# Multilevel Diver

## Specialty Course Instructor Outline

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## Legend

Note to instructors:

Points for the instructor to consider that give additional qualifying information about conducting the course. Not intended to be read to students.

Note to students:

Required information. Read to students as printed.

By the end of this session, you will be able to:
- Objective
- Objective
- Objective

Important information. Read to students.

Objectives always precede individual Academic Topics and open water dives.

PADI®
Multilevel Diver Specialty Course Instructor Outline



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# Please read this first.

## Qualifying To Teach PADI Specialty Diver Courses

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

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

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

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

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

# COURSE STANDARDS AND OVERVIEW

This course is designed to be an introduction to multilevel diving and to help the student diver develop the necessary skills, knowledge and techniques.

## Prerequisites

To qualify for the Multilevel Diver course, an individual must:

1. **Be certified as a PADI Open Water Diver, Junior Open Water Diver or have a qualifying certification from another training organization.**
2. **Be 12 years of age or older.**

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

## Instructor Supervision

Multilevel Diver courses may be conducted by a Teaching status PADI Underwater Instructor (or PADI Instructor with a higher rating) who has been certified as a PADI Multilevel Diving Instructor.

**The maximum student diver-to-instructor ratio for open water training dives is eight students per instructor (8:1).**

## Considerations for Open Water Training

The Multilevel Diver course is to include two open water training dives, which may be conducted in one day. It is recommended, but not required, that the second open water training dive conducted during the course be a *repetitive* dive (within 6 hours of the first dive). This allows student divers to practice using multilevel dive planning devices as repetitive dive calculators. It is also recommended, but not required, that divers enrolled in the course be exposed to the use of different types of multilevel dive calculators (The Wheel and various types of dive computers).

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

The PADI Advanced Open Water Diver rating (or other qualifying certification) is recommended if Multilevel Specialty Diver training is conducted deeper than 18 metres/60 feet.

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

# COURSE OVERVIEW

This course covers the knowledge and techniques of multilevel diving. The minimum number of recommended hours is 12, with time being equally divided between knowledge development and actual water-training sessions. **To conduct a Multilevel Diver course, the following is to be included:**

1. **The planning, organization, procedures, techniques, problems and hazards of multilevel diving.**
2. **Definition and advantages of multilevel diving.**
3. **Methods of calculating multilevel dives (The Wheel and/or dive computers).**
4. **Review of decompression sickness theory.**
5. **Review of emergency decompression procedures.**
6. **Review of PADI's S.A.F.E. Diver campaign.**
7. **Procedures for flying after diving.**
8. **Guidelines, rules and procedures for multilevel diving with the Wheel and/or diving computers.**
9. **Care and maintenance of dive computers.**

# CERTIFICATION PROCEDURES

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

# KEY STANDARDS

**Prerequisite Certification: PADI Open Water Diver, Junior Open Water Diver or qualifying certification**
**Minimum Age: 12**
Recommended Course Hours: 12
**Minimum Open Water Training: 2 dives**
**Student-to-Instructor Ratio: 8:1**
**Minimum Instructor Rating: Multilevel Diver Specialty Instructor**

# Introductory Information
# Multilevel Diver Specialty Course
# Instructor Outline

Heading IV, in the outline "Academic Topics," provides information that should be presented to students prior to the conclusion of the course. At the discretion of the instructor, the topics in this section may be "modularized" (divided into several academic presentation sessions).

Heading V, in the outline "General Open water Considerations," provides specific information about conducting the open water dives in the course. Although open water teaching and organizational techniques are left to the instructor, read this information carefully prior to taking students in open water.

Note that The Wheel version of the Recreational Dive Planner, which was developed for multilevel diving, is required in meeting both academic and open water performance objectives.

The Elective Multilevel Dive from the PADI Adventures in Diving Program may be counted toward Dive One of this specialty, at the discretion of the instructor. Similarly, Dive One of this specialty may be counted toward the Elective Multilevel Dive in the PADI Adventures in Diving Program .

