# DEEP DIVER

## INSTRUCTOR GUIDE

Product No. 70224 (Rev. 05/22) Version 2.04



PADI

# PADI Deep Diver
# Specialty Course Instructor Guide



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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, and describes 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, and the third 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.*

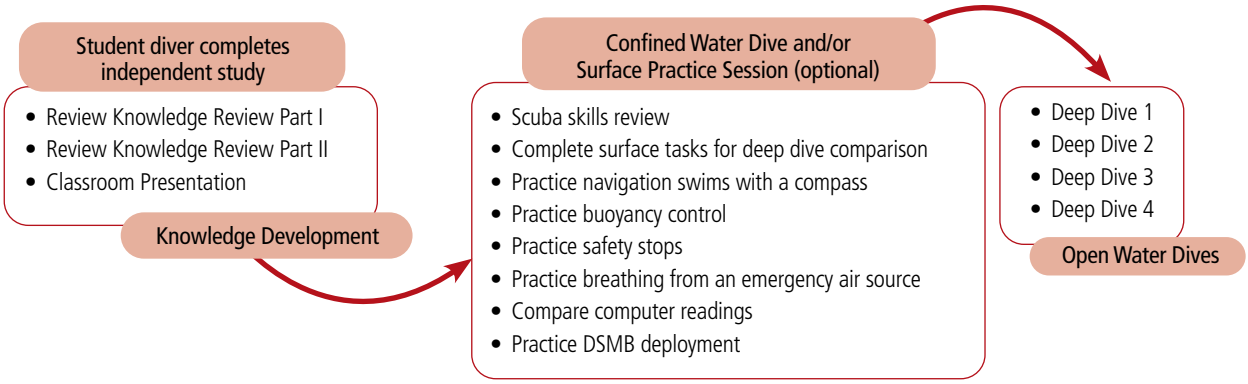
## Course Philosophy and Goals

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 gas 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 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 aquatic life.

This course philosophy, therefore, expands 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 will apply the knowledge they gain by interacting with PADI *Deep Diver eLearning* or by reading the PADI *Deep Diver Manual* and watching the companion video, on at least four open water dives while practicing and demonstrating the practical aspects of deep diving.




## Course Flow Options

The Course Flow Options diagram 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 *Deep Diver eLearning* or review Knowledge Reviews from the PADI *Deep Diver Manual* before participating in the open water dives. Knowledge Review Part I is similar to the Knowledge Review that appears in the Deep Diver section of the PADI *Advanced Open Water Diver Manual.* If you have this 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, breathing from an emergency air source, and reading (comparing with other divers) information from their dive computers or depth gauges.

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 environmentally friendly techniques throughout each dive, to accommodate student diver learning abilities and preferences, logistical needs and your sequencing preferences.

# 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**<br>**Minimum Age** | **PADI Adventure Diver**<br>**15 years** | |
| **Ratios** | **Open Water: 8:1; 4:1: Certified Assistant** | |
| **Site, Depths and Hours** | **Depth: 18-40 metres/60-130 feet**<br>**Minimum Open Water Dives: 4 dives over two days**<br>Hours Recommended: 24 | |
| **Materials and Equipment** | **Instructor:**<br>• **PADI Deep Diver Course Instructor Guide**<br>• **PADI *Deep Diver eLearning* or *Manual***<br>• **Emergency backup air supply**<br>• **Underwater light**<br>• **Demonstration items**<br>• **Safety equipment** | **Student Diver:**<br>• **PADI *Deep Diver eLearning* or *Manual***<br>• **Standard equipment as listed in PADI *Instructor Manual,* General Standards and Procedures**<br>• PADI *Deep Diving* video<br>• Underwater light<br>• Slate with pencil |

## 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 and a PADI Deep Diver Specialty Instructor.** 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. For further details, reference the Professional Membership 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.**
2. **At least 15 years old.**

## Supervision and Ratios

**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 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 can't be increased with the use of certified assistants.**

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

## Sequencing

1. Ideally, student divers should complete Knowledge Review Part I before Deep Dive One.
2. Student divers should complete Knowledge Review Part II before Deep Dives Two, Three and Four.
3. **Training dives must be conducted in order.** You may rearrange skill sequences within a dive.

# 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

- **PADI Deep Diver Specialty Instructor Guide**
- **PADI *Deep Diver eLearning* or *Manual***
- **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**
- Extra backup lights, slates with pencils, compasses, and dive computers for student divers

### Student Diver

- **PADI *Deep Diver eLearning* or *Manual***
- **Standard equipment as listed in the PADI *Instructor Manual,* General Standards and Procedures**
- PADI *Deep Diving* video
- Underwater light
- Slate with pencil

## Assessment Standards

**For eLearners, check the diver's eRecord to verify successful completion of *Deep Diver eLearning*, including the Knowledge Review.**

**To assess knowledge of divers using the manual, have divers complete the Deep Diver Knowledge Reviews (located in the *Deep Diver Manual* and in the Appendix of this guide) and review missed questions until they demonstrate accurate and adequate knowledge. 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

**To qualify for certification, student divers must complete all performance requirements for Deep Dives One, Two, Three and Four. The instructor certifying the student diver must ensure that all certification requirements have been met.**

## Links to Other Courses

Divers who successfully complete Deep Dive One may receive credit for an Adventure Dive toward the PADI Advanced Open Water Diver or Adventure Diver certifications. The Deep Diver Adventure Dive conducted during the PADI Advanced Open Water Diver course may count as the first dive toward this specialty at your discretion.

Divers may credit the specialty certification toward the PADI Master Scuba Diver rating.

# SECTION TWO

# Knowledge Development

## Conduct

Student divers complete independent study by interacting with PADI *Deep Diver eLearning* or by reading the PADI *Deep Diver Manual* and by watching the PADI *Deep Diving* video. Use these knowledge development presentations to prescriptively address student diver misconceptions or to provide clarification on certain points of interest.

