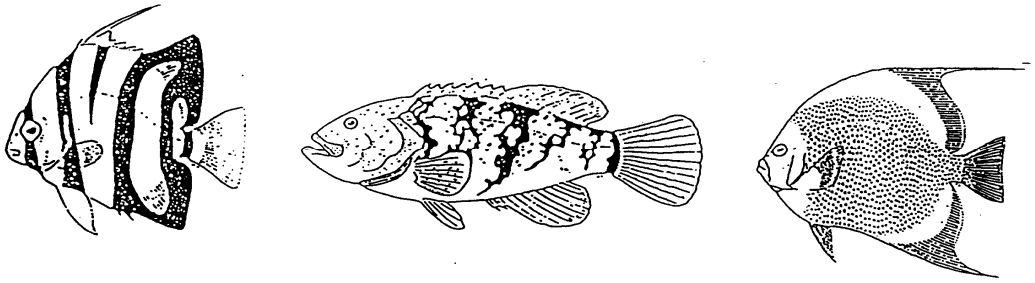
MAST ACADEMY OUTREACH

MARINE SKILLS PROGRAM

Miami Seaquarium

Pre-site Package



MAST Academy

Maritime and Science Technology High School

Miami-Dade County Public Schools

Miami, Florida

MAST ACADEMY OUTREACH

MIAMI SEAQUARIUM

PRE-SITE PACKAGE

TABLE OF CONTENTS

COMPETENCY BASED CURRICULUM
GRADE 8

Earth/Space Science – Honors

III. 5. Describe Earth's oceans with respect to sizes and composition, ocean topography, sediments, ocean floor movements, currents, waves, tides, ocean life and environments, resources and pollution.
3. Knows the ways in which humans today are placing their environmental support systems at risk.
1. Explain the interconnectedness of the systems on Earth and the quality of life.
2. Describe how the world ecosystems are shaped by physical factors that limit their productivity.

Algebra I – Honors

V. 1. Collect, organize, analyze, and interpret data by constructing charts, tables, and graphs to predict and explain outcomes.

M/J U.S. History

VI. 1. Use appropriate skills and resources to access, analyze, and synthesize information.

M/J Language Arts 3- Advanced

I. 16. Interprets functional reading material, such as newspapers, periodicals, manuals, instructions, schedules, common forms, maps, graphs, charts, tables.
III. 2. Extends the vocabulary development expectations for the seventh grade using eighth grade or higher vocabulary in reading, writing, and speaking.
4. Acquires and strengthens a personal, active vocabulary in speaking and writing in Interdisciplinary/integrated contexts.
IV. 1. Follows verbal directions.
5. Asks appropriate, challenging questions for elaboration or clarification during activities such as interviews and discussions.
11. Demonstrates appropriated listening and/or viewing skills in a variety of settings, such as viewing film, television, drama, music and dance.
V. 2. Interprets and/or constructs questionnaires and graphics, such as charts, tables, graphs, maps, labels, and signs.