# I. Course Overview

The purpose of the PADI Multilevel Diver Specialty course is to familiarize divers with the theory, skills, knowledge, planning, organization, procedures, hazards, benefits and enjoyment of multilevel diving with The Wheel and/or with modern dive computers. The goals of the PADI Multilevel Diver course are:

A. To develop the student's knowledge of the theories behind dive tables, dive computers and multilevel diving.

B. To enable the student to plan, organize and make safe multilevel no decompression dives with The Wheel and/or modern dive computers.

C. To ensure the student knows the most state-of-the-art recommendations for flying after diving, omitted decompression and the S.A.F.E. Diver program.

# II. Multilevel Diver Course Requirements

A. **Prerequisite certification: PADI Open Water Diver or have a qualifying certification from another training organization.** The instructor is to ensure that the individual can perform the skills required of a PADI Open Water Diver. If any training will be conducted deeper than 18 metres/60 feet, the PADI Advanced Open Water Diver or a qualifying certification from another training organization is recommended, with the Deep Diver rating highly recommended for any training deeper than 30 metres/100 feet.

B. **Minimum age requirement: 12 years**

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

D. The Elective Multilevel Dive from the PADI Adventures in Diving Program may be counted toward the certification requirements for this specialty at the discretion of the instructor conducting the specialty course.

E. Confined-water training may be added at the discretion of the instructor conducting the specialty course. As a preassessment before the course begins, a confined water session may include a scuba skills review. The PADI Skill Evaluation or Scuba Review program is an excellent way to accomplish this review.

F. Dive data

1. **Two scuba dives**
2. **Dives are to be conducted no deeper than 40 metres/130 feet. If training is to be conducted below 30 metres/100 feet, the PADI Deep Diver specialty course is a highly recommended prerequisite.**

Note

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

3. **At no time are divers to be required, encouraged or intentionally allowed to make dives that would require decompression stops. Safety stops, however, should be included on all dives.**

## III. Student and Instructor Equipment Requirements

### A. Student equipment

1. All personal standard diving equipment appropriate for the local environment including:
   a. Mask, snorkel and fins
   b. Exposure suit appropriate for local diving environment and depth, including hood, boots and gloves or mitts, if needed
   c. Quick-release weight belt or weight system
   d. Regulator system with submersible pressure gauge
   e. Alternate air source suitable for sharing air with other divers
   f. BCD with low-pressure inflator
   g. Complete instrumentation, including a means to monitor depth, time and direction
   h. RDP, The Wheel (Note: The Table cannot be used for multilevel diving and is therefore unsuitable for this course) and/or dive computer capable of multilevel calculations.
   i. Diving tool or knife capable of cutting line
   j. Slate with pencil
   k. Whistle or other surface signaling device
   l. Log book (Note: The PADI Diver's Log, and Adventure Log have multilevel log profiles especially suited to The Wheel and this course, and are highly recommended.)

### B. Instructor equipment

1. All personal standard and specialty equipment required of students.
2. Safety equipment
   a. Boat or surface float with weighted line or other arrangement suitable for making safety stops at the 5 metre/15 foot level, with a backup air supply available.
   b. First aid supplies and equipment. Recommended: First aid kit, Pocket Mask and oxygen

3. PADI materials that may be used to teach this course
    a. Giant Wheel and Giant Underwater Data Carrier
    b. *Diving With The Wheel* video
    c. PADI *Instructor Manual*
    d. Student Record File
    g. Dive Roster
4. PADI reference materials
    a. The PADI *Open Water Diver Manual*
    b. PADI's *Adventures In Diving Manual*
    c. *The PADI Encyclopedia of Recreational Diving*
5. Recognition materials:
    a. PIC envelopes
    b. Specialty Diver certificates

## IV. Academic Topics

The following is an actual presentation outline. Directions to, or comments for, the instructor are in [brackets].

