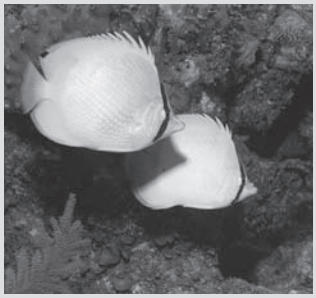

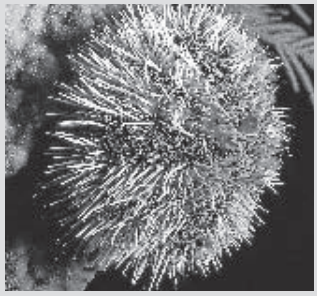

AWARE – Fish Identification

Specialty Course Instructor Outline

Developed in association with the Reef Environmental Education Foundation (REEF)

PADI®
padi.com

Product No. 70240 (Rev. 3/10) Version 1.05

Legend

Note to instructors:	Points for the instructor to consider that give additional qualifying information about conducting the course. Not intended to be read to students.
Note to students:	Required information. Read to students as printed.
By the end of this session, you will be able to: • Objective • Objective • Objective	Important information. Read to students. Objectives always precede individual Academic Topics and open-water dives.

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Please read this first.

Qualifying To Teach PADI Specialty Diver Courses

To apply for a Specialty Instructor rating, an individual must be certified as a PADI Underwater Instructor or higher. There are two ways to qualify to teach PADI Specialty Diver courses: 1) Attend Specialty Instructor Training Courses conducted by PADI Course Directors or 2) apply directly to PADI.

Specialty Instructor Training Course attendance is *highly recommended* and *encouraged.* These courses provide hands-on training, technique demonstrations, course marketing information, current PADI Standards information and, when applicable, instructor-level open water training.

Application made directly to PADI requires either: 1) use of a PADI standardized Specialty Course Instructor Outline (this document) or 2) the submission of a self-generated specialty course outline for Training and Education Department review. To speed outline approval, reduce liability exposure and assure educational validity of your specialty courses, it is highly recommended that you use the PADI standardized Specialty Course Instructor Outlines for courses they have been developed for.

The Specialty Course Instructor Application is to be used whether attending a Specialty Instructor Training Course or applying directly to PADI.

> *Important: Prior to promoting or teaching a PADI Specialty Diver course, you must first receive written confirmation of instructor certification in that specialty from PADI.*

For more information on certification as a PADI Specialty Instructor, please refer to the "General Standards and Procedures" section of the PADI *Instructor Manual.* If you still have questions after reading this section, call your PADI Office.

COURSE STANDARDS AND OVERVIEW

This course is designed to introduce divers to the most common families and species of fish found in temperate and tropical waters. Divers learn basic fish identification and scientific surveying techniques. Through an overview of Project AWARE and other preservation and research efforts, such as the REEF Fish Survey Project, divers also learn the importance of personal involvement in aquatic environment conservation.

Prerequisites

To qualify for the AWARE - Fish Identification Diver course, an individual must:

1. **Be certified as a PADI Open Water Diver, Junior Open Water Diver or have a qualifying certification from another training organization.**
2. **Be at least 10 years old.**

The AWARE - Fish Identification Dive from the PADI Adventures in Diving program may be counted toward the certification requirements of this specialty at the discretion of the instructor conducting the specialty course.

Instructor Supervision

The AWARE - Fish Identification Diver course may be conducted by a Teaching status PADI Underwater Instructor (or PADI Instructor with a higher rating) who has been certified as a PADI AWARE - Fish Identification Instructor.

The maximum student-to-instructor ratio for open water training dives is eight students per instructor (8:1). Certified assistants may assist with supervision and accompany students during the training dives.

Considerations for Open Water Training

The AWARE - Fish Identification Diver course includes two open water training dives. The first dive allows divers to practice basic fish identification techniques and the second dive prompts divers to collect fish identification data for submission to the REEF Fish Survey Project, if appropriate.

Training dives may be conducted at night for divers who have completed the Night Adventure Dive or the first dive of the PADI Night Diver specialty course, or have qualifying night diving experience.

After the training dives, student divers are required to log their dives in their personal log books.

COURSE OVERVIEW

This course covers the knowledge and techniques for identifying fish common to the local area. **To conduct a AWARE - Fish Identification Diver course, include the following:**

1. **The Project AWARE philosophy about protecting worldwide aquatic ecosystems.**
2. **Fish family groupings and common characteristics of fish species found in the local area.**
3. **Fish surveying techniques and strategies for collecting valid data.**
4. **The planning, organization, and procedures for identifying fish families and species while diving.**

CERTIFICATION PROCEDURES

The certifying instructor obtains a AWARE - Fish Identification Diver certification by submitting a completed, signed PIC to the appropriate PADI Office. **The instructor who conducts the student's final open water training session is the certifying instructor. The certifying instructor must ensure that all certification requirements have been met.**

KEY STANDARDS

Prerequisite Certification: PADI Open Water Diver, Junior Open Water Diver or qualifying certification
Minimum Age: 10
Recommended Minimum Course Duration: 12 hours
Minimum Open Water Training: 2 dives
Student-to-Instructor Ratio: 8:1*
Minimum Instructor Rating: AWARE - Fish Identification Diver Specialty Instructor

** For dives that include 10-11 year olds, direct supervision is required at a maximum ratio of 4:1. No more than two of the four divers may be age 10 or 11.*

Introductory Information AWARE – Fish Identification Specialty Course Instructor Outline

The Presentation provides specific information that you present/review with your students. It precedes both Fish Identification Dives.

Fish Identification Dive One includes "General Open Water Tips and Considerations," which provide suggestions and factors that may affect conducting the course dives. The dive outlines guide you with performance requirements and suggested organization and considerations; they are not intended to be presented to students.

I. Course Overview

A. The purpose of the AWARE — Fish Identification Specialty Course is to introduce divers to the most common families and species of fish found in temperate and tropical waters throughout the world. The course is designed to emphasize the importance of Project AWARE and involve people personally in the conservation of marine ecosystems.

B. The course introduces divers to the Fish Survey Project — a joint effort between the Reef Environmental Education Foundation (REEF) and The Nature Conservancy. Participants learn fish surveying techniques that allow them to provide valid scientific information to researchers and resource managers. Recreational divers and snorkelers can substantially increase the amount of biodiversity data available to scientists and conservationists by participating in this project.

1. REEF produces several sets of color slides (modules) of fish from various geographic regions. These slide sets along with other teaching aids — fish identification slates, reference books, videos and survey materials — are extremely useful in conducting this course. REEF modules exists for:
    a. Tropical Western Atlantic — including Florida, Caribbean and Bahamas
    b. Northern California
    c. Southern California
    d. Pacific Northwest — including Oregon, Washington and British Columbia
2. If REEF has modules or other materials that are appropriate for the locations where you will conduct this course, you're encouraged to obtain them directly from REEF.