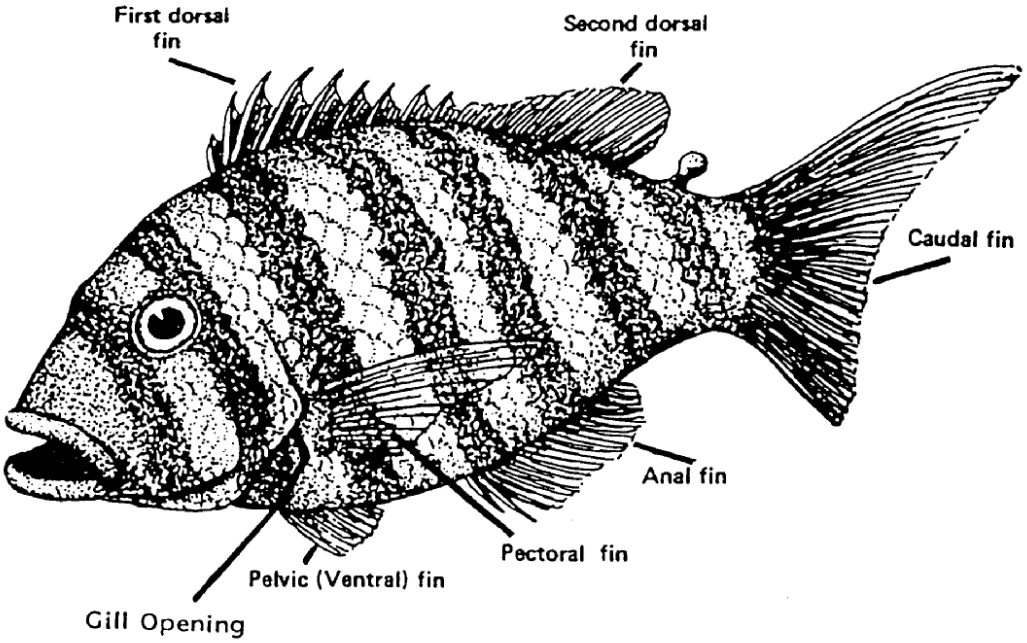
Teacher Instructions

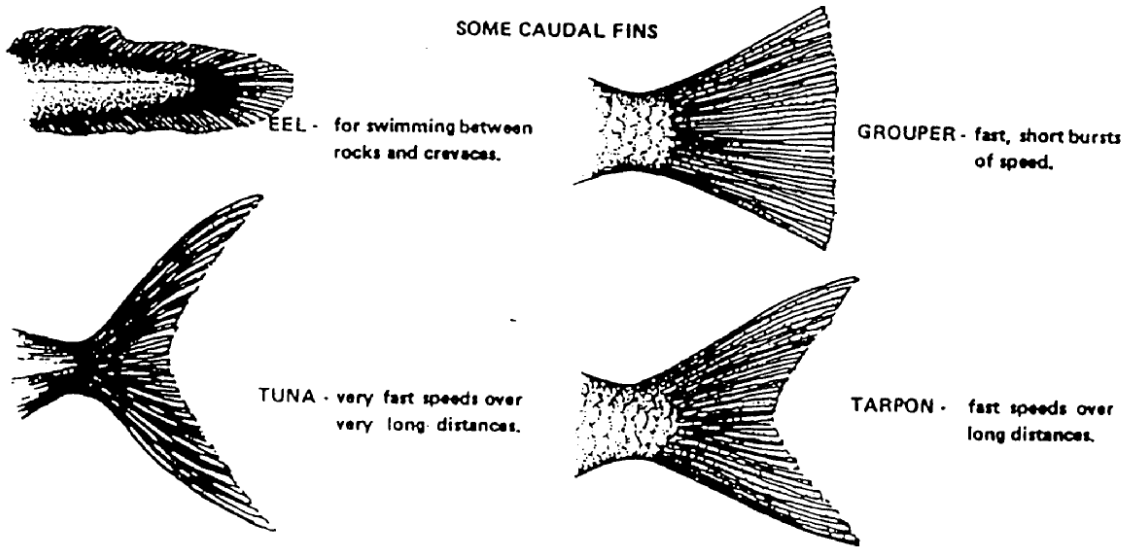
1. Make copies of the lessons for each student in your class. Be sure not to copy the answer keys.

2. After students complete the lessons, score them and total all points. This grade will be incorporated into a total grade for pre, on, and post-site activities which will be used to award Certificates of Achievement.