### A. Introduction, course overview and welcome to the course

1. Staff introductions
    a. [Introduce yourself and assistants]
    b. [Have students introduce themselves and explain their interest in multilevel diving and/or computers — break the ice and encourage a relaxed atmosphere.]
2. Course goals
    a. To develop your knowledge of the theories behind dive tables, dive computers and multilevel diving
    b. To enable you to plan, organize and make safe multilevel no decompression dives with The Wheel and/or modern dive computers
    c. To ensure that you know the most state-of-the-art recommendations for flying after diving, omitted decompression and the S.A.F.E. Diver program
    d. To improve your diving ability and provide you with additional supervised experience
    e. To encourage you to participate in other specialty training.
3. Course overview
    a. Classroom presentations. [Academic information may be presented through home study, class presentations, and predive briefings. If class presentations will be used, give the times, dates and locations.] There will be (number) classroom presentations during this course.

b. Open water training dives. There will be two open water training dives during the course. [Give the times, dates and locations of the dives.]

c. Performance assessment. [The instructor is to ensure that all performance requirements have been met. Skills will be assessed during open water training and directly observed. Academic assessment may be accomplished through discussions with students, textbook knowledge reviews and the optional quiz provided. Tell the class how their performance will be evaluated.]

4. Certification

   a. Upon successful completion of the course, the PADI Multilevel Diver Specialty certification card will be issued.

   b. Certification means you are qualified to:

      - Plan, organize, make and log open water multilevel dives with The Wheel and/or a dive computer, in conditions generally comparable to, or better than, those you were trained in.
      - Apply for the rating of Master Scuba Diver if you are a PADI Advanced Open Water Diver or have a qualifying certificate from another organization and a PADI Rescue Diver (or have a qualifying certification from another organization) with certification in four other PADI Specialty ratings (in addition to PADI Deep Diver).

5. Class requirements:

   a. Cost of course. [Be sure to explain all costs involved.]

   b. Equipment needs. [Discuss the required equipment listed in Section III .A.]

   c. Materials used during the course

   d. Attendance requirements

6. Administration — Collect course fees, enrollment, Standard Safe Diving Practices Statement of Understanding, PADI Medical Statement, Liability Release and Assumption of Risk. [The PADI Student Record File contains all of these forms. If you already have a completed file on a student, remember that new copies of the forms must be filled out. You may wish to use another Student Record File, or loose copies to insert in the existing file.]

## B. The Wheel: Use and Review

*Learning Objectives.*

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

- *State one reason why the Recreational Dive Planner distributed by PADI is different from other dive tables.*
- *Apply the nine general rules when using the Recreational Dive Planner.*
- *Find the NDL for any depth between 0 and 40 metres/0 and 130 feet using The Wheel.*
- *Define pressure group.*
- *Find the pressure group for a certain dive depth and time using The Wheel.*
- *Find the pressure group after a surface interval using The Wheel.*
- *Draw a complete three-dive profile, labeling all surface intervals, pressure groups, depths and bottom times as derived from The Wheel.*
- *Apply the three special rules for repetitive diving.*
- *State the time and depth of a safety stop.*
- *Explain the purpose of a safety stop.*
- *Describe the three situations in which a safety stop is required.*
- *Explain what should be done if a no decompression limit or an adjusted no decompression limit is exceeded by less than five minutes.*
- *Explain what should be done if a no decompression limit or an adjusted no decompression limit is exceeded by more than five minutes.*
- *State the altitude (in metres or feet), above which the Recreational Dive Planner (The Wheel or Table) should not be used unless special procedures are followed.*
- *State the current recommendations for flying or driving to altitude up to 2400 metres/8000 feet.*
- *Explain the procedure you must follow when planning a dive in cold water or under strenuous conditions using the Recreational Dive Planner.*
- *Find the minimum surface interval required to complete a series of no decompression dives using The Wheel.*
- *Plan a multilevel dive with at least three (maximum depth and two shallower) levels using The Wheel.*

### Note to Instructor

*Conducting this portion of the course is flexible depending upon your students. Here are your options:*

1. *If your students have already learned to use The Wheel as part of a previous course, have them review usage by viewing the training video* Diving With The Wheel *or review their* Wheel Instructions For Use and Study Guide. *Make sure they know how to plan multilevel dives using The Wheel.*
2. *If your students have not previously been certified by PADI, or are only familiar with the RDP Table, it will be necessary to teach them to use The Wheel. It is assumed, however, that they are already familiar with the concepts of nitrogen absorption, repetitive diving, etc. from their initial certification.*
   a. Diving With The Wheel *video. As an alternative to a class session, your students can view the* Diving With The Wheel *video and fill in the video's answer sheet. The instructor is to ensure that mastery of The Wheel has been attained by having students correctly calculate example dive profiles. Use one of PADI's standard Wheel exams.*
   b. *Class session. Refer to the "Open Water Diver Course Instructor Guide" for the teaching outlines for using The Wheel. However, teaching multilevel planning is not a requirement in the Open Water Diver course and therefore not part of the outline. Be sure to include multilevel planning with The Wheel (see The Wheel's study guide) as part of this class session.*
3. *Be sure to review flying after diving procedures based on the current recommendations.*