    Reef Environmental Education Foundation, Inc. (REEF)
    P.O. Box 246, Key Largo, FL 33037
    (305) 451-0312, FAX (305) 451-0028
    email reefO52@aol.com
    or on the internet at www.reef.org
3. When using materials produced by REEF, student divers may conduct actual fish surveys, record sightings on underwater slates, transfer data to the REEF Fish Survey Project computer scansheet and submit the scansheets to REEF.

C. This standardized course outline describes fish that are most commonly found on coral reefs. You're encouraged to elaborate beyond the detail in the outline to cover specific fish species that are common in the local area or areas where student divers are likely to visit. It's strongly recommended that you show photos of

as many fish as possible during academic development and make marine life/fish identification reference books accessible to students during training.

In the UK, reference materials are available from:

Marine Conservation Society, 9 Gloucester Rd.,

Ross-On-Wye, Herefordshire HR9 5BU, England

Phone: +44 (0) 1989 566017, FAX: +44 (0) 1989 567815.

D. The Elective AWARE — Fish Identification Dive from the PADI Adventures in Diving program may be counted toward Fish Identification Dive One of this specialty at the instructor's discretion. Similarly, Dive One of this specialty may be counted as the Elective AWARE — Fish Identification Dive in the PADI Adventures in Diving program.

II. Course Requirements

A. Prerequisite certification: PADI Junior Open Water Diver or equivalent.

B. Minimum age requirement: 10 years.

C. **Maximum student-to-instructor ratio: 8:1, to certified assistant 4:1.**

> **Note**
> *For dives that include 10-11 year olds, direct supervision is required at a maximum ratio of 4:1. No more than two of the four divers may be age 10 or 11.*

D. Confined water training may be added at your discretion to remediate/assess student dive skills.

E. Dive data

1. **Two scuba dives may be conducted on the same day.**
2. **Dive depths.**
   a. **The maximum depth for any training dive is 30 metres/ 100 feet.** To allow ample no decompression time, it's recommended that you keep training dives shallower.
   b. It's recommended that if training dives will be made deeper that 18 metres/60 feet, student should have a PADI Deep Diver certification.

> **Note**
> *For 12-14 year olds, Adventure Dive maximum depth is 18 metres/60 feet or 21 metres/70 feet if they have taken the Adventure Deep Dive.*
> *For 10-11 year olds, the maximum depth is 12 metres/40 feet.*

III. Equipment and Materials

A. Student equipment and materials

1. All personal equipment required by the local environment including:
    a. mask, snorkel and fins
    b. exposure suit appropriate for local diving environment and depth
    c. weight system
    d. regulator with submersible pressure gauge
    e. alternate air source suitable for sharing air with other divers
    f. BCD with low-pressure inflator
    g. complete instrumentation, including a means to monitor depth, time and direction
    h. Recreational Dive Planner (Table or eRDPML). If using a dive computer, it's recommended that divers have RDPs for backup planning.
    i. diving tool or knife capable of cutting line.
    j. slate with pencil.
    k. whistle.
    l. log book (PADI Adventure Log recommended)
2. Recommended student materials
    a. REEF student kit, if available for course location. (Kits include underwater fish identification guide, data collection slate, survey data scansheets, REEF membership materials, etc.)
    b. Fish identification slate
    c. Data collection slate
    d. *Discover the Underwater World — Snorkeler's Field Guide*
    e. Nav-Finder
    f. *AWARE Our World, Our Water* manual

B. Instructor equipment

1. All personal standard and specialty equipment required of students
2. Recommended safety equipment:
    a. first aid kit and emergency oxygen
    b. dive flag and surface float with descent line as required by the local dive environment and regulations
3. PADI materials that may be used to teach this course.

a. General materials and teaching aids:
    1) Student Record File
    2) Log book (PADI Adventure Log recommended)
    3) PADI *Instructor Manual*
    4) Dive Roster
b. PADI reference materials:
    1) *The Encyclopedia of Recreational Diving*
    2) *Discover the Underwater World — Snorkeler's Field Guide*
c. Project AWARE reference material
    1) *AWARE Our World, Our Water* manual
    2) *Ten Ways a Diver Can Help Protect the Underwater Environment* brochure
d. Recognition materials:
    1) PIC envelopes
    2) Project AWARE Certificate of Recognition
    3) Project AWARE decal.

4. Fish identification and surveying materials
    a. REEF teaching modules, if available for course location
    b. Slides, photos and/or fish identification reference books
    c. Fish identification slate
    d. Data collection slate
    e. REEF Fish Survey Project scansheets and instructions
    f. REEF membership information

Note to Instructor

The following presentation makes up the actual course content. The presentation outline is designed to be your presentation notes. Notes to you are in brackets. The curriculum has been developed for maximum flexibility; notes will guide you to options in conduct and sequence.

IV. Presentation Notes

This presentation should precede all open water training dives and any optional confined water skill practice sessions.

A. Introductions

1. [Introduce yourself and your assistants.]
2. [Have students introduce themselves and explain why they are interested in learning more about fish identification and preserving the aquatic environment -get to know your students and encourage a relaxed atmosphere.]

3. [Ask students to explain what, if any, courses, training or experience they have that might be relevant to this program.]

B. Course Goals

1. To familiarize you with the role Project AWARE plays in preserving the aquatic environment.
2. To introduce you to the fish species you are likely to see on a dive in temperate or tropical waters. Being more knowledgeable about the fish you encounter will enhance your enjoyment and appreciation of various aquatic ecosystems.
3. To provide you with the knowledge and skills needed to conduct fish counts. This will enable you to collect valid scientific data on the distribution and abundance of fish at the dive sites you visit.

C. Course Overview

1. Schedule [Explain the course schedule including presentation and dive times and locations.]
2. Dives — at least two fish identification training dives are required. [Advise Adventure and Advanced Open Water Divers who made the Elective AWARE — Fish Identification dive that it applies as the first dive, if appropriate.]
3. Certification
    a. Upon successful completion of the course, you will receive the AWARE — Fish Identification certification.
    b. Certification means you're qualified to:
        1) Plan and organize a dive involving fish identification.
        2) Participate in dives that include fish surveys and counts.
        3) Apply for the rating of Master Scuba Diver if you are a PADI Advanced Open Water Diver (or have a qualifying certification from another organization) and a PADI Rescue Diver (or have a qualifying certification from another organization) with certification in four other PADI Specialty ratings.
4. Course Requirements
    a. Cost of course [Explain all course costs]
    b. Equipment and materials requirements [Explain what students are expected to provide]
5. Administration

    [Complete paperwork including: enrollment forms, Standard Safe Diving Practices Statement of Understanding, PADI Medical Statement, Liability Release and Assumption of Risk — the Student Record File contains all of these.]

V. About Project AWARE Foundation

Learning Objectives.

After this discussion, you will be able to answer the following questions:

1. ***Why are divers and snorkelers the natural ambassadors for the aquatic environment?***
2. ***What is the Project AWARE Foundation?***
3. ***What is Project AWARE's mission and purpose?***
4. ***What steps is the Project AWARE Foundation taking to protect the aquatic world in partnership with PADI?***

A. Noticing both short and long term changes in the aquatic realm, be it marine or freshwater, is unavoidable for people who regularly put on masks and venture underwater.

B. Because of intimate familiarity with the underwater world, divers and snorkelers are the natural ambassadors for the aquatic environment. Today they are some of the strongest supporters of programs and initiatives such as:

   a. Volunteer monitoring.

   b. Underwater and beach cleanups.

   c. Marine parks and protected areas.

   d. Legislative actions to support sustainable fisheries and protect endangered habitats and species.

C. In 1989 PADI introduced Project AWARE (Aquatic World Awareness, Responsibility and Education) as an environmental ethic campaign to harness each diver's potential as an advocate and protector of the underwater environments.

D. What began as an environmental ethic quickly formed into the Project AWARE Foundation, a registered, nonprofi t organization that involves divers and water enthusiasts in projects and activities to conserve underwater environments. The Foundation also supports research, education and conservation projects through its established grant program.

E. Since the nonprofit designation in 1992, Project AWARE has created an international presence with offices in Australia, Japan, the United Kingdom, and Switzerland.

F. You can join the team of environmental divers and contribute to conservation by becoming a Project AWARE Patron.

   1. Project AWARE Patrons take action for the underwater environment and their donations support conservation and data collection initiatives.

   2. All patrons receive a subscription to Project AWARE's email

newsletter containing information about conservation activities and action alerts from around the world related to the underwater environment.

G. Through Project AWARE, thousands of people worldwide are exposed to environmental awareness through interactions with PADI Professionals. For the most up-to-date information, visit Project AWARE Foundation online at projectaware.org

H. Project AWARE is dedicated to conserving underwater environments through education, advocacy and action.

   a. Project AWARE partners with divers and water enthusiasts to protect aquatic environments around the world.

   b. Project AWARE involves divers and nondivers in environmental projects, activities and campaigns working toward global conservation solutions.

I. In partnership with PADI, Project AWARE Foundation:

   1. Emphasizes environmentally sound approaches to dive practices, dive operations and dive skills. These include: mooring buoy use, responsible boating and diving practices, buoyancy control, proper techniques and equipment placement for underwater photography, responsible wreck diving guidelines and dive training programs including this program.

   2. Implements initiatives to expand diver participation in conservation activities and data collection including global underwater cleanups, coral reef monitoring, shark sightings and identification, environmental education and advocacy.

   3. Empowers children to get involved in environmental solutions through its AWARE Kids program.

   4. Advocates implementation of sustainable business practices and extends financial support for aquatic environmental projects, public education and outreach programs, and research.

VI. Fish Identification Strategy

Learning Objectives.

After this discussion, you will be able to answer the following questions:

1. Approximately how many different species of fish exist worldwide?

2. What simple strategy can divers use to identify fish during a dive?

A. There are more than 21,000 species of fish worldwide with more than 4000 species found on coral reefs. Because there are so many different species, it would be impossible to learn all of them or even most of them. However, regardless of where you dive in the tropics, the most commonly encountered fish tend to belong to the same few families which makes general identification a little more

manageable.

1. The most common species are represented by between 30 to 50 families. Therefore, the emphasis of fishwatching is, first, on identifying common characteristics of these families rather than individual species. Then, secondly, focusing only on the most common and representative species of the area.
2. Through a basic understanding of key characteristics of these common families — along with some essential ecological information — you will have a foundation to identify and understand the role of the majority of fish you see in most tropical and temperate environments.

B. A simple way for nonscientists to identify fish is to categorize families that have similar visual characteristics into groups. [See *Reef Fish Identification: Florida, Caribbean, Bahamas,* Paul Humann, Second Edition 1996]
   1. One technique is to divide a slate into boxes that represent the family groups you expect to see on the dive. If you also have a fish identification slate, you can use it to remind you of the family characteristics. When you spot a fish that fits the family characteristics you can note it in the appropriate box on your slate.
   2. For example, if you know that groupers tend to be large, solitary fish with wide mouths and you spot a fish you've never seen before with those characteristics, you could describe its distinguishing features in the grouper family box. This will allow you to more easily find the fish on a fish identification slate or reference book.
   3. You also want to have room on your slate to sketch or describe a fish that doesn't appear to easily fit into a family group.

C. Keep in mind that fish identification is a passive diving activity. Avoid chasing fish to get a better look. You'll find that remaining still or moving very slowly will be more productive than aggressive behavior.
   1. Buoyancy control is a valuable skill when observing or noting fish characteristics. It's also important to avoid becoming so focused that you accidently land on or drift into other crea-

tures.

Note to Instructor

This portion of the course is designed to familiarize students with the major families and representative species of fish. The fish described in this outline are found in tropical waters, most often on coral reefs. The common names given for these fish may vary from region to region. **You need to adapt this segment to the location where your students will make training dives.**

If possible, use REEF slide sets (modules), training materials and student kits to conduct this segment. If REEF materials are not available, gather resource materials that are appropriate for the dive location — slides, photos, fish identification slates, reference books, etc. Supplement the following outline as necessary to prepare students for identifying fish on their training dives.

VII. Fish Groups and Characteristics

Learning Objectives.

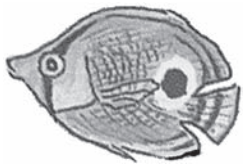
After this discussion, you will be able to answer the following questions:

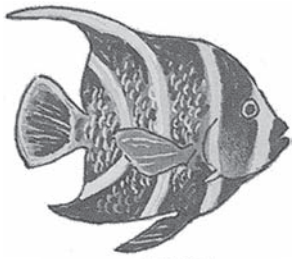
1. ***What are the 12 groupings commonly used to identify fish in tropical and temperate waters?***
   OR What are the common groupings used to identify fish in the local area?
2. ***What are the key characteristics of at least 30 of the most common fish families found in tropical and temperate waters worldwide?***

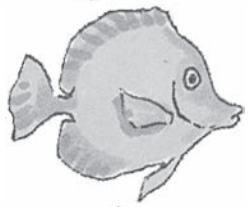
OR What are the key characteristics of the most common fish families found in the local area?

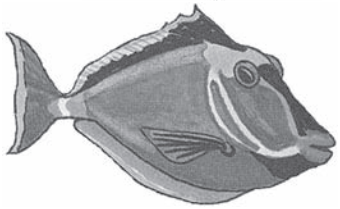
A. The 12 commonly used groups that include more than 30 different fish families are:

1. Butterflyfish, angelfish and surgeonfish
2. Jacks, barracuda, porgy and chubs
3. Snappers and grunts
4. Damselfish, chromis and hamlets
5. Groupers, seabass and basslets
6. Parrotfish and wrasse
7. Squirrelfish, bigeyes and cardinalfish
8. Blennies, gobies and jawfish
9. Flounders, scorpionfish, lizardfish and frogfish
10. Filefish, triggerfish, puffers, trunkfish, cowfish, goatfish, trumpetfish and drums
11. Eels
12. Sharks and rays









B. Common Characteristics and Examples

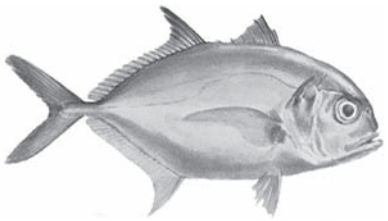
1. Butterflyfish, angelfish and surgeonfish usually have thin bodies and are oval or disk shaped. These fish generally have bright colors and interesting patterns that add to the beauty of the reef areas they typically inhabit.

   a. Butterflyfish usually are round, small bodied and have concave foreheads. Many have elongated mouths that allow them to pick out tiny invertebrates from crevices.

      1) Common names: Banded, Foureye, Spotfin, Racoon, Lemon

   b. Angelfish are usually darker in color, have long dorsal fins and have rounded foreheads. They are one of the few fish that eat sponges.

      2) Common names: Queen, Blue, French, Gray, Rock Beauty, Flame, Emperor, Royal



   c. Surgeonfish, also called tangs, are usually a solid color with minor color accents. They can be identified by the spines that stick out from each side the tail base. Surgeonfish are herbivores that help to control algae growth.

      1) Common names: Blue tang, Ocean surgeonfish, Doctorfish, Achilles tang, Convict tang, Longnose unicornfish

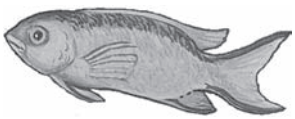
2. Jacks, barracuda, porgy and chubs are usually silvery in color and have forked tails. These fish may be some of the largest creatures you spot on or near the reef.

   a. Jacks, sometimes called trevally, are large silver or bluish fish that swim in open water often near outer reefs or over the reef fringe. Some jacks are solitary fish while others may congregate in small groups or schools. They are strong swimming predators.

      1) Common names: Bar, Crevalle, Big-eye, Amberjack, Bluefin trevally

b. Barracudas have long cylindrical silver bodies with faint markings or black blotches. They are usually identified by their big mouths full of sharp looking teeth. Large barracudas may swim alone and are often very curious. Smaller species may gather into huge schools.

1) Common names: Great, Chevron



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c. Porgies, in some areas called sea bream, are usually oval shaped with steep sloping heads. Some species have blue or yellow markings over their silvery base. They are often found nosing around in sandy areas adjacent to the reef.

1) Common names: Sheepshead, Saucereye, Doublebar sea bream

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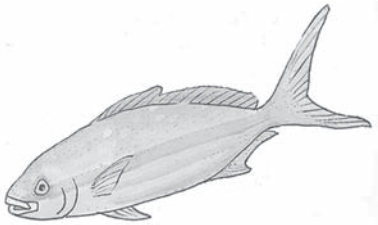
d. Chubs, or rudderfish, have elongated oval shaped bodies and are usually solid silver in color. It's likely that you'll see chubs higher up in the water column off the reef.

1) Common names: Yellow, Bermuda, Brassy rudderfish



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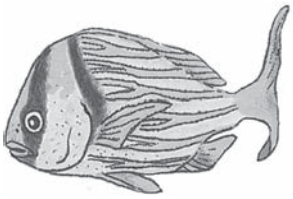
3. Snappers and grunts have long tapered bodies and heads that slope down toward their mouths. These fish are often caught commercially and are valuable food sources in many areas.

a. Snappers have upturned snouts and mouths, with visible canine teeth, that often snap open and shut when caught, which is how they got their name. Snappers often gather in small or loosely grouped schools and swim well the reef.

1) Common names: Gray, Cubera, Dog,

Schoolmaster, Yellowtail, Twinspot, Bluestriped



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b. Grunts were named because they emit a grunting sound when caught. They often congregate in small groups or large schools on the reef during the day then at night move off singly along the sand flats or grass beds to feed. Grunts may be colorful with various striped markings. In some areas, the family is known as sweetlips.

1) Common names: French, Bluestriped. Blackspotted, Oriental

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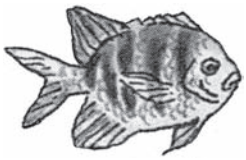

4. Damselfish, chromis and hamlets are small oval shaped fish that dart in and out of crevices. They can be quite colorful with many different patterns and shadings.

a. Many damselfish are algae-eaters that tenaciously defend their territory. It's common for a damselfish to charge a larger fish or even a diver that ventures too close to its algae patch or nest. The anemonefish of the Indo-Pacific region is a member of the damelfish family. These fish live in unique partnership with sea anemone

1) Common damselfish names: Sergeant Major, Dusky, Yellowtail, Sulfur, Humbug

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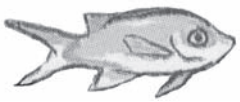

2) Common anemonefish names: Clown, Twobar, Domino

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b. Chromis are closely related to damselfish, but have a slightly different appearance. They tend to feed on plankton and are less territorial than damsels. Their bodies are usually more elongated and have deeply forked tails.

1) Common names: Blue, Brown, Purple, Bluegreen, Bicolor

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_____

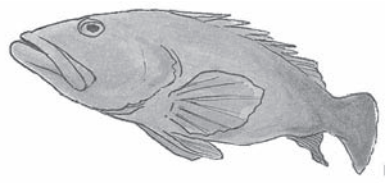
c. Hamlets are actually members of the seabass family, but are small and oval shaped like damselfish. Hamlets tend to have flatter, sloping head profiles. Common hamlet species are colorful and many have stripes or markings that make them easy to identify. They are predators.

1) Common names: Barred, Indigo, Black, Blue

_____

_____

5. Grouper is the commonly used name for the larger members of the seabass family. These fish are usually big-bodied fish with large mouths and lips. In some areas, groupers may be the largest fish you see on the reef. They tend to be solitary fish that hang out in the shadows. Because they are highly sought after food fish, they are susceptible to overfishing. They are sometimes also called rock cod.



a. Groupers are often dark brown, black or reddish in color with splotchy markings. However, they have the ability to change colors and markings, making it difficult to determine the exact species. To go with their large stocky bodies, groupers have a short spiny dorsal fin that softens as it tapers down to the tail.

1) Common names: Jewfish, Nassau, Yellowfin, Black. Peacock, Coral, Potato

_____

_____

b. Other members of the seabass family tend to be smaller and have more elongated bodies than groupers. They are often dark in color with lighter spots and varied markings. Most seabass stay on or near the bottom.

1) Common names: Graysby, Rock Hind, Coney, Harlequin, Soapfish, Kelp

_____

_____

c. Basslets are tiny, usually colorful fish that are closely related to the seabass family. They usually inhabit deeper reefs or walls. The multicolored fairy basslet is one of the few basslet species commonly spotted on shallower reefs. Indo-Pacific reefs often swarm with bright fish called anthias that are referred to as basslets but are actually a subfamily of the seabass family.

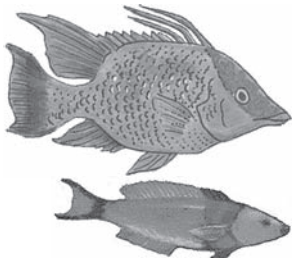
6. Parrotfish and wrasse add color and variety to the mix of creatures found on the reef. Parrotfish were named for their beak-like teeth plates and rainbow colors not unlike tropical birds. The wrasse family also has many fish with birdlike characteristics, yet the variety of shapes, sizes and colors of wrasse make them more difficult to categorize.

   a. Parrotfish are often observed using their bony beaks to scrape hard surfaces for algae. Often juvenile, adult and terminal phase parrotfish will have completely different coloration. They swim using their pectoral fins, while their tails are used for burst of speed.

      1) Common names: Rainbow, Blue, Queen, Stoplight, Redband, Longnose, Bicolor

_____

_____



   b. Wrasses are generally smaller than parrotfish and have more elongated bodies. You are likely to see wrasse foraging for small invertebrates, such as shrimp and crustaceans living in the sand. Wrasse often go through several color and pattern changes as they develop from juveniles into adults. Hogfish and razorfish are also members of the wrasse family although they are a different shape than most wrasse.

      1) Common names: Creole, Yellowhead, Bluehead, Clown, Rainbow, Senorita, Bird, Cleaner

_____

_____

7. Squirrelfish, bigeyes and cardinalfish all tend to be nocturnal. They swim freely over the reef in the dark and hide deep in cracks and crevices during the day. Their reddish color and big eyes identify them as night adapted creatures and also make them easy to spot during the day.

   a. Squirrelfish have a pronounced rear dorsal fin that sticks up similar to a squirrel's tail, thus the name. During the day, you're most likely to see groups of fish hiding under ledges and in crevices.

      1) Common names: Longspine, Reef, Giant, Blackbar Soldierfish

_____

_____

b. Bigeyes can be distinguished from squirrelfish by their larger eye, continuous dorsal fin and less scaly appearance.

1) Common names: Glasseye, Bigeye, Goggle-eye

_____

_____

c. Cardinalfish are small reddish fish with short snouts and two separate dorsal fins. They usually hide deep within the reef during the day.

1) Common names: Barred, Flamefish, Fiveline

_____

_____

8. Blennies and gobies are small fish with long bodies that often spend time perched in small holes or on the bottom. When looking for these fish, you'll often see only their head protruding from their hiding places.

a. Blennies generally perch themselves up on their pectoral fins and appear to be looking about curiously. One of their most distinguishing features are the fleshy appendages, called cirri, above their eyes that look like little horns or bushy eyebrows. Blennies come in a variety of colors.

1) Common names: Saddled, Redlip, Seaweed, Chestnut, Leopard

_____

_____

b. Gobies tend to rest on their pectoral fins in a straight, flat and motionless position. Some species are referred to as cleaner fish for their behavior of picking parasites from larger species. They come in a variety of color variations.

1) Common names: Neon, Bridled, Blue, Steinitz, Maiden, Citron

_____

_____

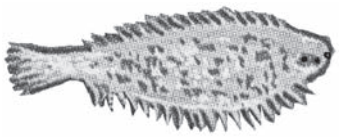
c. Jawfish have long bodies and large jaws, which is how they got their name. They are often spotted in holes that they have constructed by moving stones and sand with their mouths.

1) Common names: Yellowhead

_____

_____

9. Flounders, scorpionfish, lizardfish and frogfish all tend to be bottom dwellers that have excellent camouflage and unusual shapes.



a. Flounders are flat fish that have both eyes on one side — the side that faces the surface. Flounders often blend into the bottom color and further hide by settling down into the sand.

1) Common names: Peacock, Eyed, Gulf, Panther

_____

_____

b. Scorpionfish are often camouflaged to match their surroundings. Many species have fleshy appendages that resemble local flora. These fish have stocky bodies and spiny dorsal fins that carry venom. Scorpionfish, including the stonefish, are difficult to spot because they remain motionless when approached, only raising their venomous spines in defense. Lionfish, the more flamboyant members of the family, swim over the reef singly or in pairs with their plume-like fins spread wide.

1) Common names: Spotted, Reef

_____

_____

c. Lizardfish have elongated bodies with large, upturned mouths. They often rest on the bottom blending in well with their surroundings. Lizardfish are often pale and mottled in colors that match the sandy bottom.

1) Common names: Sand Diver, Snakefish, Common

_____

_____

d. Frogfish, also referred to as anglerfish, have bulky bodies, webbed pectoral and ventral fins, and large upturned mouths. They often blend in perfectly with their surrounding and move by walking on their pectoral fins. Frogfish attract small fish by dangling a wiry appendage in front of their mouths. When the fish approach the bait, the frogfish slurps them up.

1) Common names: Sargassumfish, Longlure, Freckled

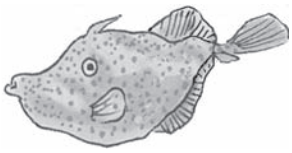
_____

_____

10. Filefish, triggerfish, puffers, trunkfish, cowfish, goatfish, trumpetfish and drums are all free-swimming fish that have unusual body shapes or characteristics.

    a. Filefish and triggerfish make up a family called leatherjackets because they have rough textured skin. These fish have thin bodies that range from long ovals to diamond shapes. Triggerfish get their name from their elongated forward dorsal fin that is shaped like a gun's trigger. Filefish also have this appendage, however it is usually more spikelike. Filefish and triggerfish also have distinctive mouths with prominent lips. They come in a variety of colors and patterns.

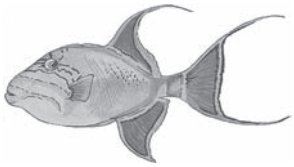
        1) Common filefish names: Scrawled, Orangespot, Whitespotted, Broom, Longnose



        _____

        _____

        2) Common triggerfish names: Queen, Black Durgon, Ocean, Titon, Clown



        _____

        _____

    b. Puffers get their name from the ability to draw water in to puff up their bodies. Some puffers have spines that become erect when they puff up while others have smoother textures. All puffers have powerful jaws and most species have dark spots or blotches.

        1) Common names: Sharpnose, Balloonfish, Porcupinefish, Masked

        _____

        _____

    c. Trunkfish and cowfish make up the boxfish named for their triangular shape and bony scales. These fish move slowly using sculling fin motions. They come in a variety of colors, many with spots or repetitive patterns.

        1) Common trunkfish names: Smooth, Spotted, Cube

        _____

        _____

        2) Common cowfish names: Scrawled, Honeycomb

        _____

        _____

d. Goatfish have long, cylindrical bodies and barbels that hang down from their chins. They are often observed feeling around the bottom with their barbels for food. Goatfish have many color variations and may gather in schools or roam around in small groups.

1) Common names: Spotted, Yellow, Red Patch, Long-barbel, Yellow saddle

_____

_____

e. Trumpetfish have tubelike bodies and long mouths that can flair open to suck in prey. They are often observed stalking by hanging head-down and waiting for small fish to swim near enough to slurp up. Trumpetfish may either be brown to blue-grey or bright yellow with shades in between.

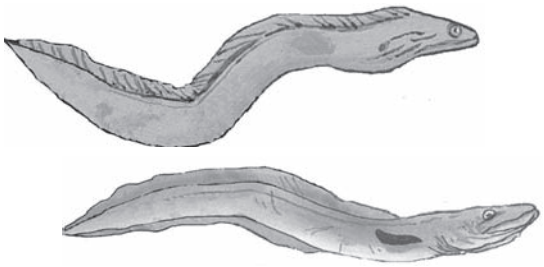
f. Drums are easily identified by their extremely long fore-dorsal fin and striking black and white coloring. These fish are often seen under ledges.

1) Common names: Spotted, Jackknife fish, Highhat

_____

_____

11. Eels you are likely to encounter in tropical or temperate areas include the moray eel, conger eel and snake eel. Eels are fish that have long snakelike bodies. Most eels spend the day in crevices, holes or under ledges, and are more likely to be seen free-swimming at night. Some eels are dark and solid colored, while many are uniquely patterned.



a. Common moray eel names: Green, Spotted, Reticulated, Viper, Giant

_____

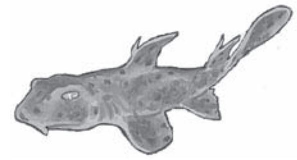
_____

b. Other eels: Conger, Blue Ribbon, Dragon, Wolf

_____

_____

12. Sharks and rays are scientifically classified as cartilaginous fish, which means that their structure is made of flexible cartilage. Spying a large shark or ray cruising over a reef is not common in most areas. However, smaller shark and ray species sightings are possible. Sharks use their tales to propel them while rays have modified pectorals they use to swim in a flying motion.

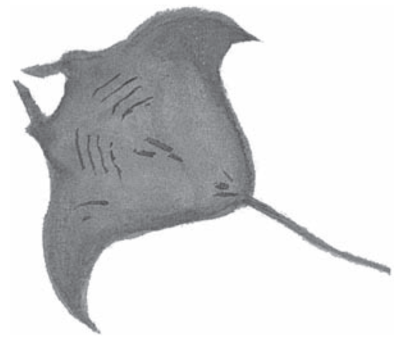


a. Common shark names: Nurse, White Tip, Black Tip, Leopard

____

____

b. Common ray names: Skate, Southern stingray, Eagle Ray, Manta Ray



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VIII. Fish Surveys

Learning Objectives.

After this discussion, you will be able to answer the following questions:

1. ***How can divers turn their observations of reef fish into valid data for use by scientists?***
2. ***What is the*** roving ***diver survey technique and why is it a desirable method for recreational divers to collect data?***
3. ***What method is recommended for identifying a*** mystery ***fish?***
4. ***How are observations properly recorded, transferred to data sheets and submitted?***

A. What is REEF and how can recreational divers get involved?

1. REEF is a private, nonprofit organization established in 1990 by underwater photographers and marine life authors Paul Humann and Ned DeLoach.

   a. REEF's mission is educate, enlist and enable divers and nondivers to become active stewards in the conservation of marine habitats. One way that REEF carries this out is to provide vital reef and inshore fish biodiversity data to marine scientists, resource managers, conservationists and other interested parties by enlisting and mobilizing volunteer recreational divers and snorkelers to conduct underwater surveys.

b. Through REEF's program, fishwatching becomes more than an enjoyable activity — you can personally contribute to the understanding and conservation of the aquatic environment.

2. The REEF Fish Survey Project is an ongoing cooperative effort between REEF and The Nature Conservancy (TNC). TNC is a private, nonprofit organization established in 1951 to preserve plants, animals, and natural communities that represent the diversity of life on earth by protecting the lands and waters they need to survive.

   a. Through the Project, volunteers gather large amounts of species and abundance data, which is transferred into the Project database. REEF developed the procedures for gathering, transferring and organizing data in cooperation with biologists from TNC, the University of Miami, and the National Oceanic and Atmospheric Administration's Southeast Science Fisheries Center.

   b. The database will provide the scientific, resource management, and conservation communities with access to a long term and geographically broad database of species inventories as well as historical records of reef fish populations.

3. To participate in the REEF Fish Survey Project, you need to have basic fish identification skills and become a member of REEF. [If using REEF materials to conduct this course, explain how students become REEF members.]

B. Data Collection

Note to Instructor

If students will participate in the REEF Fish Survey Project, review data collection procedures for the Project. If students are collecting data for personal use or other reasons, explain how they can start their own database and adapt their data collection techniques to meet their goals.

1. The REEF Fish Survey Project uses the *roving diver technique* to gather data. This means that divers do not have to alter or restrict their normal dive pattern. When conducting a survey, you simply swim along as usual while trying to spot and identify fish along your route. As you see fish you can positively identify, you record the sightings on an underwater slate.

2. To turn in survey data, you do not need to have exact fish counts, however, you do need to estimate the relative abundance of each species. For example, you would record S for Single (1), F for Few (2-10), M for Many (11-100), or A for Abundant (>100).

3. You should begin recording sightings as soon as you enter the water and continue throughout the whole dive. This may include exploring sand flats, grass beds and rubble fields for species unique to those environments and looking in cracks and crevices for less common or harder-to-find species.

C. If you discover a mystery fish (one you can't identify), take notes and sketch distinguishing characteristics on the underwater slate. When you get out of the water, check your field guide and/or consult with an experienced fish-watcher. Add the sighting to your survey data, only if you can positively identify the species.

D. Reporting Data

Note to Instructor

If students will participate in the REEF Fish Survey Project, review the proper steps for completing a Project Scansheet. If students are collecting data for other reasons, review appropriate reporting procedures.

1. After the dive, transfer your sighting information onto a REEF Fish Survey Project computer scansheet.
   a. Scansheets may either be used to record:
      1) Species and Abundance Survey — positively identified species as well as their abundance for a single dive.
      2) Species Only Survey — sightings taken over a series of dives. Mark the "S" bubble to do this. [Explain that Species and Abundance surveys are far more useful and, therefore, preferred]
   b. Record only positively identified fish species and pay special attention to those species marked with a black triangle on the scansheet.
   c. Mark the location of the survey site as accurately as possible. Use navigational coordinates (longitude and latitude) from a global positioning satellite (GPS) receiver when available.
   d. Check that you have filled in all of the information requested on the scansheet (member identification, name, survey type, date of survey, etc.)
2. Use a number two pencil to fill in the bubbles on the data sheet and thoroughly erase any mistakes.
3. Mail your completed scansheets to: REEF Fish Survey Project, P.O. Box 246, Key Largo, Florida 33037 USA

IX. AWARE — Fish Identification Dive One

Learning Objectives.

By the end of this dive, you will be able to:

1. ***Identify fish by placing them in appropriate family groups, and identify specific species when possible.***
2. ***Record sightings on a slate, including abundance and habitat information when possible.***
3. ***Draw diagrams and describe characteristics of unfamiliar fish, then attempt to determine their identities after the dive.***
4. ***Demonstrate appropriate and responsible diving practices and behaviors to minimize negative environmental effects.***

Note to Instructor

If students have previous experience conducting fish sightings, their data may be transferred to REEF Fish Survey Project scansheets. However, to avoid task loading, it's recommended that you conduct Dive One for experience and enjoyment without the pressure of collecting data for submission.

A. General open water considerations

1. Involve students in dive planning activities. Have students prepare underwater slates, training buoys and reference lines as appropriate.
2. Conduct a thorough briefing. Emphasize that students should interact responsibly with the aquatic life by maintaining neutral buoyancy, avoiding unnecessary contact, securing dangling equipment, and moving slowly to minimize disturbing the aquatic life.
3. Assign logistical duties to staff and review emergency protocols.
4. The use of qualified assistants is highly recommended. Assistants can help keep track of buddy teams, help with check-in, checkout procedures and be prepared to help in an emergency. Certified assistants may also be assigned to help students find particular fish, identify them by name, and point out unique behaviors or interesting interactions.
5. The bottom time should never exceed the no-decompression limits on the Recreational Dive Planner or each student's dive computer (if used). Preferably, plan dives to end with a margin of extra conservatism.

B. Briefing

1. Evaluate the conditions
2. Facilities at the dive site
3. Entry technique and location
4. Exit technique and location
5. Depth ranges
6. Interesting and helpful facts about the dive site
7. Emergency procedures
8. Buddy assignments

C. Predive procedures

1. Equipment preparation
2. Prepare underwater slates and gather appropriate fish identification cards/field guides.
3. Calculate no-decompression limits.
4. Predive safety check

D. Entry — appropriate for local environment

E. Dive Activities

1. Identify fish families and species [Emphasize that until students become adept at identifying individual species they should concentrate on distinguishing fish families]
2. Record sightings, abundance and habitats [Encourage students to not only record fish sightings, but to also note abundance and environments where fish where seen, if possible]
3. Sketch or describe unfamiliar fish [Encourage students to use reef fish identification cards/slates, when available]

F. Ascent and Exit — safety stop at 5 metres/15 feet (if appropriate)

G. Postdive procedures

1. Stow equipment and exchange tanks as appropriate.
2. Calculate repetitive group at the end of the dive.

H. Debriefing

1. Comment on student performance.
2. Discuss fish observed
3. Use reference materials to identify unfamiliar fish
4. Explain how students may build a life list of their sightings
5. Log dive (Instructor signs log.)

X. AWARE — Fish Identification Dive Two

Learning Objectives.

By the end of this dive, you will be able to:

1. Demonstrate the ability to independently plan and execute a fish identification dive to include recording fish families, species, abundance and habitat information and drawing diagrams of unfamiliar fish.

Note to Instructor

If students are participating in the REEF Fish Survey Project, review fish surveying techniques and data collection procedures. If students are identifying fish for other reasons, encourage them to look for species they did not encounter on the Dive One.

A. Briefing

1. Evaluate the conditions
2. Facilities at the dive site
3. Entry technique and location
4. Exit technique and location
5. Depth ranges
6. Interesting and helpful facts about the dive site
7. Emergency procedures
8. Buddy assignments
9. [Review REEF Fish Survey Project procedures, if appropriate]

B. Predive procedures

1. Equipment preparation
2. Prepare underwater slates and gather appropriate fish identification cards/field guides.
3. Calculate no-decompression limits.
4. Predive safety check

C. Entry — appropriate for local environment

D. Dive Activities

1. Identify fish families and species
2. Record sightings, abundance and habitats
3. Sketch or describe unfamiliar fish

E. Ascent and Exit — safety stop at 5 metres/15 feet (if appropriate)

F. Postdive procedures

1. Stow equipment and exchange tanks as appropriate.
2. Calculate repetitive group at the end of the dive.

G. Debriefing

1. Comment on student performance.
2. Discuss fish observed
3. Use reference materials to identify unfamiliar fish
4. [Complete REEF Fish Survey Project scansheets, if appropriate]
5. Log dive (Instructor signs log.)

Name _____ Date _____

AWARE – Fish Identification Knowledge Review

To the student: Answer the following questions, then review this knowledge review with your instructor.

1. Why are divers and snorkelers the natural ambassadors for the aquatic environment?

2. What are the origins of Project AWARE?

3. Project AWARE Foundation is a registered, nonprofit organization dedicated to conserving underwater environments through education, advocacy and action.

   ☐ True ☐ False

4. Project AWARE and dedicated volunteers are committed to conservation initiatives including:
   - ☐ a. Underwater Cleanups and Marine Debris Prevention.
   - ☐ b. Coral Reef Conservation, Monitoring and Data Collection.
   - ☐ c. Shark Education, Reporting and Conservation.
   - ☐ d. All of the above.

5. Approximately how many different species of fish exist worldwide? _____

6. Beginning fishwatchers should concentrate on identifying fish families, not specific species.
   ☐ True ☐ False

7. Fish identification is a(n) _____ diving activity. Avoid _____ fish to get a better look.
   - ☐ a. interactive/photographing
   - ☐ b. passive/staring at
   - ☐ c. passive/chasing
   - ☐ d. interactive/drawing

8. List at least four common family groupings used to identify fish in your local area.

   1. _____
   2. _____
   3. _____
   4. _____

9. List at least four key characteristics that assist in distinguishing between different fish families.

   1. _____
   2. _____
   3. _____
   4. _____

10. What is the *roving diver* survey technique and why is it a desirable method for recreational divers to collect data?

Student Statement: I have had explained to me and I understand the questions I missed.

Name _____ Date _____

Adventure Dive: AWARE – Fish Identification

Skills Overview

- Slate preparation
- Briefing
- Equipment preparation
- Predive Safety Check
- Entry
- Observe and identify fish families
- Record sightings
- Sketch/describe unfamiliar fish
- Ascent and exit
- Post dive procedures
- Use reference materials to identify unfamiliar fish
- Debrief
- Log dive

Name _____ Date _____

AWARE – Fish Identification Knowledge Review Answer Key

To the student: Answer the following questions, then review this knowledge review with your instructor.

1. Why are divers and snorkelers the natural ambassadors for the aquatic environment?

   Divers and snorkelers notice both short and long term changes in the aquatic realm. This intimate familiarity with the underwater world makes them the natural ambassadors for the aquatic environment.

2. What are the origins of Project AWARE?

   In 1989 PADI introduced Project AWARE (Aquatic World Awareness, Responsibility and Education) as an environmental ethic campaign to harness each diver's potential as an advocate and protector of the underwater environments.

3. Part of Project AWARE's mission is to teach the world about the importance and responsibility of preserving the aquatic environment.

   ☑ True ☐ False

4. Project AWARE and dedicated volunteers are committed to conservation initiatives including:

   ☐ a. Underwater Cleanups and Marine Debris Prevention.
   ☐ b. Coral Reef Conservation, Monitoring and Data Collection.
   ☐ c. Shark Education, Reporting and Conservation.
   ☑ d. All of the above.

5. Approximately how many different species of fish exist worldwide?

   21,000

6. Beginning fishwatchers should concentrate on identifying fish families, not specific species.

   ☑ True ☐ False

7. Fish identification is a(n) _____ diving activity. Avoid _____ fish to get a better look.

   ☐ a. interactive/photographing
   ☐ b. passive/staring at
   ☑ c. passive/chasing
   ☐ d. interactive/drawing

8. List at least four common family groupings used to identify fish in your local area.

   (Answers vary depending on location)

9. List at least four key characteristics that assist in distinguishing between different fish families.

   Possible answers include:

   1. Size
   2. Color
   3. Body shape
   4. Fin configuration
   5. Mouth/jaw shape
   6. Habitat and behavior
   7. Propulsion method

10. What is the roving diver survey technique and why is it a desirable method for recreational divers to collect data?

    A technique that allows diver to swim along as usual, spotting fish along the way. The divers do not have to alter or restrict their normal dive pattern.

Student Statement: I have had explained to me and I understand the questions I missed.

Name _____ Date _____

Adventure Dive: AWARE – Fish Identification

Skills Overview

- Slate preparation
- Briefing
- Equipment preparation
- Predive Safety Check
- Entry
- Observe and identify fish families
- Record sightings
- Sketch/describe unfamiliar fish
- Ascent and exit
- Post dive procedures
- Use reference materials to identify unfamiliar fish
- Debrief
- Log dive

PADI Adventure Dive Training Record

Adventure Dive:

AWARE - Fish Identification Dive

Skills Overview

- **Knowledge Review**
- **Slate preparation**
- **Briefing**
- **Equipment preparation**
- **Predive Safety Check**
- **Entry**
- **Observe and identify fish families**
- **Record sightings**
- **Sketch/describe unfamiliar fish**
- **Ascent and exit**
- **Use reference materials to identify unfamiliar fish**
- **Debrief and postdive procedures**
- **Log dive – Complete Training Record**

Instructor Statement

"I verify that this student has satisfactorily completed the Knowledge Review and Performance Requirements (as described in PADI's Adventures in Diving Program Instructor Guide) for this PADI Adventure Dive. I am a renewed, Teaching status PADI Instructor for the current year."

Instructor Name _____
First Middle Initial Last

Instructor Signature _____

PADI No. _____ Dive Completion Date _____
Day/Month/Year

Instructor Contact Information (Please Print)

Instructor Mailing Address _____

City _____ State/Province _____

Country _____ Zip/Postal Code _____

Phone/FAX/email _____

Student Diver Statement

"I verify that I have completed all of the Performance Requirements for this Adventure Dive. I realize that there is more to learn about fish identification and that completion of a PADI AWARE - Fish Identification course is highly recommended. I also agree to abide by PADI Standard Safe Diving Practices."

Diver Signature _____ Date _____
Day/Month/Year

PADI Specialty Training Record

AWARE - Fish Identification Diver

I verify that this student has satisfactorily completed all academic and/or any confined water training sessions as outlined in the PADI Specialty Course Instructor Outline for **AWARE - Fish Identification**. I am a renewed, Teaching status PADI Instructor in this specialty.

Instructor Name _____ PADI#_____

Instructor Signature _____ Completion Date _____

Open Water Dives

Dive One

I verify that this student has satisfactorily completed Dive One as outlined in the PADI standardized outline for **AWARE - Fish Identification** including:

- Identifying fish by placing them in appropriate family groupings
- Recording fish sightings
- Drawing diagrams of unfamiliar fish for later identification
- Demonstrating responsible diving practices to minimize negative environmental effects

I am a renewed, Teaching status PADI Instructor in this specialty.

Instructor Name _____ PADI #_____

Instructor Signature _____ Completion Date _____

Dive Two

I verify that this student has satisfactorily completed Dive Two as outlined in the PADI standardized outline for **AWARE - Fish Identification** including:

- Planning and executing a dive using appropriate fish surveying techniques

I am a renewed, Teaching status PADI Instructor in this specialty.

Instructor Name _____ PADI #_____

Instructor Signature _____ Completion Date _____

I verify that I have completed all performance requirements for this **AWARE - Fish Identification** Diver Specialty. I am adequately prepared to dive in areas and under conditions similar to those in which I was trained. I agree to abide by PADI Standard Safe Diving Practices.

Student Name _____

Student Signature _____Date _____