FISH AND FINS
INFORMATION SHEET

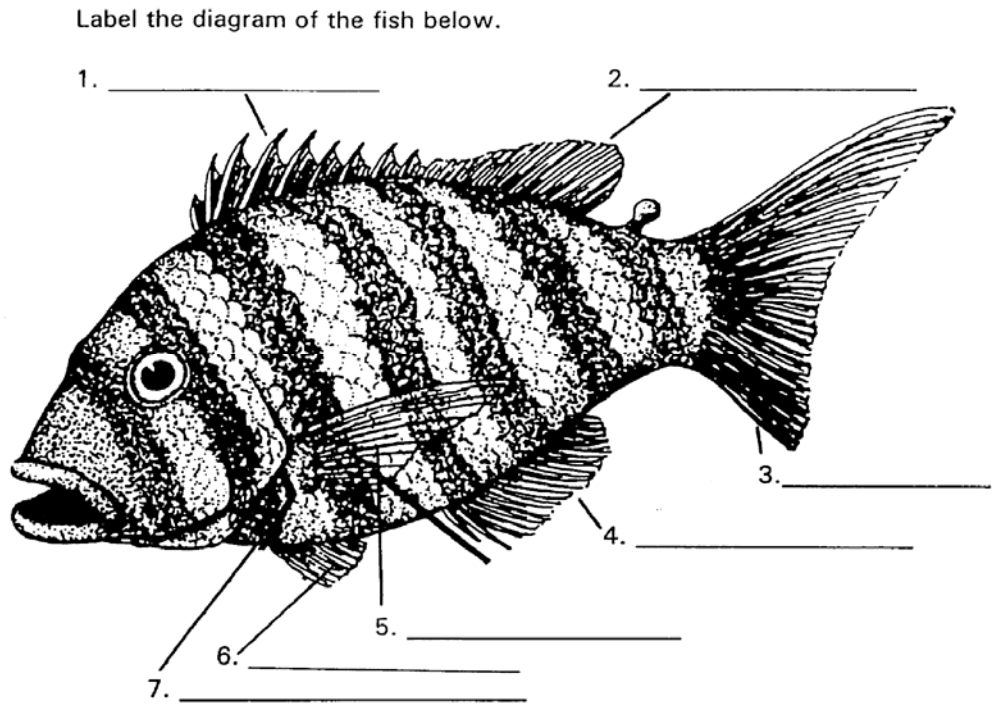
Study the diagrams below to learn the names of the fins and examples of caudal fins. Then complete the worksheet on the next page.





FISH AND FINS
QUESTIONS AND OBSERVATIONS

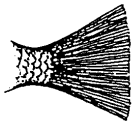
Label the diagram of the fish below.



Color the caudal fin shape that helps fish squeeze into small spaces **blue.**
Color the caudal fin shape that helps fish swim fast short distances **yellow.**
Color the caudal fin shape that helps fish swim fast long distances **green.**
Color the caudal fin shape that helps fish swim very fast for very long distances **pink.**

Name a fish with each caudal fin shape on the line next to each drawing.


8. _____


9. _____


10. _____


11. _____

CORAL REEF COMMUNITY
INFORMATION SHEET

When you visit the Miami Seaquarium, you will observe an area called the reef tank. Read the following passage about coral reefs and then define the terms in bold print on the following page by using any resource available to you.

A living coral reef is basically a sheet of living **polyps** which grow a few millimeters a year along with, and on top of their skeleton. Millions of **organisms** (up to 3,000 different **species**) congregate around a reef, for it provides plenty of hiding places and a supply of food. Few animals eat the coral itself, but they do eat each other. Many of the fish and invertebrates at the reef hide in the cracks and crevices by day and emerge only at night. At night, many **nocturnal** creatures venture out past the reef to graze on turtle grass patches. Reef fishes often spend their **juvenile** stages in the mangrove or Turgle grass areas, rather than on the reef itself.

Since the **symbiotic zooxanthellae** in the **tissue** of the coral polyps need sunlight for **photosynthesis**, coral reefs only grow in clear water and at depths where there is adequate light penetration.

The following list corresponds to the illustration on page 9. Use this list and the illlustration to answer the questions on the following page. Then color the illustration using markers or colored pencils.