### Note to Instructor

*The performance objectives and academic material for sections C - I can be covered by having students self-study* The Recreational Diver's Guide to Decompression Theory, Dive Tables and Dive Computers *book and fill out the knowledge reviews at the end of each chapter.*

## C. Decompression theory

### *Learning Objectives.*

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

- ***List the two ways*** **compartments** ***in a decompression model differ from each other.***
- ***Define the terms*** **nitrogen loading** ***and*** **allowable nitrogen loading**.
- ***Explain why slower compartments control the no decompression limit at shallower depths.***
- ***Identify the only way no decompression limits can be determined.***

1. Introduction
    a. Extended dive times on a multilevel dive are made possible by applying a mathematical decompression theory to the dive profile. Without decompression theory, multilevel diving would not be possible.
    b. To understand the practical/safety limits of multilevel diving, it's necessary to have a basic understanding of the mathematical decompression theory.
2. Decompression theory is applied via a mathematical decompression model of the human body. Decompression models track decompression status by calculating nitrogen absorbed and released by theoretical body tissues called *compartments.* Haldane's original decompression model (John Scott Haldane, 1905) used five compartments; the US Navy used six to construct the US Navy Standard Air Decompression Tables.
3. Compartments differ from one another in two ways:
    a. They each absorb and release nitrogen at a different rate (characterized by a *half-time*).
    b. They can each tolerate a different maximum amount of absorbed nitrogen, (referred to as the *allowable nitrogen loading*).
4. Nitrogen loading
    a. When you dive to any depth, your body tissues absorb nitrogen. This excess nitrogen (above the amount already in the body) is *nitrogen loading*.
    b. Given enough time, all your compartments (theoretical tissues) will gain a nitrogen loading equal to the depth. (Example: Suppose you dive to a depth of 30 metres/100 feet. According to Haldane's model, all compartments eventually will reach a nitrogen loading of 130 metres/100 feet.)
5. Half-times
    a. Used to predict how long it takes each compartment to reach a given nitrogen loading.
    b. A compartment's half-time is the time it takes to reach half the nitrogen loading at a given depth. (Example: You dive to 30 metres/100 feet. The initial nitrogen loading of all compartments is zero (no previous dive). All eventually would reach a loading of 30 metres/100 feet. Each compartment reaches 15 metres/50 feet (half the loading) in one half-time. For a dive to 30 metres/100 feet, the compartment with the five- minute half-time (commonly referred to as the *five-minute compartment*) will reach a nitrogen loading of 15 metres/50 feet in 5 minutes; the 120 minute compartment will take 2 hours to reach 15 metres/50 feet.

c. Half the tension (the difference between the existing nitrogen loading and the loading the compartment will eventually reach) is reduced by half with each subsequent half-time.

d. After six half-times, the compartment is considered 100 percent equilibrated for that depth.

6. Each compartment in the model behaves the same way, but with elapsed times that are in direct proportion to their half-times.

7. No decompression limits and decompression models.

   a. No decompression limits can be determined only through experimental test dives to establish the *allowable nitrogen loading*, which is the maximum nitrogen loading a compartment may have when a diver surfaces.

   b. Haldane's theory is an imperfect theory.

      - Haldane assumed if the diver has no symptoms of decompression sickness, no bubbles have formed. Today, we know that bubbles can form without any symptoms. Also, no decompression theory accounts for variations in individual physiology: age, weight, gender, etc.
      - Therefore, we can rely on Haldane's theory (or any other decompression theory) to produce an acceptably minimal risk of decompression sickness only as far as it has been tested.

8. Saturation depth

   a. Faster (shorter half-time) compartments have higher allowable nitrogen loading; the slower the compartment, the lower the allowable loading.

   b. The slowest compartment in the model has the least allowable loading; a decompression model will allow indefinite bottom time for any dive at the slowest compartment's maximum saturation depth, or shallower.