If there is a need for instructor-led presentations, such as when the *Deep Diver eLearning* or *Manual* does not exist in a language student divers understand, use the following teaching outline to cover the knowledge development learning objectives and course content. **The Deep Diver Knowledge Reviews** (located in the *Deep Diver Manual* and in this guide's Appendix) **must be completed and reviewed before the diver is certified.**

## I. Introduction

**Note to Instructor**

Have staff introduce themselves and provide a bit of background. Have student divers introduce themselves and explain why they are interested in deep diving.

### A. Course Goals

1. Develop your practical knowledge of deep diving.
2. Increase your diving skills.
3. Help you plan, organize and make deep dives.
4. Improve your diving ability and provide you with additional supervised experience.
5. Encourage you to participate in other specialty training.

### B. Course Overview and Schedule

**Note to Instructor**

Discuss the course sequence, assignments, meeting times, places and other information about all class, practical application sessions and training dives. Build excitement about the course, particularly the training dives.

### C. Costs, Equipment Requirements and Paperwork

**Note to Instructor**

Explain all costs, equipment requirements and logistical details as necessary. Reconfirm prerequisites if appropriate, ensure all paperwork is completed – see Section One, and Paperwork and Administrative Procedures, General Standards, PADI *Instructor Manual.* Collect outstanding fees.

### D. Performance Requirements and Certification

**1. To qualify for any PADI certification, you must meet specific performance requirements.**

a. You pay for the course, but must earn the certification.

b. Performance-based learning is objective – a student either meets a requirement or not; your instructor is not arbitrary in assessing performance.

2. Although you must meet all performance requirements, having difficulty does not mean you will be unsuccessful.

a. You take a course to learn – making mistakes and needing time to master knowledge and skill is part of learning.

b. You may pick up some things quickly and others slowly; what matters is that you demonstrate mastery – not how long it takes.

c. You move on at the pace you learn – you may need extra dives or other practice.

## II. Deep Diving: Reasons and Limits

### Learning Objectives

**By the end of this section, you should be able to answer the following questions:**

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

### 1. What are five reasons to deep dive?

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 There are many reasons that people give for deep diving, including these five:

1. You can observe different types of aquatic life and bottom topography unique to deeper environments, such as walls. Despite their awesome appearance, these structures are very fragile. Good buoyancy control skills help minimize your contact with the walls.
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 deeper environments; however, these wrecks are still fragile. Remember to explore them carefully and never take anything but photos.
3. You'll be able to take unique photographs. It's important 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.
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.

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

B. The objectives for each deep dive must be carefully determined.
   1. 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.
   2. Do not dive deep to set records.
   3. 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.

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

C. 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.

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

D. Although your maximum depth limit is 40 metres/130 feet, you'll probably find 30 metres/100 feet is your optimum limit for most deep dives.
   1. You have little time below 30 metres/100 feet, even if using a dive computer and enriched air nitrox (EANx) to allow more no stop time.

   a. 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 this 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 to Instructor**

Refer student divers to the sidebar in the PADI *Deep Diver Manual* – "Beyond the PADI Deep Diver Course" – that discusses diving deeper than 40 metres/130 feet and PADI TecRec courses.

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

E. Depth limits must be personalized – in some situations, even 18 metres/60 feet may be too deep. A personalized maximum depth limit can be formulated by taking into consideration various factors:
   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 you should opt for a less stressful dive. 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.
      a. The general recommendations are to avoid repetitive diving deeper than the previous dive and to avoid repetitive dives deeper than 30 metres/100 feet.
      b. If using enriched air, you need to respect the maximum depths for the particular blend you're 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.

# III. Equipment for Deep Diving

## Learning Objectives

**By the end of this section, you should be able to answer the following questions:**

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

### 1. How do you determine if your personal equipment is suitable for deep diving?

A. 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.

1. Regulator
   a. 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.
   b. If you're considering continuing on to a PADI TecRec course, you may want to invest in a high-end, top-of-the-line model suited to tec diving.
   c. Rinse your regulator thoroughly after each dive and have it serviced annually.

**Note to Instructor**

Refer student divers to the sidebar in the PADI *Deep Diver Manual* – "The Differences between Balanced and Unbalanced First Stages" – or to *The Encyclopedia of Recreational Diving* for detailed illustrations of regulators.

2. Submersible pressure gauge
   a. Whether you use a conventional SPG or an air-integrated dive computer, be sure the gauge, its swivels and connections are serviced annually along with your regulator.
   b. 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.
3. Buoyancy Control Device (BCD)
   a. Virtually any state-of-the-art BCD should be suitable for recreational deep diving.
   b. Inspect your BCD periodically for possible leaks, and be sure the low-pressure inflator operates properly.

4. Cylinders
    a. Since you use breathing gas 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.
    b. Some high capacity cylinders hold about half again to twice as much as a 12-litre/71.2-cubic-foot cylinder.
5. Exposure suits
    a. 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.
    b. You may want to use a thicker wet suit, or a dry suit with undergarments based on the temperature at depth.
6. Alternate air source
    a. 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.
    b. 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.
    c. You may want to consider a pony bottle – an independent air source that provides additional air – to help assure you have ample gas to reach the surface safely in an emergency. Buddy teams should agree on the procedures, should a diver need to switch to a pony cylinder and end the dive. It is important that the regulator used for the pony cylinder is easily identified, and that it can't be mistaken for the diver's primary regulator. This can be achieved in many ways including:
        i. Color of the second stage
        ii. Color of the mouthpiece
        iii. Shape and style of the second stage
        iv. Shape and style of the mouthpiece
        v. Coloration of the pony cylinder hose
        vi. Use of a physical item, which covers the mouthpiece and must be physically removed before the regulator can be used.
    d. 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.

7. Gauges and computers
    a. 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.
    b. 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.
    c. 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.
8. Surface signaling devices
    a. Audible devices such as a whistle or air horn and a visible device such as a DSMB are standard pieces of equipment for every diver.
    b. Having a second visible device – inflatable surface tube, flare, signal mirror, etc. – is highly recommended, and even required in some locations.