1. purple jellyfish
2. green turtle
3. elkhorn coral
4. spanish hogfish
5. great barracuda
6. cocoa damelfish
7. comb jelly
8. glassy sweeper
9. neon goby
10. red-lip blenny
11. mountainous star coral
12. file clam
13. spotfin butterflyfish
14. coconut macaroon urchin
15. flamingo tongue snail
16. common sea fan
17. trumpetfish
18. gray angelfish
19. basket star
20. green moray eel
21. spotted drum
22. long-spined sea urchin
23. porkfish
24. Christmas tree worm
25. arrow crab
26. nassau grouper
27. jolthead porgy
28. grooved brain coral
29. spiny lobster
30. bristle worm
31. tube sponge
32. peacock flounder
33. nurse shark
34. lettuce coral
35. sea biscuit

CORAL REEF COMMUNITY
QUESTIONS AND OBSERVATIONS

Define the following terms:

1. polyps - _____
2. organisms - _____
3. species - _____
4. nocturnal - _____
5. juvenile - _____
6. symbiotic - _____
7. zooxanthellae - _____
8. tissue - _____
9. photosynthesis - _____

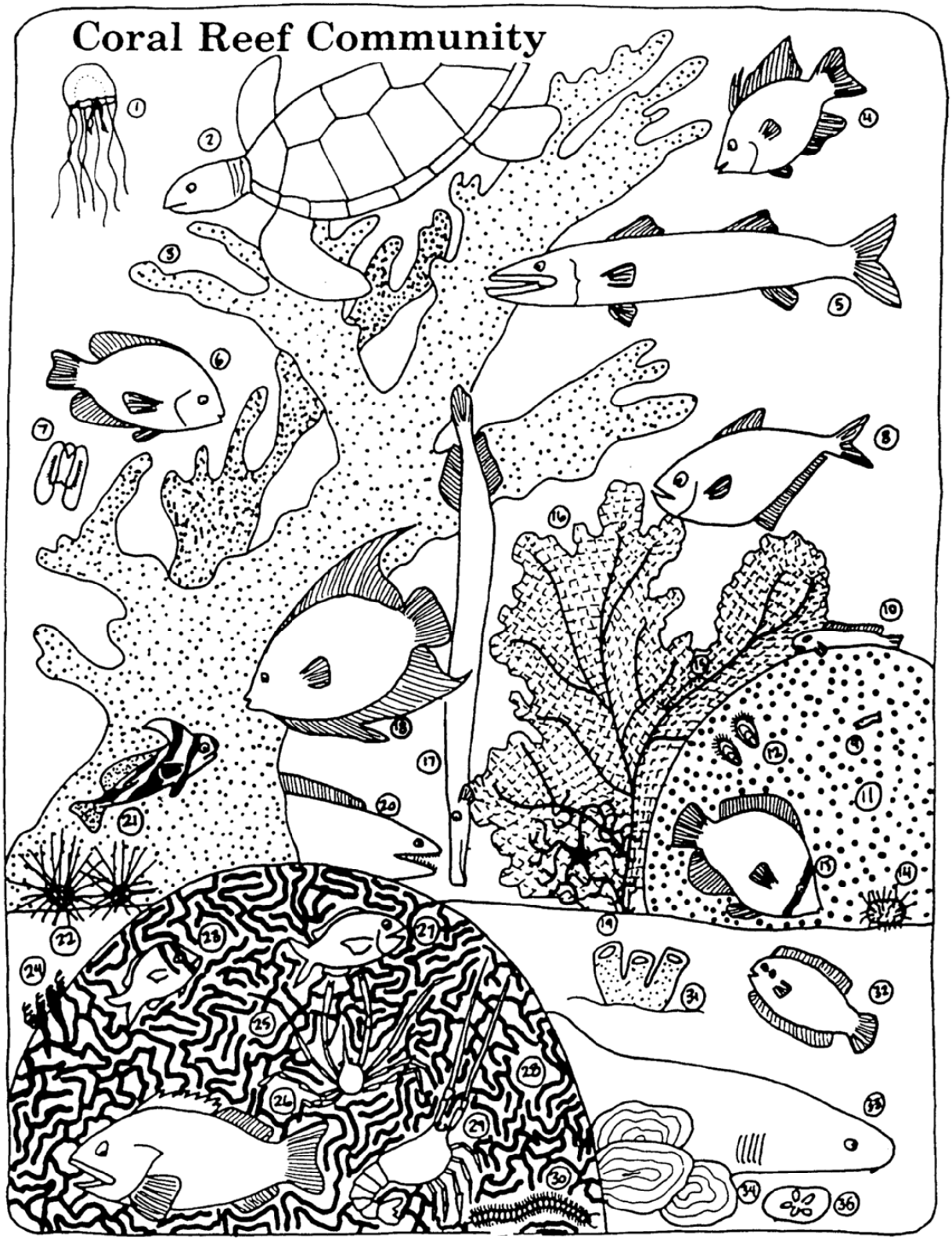
Refer to the coral reef illustration on the previous page to answer the following questions. Then color the illustration.

1. How many different kinds of fish do you see in the coral reef illustration?

   _____
2. Name 3 fish. _____
3. Name 5 Colenterates. _____

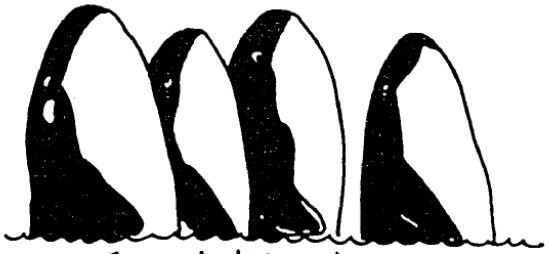
   _____
4. Name 3 Echinoderms. _____

   _____
5. Name 1 Arthropod. _____
6. Name 1 Mollusk. _____



The Seaside Naturalist, Deborah A. Coultrbe, Prinfice Hall, Inc. New Jersey. 1984.

Orca—the Killer Whale



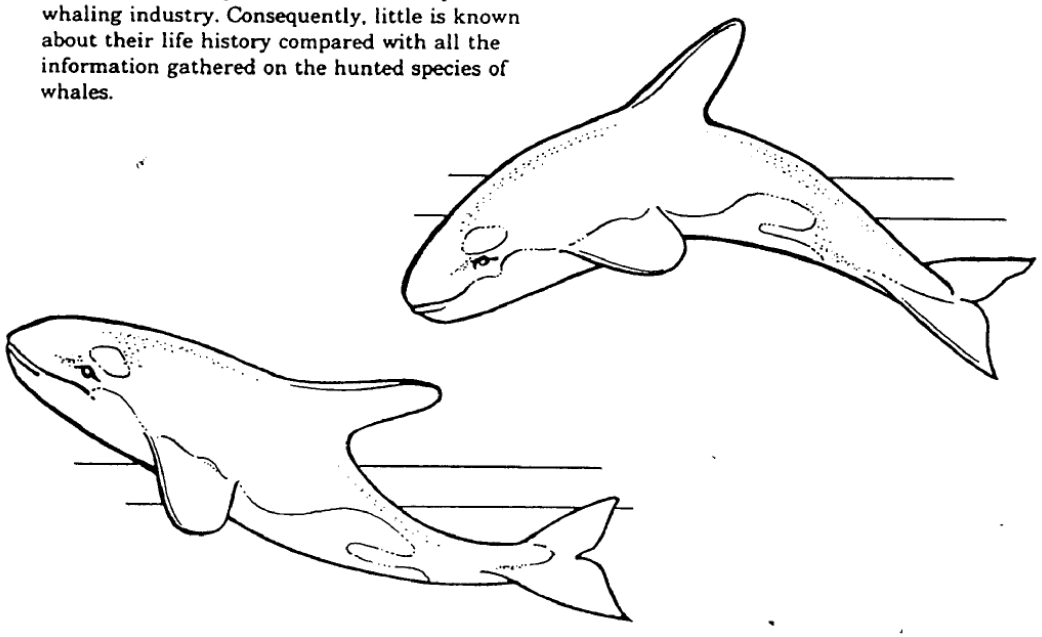
Orca whales spyhopping

Killer whales, *Orcinus orca*, are large dolphins that don't deserve the reputation the word "killer" suggests. True, Killer whales are voracious eaters and swallow fish, squid, seabirds, seals, and porpoises whole, but they need a lot of food to maintain their high activity level and large body. Contrary to misinformed sources, Killer whales do not kill for sport, only for food. The name Orca is preferred to Killer whale. In captivity, Orca whales are very gentle, trainable, affectionate, and accepting of people.

Orca whales usually have a striking black and white pattern, but totally black and totally white whales have been seen. Males have a six-foot-tall dorsal fin. Rarely are Orcas seen swimming alone. They generally stay in groups, with mature males swimming together, and females and immature males swimming together. Underwater, Orca whales have excellent vision. To see above the water, they "spyhop," that is, stand vertically (up to halfway) out of the water and look around.

