also allow them to soar without expending much muscle energy. Their heart rates while flying are close to their resting heart rates. Think about what your heart rate is like when running, as compared to lying on the couch watching television. In fact, the most difficult part of their long journeys is often getting started. These birds take a running start, with outstretched wings to catch the wind.

Albatross species take advantage of sea surface winds, using a technique in which the wind lifts them and then they rapidly glide downward. This flying technique is known as **dynamic soaring**, and allows albatross to fly huge distances. In calm weather, albatross often rest on the sea surface until the wind increases enough to fly efficiently.

Albatross and Adaptations

An **adaptation** is a genetically programmed feature that improves an individual's chances for survival and/or reproduction. Within a population, organisms with fewer adaptations to the environment do not survive. Those that are lucky enough to have these adaptations survive and pass these "lucky genes" on to offspring. Adaptations are not something an animal chooses. They are part of one's DNA. Adaptations can be structural (i.e., physical features), or behaviors.

9. Describe three features and/or behaviors of albatross that allow them to better survive and/or reproduce, passing on their genes to future generations.
   Possible answers include: strong sense of smell, olfactory lobe, webbed feet, special tendons to keep wings stiff, dynamic soaring behavior
   ____
   ____
   ____

Name: ______________________________ **Date:** ____________________

Elaborate

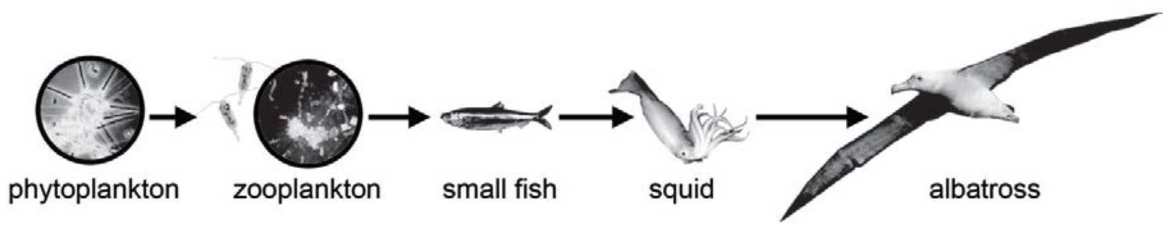
Life at the Sea Surface

The majority of living space on our *honua*, planet, is in the *kai*, ocean. The ocean is three-dimensional; living things, **organisms,** are found at its surface and at its deepest depths. Marine organisms range from tiny to huge, from microscopic organisms to the blue whale, which is the largest animal to have ever lived on earth. While most of us are more familiar with marine animals such as *manō* (sharks), *koholā* (whales), *naiʻa* (dolphins), *iʻa* (fish), *honu* (sea turtles), and *ʻōpae* (shrimp), microscopic organisms outnumber these animals by far.

Organisms that can only be seen with microscopes are called **microbes** or microorganisms**.** In the ocean, it is microbes that support life, including those huge blue whales. Tiny plant-like microbes are called **phytoplankton.** Phytoplankton take energy from *lā*, the sun, and change it into sugar. This process is known as **photosynthesis.** On land, plants, including grasses and trees, do photosynthesis. In the ocean, it is the phytoplankton that take on this role.

Phytoplankton are eaten by animal-like organisms called **zooplankton,** which use the energy in the phytoplankton for their own life processes, including respiration and making proteins. The zooplankton are in turn eaten by animals such as krill, sponges, and corals. Other animals feed on these animals. For instance, some whales eat krill, and some sea turtles eat sponges. In this way, the energy captured by the phytoplankton is passed on to many other organisms.

It is easier to picture this transfer of energy through a diagram called a **food chain.**



Food chains are a simple way of describing this energy transfer. In real life, food chains are very complex because most animals eat several different types of food. Diagrams that show a variety of overlapping food chains are known as **food webs.**

10. What are microbes?
    Microbes are living things that can only be seen with microscopes.
    ____
    ____

Image credits: Phytoplankton: NOAA MESA Project, Zooplankton: NOAA/D.Forcucci; NOAA Central Library/Charleston Bump Expedition 2003. NOAA Office of Ocean Exploration; Dr. George Sedberry, South Carolina DNR, Principal Investigator, Fish: NOAA, NEFSC, Squid: NOAA/MBARI 2006, Albatross: NOAA Corps/Lieutenant Elizabeth Crapo

Name: ______________________ Date: ______________________

11. Describe one reason that phytoplankton are important to albatross.
Phytoplankton convert the Sun's energy into sugar. The sugar is transferred up the food chain. When albatross eat squid and other organisms, they get sugars and nutrients that originally came from phytoplankton.

Evaluate

Draw a diagram of an albatross. In your diagram, note at least two adaptations of albatross that allow them to survive for months or years at sea.

Student diagrams may include adaptations such as:

- *Strong sense of smell*
- *Ability to lock out wings*
- *Huge wingspan*
- *Ability to drink saltwater and secrete salt*
- *Webbed feet*