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

B. Consider buying these pieces of specialized equipment for deep diving.
1. Reference line
    a. This 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.
        i. 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.
        ii. Rope materials have differing properties, and the same diameter in different materials will have different strength. It is recommended to use no smaller than 12-millimetre/0.5-inch rope, nylon or dacron.

**Note to Instructor**

Refer student divers to the sidebar in the PADI *Deep Diver Manual* – "Line for Divers" – that discusses the advantages and disadvantages of using synthetic or natural rope.

2. Emergency breathing equipment
    a. 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.

   b. 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.
   c. Whatever type of emergency breathing equipment is used, it's a good idea to have enough second stages for all divers to breathe from it at once.
3. Extra weight
   a. 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.
   b. 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.
4. Dive light
   a. Dive lights come in handy for bringing out vivid colors or for carefully peering into cracks and holes at depth.
   b. In lower visibility environments it may be significantly darker at depth, so a light helps with reading gauges and keeping track of your buddy.
   c. A small compact light is excellent for daytime deep diving.
5. First-aid kit and emergency oxygen
   a. It's recommended you have first aid and emergency oxygen at hand whenever you're diving, not just for deep diving.
   b. This equipment is especially important when deep diving at remote locations, some distance from professional medical assistance.

**3. What makes up a surface support station?**

C. For convenience, you can suspend a reference line, emergency breathing equipment and extra weights from a surface support station.
   1. When boat diving, your surface support station is the boat.
   2. 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.
   3. Besides carrying deep diving equipment, you can equip a surface support station with a dive flag to warn off boaters.

**4. What six guidelines should you follow when using a dive computer?**

D. Dive computers have become standard among most recreational divers, and are the mainstay for technical diving. The following guidelines apply to dive computer use:

1. Read the manufacturer instructions and use your computer as directed.
2. Use your computer to stay within no stop (no decompression) limits. In recreational diving, required decompression should be an emergency situation only.
3. As you've learned, don't share a computer. Every diver needs at least one.
4. The buddy team ascends based on the shortest no stop limits in the team.
5. If your computer fails during a dive, you may continue the dive if you're diving with a backup computer. If you don't have a backup, make a normal ascent and safety stop (gas supply permitting). Follow the manufacturer's recommendations regarding resuming diving, which may require waiting 12 or more hours.
6. Don't follow your computer blindly. Although computers differ somewhat, there shouldn't be huge differences between your and your buddies' computers if you've been diving similar profiles. Be cautious if you see significant differences – this could indicate a computer problem.

**Note to Instructor**

Refer student divers to the sidebar in the PADI Deep Diver Manual – "Computer Misconceptions" – and/or discuss the four misconceptions about dive computers: 1. Computers track gas in your body, 2. Computers are more reliable than tables, 3. The more expensive computers are safer than less expensive ones, and 4. "The computer says it, so I can do it."

# IV. Deep Diving Techniques: Buddy Contact, Buoyancy Control and Descents/Ascents

## Learning Objectives

**By the end of this section, you should be able to answer the following questions:**

1. **What are two techniques for maintaining buddy contact during deep dives?**
2. **How should you maintain neutral buoyancy on a deep dive?**
3. **How do you make a head-up descent, and why is this important in deep diving?**
4. **What are two techniques for slowing or stopping descents/ascents along a reference line with your hands occupied?**
5. **What are four steps to follow while descending/ascending without a reference?**
6. **What are two techniques for estimating an 18-metre/60-foot-per-minute or slower ascent rate?**

### 1. What are two techniques for maintaining buddy contact during deep dives?

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.
   1. To stay together, maintain eye contact during feet first descents and during ascents.
   2. On the bottom, swim side by side and try to stay within touching distance. Use a short line for you and your buddy to hold on to in low-visibility conditions.

### 2. How should you maintain neutral buoyancy on a deep dive?

B. Maintaining neutral buoyancy while deep diving is similar to buoyancy control on all dives, with a few considerations.
   1. 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.
   2. 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.
   3. 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 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.

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

C. There are a few reasons for making a head-up, feet-first vertical descent while deep diving:

1. This type of descent reduces disorientation due to vertigo.
2. It makes it easier to equalize your ears; helps prevent squeeze injuries. Air spaces are easier to equalize when your head is up.
3. It also allows for better buoyancy control; slower descent gives you time to fine-tune buoyancy, adjust loose equipment, check depth, etc.
4. 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.
5. When using a reference line, alternate one hand between your BCD low-pressure inflator mechanism and equalizing your ears, while your other hand holds on to the line.

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

D. It's important to make slow, controlled descents and ascents, even if your hands are occupied.

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.

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

E. Although it's best to make deep diving descents and ascents with a reference, if you must descend or ascend without one, 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-metre/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.

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

F. Remember to always be a S.A.F.E. Diver – Slowly Ascend From Every dive. Don't exceed an ascent rate of 18 metres-/60-feet-per-minute (0.3 metres/one foot per second), but it's fine to go slower. Think of ascent rate as a speed limit.

1. The easiest way to track your ascent rate is to use your dive computer. You measure ascent rate at 0.3 metres/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 to Instructor**

Refer student divers to the sidebar, "Ascent Rate Mythology," in the PADI *Deep Diver Manual.*

# V. Deep Diving Techniques: On the Bottom

## Learning Objectives

**By the end of this section, you should be able to answer the following questions:**

1. **How should you breathe while deep diving?**
2. **How do you avoid low air or out-of-air situations on a deep dive?**
3. **What is the best way to swim without stirring up the bottom, and why is it important?**

### 1. How should you breathe while deep diving?

A. By breathing slowly and deeply, you avoid over-breathing your regulator and feeling out of breath.

1. It is possible to over-breathe your regulator during strenuous activity while deep diving. A feeling of suffocation occurs when the regulator can't deliver a comfortable amount of air. This occurs because of the increased density of air passing through your regulator.