## Example

Suppose a decompression model with six compartments with 5-, 10-, 20-, 40-, 80- and 120-minute half-times (similar to US Navy model). The 120-minute compartment (slowest) has an allowable nitrogen loading of 6 metres/20 feet; with this model, unlimited time is permitted for dives to 6 metres/20 feet or shallower, because no compartment can ever exceed its allowable loading.

9. Decompression theory in action

   a. On a given dive, the fastest compartment will absorb nitrogen most rapidly, but has the most tolerance.

   b. No compartment should exceed its allowable loading, so the dive ends when any compartment reaches the limit of allowable loading.

## Example

A dive to 36.6 metres/120 feet using the model from the previous example. The 5-minute compartment fills fastest and has the highest allowable loading (30 metres/100 feet); the 120-minute compartment has the slowest and least allowable loading (6 metres/20 feet). If you stayed at 36.6 metres/120 feet long enough, every compartment would eventually reach 36.6 metres/120 feet of nitrogen loading. However, that exceeds the allowable loading of all compartments. At 36.6 metres/120 feet, the 5-minute compartment forces the dive to end by reaching its allowable nitrogen loading of 30 metres/100 feet first. The compartment that dictates the dive profile is said to control the dive, and is referred to as the controlling compartment.

c. At shallower depths, the faster compartments' allowable loading is greater than the depth so their allowable loading can never be reached. Slower compartments that can reach their allowable loading, control the allowable dive time at shallower depths. The shallower the depth, the slower the *controlling compartment.*

### D. Repetitive diving theory

***Learning Objectives.***

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

- ***List the aspects of diving that make a decompression theory necessary.***
- ***Explain why the US Navy chose the 120-minute compartment for the basis of its repetitive diving tables.***
- ***Explain why the 60-minute compartment proposed by Dr. Ray Rogers proved more appropriate for recreational diving.***
- ***Explain how far decompression theory can be relied upon.***
- ***Describe the significance of the DSAT experiments in no decompression, repetitive and multilevel diving.***

1. A decompression theory is necessary to make repetitive, multilevel and decompression diving possible.
   a. If diving were limited to a single one-depth, no decompression dive, the no decompression limits established by tests could be memorized and no theory would be needed.
   b. Multilevel and decompression diving will be discussed in future sessions.
2. Repetitive diving, the US Navy way
   a. In the 1950s, the US Navy developed the first system of repetitive diving that credits for nitrogen release during surface interval to meet the needs of decompression diving.

b. The Navy approach: With any possible combination of dive depths, times and surface intervals, it's impossible to know which compartment controls a repetitive dive.

c. However, the Navy realized that the worst case for any possible repetitive dive situation is a repetitive dive controlled by the slowest compartment (120-minute), which would be common following a decompression dive.

d. Therefore, the US Navy Repetitive Dive Tables are dictated by decompression diving needs and the nitrogen elimination of the 120 minute compartment.

3. Repetitive diving, the DSAT (Diving Science and Technology) way.

a. In 1984, Dr. Ray Rogers proposed that repetitive no decompression diving could be based on a 60-minute compartment because in no decompression diving, compartments slower than 60 minutes seldom control a dive.

b. Rogers' proposal was a significant departure from the Navy tables because a 60-minute compartment reduces residual nitrogen twice as fast as the 120-minute compartment, yielding shorter surface intervals/longer repetitive dives.

c. Rogers' theory was successfully tested for DSAT in October 1987 by Dr. Michael Powell of the Institute of Applied Physiology and Medicine.

- More than 911 exposures were made, all Doppler-monitored for nitrogen bubbles in the bloodstream. No cases of decompression sickness occurred, and only low grade bubbles were detected in a small percentage of the experiments.
- Every test dive equalled or exceeded the RDP limits
- The tests proved that multilevel diving and the 60-minute control of repetitive diving could be safely combined.
- The significance of Rogers' theory for tables, computers and multilevel diving is that the DSAT are the only tested basis for multilevel diving and repetitive diving based on any compartment faster than 120 minutes.

d. The 60-minute compartment became the basis for the Recreational Dive Planner, the Table and The Wheel, developed by Diving Science and Technology (DSAT) and distributed by PADI.