On the Atlantic coast, Orca whales range from the Arctic to the Bahamas, but they are found throughout the world. Orcas are not thought to be in danger of extinction. Little interest has been paid to Orca whales by the whaling industry. Consequently, little is known about their life history compared with all the information gathered on the hunted species of whales.

Color the upper body black, the lower body white, and color the patch above the eye white.



The Seaside Naturalist, Deborah A. Coulombe, Prentice Hall, Inc., New Jersey. 1984.

ORCA - THE KILLER WHALE
QUESTIONS AND OBSERVATIONS

1. Why don't killer whales deserve their name? _____

_____

2. What do killer whales eat? _____
3. How do orca whales in captivity behave towards people? _____

_____

4. If you were to observe orca whales swimming, how would they be grouped together? _____

_____

5. What is "spyhopping?" _____

_____

6. Where are orca whales found? _____
7. Are orca whales in danger of becoming extinct? _____

_____

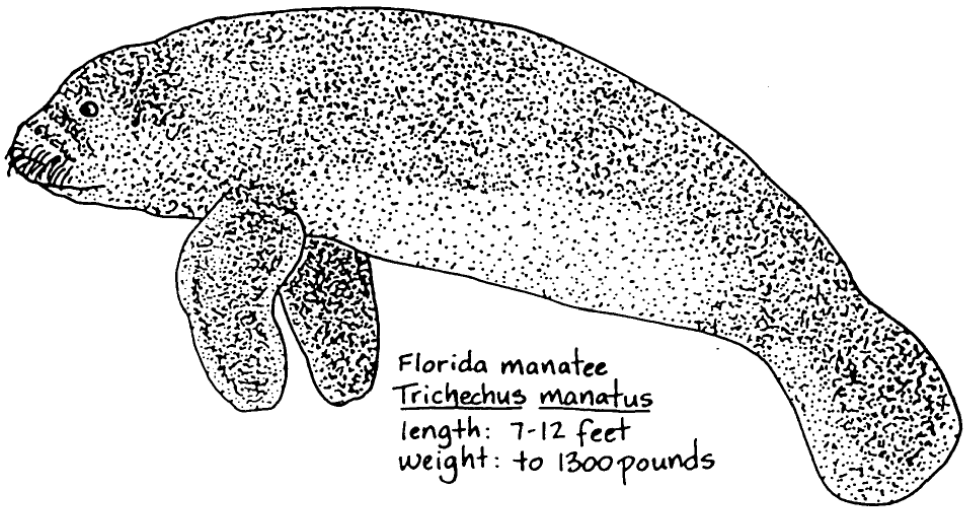
8. Why or why not? _____
9. What is the scientific name for the orca whale? _____
10. How large is the dorsal fin of a male orca? _____

The Manatee

Manatees, *Trichechus manatus*, are sluggish, wrinkly marine mammals with thick lips and a bristly face. They have squinty eyes, broad front flippers and a flat tail. Sailors are said to have mistaken Manatees for mermaids, possibly because of poor eyesight or a fading memory of what women looked like. Female manatees, however, do nurse their baby by holding it up to their breast, much as human mothers do; perhaps from several miles off a desperate sailor could mistake a manatee for a mermaid, if he were imaginative enough.

Another name for the manatee is the Sea cow. This is quite an appropriate pseudonym, since the manatee is a voracious herbivore. In one day, a manatee may consume a hundred pounds of weeds, grass, and seaweed, which grow in the shallow warm waters where the manatee lives. In the past the state of Florida encouraged the introduction of manatees into clogged waterways to eradicate weeds that choke water flow.

Along the Atlantic Coast of the U.S., manatees once ranged from North Carolina to Florida. Now they are restricted almost exclusively to southern Florida, particularly the Everglades. By 1900, manatees were nearly extinct because of over-hunting. Their flesh, hide, and oil were fervently sought. In the wild, a manatee's natural predators are crocodiles and sharks. Having been designated an endangered species in Florida, manatees are now legally protected; there is a fine for harassing or molesting them. The biggest threats to manatees today (besides illegal shooting) are boat propellers and siltation of their feeding grounds. Channelization of southern Florida has drastically altered the run-off of water from land, and silt now accumulates where it never used to, closing the canals and filling in the manatee's habitats. Manatees lie placidly in shallow areas just under the surface, coming up to breathe every ten to fifteen minutes. All too frequently, they are hit by boats while submerged.



The Seaside Naturalist, Deborah A. Coulombe, Prentice Hall, Inc., New Jersey, 1984

MANATEES
QUESTIONS AND OBSERVATIONS

After reading about manatees on the previous page, answer the following questions:

1. Describe the physical characteristics of manatees.

2. Why were manatees once thought to be mermaids?

3. Why are manatees appropriately called sea cows?

4. Why were manatees nearly extinct by 1900?

5. What are some of the threats that face manatees today?

AMAZING MANGROVES

12

AMAZING MANGROVES
QUESTIONS AND OBSERVATIONS

At the Miami Seaquarium, you will visit an area called Discovery Bay. You will see some of the same organisms you see in the drawing on the next page called "Amazing Mangroves." After observing the drawing, answer the following questions.

1. How does the drawing support the following statement, "Mangroves are quiet different from most trees which grow on land."

_____

_____

2. How does the drawing support the following statement, "Mangroves are very valuable as habitats for many birds and other animals."

_____

_____

3. Mangrove prop roots are commonly called finger roots which extend out into the water. Why are mangroves called "land builders?"

_____

_____

4. Explain this statement, "Mangrove leaves provide the basis for the energy supply for many types of marine organisms."

_____

_____

5. How many different birds do you see? _____
6. How many different fish do you see? _____
7. How many different arthropods do you see? _____
8. How many reptiles do you see? _____

ANSWER KEY (49 Total Points)

Fish and Fins Worksheet (11 points)

1. first dorsal fin
2. second dorsal fin
3. caudal fin
4. anal fin
5. pectoral fin
6. pelvic fin
7. gill opening
8. eel
9. grouper
10. tuna
11. tarpon

Coral Reef Community Questions and Observations (15 points)

1. poly - cylindrical body of a coral with tentacles
2. organism - a living thing
3. species - a category of taxonomic classification, ranking after genus and consisting of organisms that can interbreed
4. nocturnal - active at night
5. juvenile - not fully developed; not yet adult
6. symbiotic - the relationship of two or more different organisms in a close association that may be but not necessarily of benefit to each
7. zooxanthellae - dinoflagellates that live in coral polyps in a symbiotic relationship
8. tissue - a group of cells with similar function and structure that form an organ
9. photosynthesis - the process by which chlorophyll containing cells in plants produce their own food

1. 16
2. any 3 of the following: spanish hogfish, great barracuda, cocoa damelfish, glassy sweeper, neon goby, red-lip blenny, spotfin butterflyfish, trupetfish, gray angelfish, green moray eel, spotted drum, porkfish, nassau grouper, jolthead progy, peacock flounder, nurse shark
3. any 5 of the following: purple jellyfish, elkhorn coral, mountainous star coral, common sea fan, grooved brain coral, lettuce coral
4. any 3 of the following: coconut macaroon urchin, basket star, long-spined sea urchin, sea biscuit
5. arrow crab or spiny lobster
6. file clam or flamingo tongue snail

Orca - The Killer Whale Questions and Observations (10 points)

1. They do not kill for sport, only for food.

2. fish, squid, seabirds, seals, porpoises
3. They are gently, trainable, affectionate, and accepting.
4. Mature males swim together while females and immature males swim together.
5. Orcas stand vertically out of the water to look around.
6. They are found from the Arctic to the Bahamas.
7. No
8. They are not hunted by whalers.
9. *Orcinus orca*
10. 6 feet tall

Manatees Questions and Observations (5 points)

1. They are sluggish marine mammals with thicklips and a bristly face. They have squinty eyes, broad front flippers and a flat tail.
2. Sailors may have mistaken them for mermaids because they nurse their babies by holding them up to their breasts.
3. Because they are voracious herbivores like cows.
4. They were over-hunted for their flesh, hide and oil.
5. The two biggest threats are boat propellers and siltation of their feeding grounds.

Amazing Mangroves Questions and Observations (8 points)

1. Mangroves are trees that grow in the water.
2. In the drawing, there is a wide variety of different animals.
3. As the prop roots extend out, they become more dense and trap sand to form land.
4. Mangrove leaves fall into the water and are food for small organisms which in turn are food for fish, shrimp, etc. The leaves are at the top of the energy pyramid.
5. 5
6. 6
7. 2
8. 1

The School Board of Miami-Dade County, Florida, adheres to a policy of nondiscrimination in employment and educational programs/activities and strives affirmatively to provide equal opportunity for all as required by:

Title VI of the Civil Rights Act of 1964 - prohibits discrimination on the basis of race, color, religion, or national origin.

Title VII of the Civil Rights Act of 1964, as amended - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

Title IX of the Education Amendments of 1972 - prohibits discrimination on the basis of gender.

Age Discrimination in Employment Act of 1967 (ADEA), as amended - prohibits discrimination on the basis of age with respect to individuals who are at least 40.

The Equal Pay Act of 1963, as amended - prohibits sex discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

Section 504 of the Rehabilitation Act of 1973 - prohibits discrimination against the disabled.

Americans with Disabilities Act of 1990 (ADA) - prohibits discrimination against individuals with disabilities in employment, public service, public accommodations, and telecommunications.

The Family and Medical Leave Act of 1993 (FMLA) - requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to "eligible" employees for certain family and medical reasons.

The Pregnancy Discrimination Act of 1978 - prohibits discrimination in employment on the basis of pregnancy, childbirth, or related medical conditions.

Florida Educational Equity Act (FEEA) - prohibits discrimination on the basis of race, gender, national origin, marital status, or handicap against a student or employee.

Florida Civil Rights Act of 1992 - secures for all individuals within the state freedom from discrimination because of race, color, religion, sex, national origin, age, handicap, or marital status.

School Board Rules 6Gx13- 4A-1.01, 6Gx13- 4A-1.32, and 6Gx13- 5D-1.10 - prohibit harassment and/or discrimination against a student or employee on the basis of gender, race, color, religion, ethnic or national origin, political beliefs, marital status, age, sexual orientation, social and family background, linguistic preference, pregnancy, or disability.

Veterans are provided re-employment rights in accordance with P.L. 93-508 (Federal Law) and Section 295.07 (Florida Statutes), which stipulate categorical preferences for employment.

REVISED 8/1/01