2. Density is only part of the issue. A gas flows less smoothly as flow speed rises.
    a. 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.
    b. Turbulence disrupts even airflow and increases breathing resistance, which in turn demands more effort – more effort demands more air.
3. Always breathe consistently deep and slow.
4. Try to breathe from your stomach and diaphragm, so you fill your lungs from the bottom up.
5. Slow, deep breathing maximizes your respiratory efficiency, so you use your air more slowly. For maximum air conservation, relax and don't overexert yourself.

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

B. You use air faster on deep dives. To prevent low air or out-of-air emergencies:
1. Check your submersible pressure gauge (and other instruments) frequently.
2. 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.
3. Calculate gas consumption for a given depth.
4. Try to avoid overexertion, exercise and strenuous activity.

**Note to Instructor**

Refer student divers to the air consumption chart in the PADI *Deep Diver Manual.* 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.

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

C. Avoid touching the bottom with your fins on deep dives because doing so reduces visibility and destroys aquatic life.
1. As you get near the bottom, stop all fin movement. Neutralize buoyancy.
2. When on the bottom, avoid stirring up the bottom. Release the reference line and move away from the descent area as other divers come down. You can hover away from the line or place your fin tips on the bottom after making sure the area is free of sharp objects or aquatic life.

# VI. Deep Diving Techniques: Safety Stops and Emergency Decompression

## Learning Objectives

**By the end of this section, you should be able to answer the following questions:**

1. **How do you make a safety or emergency decompression stop at 5 metres/15 feet with and without a reference line?**
2. **What should you do if you accidentally omit an emergency decompression stop?**

### 1. How do you make a safety or emergency decompression stop at 5 metres/15 feet with and without a reference line?

A. A safety stop is recommended after all dives, but especially after deep dives and repetitive dives.

1. It 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.
2. You must make a safety stop if:
   a. Your dive has been to 30 metres/100 feet or deeper.
   b. Your pressure group at the end of the dive is within three pressure groups of the no decompression limit.
   c. You dive up to any limit on the Recreational Dive Planner.
3. 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.
4. To maintain 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 (a short line with a loop on each end) 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.

5. To maintain 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. Maintain your depth by watching your computer with a hand on your buddy, who keeps an eye on the boat, navigates 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.
6. If you need to make 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 before you can surface.
   b. If you're using the RDP, these are the rules if you accidentally exceed the no stop limits:
      i. 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.
      ii. 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.

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

B. Follow these steps if you accidentally miss an emergency decompression stop:
   1. Remain calm.
   2. Tell your buddies or the divemaster, and monitor yourself closely for symptoms of decompression sickness.
   3. Breathe 100 percent oxygen if available.
   4. If anything unusual develops, seek medical assistance.
   5. Do not reenter the water.

# VII. Deep Diving Techniques: Drift Dives and Wall Dives

## Learning Objectives

**By the end of this section, you should be able to answer the following questions:**

1. **What are five recommended guidelines to follow when making a deep drift dive?**
2. **What's a wall dive and what three recommended guidelines should you follow when making a deep wall dive?**

### 1. What are five recommended guidelines to follow when making a deep drift dive?

A. If you have the opportunity to make a deep drift dive, follow these guidelines:

1. Make all deep drift dives from boats.
2. Do everything at the same time as your buddy – suiting up, entering, descending, etc.
3. 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.
4. Where practical, use an unanchored and hand-carried buoy as a visual reference for the trailing boat and for ascents. Another approach is to send up a DSMB when divers are ready to ascend. 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.
5. 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.

### 2. What three recommended guidelines should you follow when making a deep wall dive?

B. Deep dives along walls are exhilarating, especially in very clear water. When making a dive along a "bottomless" wall, there are three consideration:

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.

# VIII. Gas Narcosis and Decompression Sickness

## Learning Objectives

**By the end of this section, you should be able to answer the following questions:**

1. **At approximately what depth does narcosis typically begin to affect divers?**
2. **What are seven symptoms and four signs of narcosis?**
3. **What five factors may speed the onset of, or intensify the effects of narcosis?**
4. **In recreational diving, how do you prevent narcosis, and what do you do if it occurs?**
5. **What is the primary reason recreational divers experience decompression sickness?**
6. **What are five symptoms and seven signs of decompression sickness?**
7. **What 10 factors may predispose a diver toward decompression sickness?**
8. **What can you do to avoid decompression sickness (DCS)?**
9. **What is the recommended emergency care for a diver suspected of having decompression sickness?**
10. **What are seven reasons why a diver suspected of having decompression sickness should not be recompressed underwater?**

### 1. At approximately what depth does narcosis typically begin to affect divers?

A. Gas narcosis – sometimes called nitrogen narcosis – is the narcotic property of air or enriched air when breathed under pressure on deep dives, generally appearing deeper than 30 metres/100 feet.

1. Physiologists don't understand the exact causes of gas narcosis, but it is a form of anesthesia that has been linked to absorption of nitrogen into nerve cell structure. The most accepted hypotheses state that all gases (including oxygen) can induce narcosis by going into solution and interfering with the transmission of nerve impulses from one nerve cell to the next. At one time thought to be based on solubility in lipids (fats), this fails to account for some of the differences in gas anesthetic qualities, so modern theories of anesthesia are more complicated and consider more than solubility.
2. 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.
3. At depths of approximately 30-40 metres/100-130 feet, you will probably be able to perform routine tasks (such as adjusting buoyancy). This, however, leads to a false sense of security. Actual impairment from narcosis may be such that you can't handle a stressful, new or complex situation underwater.

### 2. What are seven symptoms and four signs of narcosis?

B. Symptoms are things you feel yourself and signs are things others observe.

1. The common symptoms of narcosis include:

a. Rigid, inflexible thinking, such as being unable to adapt to unexpected conditions on a dive.
b. Loss of good judgment and short-term memory loss.
c. A false sense of security.
d. Lack of concern for a specific task or for your own safety.
e. Unjustified elation.
f. Drowsiness and a desire to sleep.
g. Anxiety.