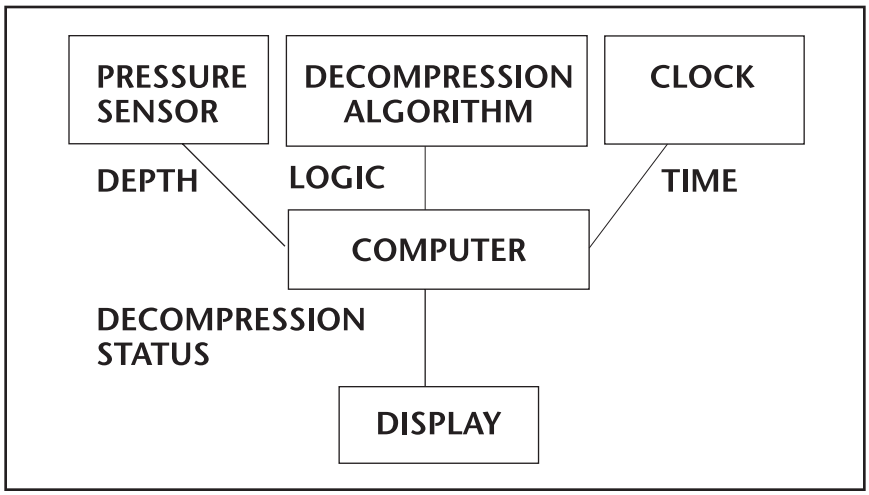
### E. Dive computer overview

***Learning Objectives.***

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

- ***Sketch the schematic of a dive computer.***
- ***Define the primary purpose of all dive computers.***
- ***List the three common data displays shared by all dive computers.***

1. There are more than a dozen dive computers available worldwide with various features.
2. Regardless of make or model, all are basically the device schematically illustrated below:
   a. Computer senses




   - Depth — Computers have very accurate depth gauges
   - Time — Computers record elapsed dive time, surface interval time

   b. Algorithm — The algorithm is the mathematical recipe based on decompression theory that tells the computer what to do with time and depth information. Not all decompression algorithms are the same.

   c. Different computers feature varied information display, but all display depth, bottom time and no decompression bottom time remaining.

3. The primary purpose of all dive computers is to tell a diver when he has reached a no decompression limit.

**Note to Instructor**

*It is recommended that you briefly review/demonstrate dive computers commonly available in the local area and their basic features.*

## F. Multilevel diving theory

***Learning Objectives.***

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

- ***Define*** **multilevel** ***diving.***
- ***Explain why more no decompression time may be available when ascending to a shallower depth after reaching the no decompression limit at a deeper depth.***
- ***List two reasons you should not attempt multilevel diving with conventional dive tables.***
- ***Identify the dive table that can be used for multilevel diving.***
- ***Compare the performance of different dive computers in multilevel diving.***

1. Mutilevel diving is a technique for safely extending bottom time beyond the no decompression limit of the deepest depth — more time becomes available when the diver ascends to a shallower depth, even after reaching the no decompression limit at a deeper depth.
2. Multilevel decompression theory
   a. Additional time does not result from loss of nitrogen at shallower depths.
   b. Additional time is available because faster compartments control deeper depths. After reaching the no decompression limit at a deeper depth, the diver ascends above the saturation depth of the controlling faster compartment. The faster compartment can no longer reach its allowable limit, so a slower compartments control the shallower depths. These load with nitrogen more slowly, so they haven't reached their allowable loading and more dive time is available.
   c. A properly executed multilevel dive may be limited before reaching the planned no decompression limit by your air supply or desire to stay before reaching the planned no decompression limit.
   d. The 1987 DSAT tests of 911 exposures of more than 20 combinations of multilevel and repetitive dives showed that multilevel no decompression diving within the limits tested to have acceptably minimal risk of decompression sickness.
3. Multilevel diving and tables
   a. Conventional tables cannot be used
      - It can lead to multilevel diving that is well beyond those profiles that have been successfully tested.
      - Using conventional dive tables to perform multilevel diving planning is complex at worst and tedious at best.

- Multilevel diving with conventional tables is untested and cannot be recommended.

b. The Recreational Dive Planner, The Wheel, can be used for multilevel diving.
   - DSAT's The Wheel (distributed by PADI) was designed for multilevel diving; the DSAT tests were made to validate The Wheel.
   - The Wheel's format makes multilevel planning feasible.

4. Multilevel diving and computer performance.
   a. All computers calculate nitrogen loading on multilevel dives almost identically, but give different allowable dive times due to their different no decompression limits.

### Note to Instructor

*The following example and explanation are not required to meet performance objectives, but are included for your further elaboration if appropriate. A comparison of an Oceanic DataMax Sport, with the Dacor Microbrain Pro, which has lower no decompression limits, on the same multilevel dive: 30 metres/100 feet for 10 minutes, 15.2 metres/50 feet at the second level. At 15.2 metres/50 feet, the DataMax Sport allows an additional 56 minutes; and the Microbrain Pro allows an additional 40 minutes. However, add 20 minutes to both times, for 76 minutes and 60 minutes respectively. These times are within two minutes of each computer's no decompression limit at 15.2 metres/50 feet. Explanation: Ten minutes at 30 metres/100 feet is equivalent to about 20 minutes worth of residual nitrogen at 15.2 metres/50 feet for both dive computers. Despite their different NoD limits, these dive computers calculated the same nitrogen absorption. Therefore, different times at each level must be a result of the different no decompression limits — not different calculated nitrogen loading.*

   b. The exception to this is computers that do not calculate multilevel profiles at all, such as the Suunto USN.

## G. Repetitive diving

***Learning Objectives.***

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

- ***Compare and contrast the performance of various dive computers for shallow, moderately deep and deep repeti-tive diving.***
- ***Explain why repetitive diving below 30 metres/100 feet should be avoided.***

1. In order to minimize risk of decompression sickness, it's important to make dives within the types of repetitive dive profiles that have been shown through tests as having acceptably minimal risk of decompression sickness. Likewise, it's important to avoid those types of repetitive dive profiles that

have been shown to have an unacceptable risk of decompression sickness.

2. Tests and computer performance related to shallow repetitive diving
   a. The following profile is an example of shallow repetitive diving that was successfully tested (no DCS, minimal Doppler detectable bubbles) in the DSAT experiments:

      First dive: 16.8 metres/55 feet for 65 minutes.

      Surface interval: 57 minutes.

      Second dive: 16.8 metres/55 feet for 43 minutes.

      Total bottom time of 108 minutes.

   b. Virtually all dive computers do not exceed the time limits of this successfully tested profile.
3. Tests and computer performance related to moderately deep repetitive diving
   a. The following profile is an example of moderately deep repetitive diving that was successfully tested in the DSAT experiments:

      First dive: 40 metres/130 feet for 12 minutes

      Surface interval: 43 minutes

      Second dive: 27.4 metres/90 feet for 16 minutes

      Total bottom time: 28 minutes

   b. Computers fall into three groups regarding their performance on this type profile:
      - A group well within the limits of what was successfully tested.
      - A group within and near the limits of what was successfully tested.
      - A group that slightly exceeds the limits of what was successfully tested.
4. Tests and computer performance related to deep repetitive diving.
   a. The following schedule was unsuccessfully tested (had unacceptably high incidence of decompression sickness) by the Royal Navy:

      First dive: 45.7 metres/150 feet for 5 minutes

      Surface interval: 60 minutes

      Second dive: 45.7 metres/150 feet for 5 minutes

      Surface interval: 60 minutes

      Third dive: 45.7 metres/150 feet for 5 minutes

      - Several divers had DCS symptoms
      - Divers were using a reduced-nitrogen mix using air, DCS may have been more frequent

b. Computers fall into three groups regarding this profile:
   - A group that permits none of these dives
   - A group that permits only the first dive
   - A group that permits all three dives in this unsuccessful profile.

c. Key points
   - The moderately deep and deep repetitive dives demonstrate that no dive computer (or table) should be considered infallible.
   - There is little or no data available to validate repetitive no decompression diving deeper than 30 metres/100 feet as having an acceptably minimal risk of decompression sickness, regardless of computer or table used. More importantly, the Royal Navy tests provide ample evidence that repetitive deep diving may have an unacceptably high risk of decompression sickness. Therefore, repetitive dives below 30 metres/100 feet should be avoided, regardless of table or computer used.

## H. Ascent procedures

***Learning Objectives.***

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

- ***Name the two potentially hazardous conditions that are related to ascent.***
- ***List the three parts of an ascent procedure.***
- ***Identify the test data relating to each ascent part, and what the data tells us.***
- ***Explain the recommended procedures for ascent with any dive computer or table.***

1. The prevention of two *life-threatening conditions*, air embolism and decompression sickness, is the primary consideration in a proper ascent procedure.
2. An ascent procedure consists of three distinct elements: reaching the no decompression limit, rate of ascent and a safety stop.
   a. Those used in the DSAT tests seem reasonable and were successful in the tests (no decompression sickness, minimal Doppler detectable bubbles).
   b. Rate of ascent
      - 18 metres/60 feet per minute has been tested successfully repeatedly by Spencer, DSAT, Thalmann and others. These tests point to no unusual risk of air embolism for a healthy diver breathing normally.

- In computer analysis of the Haldanean model, a reduction of ascent rate to 9 metres/30 feet per minute reduces nitrogen loading only relatively insignificantly. Therefore, there is little theoretical advantage in an ascent rate slower than 18 metres/60 feet per minute to prevent decompression sickness.
- There seems to be little or no basis for a rate of ascent slower than 18 metres/60 feet metres per minute. Additionally, rates slower than 9 metres/30 feet per minute prove to be difficult.

c. Safety stop

- In computer analysis of the Haldanean model, a safety stop between 20 and 10 feet that is the greater of three minutes or 10 percent of bottom time reduces nitrogen loading significantly.
- Limited tests at the University of Southern California Catalina Hyperbaric Chamber showed a marked reduction in Doppler-detectable bubbles after a safety stop.
- Unlike an ascent rate slower than 18 metres/60 feet per minute, a safety stop has both theoretical and experimental data to support it.

3. Recommended ascent procedure with any dive table or computer:
   a. Ascend at a rate no faster than 18 metres/60 feet per minute. Some computers call for a slower rate; this should be followed unless told otherwise by the manufacturer.
   b. Make a safety stop of no less than three minutes between 6 metres/20 feet and 3 metres/10 feet. For bottom times greater than 30 minutes, a stop of at least 10 percent of the bottom time is recommended.

## I. Decompression diving

***Learning Objectives.***

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

- ***Explain why dive computers can be relied on for limited decompression only.***
- ***Explain why any dive requiring emergency decompression should be the last, and preferably only, dive of the day.***

1. Tests show that Haldane's model can adequately predict only limited decompression applications.
   a. Single decompression dives: Thalmann, US Navy, successfully tested (1986) 60 minutes at 30 metres/100 feet with decompression according to USN tables, but 60 minutes

at 36.6 metres/120 feet was *not* successfully tested even on the 70 minutes at 36.6 metres/120 feet schedule. Thalmann chose 60 minutes at 30 metres/100 feet and 30 minutes at 45.7 metres/150 feet as the limits. These are beyond recreational emergency decompression scenarios, but point to the limits of the model; computers cannot be relied on to predict extreme decompression dives.

b. Repetitive decompression dives:
   - Thalmann, US Navy, tested a series of repetitive decompression dives (1986) with six cases of decompression sickness out of 32 dives, despite increasing decompression time 63-83 percent beyond amount predicted by US Navy table.
   - Anecdotal reports from hyperbaric chambers seem to indicate high amounts of decompression sickness when repetitive and decompression diving are combined. Only one of the series needs to be a decompression dive to cause problems.
   - Therefore, a dive requiring emergency decompression should be followed by no more dives and ideally be the only dive of the day.

c. Decompression diving should be considered an emergency procedure only for recreational divers.

## J. Choosing and using dive computers

***Learning Objectives.***

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

- ***Identify eight features to consider when selecting a dive computer.***
- ***State eight safety rules that apply to diving with a computer.***

1. Computer features to consider when selecting: [Note to instructor: It is recommended that you demonstrate these features on several commonly available computers.]
   a. Predive planning — Most computers have a method for previewing repetitive dive no decompression limits.
   b. No decompression limits — these can range (for example) from 12 minutes to 25 minutes at 30 metres/100 feet.
   c. