Deep Diver

PADI

Specialty Course Instructor Guide

Product No. 70224 (Rev. 10/10) Version 2.02

PADI Deep Diver
Specialty Course Instructor Guide

Published and distributed by PADI
30151 Tomas
Rancho Santa Margarita, CA 92688-2125 USA

Printed in U.S.A.
Product No. 70224 (10/10) Version 2.02

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Introduction

This section includes suggestions on how to use this guide, an overview of course philosophy and goals, a flow chart to show you how course components and materials work together for success, and ways you can organize and integrate student diver learning.

How to Use this Guide

This guide speaks to *you,* the PADI Deep Diver Specialty Instructor. The guide contains three sections – the first contains standards specific to this course, the second contains knowledge development presentations, the third considers optional confined water and/or surface training and details the open water dives. All required standards, learning objectives, activities, and performance requirements specific to the PADI Deep Diver course appear in **boldface** print. **The boldface assists you in easily identifying those requirements that you *must* adhere to when you conduct the course.** Items not in boldface print are recommendations for your information and consideration. General course standards applicable to *all* PADI courses are located in the General Standards and Procedures section of your PADI *Instructor Manual.*

Course Philosophy and Goals

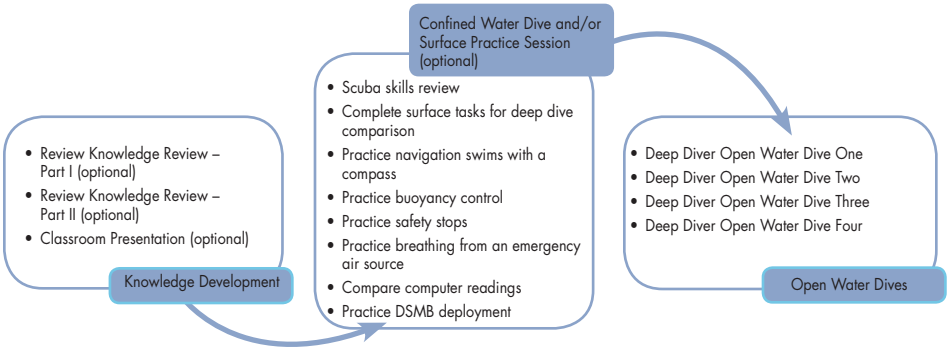
It's a rare diver who hasn't felt the urge to dive deep. Deep diving opens the door to many new exciting dive sites like deeper wrecks, reefs and walls. As a rule, divers tend to be adventurous people, and deep diving – whether to visit a wreck or take photos – can certainly be called adventurous. It's only natural that like most divers, you have some interest in deep diving.

Deep diving is a means to an end. You make a deep dive to see, to do or to experience something that you can't on a shallower dive. There's no reason to make a deep dive if you can make essentially the same dive at a shallower depth. Unlike shallower dives, deep dives tend to be short since time and air supply is limited. Therefore, you don't have a great deal of time to do much so you'll need to make smart decisions about a dive objective and dive accomplishments. Keep

that thought, the *philosophy* of this course is to focus on *making smart decisions for a stress free, deep diving experience with an emphasis on safety.* Thus, the *goal* of this course is to bring to light the necessary equipment needed to support deep diving activities, to discourage thrill seeker attitudes and encourage the proper deep diver behavior of following appropriate limits, and to teach student divers a systematic, methodical approach to enjoying deep diving. Student divers will develop the techniques involved in deep diving within recreational limits (between the depths of 18 metres/60 feet and 40 metres/130 feet) while avoiding disturbing delicate marine life.

The best way to learn Deep Diving procedures and to apply them is by doing it. This *course philosophy,* therefore, expands student diver knowledge about deep dive planning and organization, the basics of deep diving, hazards to avoid, deep diving support equipment, and how to interact responsibly with the aquatic life they'll see while deep diving. Student divers will apply the knowledge they gain by reading the PADI *Deep Diver Manual* and watching the companion video on at least four open water dives practicing and demonstrating the practical aspects of deep diving.

Course Flow Options



Course Flow Options provides a visual representation of how knowledge development and confined water and/or surface practice sessions support open water dives. When possible, it's preferable to have student divers complete and review Knowledge Reviews from the PADI *Deep Diver Manual* before participating in the open water dives. Knowledge Review – Part I is the same Knowledge Review that appears in the Deep Diver section of *Adventures in Diving.* If you have the first part of the Knowledge Review on file, you may at your discretion, have student divers complete only Knowledge Review – Part II.

Confined water and/or surface practice sessions are not required for the PADI Deep Diver course; however, you may choose to have practical sessions that allow student divers to practice skills such as navigating with a compass, buoyancy control, safety stops, Delayed Surface Marker Buoy (DSMB) deployment, breath-

ing from an emergency air source, reading (comparing with other divers) information from their depth gauges or dive computers.

There are four dives to complete. **You may rearrange skill sequences within each dive; however, the dive sequence must stay intact.** You may add more dives as necessary to meet student divers' needs. Organize your course to incorporate environment friendly techniques throughout each dive, to accommodate student diver learning style, logistical needs, and your sequencing preferences. You may choose from one of the approaches from Program Options, or develop your own.

Program Options

Step	Independent Study	Adventure Dive Integration	Instructor-Led
1	Independent study with manual and video (optional)	Independent study with manual and video (optional)	Knowledge Development Classroom Presentation (optional)
2	Review Knowledge Review – Part I and Part II (optional)	Give credit for Deep Adventure Dive and collect Knowledge Review – Part I (optional)	Review Knowledge Review – Part I and Part II (optional)
3	Confined Water Dive and/or Surface Practice Session (optional)	Confined Water Dive and/or Surface Practice Session (optional)	Confined Water Dive and/or Surface Practice Session (optional)
4	Open Water Dive One	Review Knowledge Review – Part II (optional)	Open Water Dive One
5	Open Water Dive Two	Open Water Dive Two	Open Water Dive Two
6	Open Water Dive Three	Open Water Dive Three	Open Water Dive Three
7	Open Water Dive Four	Open Water Dive Four	Open Water Dive Four

Section One:
Course Standards

This section includes the course standards, recommendations, and suggestions for conducting the PADI Deep Diver course.

Standards at a Glance

Topic	Course Standard
Minimum Instructor Rating	**PADI Deep Diver Specialty Instructor**
Prerequisites **Minimum Age**	**PADI Adventure Diver or Advanced Open Water Diver** **15 years**
Ratios	**Open Water 8:1 Instructor; 4:1 Certified Assistant.**
Site, Depths, and Hours	**Depth: 18-40 metres/60-130 feet** Hours Recommended: 24 **Minimum Open Water Dives: 4 dives over 2 days**
Materials and Equipment	Instructor: • **PADI Deep Diver Specialty Course Instructor Guide** • **Emergency backup air supply**

Instructor Prerequisites

To qualify to teach the PADI Deep Diver course, an individual must be a Teaching status PADI Open Water Scuba Instructor or higher. **PADI Instructors**

may apply for the Deep Diver Specialty Instructor rating after completing a Specialty Instructor Training course with a PADI Course Director, or by providing proof of experience and applying directly to PADI. For further detail, reference Membership Standards in the General Standards and Procedures section of your PADI *Instructor Manual.*

Student Diver Prerequisites

By the start of the course, a diver must be:

1. **Certified as a PADI Adventure Diver or Advanced Open Water Diver or have a qualifying certification from another training organization.** In this case, a qualifying certification is defined as proof of certification beyond entry level (at least two certifications total) with proof of 20 or more logged dives documenting experience in deep diving and underwater navigation. Verify student diver prerequisite skills and provide remediation as necessary.
2. **At least 15 years.**

Supervision and Ratios

Open Water Dives

A Teaching status PADI Deep Diver Specialty Instructor must be present and in control of all activities. During deep dives, students must be accompanied by the course instructor or certified assistant (PADI Instructor, Assistant Instructor or PADI Divemaster). During Open Water Dive One, the instructor must be in the water *directly* supervising student divers at a maximum ratio of 8:1. This ratio cannot be increased with the use of certified assistants.

The ratio for Dives Two, Three, and Four is 8 student divers per instructor (8:1), with 4 additional student divers allowed per certified assistant (4:1). The maximum student diver to certified assistant is 4:1. The Specialty Instructor must ensure that all performance requirements are met.

Site, Depths, and Hours

Site

Choose sites with conditions and environments suitable for completing requirements. Ideally, select sites familiar to student divers. Use different open water dive sites, if possible, to give student divers experience in dealing with a variety of environmental conditions (incorporate environment friendly techniques throughout each dive) and logistical challenges. Practice skills in confined water sessions first to better prepare divers to apply skills in open water later.

Depths

Conduct Dive One between 18 metres/60 feet and 30 metres/100 feet. Dives Two, Three and Four may not exceed 40 metres/130 feet.

Hours

The PADI Deep Diver course includes four open water dives, conducted over two days. No more than three dives per day. The minimum number of recommended hours is 24.

Materials and Equipment

Instructor Materials and Equipment

Use the PADI Deep Diver course materials prescriptively to accommodate various sequencing preferences and teaching and learning styles.

Required

- **PADI *Deep Diver Specialty Course Instructor Guide***
- **Specialty equipment needed for student divers to perform deep dives.**
  - **Underwater light**
  - **Demonstration items** (e.g., puzzles, problems, colored objects or colors painted on a slate)
  - **Pressure affected items** (e.g., ping-pong ball, tennis ball, wet suit materials, etc.)
  - **Safety equipment** (e.g., emergency oxygen; flag and surface float with 6 metre/20 foot weighted line for safety stops with backup air supply attached).
  - **Emergency backup air supply**

Recommended

- PADI *Deep Diver Manual.* Use the student diver manual for detailed content explanation.
- PADI *Deep Diving* video
- As needed: Extra backup lights, slates with pencils, compasses, and dive computers for student divers.

Student Diver Materials and Equipment

Recommended

- PADI *Deep Diver Manual*
- PADI *Deep Diving* video
- Underwater light
- Slate with pencil
- Dive computer
- Access to support equipment as necessary, including but not limited to: backup lights, slate and pencils, and compasses.

Assessment Standards

To assess knowledge you may review the Knowledge Reviews from the student diver's manual with the diver. **The student diver must demonstrate accurate and adequate knowledge during the open water dives and must perform all skills (procedures and motor skills) fluidly, with little difficulty, in a manner that demonstrates minimal or no stress.**

Certification Requirements and Procedures

Document student diver training by completing the PADI *Specialty Training Record* for Deep Diver (see Appendix). **To qualify for certification, by completion of the course, student divers must complete *all* performance requirements for Deep Diver Open Water Dives One, Two, Three and Four.**

The instructor certifying the student diver must ensure that all certification requirements have been met. Reference Administrative Procedures of the General Standards and Procedures section of your PADI *Instructor Manual* for detailed information on Referral.

Links to Other Courses

The Deep Diver Adventure Dive conducted during the PADI Adventures in Diving program may count as the *first dive* toward this specialty at your discretion.

Similarly, divers who successfully complete Deep Diver Open Water Dive One and Knowledge Review Part 1 may receive credit as an Adventure Dive toward the PADI Adventure Diver and the PADI Advanced Open Water Diver certifications. They may also credit the specialty certification toward the PADI Master Scuba Diver rating.

Section Two:
Knowledge Development
Conduct

Unlike shallower dives, deep dives tend to be short since time and air supply is limited. Consequently, you don't have a great deal of time to do much so you'll need to make smart decisions about a dive objective and dive accomplishments. Therefore, the philosophy of this course is to focus on *making smart decisions for a stress free, deep diving experience with an emphasis on safety.* This means to expand student divers' knowledge about deep dive planning and organization, the basics of deep diving, hazards to avoid, deep diving support equipment, and how to interact responsibly with the aquatic life they'll see while deep diving.

Student divers complete independent study of the course by reading the PADI *Deep Diver Manual* and by watching the PADI *Deep Diving* video. Work hand-in-hand with the student diver manual to address prescriptively student diver misconceptions or for clarification on certain points of interest. If there is a need for instructor-led presentations, use the following teaching outline, which appears in point form, as a road map of the conduct, content, sequence and structure for the PADI Deep Diver course.

The result should be student divers with theoretical knowledge and pragmatic experience who can adapt what they've learned to future deep dive opportunities. **Regardless of how you conduct knowledge development (independent study, instructor-led or a combination of these instructional approaches), student divers will be able to explain the following learning objectives.**

Knowledge Development

Learning Objectives

By the end of knowledge development, student divers will be able to explain:

Reasons why people deep dive, deep diving objectives, the definition of recreational deep diving, optimal depth limits for recreational divers, important information and decisions about deep diving personal depth limits.

- **What are five reasons to deep dive?**
- **What is the difference between a proper and an improper deep diving objective?**
- **What's the definition of a recreational deep dive?**
- **What are four reasons that 30 metres/100 feet is recommended as the optimal depth limit for recreational diving?**
- **What five factors should you consider when setting your personal depth limit?**

Proper equipment for the demands of deep diving, essential specialized deep diving equipment, surface support stations, and important guidelines for using dive computers.

- **How do you determine if your personal equipment is suitable for deep diving?**
- **What five specialized pieces of equipment are recommended for deep diving?**
- **What makes up a surface support station?**
- **What five guidelines should you follow when using a dive computer?**

Buddy contact and neutral buoyancy deep diving techniques, proper deep diving descents and ascents, deep diving breathing techniques, deep diving low or out-of-air situations, maintaining stop depth with and without a reference, required safety stops and emergency decompression, and deep drift and wall dives.

- **What are two techniques for maintaining buddy contact during deep dives?**
- **How should you maintain neutral buoyancy on a deep dive?**
- **How do you make a head-up descent, and why is this important in deep diving?**
- **What are two techniques for slowing or stopping descents/ascents along a reference line with your hands occupied?**
- **What are four steps to follow while descending/ascending without a reference?**
- **What are two techniques for estimating an 18 metre/60 foot per minute or slower ascent rate?**
- **How should you breathe while deep diving?**
- **How do you avoid low air or out-of-air situations on a deep dive?**
- **What is the best way to swim without stirring up the bottom, and why is it important?**
- **How do you make a safety or emergency decompression stop at 5 metres/15 feet, with and without a reference line?**

- **What should you do if you accidentally omit an emergency decompression stop?**
- **What are five recommended guidelines to follow when making a deep drift dive?**
- **What's a wall dive and what three recommended guidelines should you follow when making a deep wall dive?**

Deep diving narcosis, symptoms and signs of narcosis, factors affecting the onset and intensity of narcosis, the prevention of and dealing with narcosis at depth. The definition of decompression sickness; symptoms, signs and predisposing factors toward decompression sickness, avoiding decompression sickness, and emergency care for a diver suspected of having decompression sickness.

- **At approximately what depth does narcosis typically begin to affect divers?**
- **What are seven symptoms and four signs of narcosis?**
- **What five factors may speed the onset of, or intensify the effects of narcosis?**
- **In recreational diving, how do you prevent narcosis, and what do you do if it occurs?**
- **What is the primary reason recreational divers experience decompression sickness?**
- **What are five symptoms and seven signs of decompression sickness?**
- **What ten factors may predispose a diver toward decompression sickness?**
- **What can you do to avoid decompression sickness?**
- **What is the recommended emergency care for a diver suspected of having decompression sickness?**
- **What are seven reasons why a diver suspected of having decompression sickness should not be recompressed underwater?**

Knowledge Development Teaching Outline

Suggestions to *you,* the PADI Deep Diver Specialty Course Instructor, *appear in note boxes.*

A. Course Introduction

1. Staff and student diver introductions

Note:
Introduce yourself and assistants. Explain your background with deep diving if your student divers are not familiar with you.

Have divers introduce themselves and explain why they are interested in deep diving. Break the ice and encourage a relaxed atmosphere.

Give times, dates and locations as appropriate for classroom presentations, confined water and/or surface practice sessions, and open water dives.

Review with student divers other skills they'll want as a PADI Deep Diver. These opportunities, through additional specialty course training, may include, but are not limited to: PADI Enriched Air Diver, *PADI* Wreck Diver, *PADI* Digital Underwater Photographer, *PADI* Dry Suit Diver, *PADI* Peak Performance Buoyancy Diver *and PADI* TecRec.

2. Course goals – this course will help:
   a. Develop your practical knowledge of deep diving.
   b. Increase your diving skills.
   c. You plan, organize, and make deep dives.
   d. Improve your diving ability and provide you with additional supervised experience.
   e. Encourage you to participate in other specialty training.
3. Course overview
   a. Classroom presentations and confined water and/or surface practice sessions.
   b. Open water dives. There will be four open water dives.
4. Certification

a. Upon successfully completing the course, you will receive the PADI Deep Diver Specialty certification.

b. Certification means that you will be qualified to:

1. Plan, organize, make, and log open water deep dives in conditions generally comparable to or better than, those in which you are trained.

2. Apply for the Master Scuba Diver rating if you are a PADI Advanced Open Water Diver and a PADI Rescue Diver (or qualifying certification from another training organization) with certification in four other PADI Specialty ratings, and you have 50-logged dives.

Note:
Use the PADI Student Record File. *Explain all course costs and materials, and what the costs do and do not include, including equipment use, dive site fees, etc. Explain what equipment student divers must have for the course, and what you will provide. Cover and review points about scheduling and attendance.*

5. Class requirements

a. Complete paperwork.

b. Course costs.

c. Equipment needs.

d. Schedule and attendance.

B. Why Dive Deep?

- ***What are five reasons to deep dive?***

1. Deep diving activities

a. Deep diving is a means to an end. It is a passport to a greater number of dive sites where you can sightsee and engage in new activities.

b. Deep diving may allow you to:

1. Observe different types of aquatic life and bottom topography unique to deeper environments such as walls. Despite their awe-some appearance, these structures are very fragile. Good buoyancy control skills help minimize your contact with the wall.

2. Explore wrecks that lie untouched by waves, surge and ice. Deep wrecks tend to be better preserved by the cool, lower-oxygen water common to deep wrecks; however, they are still fragile. Remember to explore them carefully and never take anything but photos.

Note:
Inform student divers to consult the Project AWARE Foundation's "Responsible Wreck Diving Considerations" *before diving on deep-water wrecks. Remind divers that they can visit www.projectaware.org to learn more.*

Responsible Wreck Diving Considerations

1. Respect the Heritage and Loss

Wrecks of military vessels or aircraft are often the last resting place of men and women who gave their lives while serving their nation. Treat these war graves with respect and honor to commemorate the lives sacrificed for their country. Protect underwater graves as you would any burial ground or memorial.

2. Respect the Environment

Low impact dive techniques are essential in preserving fragile wreck sites. It's important to fine-tune your buoyancy and streamline your equipment to avoid disturbing or damaging the artificial reef habitat during your dive. Use care to avoid touching the wreck with your hands, knees or fins. Whenever possible, use a mooring line instead of tying or anchoring on sites in a manner that may cause disturbance. Remember, many wrecks are habitats for entire ecosystems.

3. Respect Others

Resist the temptation to remove anything from wreck sites. Taking souvenirs for yourself often limits interest and enjoyment for future divers. Wrecks are not renewable resources; important archeological evidence can be lost if an object is removed. As divers, we are merely visitors to these sites. As such, we are responsible for leaving the wrecks as we found them. Take photos rather than souvenirs, so that wrecks remain intact for future generations.

4. Respect Your Limitations

Wrecks have claimed the lives of inadequately prepared divers. Exploring wrecks requires experience and supplemental skill training such as the PADI Wreck Diver Specialty course. This is especially true with regard to entering intact shipwrecks. Training for other overhead environments, such as caverns or caves, does not qualify you to enter wrecks. Know your personal limitations and dive ability. If necessary, seek additional training with a qualified instructor

5. Respect the Law
Know and obey all local laws and regulations when wreck diving, such as diver access, restricted areas, fish and game laws and collecting and reporting underwater finds. In many instances, these laws exist for your safety and protection.

6. Respect Safety
Many military vessels laid to rest at sea still contain hazardous materials such as oil, firearms, heavy containers and munitions. In most cases, transporting these materials or bringing them ashore is far more dangerous than leaving them alone. For your safety and the safety of others, do not recover or interfere with dangerous materials.

7. Respect the History and Archeology
Shipwrecks hold clues to our maritime past. Therefore, it's important not to disturb these submerged historical sites. As a diver, if you find an object or wreck that may be of historical importance, leave it where it lies, mark its position and seek advice from the local government authority who looks after historical and archeological finds.

3. Take unique photographs, but you'll want to be completely familiar with taking photos so you can use time effectively while following deep diving procedures. You can learn more about underwater photography techniques and camera equipment in the PADI Digital Underwater Photographer course.

Note:
Inform student divers to consult the Project AWARE Foundation brochure "10 Tips for Underwater Photographers" before taking underwater photos. Remind divers that they can download a pdf of this information from www.projectaware.org.

10 Tips for Underwater Photographers

1. Photograph with Care

Dive carefully as many aquatic creatures are fragile regardless of size. Improper techniques while taking or editing photos underwater can damage sensitive aquatic life and harm fragile organisms with the bump of a camera or cylinder, swipe of a fin or even the touch of a hand.

2. Dive Neutral

Camera systems may add weight or be buoyant. Make sure to secure photo and dive equipment and be properly weighted to avoid contact with reefs or other vital habitat. Practice buoyancy control and photography skills in a pool before swimming near sensitive and fragile environments.

3. Resist Temptation

Avoid touching, handling, feeding, chasing or riding aquatic life. Avoid altering an organism's location to get the perfect shot. Many aquatic creatures are shy and easily stressed. These actions may interrupt feeding, disturb mating or provoke aggression in a normally nonaggressive species.

4. Easy Does It

While diving, move slowly and deliberately through the water. Be patient and still while photographing – allow organisms to show their natural behavior for a more significant and meaningful shot.

5. Sharpen Your Skills

Make sure the difficulty of the dive and the environmental conditions are appropriate for your current skills and comfort level. Avoid stabilizing underwater by grabbing onto the reef for a better photo. Enroll in PADI's Underwater Photographer, Digital Underwater Photography and Peak Performance Buoyancy Specialty courses to become a more skilled and successful photographer.

6. Be Informed

Be aware of local regulations and protocols regarding behavior around marine mammals and other species before entering the water. These regulations protect creatures and aim to assure their preservation for future generations.

7. Be an AWARE Diver
Consider enrolling in an AWARE - Coral Reef Conservation, Project AWARE Specialty or Underwater Naturalist course to learn sustainable dive techniques and increase knowledge about the environment you're photographing.

8. Take Only Pictures, Leave Only Bubbles
Avoid souvenir collection. Nearly everything found in the aquatic realm is alive or will be used by a living creature. Removing specimens such as corals and shells can disturb the delicate balance and quickly deplete dive sites of both their resources and their beauty.

9. Share Your Images
Use images for conservation by reporting environmental disturbances or destruction using your photographs as evidence. Assist scientific research and improve resource management by contributing your photos to The Whale Shark Project and other monitoring programs. You may also submit your photos to Project AWARE. Your images have the power to change perspectives and influence conservation.

10. Conserve the Adventure
Join Project AWARE Foundation, the dive industry's leading nonprofit environmental organization. Your support helps conserve underwater environments through education, advocacy and action.

4. Drift dive in prevailing ocean currents, which slow or stop in shallow water.
5. Recover objects that have been lost in deep water. Since deep-water search and recovery techniques fall beyond the scope of this course, it's recommended that you become a certified PADI Search and Recovery Diver, as well as a Deep Diver, before attempting them.

- ***What is the difference between a proper and an improper deep diving objective?***

2. Proper deep diving objectives
   a. The objectives for each deep dive must be carefully determined.
   b. You need to isolate a sensible, nearly singular objective. You only have a short period to get things done while deep diving, so avoid trying to do too much.
   c. Do not dive deep to set records.

d. Proper deep diving objectives may include: exploring part of a deep wreck, drift diving with a current along a vertical reef wall, photographing a deeper-water organism and sightseeing.

C. What is a Deep Dive?

- ***What's the definition of a recreational deep dive?***

1. Standard definition of a deep dive
   a. A recreational deep dive is generally defined as a dive deeper than 18 metres/60 feet to an absolute maximum depth limit of 40 metres/130 feet.
   b. Most references, in this course, to breathing underwater, refer to air. Air is a generic term used for breathing gases, including any blend of enriched air, or air.
      1. Enriched air – sometimes called "nitrox" – is an oxygen-nitrogen gas mix like air is and is a good choice for making deep dives. While air consists of 21 percent oxygen, enriched air has more oxygen – typically 32 to 36 percent. Increasing the oxygen lowers your exposure to nitrogen, which increases the time before you reach a no stop limit. Using high oxygen percentages creates a few easily managed concerns, which you can learn to handle in the PADI Enriched Air Diver course.

- ***What are four reasons that 30 metres/100 feet is recommended as the optimal depth limit for recreational diving?***

2. Depth limits
   a. Although your maximum depth limit is 40 metres/130 feet, you'll probably find 30 metres/100 feet your *optimum* limit for most deep dives.
      1. You have little time below 30 metres/100 feet, even though you'll probably use a dive computer and enriched air nitrox to allow more no stop time. Your time gets significantly shorter below 30 metres/100 feet because you're consuming air/EANx faster, shortening your overall dive.
      2. Divers are more susceptible to narcosis at depths below 30 metres/100 feet – staying shallower helps avoid the problem.
      3. There is an increased possibility of decompression sickness at depths below 30 metres/100 feet; it is easier to overstay the no decompression limits with a single cylinder.

4. In most environments (especially in some freshwater bodies), light intensity falls off dramatically with depth. Below 30 metres/100 feet, low light levels complicate deep diving and dramatically reduce the diversity of aquatic life.

Note:
*Refer student divers to read the side bar in the manual "*Beyond the PADI Deep Diver Course.*" This side bar informs divers that diving deeper than 40 metres/130 feet calls for requirements beyond recreational deep diving. Specifically, the side bar explains to student divers what they'll learn in a PADI Tec Deep Diver Course and a PADI Tec Trimix Diver Course. In addition, student divers are informed of the typical Tec Diver equipment list required for deeper dives.*

- ***What five factors should you consider when setting your personal depth limit?***

3. Developing a personal deep-diving depth limit
    a. It's impossible to accurately define deep diving by simply saying it is any diving taking place between 18 metres/60 feet and 40 metres/130 feet. Depth limits must be personalized – in some situations, even 18 metres/60 feet may be too deep.

Note:
Provide student divers with an example of where the definition of deep diving may be too deep. The objective is to get students to think more in terms of day-to-day personalized depth limits rather than the established 18 metres/60 feet to 40 metres/130 feet maximum.

For example, you haven't been diving for seven months and you are about to make a dive with a new dry suit. Is the maximum depth definition in this situation still valid? Perhaps not.

    b. A personalized maximum depth limit can be formulated by taking into consideration:
        1. Environmental conditions at a deep dive site (40 metres/130 feet in a cold, low-visibility lake vs. 40 metres/130 feet in warm, clear tropical waters).

2. Your psychological and physiological well-being. If you feel unduly anxious, perhaps a less stressful dive is in order. It's okay for a dive to feel challenging, however, if you start wishing the dive was over before you've even started, listen to your feelings and skip it.
3. Is this a repetitive dive? If so, consult your computer (or RDP) to be sure you have a reasonable allowable bottom time. The general recommendations are to avoid repetitive diving deeper than the previous dive and to avoid repetitive dives deeper than 30 metres/100 feet. In the case of using enriched air, you need to respect the maximum depths for the particular blend you are using.
4. Remoteness of dive location, distance to emergency assistance and availability of proper first aid equipment. The longer it would take to reach these, the shallower and more conservative you'll want to plan your dive.
5. Training and experience of diving partner; if less than you, plan the dive based on your buddy's training and experience.

D. Equipment for Deep Diving

- ***How do you determine if your personal equipment is suitable for deep diving?***

1. It's your responsibility to be properly equipped for the demands of the deep diving environment. In addition, you'll want to become familiar with any new equipment before making a deep dive with it.
   a. Regulator
      1. Probably the most important feature to look for in a deep diving regulator is a balanced first stage. You may want to consider a high-performance second stage design. These include balanced adjustable second stages, pilot valve second stages and Venturi assisted second stages.
      2. If you're considering continuing into the Tec Deep Diver course, you may want to invest in a high end, top of the line model suited to tec diving now.
      3. Rinse your regulator thoroughly after each dive and have it serviced annually.

Note:
For a more detailed discussion on the differences between balanced and unbalanced first stages, suggest to student divers to read the side bar "The Differences between Balanced and Unbalanced First Stages" *in their student manual. In addition, refer student divers to* The Encyclopedia of Recreational Diving *for detailed illustrations of regulators.*

b. Submersible pressure gauge
    1. Whether you use a conventional SPG or an air-integrated dive computer, be sure the gauge, its swivels, and connections obtain annual service with your regulator.
    2. If you notice that your conventional mechanical SPG always seems high compared to the fill station and/or that the gauge doesn't read zero without pressure, have the gauge checked or replace it.

c. Buoyancy Compensating Device (BCD)
    1. Virtually any state-of-the-art BCD should be suitable for recreational deep diving.
    2. Inspect your BCD periodically for possible leaks, and be sure the low pressure inflator operates properly.

d. Cylinders
    1. Since you use air or enriched air faster as you dive deeper, it's better to have more than less. Deep dive with a 12 litre/71.2 cubic foot or larger cylinder.
    2. Some high capacity cylinders hold about half again to twice as much as a 12 litre/71.2 cubic foot cylinder.

e. Exposure suits
    1. The suit that keeps you comfortable at 12 metres/40 feet may not be adequate for a dive to 36 metres/120 feet. Wear exposure protection based on the planned depth temperature, not the surface temperature.
    2. You may want to use a thicker wet suit, or a dry suit with undergarments based on the temperature at depth.

f. Alternate air source
    1. An alternate air source (a system that is capable of delivering sufficient air to two divers in distress and allow them to comfortably return to the surface) is a must have for deep diving.

2. The alternate air source second stage should be visually identifiable and attached within the triangle area between the mouth and lower corners of the rib cage.
3. You may want to consider a pony bottle – an independent air source that provides additional air; it helps assure that you have ample gas to reach the surface safely in an emergency. It is important that the regulator used for the pony cylinder is easily identified, and that it cannot be mistaken for the diver's primary regulator. This can be achieved in many ways including:
   a. Color of the second stage
   b. Color of the mouthpiece
   c. Shape and style of the second stage
   d. Shape and style of the mouthpiece
   e. Coloration of the pony cylinder hose
   f. Use of a physical item, which covers the mouthpiece and must be physically removed before the regulator can be used.

   Buddy teams should confirm the procedures that will be used, should a diver need to switch to a pony cylinder and end the dive.
4. Another option that is a spin off from tec diving, cavern diving and recreational penetration diving are H- and Y-valves. These valves allow you to attach two separate regulators to a single cylinder. If one were to fail (and freeflow), you or your buddy would close the portion of the valve supplying that regulator, and you would end the dive using the other.

g. Gauges and computers
   1. Most divers use a dive computer, which tracks depth, time and no stop time remaining and (in some models) air supply and estimated air supply time remaining.
   2. Modern dive computers work for years with little care beyond rinsing, drying and replacing the batteries as specified by the manufacturer, though it's a good idea to have their accuracy checked periodically.
   3. It's a good idea to wear two dive computers so you have one for backup. Alternatively, you can wear one dive computer and then have a depth gauge and timing device as backup.

h. Surface signaling devices
   1. Audible devices such as a whistle or air horn and a signal mirror are standard pieces of equipment for every diver.

Note:
Inform student divers that devices used to gain attention at the surface should be a standard piece of equipment for every diver, regardless of certification level. Audible devices like whistles or air horns (devices that attach to the low-pressure inflator of the BCD) can be easily heard at night or in limited visibility conditions. For daytime use, suggest to divers to include a visual signaling device like a signal mirror or surface marker buoy (safety sausage) in their equipment. If time allows, show your student divers the latest devices on the market and have student divers show each other their devices they'll be using to gain attention at the surface.

- ***What five specialized pieces of equipment are recommended for deep diving?***

Note:
Remind student divers to avoid using new or unfamiliar equipment when deep diving. Suggest they first learn to use new or unfamiliar equipment at depths above 18 metres/60 feet.

2. Special equipment needed for deep diving
    a. Reference line
        1. Allows you to make comfortable, slow descents/ascents, to control yourself in currents above the bottom, to make comfortable safety stops, to offset positive buoyancy by slowing ascents, to comfortably equalize and to maintain buddy contact.
            a. Can be a boat's mooring or anchor line, but often best to have a separate weighted reference line attached to a float or the boat's stern.
            b. Rope materials have differing properties, and the same diameter in different materials will have different strength. It is recommended to use no smaller than 1.25 centimetres/1/2-inch rope, nylon or polypropylene.

Note:
Remind student divers to exercise caution when using a boat's anchor line as a descent/ascent reference line. Holding onto the line as the boat pitches or rolls may result in injury if the anchor line is jerked up suddenly. Additionally, loss of the line may occur if it becomes necessary for the boat to re-anchor while divers are underwater. In areas where waves are common, some divers carry a jon line – a strong, short cord with a loop at each end that they can snug around the anchor line and hang on to. The cord helps dampen the anchor line's motion.

Ask student divers to read the side bar "Line for Divers" *in their manual. This side bar discusses the advantages and disadvantages of using synthetic or natural rope.*

b. Emergency breathing equipment
    1. Given the short no stop limits and rapid air consumption of deep dives, it's reassuring to have extra air waiting for a safety or emergency decompression stop. The simplest emergency breathing equipment is a cylinder and regulator suspended at 5 metres/15 feet, next to the reference line.
    2. Some charter dive boats have second stages on long hoses that reach down to 5 metres/15 feet, eliminating the need for a cylinder. Dive boats often suspend a weighted horizontal bar at 5 metres/15 feet, so divers can spread out and hang on for their safety stop instead of crowding a single spot on the reference line.
    3. Whatever type emergency breathing equipment is used, it's a good idea to have enough second stages for all divers to breathe from it at once.

c. Extra weight
    1. Extra weight is used to offset positive buoyancy at the end of the dive (due to an empty cylinder, etc.), allowing you to comfortably maintain a 5 metre/15 foot depth level for safety stops. Extra weight is typically placed with emergency breathing equipment on a 5-metre/15-foot stop line.
    2. These may be loose weights that you drop in your BCD pocket, or weights with snap hooks to clip to a D ring on your weight belt or BCD.

d. Dive light
    1. Dive lights come in handy for bringing out vivid colors or carefully peering into cracks and holes at depth.

2. In lower visibility environments it may be significantly darker at depth, so a light helps with reading gauges and keeping track of your buddy.
3. A small compact light is excellent for daytime deep diving.

e. First aid kit and emergency oxygen

1. It's recommended that you have first aid and emergency oxygen at hand whenever you're diving, not just deep diving.
2. Especially important when deep diving at remote locations, some distance from professional medical assistance.

Note:
Review DCS and oxygen first aid as part of your PADI Deep Diver *course. Remind student divers that they can learn more about handling emergencies in the PADI* Rescue Diver *course, and the* Emergency First Response *program.*

- ***What makes up a surface support station?***

3. Configurations of surface support stations

a. When boat diving, your surface support station is the boat. You'll need to provide an independent surface support station when diving from shore. For convenience, you can suspend your reference line, emergency breathing equipment and extra weights from a float or even a small boat, forming an independent surface support station.

b. Besides carrying deep diving equipment, you can equip a surface support station with a dive flag to warn off boaters.

- ***What five guidelines should you follow when using a dive computer?***

4. The modern dive computer has become standard among most recreational divers, and is the mainstay in most (but not all) tec diving.

a. Most provide all or some of the following features and information:

1. A continuing readout of depth and time
2. A continuing readout of no decompression limits or time needed at a certain depth for emergency decompression stops
3. Signal when ascent is too fast
4. Water temperature
5. Depth at which you must decompress in an emergency

6. Surface interval time

b. The following guidelines apply specifically to dive computers (always read and follow the manufacturer's instructions):

1. Always use your dive computer as a no stop (no decompression) device.
2. Don't share computers. Every diver needs a personal one.
3. Follow the more conservative computer, yours, your buddy's or your back up if you use one.
4. If your computer malfunctions during a dive, make a normal ascent and a safety stop (air permitting). Follow the manufacturer's instructions regarding resuming diving, which may require you to wait 12 or more hours.
5. Don't follow your computer blindly. Compare yours with your buddy's – if you've been on the same dive profiles, there shouldn't be huge discrepancies.

Note:
Ask student divers to show you their dive computer they intend to use for their deep dives. If divers don't have a dive computer explain the features and benefits of several different types. Have a variety of dive computers for student divers to handle.

*Refer student divers to the side bar "*Computer Misconceptions*" in their student manual. Discuss with divers the four misconceptions about dive computers.*

1. *Computers track something in your body.*
2. *Computers are more reliable than tables.*
3. *A computer that costs more is safer than a cheaper one.*
4. *The computer says it, so I can do it.*

E. Deep Diving Techniques: Buddy Contact and Neutral Buoyancy

- ***What are two techniques for maintaining buddy contact during deep dives?***

1. Maintaining buddy contact while deep diving

a. If you and your buddy lose track of each other on a shallow dive you can usually surface, regroup and continue the dive. On a deep dive,

you seldom have sufficient air and no stop time to continue the dive.

b. How to maintain contact:

1. Maintain eye contact during feet first descents
2. Maintain eye contact during ascents
3. On the bottom, swim side-by-side
4. Try to stay within touching distance; use a short line for you and your buddy to hold on to in low-visibility conditions.

- ***How should you maintain neutral buoyancy on a deep dive?***

2. Maintaining neutral buoyancy while deep diving

a. Begin each deep dive properly weighted (perform a buoyancy check). For deep dives, it's ideal to check your weighting with a nearly empty cylinder. This is because your scuba cylinder can be two kilograms/five pounds (or more) lighter when it's nearly empty at the end of a dive. The extra buoyancy could make you struggle to stay at the safety stop.

b. During descents and ascents, adjust buoyancy often. Don't wait to neutralize buoyancy until you reach the bottom. Avoid uncontrolled descents due to excessive negative buoyancy or fast ascents due to excessive positive buoyancy.

c. As you descend add air to your BCD periodically to compensate for the loss of buoyancy. If you're diving in a dry suit, it's very important to add air to your suit frequently as you descend. You need to do this not just to maintain neutral buoyancy, but to equalize the suit and prevent a dry suit squeeze.

F. Deep Diving Techniques: Descents and Ascents

- ***How do you make a head-up descent, and why is this important in deep diving?***

1. Making a head-up descent while deep diving.

a. It's recommended that you make a head-up, feet-first vertical descent while deep diving:

1. Reduces disorientation due to vertigo
2. Makes it easier to equalize your ears; helps prevent squeeze injuries. Air spaces are easier to equalize when your head is up.
3. Allows for better buoyancy control; slower descent gives you time to fine-tune buoyancy, adjust loose equipment, check depth, etc.

b. Alternatively, keep your head slightly higher than the rest of your body, and allow your body, legs and feet to take a less upright, more

diagonal position – keep your feet at the lowest point. You may find this diagonal position to be more stable during the descent.

c. When using a reference line alternate one hand between your BCD low-pressure inflator mechanism and equalizing your ears, while your other hand holds onto the line.

- ***What are two techniques for slowing or stopping descents/ascents along a reference line with your hands occupied?***

2. Slowing or stopping descents and ascents

   a. Important to make slow, controlled descents and ascents

      1. A rapid descent may result in an ear, sinus, mask or dry suit squeeze if you can't equalize fast enough. Equipment may become loose due to suit compression.
      2. Control your descent rate and stop your descent prior to reaching the bottom. Look at the bottom composition and determine whether to make contact. Avoid disturbing aquatic life and/or stirring up a soft bottom reducing visibility.
      3. Fast ascents can cause lung overexpansion injuries, cause you to miss a safety stop and increase the likelihood of decompression sickness. Remember: Be a S. A. F. E. Diver – Slowly Ascend From Every dive

   b. When both hands are occupied and a reference line is used, to slow or stop descent or ascent:

      1. Descend or ascend with one hand on the line, while using the other to equalize and control your BCD. If your hands are occupied, you can still slow or stop your descent or ascent on a line by locking your elbow around the line.
      2. To remain stopped for a while with both hands free, wrap your leg around the line.

- ***What are four steps to follow while descending/ascending without a reference?***

3. Deep diving descents or ascents without a reference

   a. Deep diving descents and ascents without a reference are not recommended. Try to make every deep diving descent or ascent either holding on to a reference line or near a sloping bottom or wall.

   b. If a descent or ascent must be made without a reference, follow these guidelines:

1. At the start, place your body in a head-up, feet-first vertical or diagonal position.
2. Face your buddy and descend or ascend close together, maintaining eye contact. Continuously adjust your buoyancy as needed to remain neutral throughout your descent or ascent.
3. While descending watch the depth on your dive computer and adjust your buoyancy so you don't exceed your maximum depth.
4. While ascending, obey the 18 metres/60 feet per minute rule or the rate specified by your computer (whichever is slower). Keep one hand overhead and rotate. Listen for boat noises overhead. Make a three minute (or longer) safety stop at 5 metres/15 feet and wait for noise to pass before continuing your ascent.

- ***What are two techniques for estimating an 18 metre/60 foot per minute or slower ascent rate?***

4. Estimating proper ascent rate
   a. Be a S. A. F. E. Diver – Slowly Ascend From Every dive.
   b. Rate of ascent is not to exceed 18 metres/60 feet per minute (.3 metres/one foot per second) – but it's fine to go slower. Think of ascent rate as a speed limit.
   c. How to estimate ascent rate:
      1. The easiest way to track your ascent rate is to use your dive computer. You measure ascent rate at .3 metres or one foot per second. It should take about 20 seconds to rise six metres, or 10 seconds to rise 10 feet. If your computer has a slow ascent warning, use it. This technique is very accurate.
      2. If you have a computer problem, the easiest way to ascend at an appropriate rate is to stay with your buddy, who likely still has a working computer. In addition, you have a backup depth gauge and watch; you can estimate your rate by comparing your depth with time.

Note:
*Ask student divers to familiarize themselves with the side bar in their student diver manual "*Ascent Rate Mythology.*" Over the years, diving folklore has drummed up some interesting "facts" about ascent rates. These range from ideas that once had some validity, but have passed their time, to others that have no basis in reality at all. These myths include:*

1. *The 18 metre/60 foot per minute ascent rate is based on hard data about human physiology.*
2. *To ascend at a proper rate, ascend no faster than your smallest bubbles.*
3. *A slow ascent rate replaces a safety stop.*
4. *You can ascend too slowly.*

G. Deep Diving Techniques: On the Bottom

- ***How should you breathe while deep diving?***

1. Deep diving breathing techniques
    a. It is possible to over-breathe your regulator during strenuous activity while deep diving. A feeling of suffocation occurs when the regulator cannot deliver a comfortable amount of air. This occurs because of the increased density of air passing through your regulator.
    b. Density is only part of the issue. A gas flows less smoothly as the flow speed rises. This happens because as air flows through dive equipment, your trachea and bronchi and into your lungs, drag from contact with the passage surfaces causes the air to become turbulent. Turbulence disrupts even airflow and increases breathing resistance, which in turn demands more effort –- more effort demands more air.
        1. Always breathe consistently deep and slow. By breathing slowly and deeply, you avoid over-breathing your regulator and feeling out of breath.
        2. Try to breathe from your stomach and diaphragm, so you fill your lungs from the bottom up. Slow, deep breathing maximizes your respiratory efficiency, so you use your air more slowly. For maximum air conservation, relax and don't overexert yourself.

- ***How do you avoid low air or out-of-air situations on a deep dive?***

2. Even though the laws of physics dictate that you use air about twice as fast at 30 metres/100 feet as at 10 metres/33 feet, during the dive it seems to go faster than that. To prevent low air or out-of-air emergencies:
   a. Check your submersible pressure gauge (and other instruments) frequently.
   b. Reach your ascent point with sufficient air to make a safe ascent, a three-minute safety stop and reach the surface with an appropriate reserve.
   c. Calculate air consumption for a given depth. Air integrated dive computers provide a technological solution to estimating air consumption. Try to avoid overexertion, exercise and strenuous activity.

Note:
Work with student divers to show them how to estimate their air consumption by using the chart in their student manual. Ensure student divers understand that by estimating the depth of their dive and by using the chart to find the column representing their cylinder size they should be able to find an approximate total time (in minutes) they'll have underwater listed on the chart. With time permitting, go through a number of examples with divers.
For example: A dive to 21 metres/70 feet, with a 12 litre/80 cubic foot cylinder will allow you approximately 34 total minutes underwater.

In addition, remind student divers that knowing an estimate of how long a cylinder may last at a certain depth is no substitute for constant monitoring of their submersible pressure gauge or dive computer. Ask student divers to read both "Air Consumption Calculation" *and* "How Much Reserve?" *side bars in their student manual to formulate a good all-round air management plan.*

- ***What is the best way to swim without stirring up the bottom, and why is it important?***

3. Anti-silting techniques on the bottom
   a. Avoid touching the bottom with your fins on deep dives. Doing so reduces visibility and destroys aquatic life.
   b. As you get near the bottom, stop all fin movement. Neutralize buoyancy.

c. When on the bottom avoid stirring up the bottom. Release the reference line and move away from the descent area as others come down. You can hover away from the line or kneel on the bottom after making sure that the area is free of sharp objects or aquatic life.

H. Deep Diving Techniques: Safety Stops and Emergency Decompression

- ***How do you make a safety or emergency decompression stop at 5 metres/15 feet, with and without a reference line?***

1. A safety stop increases your safety margin by giving your body a chance to release excess dissolved nitrogen before surfacing. It also helps you affirm proper buoyancy control and a proper ascent rate by forcing you to stop before ascending the final 5 metres/15 feet to the surface.
   a. Recommended after all dives, but especially after deep dives and repetitive dives.
   b. Must make a safety stop if:
      1. Your dive has been to 30 metres/100 feet or deeper.
      2. Your pressure group at the end of the dive is within three pressure groups of the no decompression limit.
      3. You dive up to any limit on the Recreational Dive Planner.
2. Besides creating an extra safety margin, safety stops help you avoid the serious situation of accidentally missing an emergency decompression stop. During a safety stop, double-check with your buddy your no decompression status on your computer or the RDP limits.
3. Maintaining stop depth with the aid of a reference line
   a. Using your depth gauge, find the place on the line that is 5 metres/15 feet below the surface and grab the line just above that point (this positions the mid-chest area at 5 metres/15 feet). If you're on a rising and falling anchor line, holding on to a jon line will smooth out the stop a little, but you must be sure to maintain neutral buoyancy.
   b. Your body should be vertical and parallel with the line. Most divers seem to prefer a near vertical position during a stop, though a horizontal position is theoretically optimal. However, practically speaking, any position that's comfortable is fine.
   c. In clear, currentless water, you may prefer to hover near the line, without actually hanging on to it. One advantage of this is that several divers don't end up crowding the same point on the line.
4. Maintaining stop depth without the aid of a reference line and without a sloping bottom

a. Ascend slowly to 5 metres/15 feet, adjusting your buoyancy to remain neutral at that depth.

b. Maintaining your depth by watching your computer with a hand on your buddy, who keeps an eye on the boat, navigation or double checks the RDP if making a tables-based dive. You may want to deploy a Delayed Surface Marker Buoy (DSMB), one with a line long enough for your safety stop depth, to make your location visible to others.

c. Maintain a comfortable body position and avoid overexertion.

Note:

Explain to student divers that a Delayed Surface Marker Buoy (DSMB) is a long sausage-like marker buoy, with an opening at one end. Divers carry it deflated and rolled up in a pocket, or rolled and attached to their reels. At the end of the dive, prior to ascending, a diver can use their alternate air source or exhaled bubbles to inflate the DSMB and send it to the surface, paying out line from their reel as it goes. Divers can then slowly reel the line in as they ascend.

Make clear that DSMBs provide divers with a visual reference as they ascend and during their safety stops. They are helpful when divers are in a current, or unable to return to the boat for any reason. They also allow boat traffic to identify divers as they begin their ascent.

Suggest to student divers that they will be able to practice DSMB deployment in their confined water session.

5. Making an emergency decompression stop

a. Using a computer, follow the procedures dictated by the computer. Typically, your computer will tell you how long to stop at 3 metres/10 feet before you can surface.

b. If you're using the RDP, these are the rules if you accidentally exceed the no stop limits:

1. If you exceed the no decompression limit by no more than five minutes, make an eight minute stop at 5 metres/15 feet. Do not dive again for at least six hours.

2. If you exceed the no decompression limit by more than five minutes, make a stop at 5 metres/15 feet for at least 15 minutes (air supply allowing) and do not dive for at least 24 hours.

- ***What should you do if you accidentally omit an emergency decompression stop?***

6. If you accidentally miss an emergency decompression stop
    a. Remain calm.
    b. Tell your buddies or the divemaster and monitor yourself closely for symptoms of decompression sickness.
    c. Breathe 100 percent oxygen if available.
    d. If anything unusual develops, seek medical assistance.
    e. Do not reenter the water. The old U.S. Navy procedures for omitted decompression are not recommended for recreational divers.

Note:
Inform student divers that the age-old Navy procedure for omitted decompression is no longer recommended for recreational divers. The Navy procedure was never intended for recreational divers; it was designed to be used if the diver is asymptomatic, a chamber is on site, surface-supply or ample air is available, communications are available, decompression platforms are available, and the diver is capable of realizing he made an error and can get back into the water and descend to 12 metres/40 feet, having already calculated his emergency stops, all within three to five minutes. Generally, recreational divers operate well outside these conditions.

I. Deep Diving Techniques: Drift Dives and Wall Dives

- ***What are five recommended guidelines to follow when making a deep drift dive?***

1. Making a deep drift dive
    a. Make all deep drift dives from boats.
    b. Do everything at the same time as your buddy – suiting up, entering, descending, etc.
    c. Depending on the location, you may enter the water with an inflated BCD or you may enter the water with an empty BCD and descend immediately. It's important that everyone agrees to use the same technique.

d. Where practical, use an unanchored and hand-carried buoy as a visual reference for the trailing boat and for ascents. During the dive, make sure your equipment is streamlined and secured. Dangling equipment can destroy aquatic life in an instant and can cause damage on exposed parts of shipwrecks.

e. Watch your air supply and no stop times closely and allow an extra margin with both. On drift dives, it's often impractical to have emergency breathing equipment hanging from the boat or buoy. You may therefore want to allow an extra air reserve to assure you can make your safety stop.

Note:
Review "For Want of an Attitude" side bar in the student diver manual with your class. Emphasize to your student divers that it's important that they deep dive with an appropriate attitude regarding deep diving. Remind divers that recreational deep diving remains fun and has acceptable risk only as long as they apply appropriate principles and techniques, including those they've learned in this course. If they disregard proper procedures, fun and safety go out the window. Review the example as to how quickly little things can lead to an incident or accident.

- ***What's a wall dive, and what three recommended guidelines should you follow when making a deep wall dive?***

2. Deep dives along walls are exhilarating, especially in very clear water.
   a. When making a dive along a "bottomless" wall, there are three considerations
      1. Watch depth – in clear water it is easy to exceed depth limits.
      2. Dive next to the wall to avoid vertigo. The wall is your reference.
      3. Don't harm aquatic life on the wall – avoid touching or kicking the wall with hands or fins.

Note:
Review with student divers Project AWARE Foundation's "Ten Ways a Diver Can Protect the Underwater Environment." *Remind divers that they can download a pdf of this information from www.projectaware.org.*

Ten Ways a Diver Can Protect the Underwater Environment

1. ***Dive carefully to protect fragile aquatic ecosystems***
   Many aquatic organisms are delicate and can be harmed by the bump of a camera, the swipe of a fin or even the gentle touch of a hand. Some aquatic organisms like corals grow very slowly and breaking even a small piece can destroy decades of growth. By being careful you can prevent long-term damage to magnificent dive sites.
2. ***Be aware of your body and equipment placement when diving***
   Keep your gauges and alternate air source secured so they don't drag over the reef or other vital habitat. Control your buoyancy, taking care not to touch fragile organisms with your body or equipment. You can do your part and prevent injury to aquatic life every time you dive.
3. ***Keep your dive skills sharp through continuing education***
   Before heading to open water seek bottom time with a certified professional in a pool or other environment that won't be damaged. You can also refresh your skills and knowledge with a PADI Scuba Review, PADI Advanced Open Water Diver course or Project AWARE Specialty course such as Peak Performance Buoyancy.
4. ***Consider how your interactions affect aquatic life***
   Avoid touching, handling, feeding or riding on aquatic life. These actions may stress the animal, interrupt feeding and mating behavior or provoke aggressive behavior in normally nonaggressive species.
5. ***Understand and respect underwater life***
   Playing with animals or using them as food for other species can leave a trail of destruction, disrupt local ecosystems and rob other divers of their experiences with these creatures. Consider enrolling in a PADI Underwater Naturalist, AWARE Fish Identification or Coral Reef Conservation Specialty course to better understand sustainable interactions.

6. ***Be an ecotourist***
   Make informed decisions when selecting a destination and choose Project AWARE Environmental Operators or other facilities dedicated to sustainable business practices. Obey all local laws and regulations and understand your effect on the environment. Don't collect souvenirs like corals or shells. Instead, take underwater photos and follow Project AWARE's 10 Tips for Underwater Photographers.
7. ***Respect underwater cultural heritage***
   Divers are privileged to access dive sites that are part of our cultural heritage and maritime history. Wrecks can also serve as important habitats for fish and other aquatic life. Help preserve these sites for future generations by obeying local laws, diving responsibly and treating wrecks with respect.
8. ***Report environmental disturbances or destruction***
   As a diver, you're in a unique position to monitor the health of local waters. If you notice unusual depletion of aquatic life, injury to aquatic animals or strange substances in the water, report these observations to responsible authorities in your area.
9. ***Be a role model for other divers and nondivers when interacting with the environment***
   As a diver, you see the underwater results of carelessness and neglect. Set a good example in your own interactions so that others can learn from you.
10. ***Get involved in local environmental activities and issues***
    You can greatly affect your corner of the planet. There are plenty of opportunities to support healthy aquatic environments including Project AWARE conservation and data collection activities like local beach and underwater cleanups and CoralWatch monitoring, supporting environmental legislative issues, attending public hearings on local water resources, conserving water or making responsible seafood choices.

J. Gas Narcosis

- ***At approximately what depth does narcosis typically begin to affect divers?***

1. Nitrogen narcosis (or more properly, gas narcosis), is the narcotic property of air or enriched air when breathed under pressure on deep dives.
    a. Physiologists don't understand the exact causes of nitrogen narcosis, but it has been linked to absorption of nitrogen into nerve cell structure. All gases (including oxygen – hence the preferred term gas narcosis) can induce narcosis if they penetrate the cell lipid (fat) structure in sufficient concentration.
    b. Because narcosis is a physiological phenomenon, it is variable depending upon the individual, and upon physical condition. This means it not only varies from person to person, but in the same person from day to day.
    c. At depths of approximately 30 metres/100 feet to 40 metres/130 feet you will probably be able to perform routine tasks (such as adjusting buoyancy or taking photos). This, however, leads to a false sense of security. Actual impairment from narcosis may be such that you cannot handle a stressful, new or complex situation underwater.

- ***What are seven symptoms and four signs of narcosis?***

2. Symptoms and signs of narcosis
    a. The common symptoms (what you feel yourself) include:
        1. Rigid, inflexible thinking, such as being unable to adapt to unexpected conditions on a dive.
        2. Loss of good judgment and short-term memory loss.
        3. A false sense of security.
        4. Lack of concern for a specific task or for your own safety.
        5. Unjustified elation.
        6. Drowsiness and a desire to sleep.
        7. Anxiety.
    b. The common signs (what you observe in another diver) include:
        1. Inappropriate behavior, such as poor diving habits.
        2. Short attention span and slowed thinking, such as having trouble understanding a dive computer or hand signals.
        3. Impaired vigilance and a disregard for safety.
        4. Stupor and semi consciousness.

- ***What five factors may speed the onset of, or intensify the effects of narcosis?***

3. Because narcosis is a form of intoxication, physiological conditions can intensify it. These include:
    a. Hard work underwater and/or failure to breathe deeply, which build up carbon dioxide levels.
    b. Inexperience with deep diving or no recent deep dives. Divers with deep diving experience seem to build a temporary adaptation to and compensation for narcosis.
    c. Alcohol or drugs (tranquilizers, barbiturates, sleeping pills, some decongestants, etc.) that cause drowsiness. These chemicals impair nerve impulse transmission, so that when combined with nitrogen, narcosis can occur at surprisingly shallow depths.
        1. It is understood – never dive under the influence of alcohol. Use prescription drugs only with the clearance from a doctor.
    d. Anxiety. Anxiety creates perceptual narrowing and other psychological reactions that can magnify the effects of narcosis. Low visibility, cold and dark water can all contribute to anxiety, and therefore narcosis.
    e. Fatigue. Just as alcohol and other intoxicants affect you more when you're tired, so does breathing a gas under pressure. If you're tired, you're more likely to have narcosis affect you.

- ***In recreational diving, how do you prevent narcosis, and what do you do if it occurs?***

4. Don't ignore narcosis, even if you or an apparently affected diver seems able to handle routine tasks. Such a diver may be able to dive adequately, but may not be able to respond properly to an emergency.
    a. To prevent narcosis dive at shallower depths.
    b. Most of the time you can avoid narcosis by staying above 30 metres/100 feet, keeping in mind that it can occur shallower if drugs or other factors are involved. If narcosis becomes a factor on a deep dive ascend to a shallower depth and narcosis will subside on its own with no aftereffects.

K. Decompression Sickness

- ***What is the primary reason recreational divers experience decompression sickness?***

1. Cause of decompression sickness
    a. The primary reason divers suffer DCS is from diver error. Often, DCS is a result of several errors contributing to the situation.
    b. These errors cause a diver to absorb more nitrogen than expected, or fail to release sufficient nitrogen safely before surfacing.
    c. These errors include:
        1. Misuse of, or failure to use dive computers or tables
        2. Exceeding proper ascent rates
        3. Omitting emergency decompression stops
        4. Running out of air (which can lead to exceeding proper ascent rates and omitting emergency decompression/safety stops)
        5. Ignoring factors that predispose divers to DCS
        6. Failure to follow conservative diving practices (such as staying well within your computer's limits).

Note:
Remind student divers that enriched air nitrox is the latest tool in our efforts to stay underwater. Especially in the 18 to 30 metre/60 to 100-foot range, enriched air nitrox gives you more of what you got into diving for – time underwater. Explain to student divers that enriched air does this by replacing some of the nitrogen in the air with oxygen. This means you absorb less nitrogen during a dive, which gives you longer no decompression limits. Suggest to student divers, if they haven't already done so, to take a PADI Enriched Air Diver *course. Explain to divers that they will learn the procedures for no decompression diving with enriched air nitrox, and will learn to use enriched air dive computers, as well as tables for planning dives within no stop limits and oxygen exposure limits.*

- ***What are six symptoms and six signs of decompression sickness?***

2. Symptoms and signs of decompression sickness
    a. The common symptoms (what you feel yourself) include:
        1. Pain, often in the limbs, and also often, but not necessarily in the joints. The pain can move over time.

2. Numbness, tingling or paralysis
3. Unusual fatigue or weakness
4. Skin itch
5. Shortness of breath
6. Dizziness & Vertigo

b. The common signs (what you observe in another diver) include:

1. Favoring an arm or leg, or rubbing a joint
2. Paralysis
3. Unconsciousness
4. Staggering
5. Collapse
6. Coughing spasms
7. Blotchy skin rash

- ***What ten factors may predispose a diver toward decompression sickness?***

3. Factors predisposing divers to decompression sickness

a. In the majority of instances, DCS occurs at the surface within one to two hours of the dive. However, it can occur underwater at a shallow depth, and symptoms can be delayed as long as 48 hours.

b. DCS may become more likely based on these factors:

1. Dehydration. This reduces the quantity of blood circulating to eliminate nitrogen.
2. Excess fat tissue and poor fitness. Fat tissue holds more dissolved nitrogen, and being out of shape impairs circulatory and respiratory efficiency. It also reduces tolerances to physical stressors.
3. Age. As a person ages, the circulatory system becomes less efficient, therefore in theory, nitrogen elimination slows.
4. Heavy exertion immediately before, during or immediately after a deep dive. Exertion before or after the dive can promote micro bubbles that grow as excess nitrogen dissolves into them. Exertion during the dive speeds up the circulation, accumulating more nitrogen than normal.
5. Injuries and illness. These can affect circulation and the ability to eliminate nitrogen.
6. Use of alcohol. Before the dive, this can cause dehydration, and immediately after the dive it alters circulation, possibly promoting bubble growth.
7. Cold water. To save heat, the body restricts circulation to parts of the body, thereby eliminating nitrogen less effectively.

8. Hot showers or baths immediately after a dive. These cause skin capillaries to dilate, altering circulation.
9. Carbon dioxide increase. This is usually caused by exertion or skip-breathing (breath holding) and interferes with the blood's ability to carry nitrogen.
10. Exposure to altitude. Altitude exposures lessen the surrounding pressure after a dive, allowing bubbles to form when they wouldn't be expected at sea level. Follow current recommendations when flying or driving to altitude after diving.

c. Presently, there's no way to quantify predisposing factors in such a way that they can be incorporated into a decompression model. Therefore, the more predisposing factors that apply to you, the more important it is to dive conservatively.

Note:
Explain to student divers that because people differ in their susceptibility to decompression sickness, no decompression table can guarantee that decompression sickness will never occur, even though they dive within the table limits.

- ***What can you do to avoid decompression sickness?***

4. Avoiding decompression sickness
   a. Never dive to the limits of the Recreational Dive Planner (or any other table or dive computer) and avoid factors or situations that may aggravate the situation.

- ***What is the recommended emergency care for a diver suspected of having decompression sickness?***

5. Recommended emergency care for decompression sickness
   a. Have the diver lie down and administer 100 percent oxygen if available. For most cases, have the diver lie on the back or left side, whichever is more comfortable, but not sitting up.
   b. In severe cases, in which the patient has no breath and no signs of circulation, you will need to provide CPR. In this case, the patient must be face up.
   c. Put an unresponsive breathing diver in the recovery position, left side down.
   d. After beginning first aid – or before if the diver is unresponsive and you're alone – immediately contact the local emergency medical system.

Note:

Review with your student divers the following emergency contact information:

1. Emergency contact information for medical assistance:

a. ***DAN America:*** *Divers Alert Network (DAN) America serves as the headquarters for IDAN (International DAN). Regions of coverage include the United States and Canada.*

1. Emergencies

a. United States Coast Guard VHF Channel 16

b. DAN Emergency Hotline

+1-919-684-9111

**Hotline is available 24 hours a day, seven days a week. It can be called collect for both diving and non-diving emergencies (including all TravelAssist-related needs).*

2. Non-emergencies, general inquiries and the DAN Medical Information Line +1-919-684-2948

b. ***DAN World:*** *Regions of coverage include the Caribbean, Polynesia, Micronesia and Melanesia (except Fiji), Puerto Rico, Guam, Bahamas, British and U.S. Virgin Islands, Central and South America and any other region not otherwise specifically designated.*

1. Diving Emergencies +1-919-684-9111

**DAN America provides emergency hotline services for the DAN World region.*

2. Traveler Emergency Medical Services

Skype - TravelerEMS English +1-202-470-0929 Spanish + 52-55-8421-9866 Portuguese + 55-11-3711-7063

c. ***DAN Brasil:*** *Regions of coverage include Brasil.*

1. Diving Emergencies +1-919-684-9111

**DAN America provides emergency hotline services for the DAN World region.*

2. Non-emergencies (19) 3707-1569 – general inquiries

+1-919-684-2948 – Non-emergency medical inquiries

d. ***DAN Europe:*** *Regions of coverage include geographical Europe, the countries of the Mediterranean Basin, the countries on the shores of the Red Sea, the Middle East including the Persian Gulf, the countries on the shores of the Indian Ocean north of the Equator and West of India and Sri Lanka, as well as the related overseas territories, districts, and protectorates.*

1. Diving Emergencies

a. DAN Europe +39-06-4211-8685

*e. **DAN Japan:** Regions of coverage include Japan, Japanese islands, and related territories.*

1. Diving Emergencies

a. DAN Japan + 81-3-3812-4999

*f. **DAN Asia-Pacific:** Regions of coverage include all Asian countries between India and Korea, Australia, New Zealand, and the South Pacific Islands.*

1. Diving Emergencies

a. DES Australia +1-800-088-200 (within Australia)

+61-8-8212-9242 (outside Australia)

b. DAN / DES New Zealand 0800-4DES111 (within New Zealand)

c. Singapore Naval Medicine & Hyperbaric Center 6758-1733 (within Singapore)

d. DAN Asia-Pacific (within Philippines) (02) 632-1077

e. DAN Asia-Pacific (within Malaysia) (05) 930-4114

f. DAN Asia-Pacific (within Korea) (010) 4500-9113

g. DAN Asia-Pacific (China) +852-3611-7326

2. Non-Diving Emergencies

a. Head Office – Australia +61-3 9886 9166

*g. **DAN Southern Africa:** Regions of coverage include South Africa, Swaziland, Lesotho, Namibia, Botswana, Zimbabwe, Mozambique, Angola, Zambia, Zaire, Malawi, Tanzania, Kenya, Madagascar, Comoros, Seychelles, and Mauritius.*

1. Diving Emergencies

a. DAN Southern Africa 0800-020-111 (within South Africa)

+27-11-254-1112 (outside South Africa – accepts collect calls)

e. Provide contact information for local area:

_____

_____

f. Recompression and recompression chambers

1. Secondary medical treatment for DCS usually requires recompression in a chamber.
   a. Recompression reduces the bubbles and forces them back into solution.
   b. Accompanied by oxygen, drug therapy and fluids for rehydration, the diver is brought back to surface pressure at a slow, controlled rate.
   c. Often, more than one recompression is required.

Note:
Time allowing; take your class to a recompression chamber facility. Ask student divers to familiarize themselves with the side bars "Recompression Chambers" *and* "Decompression Sickness, Decompression Illness" *in their student diver manuals.*

- ***What are seven reasons why a diver suspected of having decompression sickness should not be recompressed underwater?***

6. Never put a diver suspected of having decompression sickness back into the water for recompression for the following reasons:
   a. Recompression often requires extreme pressure – the equivalent of 50 metres/165 feet, which is well beyond safe diving depths.
   b. Recompression usually involves oxygen and drug therapy, both of which are at best difficult and under many circumstances impossible underwater.
   c. Recompression treatments typically take six to 10 hours - far longer than a diver can reasonably endure the heat loss even in very warm water, and that assumes having adequate air for such a dive.
   d. Attempting treatment underwater makes it impossible for medical personnel to observe the diver, and the diver's safety is jeopardized because it's hard to communicate with him.
   e. Attempting to recompress underwater will make someone worse if with an incomplete attempt, and it only delays getting the patient to a proper medical facility.

Section Three:
Open Water Dives
Conduct

There are no required confined water and/or surface practice sessions for the PADI Deep Diver Specialty Diver course, however, developing student diver abilities in conditions that doesn't add complexity to learning new skills such as reading (comparing with other divers) information from depth gauges or dive computers, deploying Delayed Surface Marker Buoys (DSMBs), and controlling buoyancy at safety stops before progressing to more challenging conditions, is sound instruction. Some of the underwater skills, such as basic buoyancy control, breathing from an emergency air source, and navigating with a compass, are much easier to learn if you have student divers practice them in a confined water session or on the surface first. You may add confined water and/or surface practice sessions at your discretion. The confined water session may also include a scuba skills review. After completing the course, suggest to divers to dry-rehearse navigation techniques, alternate air source procedures, and safety stop measures before commencing deep dives.

On the first dive, student divers use a visual reference for descents, record changes to colors at depth, read and compare their depth gauge or dive computer readouts with other students' and practice using their diving equipment to monitor ascent rates. On the second dive, student divers perform a free descent using a reference line, wall or sloping bottom, record changes that occur to three pressure-sensitive items while at depth, navigate away from and back to the reference line, monitor their ascent rates and practice a three-minute safety stop. On the third dive, student divers compare the amount of time it takes to complete a task on the surface and at depth and simulate an emergency decompression stop while breathing from an emergency air source. On the fourth dive, student divers complete an underwater tour of the area before proceeding to the surface. Divers who finish exercises in dive one, two, or three with sufficient air and no decompression time remaining may continue to dive for pleasure and experience, at your discretion. Bottom time on each dive should not exceed the no decompression limits of the Recreational Dive Planner or each diver's computer, if used. **Regardless of how you conduct the open water dives, student divers must demonstrate the following performance requirements to qualify for certification.**

Open Water Dives

Performance Requirements

By the end of the open water dives, student divers will be able to:

Deep Diver Open Water Dive One

- **Execute a descent using a reference as a tactile or visual guide (line, wall or sloping bottom).**
- **Compare changes in color at the surface and at depth.**
- **Compare your own depth gauge to your instructor's and/or other student diver's depth gauges.**
- **Use a depth gauge and timing device (or a dive computer with an ascent-rate indicator) to measure an ascent rate not to exceed 18 metres/60 feet per minute.**
- **Perform a 3-minute safety stop at 5 metres/15 feet before surfacing.**

Deep Diver Open Water Dive Two

- **Execute a "free" descent using a reference line, wall or sloping bottom as a visual guide only.**
- **Describe and record the changes that occur to three pressure-sensitive items while at depth.**
- **Perform a navigation swim with a compass away from, and back to, the anchor of the reference line (one diver navigates away from, the other navigates back to, the reference line for a distance of between 10 and 20 kick cycles, depending on visibility).**
- **Perform an ascent using a reference line, wall or sloping bottom as a visual guide only.**
- **Use depth gauge and timing device (or a dive computer with ascent-rate indicator) to measure an ascent rate not to exceed 18 metres/60 feet per minute.**
- **Perform a 3-minute safety stop at 5 metres/15 feet before surfacing without physically holding on to a reference line for positioning.**

Deep Diver Open Water Dive Three

- **Execute a descent using a reference as a tactile or visual guide (line, wall or sloping bottom).**
- **Compare the amount of time needed to complete a task on the surface and at depth.**
- **Perform an ascent using a reference as a tactile or visual guide (line, wall or sloping bottom).**
- **Use a depth gauge and timing device (or a dive computer with ascent-rate indicator) to measure an ascent rate not to exceed 18 metres/60 feet per minute.**

- **Perform an 8-minute simulated emergency decompression stop at 5 metres/15 feet before surfacing, while breathing from an emergency air source for at least one minute of the total time.**

Deep Diver Open Water Dive Four

- **Execute a descent using a reference as a tactile or visual guide (line, wall or sloping bottom).**
- **Complete an underwater tour of the area.**
- **Perform an ascent using a reference as a tactile or visual guide (line, wall or sloping bottom).**
- **Use your depth gauge and timing device (or a dive computer with ascent-rate indicator) to measure an ascent rate not to exceed 18 metres/60 feet per minute.**
- **Perform a 3-minute safety stop at 5 metres/15 feet before surfacing.**

Open Water Guidelines for Deep Dives

A. General Open Water Considerations

1. Involve student divers in dive-planning activities. Have student divers prepare a surface-float system with a reference line for ascents and descents, and emergency-decompression breathing equipment as appropriate.

2. Conduct a thorough briefing. The better the briefing, the more smoothly the deep dive will proceed. Assign buddy teams according to ability (pair weak with strong) and establish check in and check out procedures, depth limitations, environmentally aware diving techniques, bottom times, and cylinder pressures for turnaround times, safety stops and reserves. Deep dives may be psychologically stressful to some individuals. Pay close attention to stress levels and behavior. In an effort to reduce stress, you could direct student divers' attention towards observing aquatic life during the dive. Never force a student diver to make a deep dive.

3. The use of qualified assistants with inwater training is highly recommended. An assistant at the bottom of the reference line can help keep track of buddy teams and watch student divers waiting to complete an exercise with the instructor. An assistant at 5 metres/15 feet can watch for student divers who may ascend in an emergency and can help monitor student diver safety and simulated decompression stops. Assistants at the surface can help with check in and check out procedures and be prepared to help in an emergency.

4. It is recommended, but not required, that Open Water Dive Three be the deepest of all the dives in the course. Open Water Dive Three is suited for the deepest dive in the dive sequence since it includes a reference line for descents and ascents; in a two-day dive sequence, it is the first dive of the second day; and the objectives for Dive Three are such that a deeper dive would enhance student learning.

B. Deep Diver Open Water Dives

Dive One

- **Execute a descent using a reference as a tactile or visual guide (line, wall or sloping bottom).**
- **Compare changes in color at the surface and at depth.**
- **Compare your own depth gauge to your instructor's or other student diver's depth gauges.**
- **Use a depth gauge and timing device (or a dive computer with an ascent-rate indicator) to measure an ascent rate not to exceed 18 metres/60 feet per minute.**
- **Perform a 3-minute safety stop at 5 metres/15 feet before surfacing.**

a. Briefing
   1. Dive sequence – review Dive One tasks

b. Predive procedures

c. Dive One Tasks
   1. Student divers observe and record color changes of objects while at depth. If possible, use underwater lights to view colors with natural light and then with the artificial light comparison
   2. Student divers compare depth gauge or dive computer readings with buddy's and instructor's. Write down each reading on a slate.

d. Post-dive procedures

e. Debriefing
   1. Student divers discuss the changes of color of objects at depth. In addition, discuss the comparison of personal depth gauge or computer readings with instructor's and other student divers'. Guide discussions to address what worked, what didn't work, and how things may be done differently the next time. Specifically focus the discussion on descents using a reference, their observations of color changes at depth, the comparison of depth gauge or dive computer readings, their ascents using a reference, procedures for monitoring their ascent rate, and the 3-minute safety stop at 5 metres/15 feet before surfacing.

f. Log dive (instructor signs log)

Dive Two

- ***Execute a "free" descent using a reference line, wall or sloping bottom as a visual guide only.***
- ***Describe and record the changes that occur to three pressure-sensitive items while at depth.***
- ***Perform a navigation swim with a compass away from, and back to, the anchor of the reference line (one diver navigates away from, the other navigates back to, the reference line for a distance of between 10 and 20 kick cycles, depending on visibility).***
- ***Perform an ascent using a reference line, wall or sloping bottom as a visual guide only.***
- ***Use depth gauge and timing device (or a dive computer with ascent-rate indicator) to measure an ascent rate not to exceed 18 metres/60 feet per minute.***
- ***Perform a 3-minute safety stop at 5 metres/15 feet before surfacing without physically holding on to a reference line for positioning.***

a. Briefing

1. Dive sequence – review Dive Two tasks

b. Predive procedures

c. Dive Two Tasks

1. Student divers handle and examine pressure-related objects while at depth.
2. Student divers navigate away from and/or back to the reference line for a distance of 10-20 kick cycles.

d. Post-dive procedures

e. Debriefing

1. Student divers discuss the appearance of the pressure-related objects. In addition, discuss how student divers managed the navigation exercise. Guide discussions to address what worked, what didn't work, and how things may be done differently the next time. Specifically focus the discussion on descents using a reference line, wall or sloping bottom as a visual guide, their navigation exercise, their ascents using a reference line, wall or sloping bottom as a visual guide, procedures for monitoring their ascent rate, and the 3-minute safety stop at 5 metres/15 feet before surfacing.

f. Log dive (instructor signs log)

Dive Three

- ***Execute a descent using a reference as a tactile or visual guide (line, wall or sloping bottom).***
- ***Compare the amount of time needed to complete a task on the surface and at depth.***
- ***Perform an ascent using a reference as a tactile or visual guide (line, wall or sloping bottom).***
- ***Use a depth gauge and timing device (or a dive computer with ascent-rate indicator) to measure an ascent rate not to exceed 18 metres/60 feet per minute.***
- ***Perform an 8-minute simulated emergency decompression stop at 5 metres/15 feet before surfacing, while breathing from an emergency air source for at least one minute of the total time.***

a. Briefing

   1. Dive sequence – review Dive Three tasks

b. Predive procedures

c. Dive Three Tasks

   1. Student divers repeat timed task at depth for comparison with time taken to complete the same task on the surface.

   2. Student divers perform an 8-minute simulated emergency decompression stop while breathing from an emergency air source for at least one minute.

d. Post-dive procedures

e. Debriefing

   1. Student divers discuss the timed task performed at the surface to that performed at depth. Guide discussions to address what worked, what didn't work, and how things may be done differently the next time. Specifically focus the discussion on descents using a reference line, wall or sloping bottom as a tactile or visual guide, their timed task, their ascents using a reference line, wall or sloping bottom as a tactile or visual guide, and procedures for monitoring their ascent rate. In addition, talk about the 8-minute simulated emergency decompression stop at 5 metres/15 feet before surfacing and how student divers handled breathing from an emergency air source for at least one minute of total time. Ask student divers to discuss what they used for an emergency air source (alternate air source second stage, pony bottle, H- and Y-valves). Again, ask divers to elaborate on what worked, what didn't, and how things may be done differently the next time.

f. Log dive (instructor signs log)

Dive Four

- ***Execute a descent using a reference as a tactile or visual guide (line, wall or sloping bottom).***
- ***Complete an underwater tour of the area.***
- ***Perform an ascent using a reference as a tactile or visual guide (line, wall or sloping bottom).***
- ***Use your depth gauge and timing device (or a dive computer with ascent-rate indicator) to measure an ascent rate not to exceed 18 metres/60 feet per minute.***
- ***Perform a 3-minute safety stop at 5 metres/15 feet before surfacing.***

a. Briefing

   1. Dive sequence – review Dive Four tasks

b. Predive procedures

c. Dive Four Tasks

   1. Student divers complete an underwater tour of the area at depth.

d. Post-dive procedures

e. Debriefing

   1. Student divers discuss their underwater tour at depth. Guide discussions to address what worked, what didn't work, and how things may be done differently the next time. Specifically focus the discussion on descents using a reference as a tactile or visual guide (line, wall or sloping bottom), their underwater tour, their ascents using a reference as a tactile or visual guide (line, wall or sloping bottom), procedures for monitoring their ascent rate, and the 3-minute safety stop at 5 metres/15 feet before surfacing.

f. Log dive (instructor signs log)

Appendix

Table of Contents

Deep Diver
Knowledge Review Part I Answer Key

Note:
To assess knowledge you may review the Knowledge Review from the student diver's manual with the diver, ideally prior to participating in skill practice. Prescriptively teach answers to questions student divers may have missed or have answered incorrectly or incompletely. Ensure student divers understand what they have missed.

1. List five factors to consider when determining your personal deep-diving depth limit.
   1. *Environmental conditions*
   2. *Physical and psychological fitness*
   3. *Surface interval – pressure group*
   4. *Geographical location*
   5. *Buddy's ability*

2. Explain how to determine if your equipment is suitable for deep diving.
   Consider equipment's condition and appropriateness for use while deep diving. Regulator and SPG serviced annually. BCD in good working condition, exposure suit used based on deep water temperatures. Complete set of gauges – ideally on a console.

3. List five pieces of specialized equipment recommended for deep diving.
   1. *Reference line*
   2. *Emergency breathing equipment*
   3. *Extra weights*
   4. *Underwater light*
   5. *First aid and emergency oxygen*

4. Describe proper ascent and descent techniques for deep diving, including positioning, maintaining a proper ascent rate and descending/ascending without a visual reference.
   When possible, descend feet-first on deep dives. Estimate rate of ascent using depth gauge and timer together or electronic depth gauge/dive computer with ascent warning. Without a visual reference, ascend/descend in a feet-down position, face buddy, watch rate of ascent, and adjust buoyancy frequently. Make a safety stop.

5. Explain how to avoid low-on-air or out-of-air situations while deep diving.
   Monitor SPG frequently – more often than on shallower dives.

6. Describe how to make a safety stop at 5 metres/15 feet with a visual reference (line or sloping bottom).
   Grasp line (or bottom) so that depth is at mid chest level – body vertical. Maintain neutral or slight negative buoyancy – watch depth and time. Review dive time and depth limits.

7. Describe how to prevent narcosis, and how to treat it if it occurs.
   Stay in shallower water. If nitrogen narcosis occurs, ascend with buddy to shallower water until symptoms/signs subside.

8. List six symptoms and six signs of decompression illness.

Symptoms	*Signs*
1. *Pain in arms, legs or torso*	1. *Blotchy skin rash*
2. *Local numbness, tingling, paralysis*	2. *Tendency to favor an arm or leg*
3. *Dizziness and vertigo*	3. *Staggering*
4. *Unusual fatigue/weakness*	4. *Coughing spasms*
5. *Skin itch*	5. *Collapse*
6. *Shortness of breath*	6. *Unconsciousness*

9. What is the primary reason divers get decompression illness?
   Diver error

10. Explain how to minimize the risk of decompression illness.
    Use all decompression devices and tables (including the RDP) accurately, and never dive to their limits.

Adventure Dive: Deep Diver

Skills Overview

- Knowledge Review
- Briefing
- Observe Colored Objects at Depth
- Assembling and Positioning Emergency Equipment
- Suiting Up
- Predive Safety Check (BWRAF)
- Entry
- Descent
- Timed Task on Bottom
- Depth Gauge Comparisons at Depth
- Guided Tour (time/air pressure permitting)
- Ascent and Safety Stop
- Exit
- Debrief
- Log Dive – Complete Adventure Dive

Deep Diver
Knowledge Review Part II Answer Key

Note:
To assess knowledge you may review the Knowledge Review from the student diver's manual with the diver, ideally prior to participating in skill practice. Prescriptively teach answers to questions student divers may have missed or have answered incorrectly or incompletely. Ensure student divers understand what they have missed.

11. Describe a proper deep diving objective:
    To view a wreck, reef or other special underwater feature or organism that can only be found at a deep site.

12 List five guidelines to follow when using a dive computer:
1. *Use as a no decompression device.*
2. *Don't share computers.*
3. *Follow the most conservative profile.*
4. *If your computer malfunctions, make a normal ascent and safety stop.*
5. *Don't follow your computer blindly.*

13. Describe how to maintain neutral buoyancy while deep diving.
    Be properly weighted and adjust buoyancy frequently, especially upon ascent.

14. Describe two techniques for estimating a proper ascent rate.
    Compare change in depth with the change in time, or use a dive computer or gauge that tracks ascent rate.

15. Explain what divers should do if they discover they have accidentally omitted an emergency decompression stop:
    Remain calm. Inform divemaster or buddy and monitor yourself for symptoms of decompression illness. Breathe 100 percent oxygen, if available.

16. List five recommendations that you should follow when making a deep drift dive.
1. *Dive from a boat, if possible.*
2. *Closely coordinate dive with your buddy.*
3. *Use same entry technique as your buddy/group.*
4. *Tow a surface buoy, if possible.*
5. *Watch air supply and no decompression limits.*

17. List four guidelines you should follow when diving near a wall:
    1. *Watch your depth.*
    2. *Dive close to the wall.*
    3. *Avoid damaging aquatic life on wall.*
    4. *Use the wall as a reference for safety stops.*

18. List ten factors that may predispose a diver to decompression sickness.
    1. *Excess fat tissue*
    2. *Age*
    3. *Heavy exertion*
    4. *Injuries and illness*
    5. *Dehydration*
    6. *Use of alcohol*
    7. *Cold water*
    8. *Hot shower/bath immediately after dive*
    9. *Carbon dioxide increase*
    10. *Exposure to altitude*

19. Describe the steps to take if a diver is suspected of having decompression sickness.
    Alert the local emergency medical system. Have the diver lie down and administer 100 percent oxygen, if available. Continuously monitor patient.

20. Explain why a diver suspected of having decompression sickness should not be put back in the water.
    Recompression usually involves oxygen and drug therapy as well as long treatments under close observation of medical personnel, which is impossible to accomplish underwater.

PADI Adventure Dive Training Record
Adventure Dive:
Deep Diver

Skills Overview

- Knowledge Review
- Briefing
- Note object color on surface
- Assembling and Positioning Emergency Equipment
- Suiting Up
- Predive Safety Check (BWRAF)
- Entry
- Descent
- Note object color at depth
- Depth Gauge Comparisons at Depth
- Guided Tour (time/air pressure permitting)
- Ascent and Safety Stop
- Exit
- Debrief
- Log Dive – Complete Adventure Dive

Instructor Statement

"I verify that this student diver 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: _____

Instructor Signature: _____

PADI #: _____ 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 deep diving and that completion of a PADI Deep Diver course is highly recommended. I also agree to abide by PADI Standard Safe Diving Practices."

Student Diver Signature _____ Date: _____
Day/Month/Year

PADI Specialty Training Record

Deep Diver

Instructor Statement

"I verify that this student diver has satisfactorily completed all academic and/or any confined water training sessions as outlined in the PADI Specialty Course Instructor Guide for Deep Diver. I am a renewed, Teaching status PADI Instructor in this specialty."

Instructor Name: _____ PADI #:_____

Instructor Signature: _____ Completion Date: _____
Day/Month/Year

Open Water Dives

Dive One

I verify that this student diver has satisfactorily completed Dive One as outlined in the PADI standardized guide for Deep Diver including:
- Descent using a reference as a tactile or visual guide (line, wall or sloping bottom)
- Compare depth gauges with buddy and instructor, record data
- At depth, observe colored objects with/without lights
- Perform safety stop 3 minutes at 5 metres/15 feet

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

Instructor Name: _____ PADI #:_____

Instructor Signature: _____ Completion Date: _____
Day/Month/Year

Dive Two

I verify that this student diver has satisfactorily completed Dive Two as outlined in the PADI standardized guide for Deep Diver, including:
- Descent using a line, wall or slopin bottom as a visual reference
- Navigate away from and back to reference line
- Observe pressure-affected objects
- Perform safety stop 3 minutes at 5 metres/15 feet

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

Instructor Name: _____ PADI #:_____

Instructor Signature: _____ Completion Date: _____
Day/Month/Year

Dive Three

I verify that this student diver has satisfactorily completed Dive Three as outlined in the PADI standardized guide for Deep Diver, including:
- Descent using a reference as a tactile or visual guide (line, wall or sloping bottom)
- Perform timed task at depth
- Perform simulated emergency decompression stop for 8 minutes at 5 metres/15 feet. Breathe from emergency air source for at least 1 minute

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

Instructor Name: _____ PADI #:_____

Instructor Signature: _____ Completion Date: _____
Day/Month/Year

Dive Four

I verify that this student diver has satisfactorily completed Dive Three as outlined in the PADI standardized guide for Deep Diver, including:
- Descent using a reference as a tactile or visual guide (line, wall or sloping bottom)
- Underwater tour of the area
- Ascent up a line, wall or sloping bottom

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

Instructor Name: _____ PADI #:_____

Instructor Signature: _____ Completion Date: _____
Day/Month/Year

Student Diver Statement

"I verify that I have completed all performance requirements for this Deep 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 Diver Name: _____

Student Diver Signature: _____ Date: _____
Day/Month/Year