2. The common signs of narcosis include:
   a. Inappropriate behavior, such as poor diving habits.
   b. Short attention span and slowed thinking, such as having trouble understanding a dive computer or hand signals.
   c. Impaired vigilance and a disregard for safety.
   d. Stupor and semi consciousness.

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

C. Because narcosis is a form of intoxication, physiological conditions can intensify it. These include:

1. Hard work underwater and/or failure to breathe deeply, which builds up carbon dioxide levels.
2. 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.
3. 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.
   a. Never dive under the influence of alcohol.
   b. Use prescription drugs only with the clearance from a doctor.
4. 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.
5. 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.

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

D. Don't ignore narcosis – even if you or an apparently affected diver seem able to handle routine tasks, you may not be able to respond properly to an emergency.

1. To prevent narcosis, dive at shallower depths.
2. 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.
3. If narcosis becomes a factor on a deep dive, ascend to a shallower depth and narcosis will subside on its own with no aftereffects.

**5. What is the primary reason recreational divers experience decompression sickness (DCS)?**

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

**6. What are six symptoms and six signs of decompression sickness?**

F. Remember that symptoms are things you feel yourself, and signs are indications others observe.
   1. The common symptoms of DCS include:
      a. Pain, often in the limbs, and also often, but not necessarily in the joints. The pain can move over time.
      b. Numbness, tingling or paralysis
      c. Unusual fatigue or weakness
      d. Skin itch
      e. Shortness of breath
      f. Dizziness and vertigo
   2. The common signs of DCS include:
      a. Favoring an arm or leg, or rubbing a joint
      b. Paralysis
      c. Unconsciousness
      d. Staggering

e. Collapse
f. Coughing spasms
g. Blotchy skin rash

**7. What 10 factors may predispose a diver toward decompression sickness?**

G. In the majority of cases, 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.

1. DCS may become more likely based on these factors:
   a. Dehydration. This reduces the quantity of blood circulating to eliminate nitrogen.
   b. 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.
   c. Age. As a person ages, the circulatory system becomes less efficient, therefore in theory, nitrogen elimination slows.
   d. Heavy exertion immediately before, during or immediately after a deep dive. Exertion before or after the dive can promote microbubbles that grow as excess nitrogen dissolves into them. Exertion during the dive speeds up the circulation, accumulating more nitrogen than normal.
   e. Injuries and illness. These can affect circulation and the ability to eliminate nitrogen.
   f. Use of alcohol. Before the dive, this can cause dehydration, and immediately after the dive it alters circulation, possibly promoting bubble growth.
   g. Cold water. To save heat, the body restricts circulation to parts of the body, thereby eliminating nitrogen less effectively.
   h. Hot showers or baths immediately after a dive. Taking a hot shower/bath immediately after a dive can cause skin capillaries to dilate, altering circulation.
   i. Carbon dioxide increase. This is usually caused by exertion or skip-breathing (breath holding) and interferes with the blood's ability to carry nitrogen.
   j. Exposure to altitude. Altitude exposure lessens 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.
2. 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 to Instructor**

Explain to student divers that because people differ in their susceptibility to decompression sickness, no decompression model/table can guarantee that decompression sickness will never occur, even when diving within the model/table limits.

**8. What can you do to avoid decompression sickness?**

H. To avoid decompression sickness, never dive to the limits of a dive computer or the Recreational Dive Planner (or any other table), and avoid factors or situations that may increase risk.

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

I. As you've learned in previous training, there are several steps in the recommended emergency care for a patient suspected of having decompression sickness.
   1. 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.
   2. 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.
   3. Put an unresponsive breathing diver in the recovery position, left side down.
   4. After beginning first aid, or before if the diver is unresponsive and you're alone, immediately contact the local emergency medical system.

**Note to Instructor**

Review with your student divers the local emergency contact information.

   5. 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 to Instructor**

Refer student divers to the sidebars in the PADI *Deep Diver Manual:* "Recompression Chambers" and "Decompression Sickness, Decompression Illness."

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

J. Never put a diver suspected of having decompression sickness back into the water for recompression for the following reasons.

1. Recompression often requires extreme pressure – the equivalent of 50 metres/165 feet, which is well beyond safe diving depths.
2. Recompression usually involves oxygen and drug therapy, both of which are at best difficult, and under many circumstances impossible underwater.
3. 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 gas for such a dive.
4. Attempting treatment underwater makes it impossible for medical personnel to observe the diver.
5. The diver's safety is jeopardized because it's hard to communicate with the diver.
6. Attempting to recompress underwater will make someone worse if done with an incomplete attempt.
7. Attempting underwater recompression delays getting the patient to a proper medical facility.

# SECTION THREE

# Deep Diver Training Dives

## Conduct

**The PADI Deep Diver Specialty course has four required open water training dives.** You also have the option of adding a confined water dive to practice skills, such as comparing dive computers, deploying Delayed Surface Marker Buoys (DSMBs), controlling buoyancy at safety stops, breathing from an emergency air source, and compass navigation along with a general scuba skills review.

You may add training dives for additional experience as needed for student divers to demonstrate mastery. However, **student divers must demonstrate mastery of all performance objectives for each dive prior to progressing to the next training dive.**

The purpose of Dive One is to have divers record changes to colors at depth and compare dive computers (depth gauges). On Dive Two, student divers perform a free descent and record changes that occur to pressure-sensitive items while at depth. On Dive Three, 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 Dive Four, student divers complete an underwater tour of the area before proceeding to the surface.

**Prior to certification, student divers must demonstrate mastery of all performance objectives.**

## Dives, Times, Depths and Gases

1. **The minimum number of dives for certification as a PADI Deep Diver is four open water dives.**
2. **All dives must be planned as no stop (no decompression) dives.** Divers may use enriched air to extend no stop time or add conservatism if they are certified as PADI Enriched Air Divers (or have a qualifying certification).
3. **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.**

## General 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. Deep dives may be psychologically stressful to some individuals. Pay close attention to stress levels and behavior. Never force a student diver to make a deep dive.
3. Use qualified certified assistants to help provide supervision on the bottom, at safety stops and on the surface.
4. It's recommended, but not required, that Open Water Dive Three be the deepest of all the dives in the course. It includes a reference line for descents and ascents and, in a two-day dive sequence, is the first dive of the second day. The performance requirements for Dive Three are best met on a deeper dive, which would enhance student learning.

## Sequence Options and Dives

1. Ideally, student divers should complete Knowledge Review – Part I before Deep Dive One.
2. Student divers should complete Knowledge Review – Part II before Deep Dives Two, Three and Four.
3. **Training dives must be conducted in order.** You may rearrange skill sequences within a dive.

# Deep Dive One

## Performance Objectives

**By the end of Deep Dive One, student divers should be able to, with a buddy and with instructor guidance as appropriate:**

1. **Plan and manage gas use, including determining turn pressure, ascent pressure and reserve pressure. Establish no stop and dive time limits.**
2. **Descend using a line, wall or sloping bottom.**
3. **Compare changes in color at the surface and at depth.**
4. **Compare a dive computer (or depth gauge) reading to another diver's depth reading.**
5. **Ascend at a rate not to exceed 18 metres/60 feet per minute using a dive computer (or depth gauge and timing device).**
6. **Make a safety stop at 5 metres/15 feet for at least three minutes.**

## I. Deep Dive One Standards

**A. Environment: Open water**

**B. Maximum Depth: 30 metres/100 feet**

## II. Suggested Sequence

**A. Briefing**

1. Evaluate dive site conditions.
2. Identify facilities at the dive site.
3. Explain interesting and helpful facts about the dive site, including bottom topography, bottom composition, depth range and points of interest (use a dive site map if appropriate).
4. Describe entry and exit techniques for the dive site.
5. Have buddy teams plan their turn pressure, ascent pressure and reserve pressure for the dive based on gas supply limits.
6. Have buddy teams establish maximum depths and bottom times, and plan contingency profiles for longer and deeper dives than planned.
7. Review the dive sequence and performance requirements.
8. Review communication and other emergency protocols as required by local regulations.

**B. Predive Procedures**

1. Have divers prepare all standard and specialized equipment.
2. Confirm that divers have all dive data: turn-around gas pressure, maximum depth and bottom time on a slate.

3. Put on all equipment.
4. Review check-out/in procedure with surface support staff (as required).

**C. Deep Dive One**

1. Predive check
   a. Buddies conduct a predive safety check.
   b. Watch for and correct errors as appropriate.
2. Entry
3. Buoyancy check and proper weighting
4. Gas management
   a. Before beginning the descent, remind divers to check their starting pressure and make a note of their turn pressure.
   b. During the dive, check cylinder pressures at irregular intervals to confirm appropriate gas management.
5. Descent
   a. Buddies execute a five-point descent.
   b. Bubble check and acclimatization below the surface (3-6 metres/ 10-20 feet recommended).
6. Color changes. Have 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.
7. Computer comparison. Have divers compare dive computer (depth gauge) readings with buddy's and instructor's. Write down each reading on a slate.
8. Ascent
   a. Divers ascend at a maximum rate not exceeding 18 metres/60 feet per minute or according to dive computer. (Determine the rate of ascent using your depth gauge and timer or dive computer with ascent-rate indicator.)
   b. Perform a safety stop at 5 metres/15 feet for three minutes. .
9. Exit
   a. Divers establish positive buoyancy at the surface.
   b. Divers exit the water appropriately for the environment, with assistance as necessary.

**D. Post-dive Procedures**

1. Check in with surface support staff (as required).
2. Divers stow dive equipment as appropriate.

**E. Debriefing**

1. Provide positive reinforcement and assess performance.

2. Have student divers critique themselves on their performance. Add your observations as appropriate.
3. Log the dive (instructor signs logbook/approves digital log).

# Deep Dive Two

### Performance Objectives

**By the end of Deep Dive Two, student divers should be able to, with a buddy and with instructor guidance as appropriate:**

1. **Execute a free descent using a reference line, wall or sloping bottom as a visual guide only.**
2. **Describe and record the changes that occur to three pressure-sensitive items while at depth.**
3. **Perform a navigation swim with a compass away from, and back to, the anchor or 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.)**
4. **Perform an ascent using a reference line, wall or sloping bottom as a visual guide only.**
5. **Ascend at a rate not to exceed 18 metres/60 feet per minute using a dive computer (or depth gauge and timing device).**
6. **Make a safety stop at 5 metres/15 feet for at least three minutes without physically holding on to a reference line for positioning.**

## I. Deep Dive Two Standards

**A. Environment: Open water**

**B. Maximum Depth: 40 metres/130 feet**

## II. Suggested Sequence

**A. Briefing**

1. Evaluate dive site conditions.
2. Identify facilities at the dive site.
3. Explain interesting and helpful facts about the dive site, including bottom topography, bottom composition, depth range and points of interest (use a dive site map if appropriate).
4. Describe entry and exit techniques for the dive site.
5. Have buddy teams plan their turn pressure, ascent pressure and reserve pressure for the dive based on gas supply limits.
6. Have buddy teams establish maximum depths and bottom times, and plan contingency profiles for longer and deeper dives than planned.
7. Review the dive sequence and performance requirements, including compass use.

8. Review communication and other emergency protocols as required by local regulations.

**B. Predive Procedures**

1. Have divers prepare all standard and specialized equipment.
2. Confirm that divers have all dive data: turn-around gas pressure, maximum depth and bottom time on a slate.
3. Put on all equipment.
4. Review check-out/in procedure with surface support staff (as required).

**C. Deep Dive Two**

1. Predive check
   a. Buddies conduct a predive safety check.
   b. Watch for and correct errors as appropriate.
2. Entry
3. Buoyancy check and proper weighting
4. Gas management
   a. Before beginning the descent, remind divers to check their starting pressure and make a note of their turn pressure.
   b. During the dive, check cylinder pressures at irregular intervals to confirm appropriate gas management.
5. Descent
   a. Buddies execute a five-point descent.
6. Student divers handle and examine pressure-related objects while at depth.
7. Student divers navigate away from and/or back to the reference line for a distance of 10 to 20 kick cycles. Consider basing number of kick cycles on visibility.
   a. Have the navigating diver set a compass bearing and share it with the other diver, so the diver will be able to set a reciprocal course.
   b. Have divers repeat navigation until they meet the performance requirement of returning to the reference line.
8. Ascent
   a. Divers ascend at a maximum rate not exceeding 18 metres/60 feet per minute or according to dive computer.
   b. Perform a safety stop at 5 metres/15 feet for three minutes.
9. Exit
   a. Divers establish positive buoyancy at the surface.
   b. Divers exit the water appropriately for the environment, with assistance (as necessary).

**D. Post-dive Procedures**

1. Check in with surface support staff (as required).
2. Divers stow dive equipment as appropriate.

**E. Debriefing**

1. Provide positive reinforcement and assess performance.
2. Have student divers critique themselves on their performance. Add your observations as appropriate.
3. Log the dive (instructor signs logbook/approves digital log).

# Deep Dive Three

### Performance Objectives

**By the end of Deep Dive Three, student divers should be able to, with a buddy and with instructor guidance as appropriate:**

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

## I. Deep Dive Three Standards

**A. Environment: Open water**

**B. Maximum Depth: 40 metres/130 feet**

## II. Suggested Sequence

**A. Briefing**

1. Evaluate dive site conditions.
2. Identify facilities at the dive site.
3. Explain interesting and helpful facts about the dive site, including bottom topography, bottom composition, depth range and points of interest (use a dive site map if appropriate).
4. Describe entry and exit techniques for the dive site.

5. Have buddy teams plan their turn pressure, ascent pressure and reserve pressure for the dive based on gas supply limits.
6. Have buddy teams establish maximum depths and bottom times, and plan contingency profiles for longer and deeper dives than planned.
7. Review the dive sequence and performance requirements, including timed task.
8. Review communication and other emergency protocols as required by local regulations.

**B. Predive Procedures**

1. Have divers prepare all standard and specialized equipment, including emergency breathing station.
2. Confirm that divers have all dive data: turn-around gas pressure, maximum depth and bottom time on a slate.
3. Put on all equipment.
4. Review check-out/in procedure with surface support staff (as required).

**C. Deep Dive Three**

1. Predive check
   a. Buddies conduct a predive safety check.
   b. Watch for and correct errors as appropriate.
2. Entry
3. Buoyancy check and proper weighting
4. Gas management
   a. Before beginning the descent, remind divers to check their starting pressure and make a note of their turn pressure.
   b. During the dive, check cylinder pressures at irregular intervals to confirm appropriate gas management.
5. Descent
   a. Buddies execute a five-point descent.
6. Student divers repeat timed task at depth for comparison with time taken to complete the same task on the surface.
7. Ascent
   a. Divers ascend at a maximum rate not exceeding 18 metres/60 feet per minute or according to dive computer.
8. Student divers perform an 8-minute simulated emergency decompression stop while breathing from an emergency air source for at least one minute.
   a. Emergency air sources may include: alternate air source supplied by another diver, pony bottle, emergency breathing station, etc.

9. Exit
    a. Divers establish positive buoyancy at the surface.
    b. Divers exit the water appropriately for the environment, with assistance as necessary.

**D. Post-dive Procedures**

1. Check in with surface support staff (as required).
2. Divers stow dive equipment as appropriate.

**E. Debriefing**

1. Provide positive reinforcement and assess performance.
2. Have student divers critique themselves on their performance. Add your observations as appropriate.
3. Log the dive (instructor signs logbook/approves digital log).

# Deep Dive Four

### Performance Objectives

**By the end of Deep Dive Four, student divers should be able to, with a buddy and with instructor guidance as appropriate:**

1. **Execute a descent using a reference as a tactile or visual guide (line, wall or sloping bottom).**
2. **Complete an underwater tour of the area.**
3. **Perform an ascent using a reference as a tactile or visual guide (line, wall or sloping bottom).**
4. **Ascend at a rate not to exceed 18 metres/60 feet per minute using a dive computer (or depth gauge and timing device).**
5. **Make a safety stop at 5 metres/15 feet for at least three minutes.**

## I. Deep Dive Four Standards

**A. Environment: Open water.**

**B. Maximum Depth: 40 metres/130 feet.**

## II. Suggested Sequence

**A. Briefing**

1. Evaluate dive site conditions.
2. Identify facilities at the dive site.
3. Explain interesting and helpful facts about the dive site, including bottom topography, bottom composition, depth range and points of interest (use a dive site map if appropriate).

4. Describe entry and exit techniques for the dive site.
5. Have buddy teams plan their turn pressure, ascent pressure and reserve pressure for the dive based on gas supply limits.
6. Have buddy teams establish maximum depths and bottom times, and plan contingency profiles for longer and deeper dives than planned.
7. Review the dive sequence and performance requirements.
8. Review communication and other emergency protocols as required by local regulations.

**B. Predive Procedures**

1. Have divers prepare all standard and specialized equipment.
2. Confirm that divers have all dive data: turn-around gas pressure, maximum depth and bottom time on a slate.
3. Put on all equipment.
4. Review check-out/in procedure with surface support staff (as required).

**C. Deep Dive Four**

1. Predive check
   a. Buddies conduct a predive safety check.
   b. Watch for and correct errors as appropriate.
2. Entry
3. Buoyancy check and proper weighting
4. Gas management
   a. Before beginning the descent, remind divers to check their starting pressure and make a note of their turn pressure.
   b. During the dive, check cylinder pressures at irregular intervals to confirm appropriate gas management.
5. Descent
   a. Buddies execute a five-point descent.
6. Student divers complete an underwater tour of the area.
7. Ascent
   a. Divers ascend at a maximum rate not exceeding 18 metres/60 feet per minute or according to dive computer.
   b. Divers complete a safety stop.
8. Exit
   a. Divers establish positive buoyancy at the surface.
   b. Divers exit the water appropriately for the environment, with assistance as necessary.

**D. Post-dive Procedures**

1. Check in with surface support staff (as required).
2. Divers stow dive equipment as appropriate.

**E. Debriefing**

1. Provide positive reinforcement and assess performance.
2. Have student divers critique themselves on their performance. Add your observations as appropriate.
3. Log the dive (instructor signs logbook/approves digital log).

# APPENDIX

# Deep Diver

## Knowledge Review – Part I

Complete this knowledge review to hand in to your instructor for review. If there's something you don't understand, review the related material. If you still don't understand, have your instructor explain it to you.

1. List five factors to consider when determining your personal deep-diving depth limit.
    1. _____
    2. _____
    3. _____
    4. _____
    5. _____

2. Explain how to determine if your equipment is suitable for deep diving.

3. List five pieces of specialized equipment recommended for deep diving.
    1. _____
    2. _____
    3. _____
    4. _____
    5. _____

4. Describe proper ascent and descent techniques for deep diving, including positioning, maintaining a proper ascent rate and descending/ascending without a visual reference.

5. Explain how to avoid low-on-air or out-of-air situations while deep diving.

6. Describe how to make a safety stop at 5 metres/15 feet with a visual reference (line or sloping bottom).

7. Describe how to prevent narcosis, and how to treat it if it occurs.

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

| **Symptoms** | **Signs** |
|---|---|
| 1. _____ | 1. _____ |
| 2. _____ | 2. _____ |
| 3. _____ | 3. _____ |
| 4. _____ | 4. _____ |
| 5. _____ | 5. _____ |
| 6. _____ | 6. _____ |

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

10. Explain how to minimize the risk of decompression illness.

# Deep Diver

## Knowledge Review – Part II

Complete this knowledge review to hand in to your instructor for review. If there's something you don't understand, review the related material. If you still don't understand, have your instructor explain it to you.

11. Describe a proper deep diving objective:

12. List five guidelines to follow when using a dive computer:
    1. _____
    2. _____
    3. _____
    4. _____
    5. _____

13. Describe how to maintain neutral buoyancy while deep diving.

14. Describe two techniques for estimating a proper ascent rate.

15. Explain what divers should do if they discover they have accidentally omitted an emergency decompression stop:

16. List five recommendations that you should follow when making a deep drift dive.
    1. _____
    2. _____
    3. _____
    4. _____
    5. _____

17. List four guidelines you should follow when diving near a wall:
    1. _____
    2. _____
    3. _____
    4. _____

18. List 10 factors that may predispose a diver to decompression sickness.
    1. _____
    2. _____
    3. _____
    4. _____
    5. _____
    6. _____
    7. _____
    8. _____
    9. _____
    10. _____

19. Describe the steps to take if a diver is suspected of having decompression sickness.

20. Explain why a diver suspected of having decompression sickness should not be put back in the water.

**Student Diver Statement:**

I've reviewed the questions and answers, and any I answered incorrectly or incompletely I have had explained to me and/or reviewed the material, so that I now understand what I missed.

Student Name _____

Signature _____ Date _____

# Deep Diver

## Knowledge Review – Part I Answer Key

**Note to Instructor**

To assess knowledge, review the Knowledge Review student divers completed in their PADI *Deep Diver Manual.* 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 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.**

# Deep Diver

## Knowledge Review – Part II Answer Key

**Note to Instructor**

To assess knowledge, review the Knowledge Review student divers completed in their PADI *Deep Diver Manual.* 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 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 10 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 Specialty Training Record

## Deep Diver Course

### Instructor Statement

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

Instructor Name _____ PADI # _____

Instructor Signature _____ Completion Date _____

### Open Water Dives

**Dive 1**

I verify that this diver has satisfactorily completed Dive One as outlined in the PADI Deep Diver Specialty Instructor Guide, 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 for three minutes at 5 metres/15 feet

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

Instructor Name _____ PADI # _____

Instructor Signature _____ Completion Date _____

**Dive 2**

I verify that this diver has satisfactorily completed Dive Two as outlined in the PADI Deep Diver Specialty Instructor Guide, including:

- Descent using a line, wall or slopin bottom as a visual reference
- Observe pressure-affected objects
- Navigate away from and back to reference line
- Perform safety stop three minutes at 5 metres/15 feet

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

Instructor Name _____ PADI # _____

Instructor Signature _____ Completion Date _____

**Dive 3**

I verify that this diver has satisfactorily completed Dive Three as outlined in the PADI Deep Diver Specialty Instructor Guide, 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 eight minutes at 5 metres/15 feet. Breathe from emergency air source for at least one minute.

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

Instructor Name _____ PADI # _____

Instructor Signature _____ Completion Date _____

**Dive 4**

I verify that this diver has satisfactorily completed Dive Four as outlined in the PADI Deep Diver Specialty Instructor Guide, 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 _____

## 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 Name _____

Student Signature _____ Date _____

# PADI Adventure Dive Training Record

## Adventure Dive: Deep Diver

### Skills Overview

- Knowledge Review
- Briefing
- Assembling and Positioning Emergency Equipment
- Gearing Up
- Predive Safety Check (BWRAF)
- Entry
- Descent
- Describe and Record Color Changes at Depth
- Computer/Depth Gauge Comparisons at Depth
- Guided Tour (time/air pressure permitting)
- Ascent – Safety Stop
- Exit
- Debrief
- Log Dive – Complete Adventure Dive Training Record

### Instructor Statement

I verify that this student diver has satisfactorily completed the Knowledge Review and Performance Requirements (as described in PADI's Advanced Open Water Diver Course Instructor Guide) for this PADI Adventure Dive. I am a renewed, Teaching status PADI Instructor for the current year.

Instructor Name _____ PADI # _____

Instructor Signature _____ Completion Date _____

### Instructor Contact Information (Please Print)

Instructor Mailing Address _____

City _____ State/Province _____

Country _____ Zip/Postal Code _____

Phone _____ Fax _____

## 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 Name _____

Student Signature _____ Date _____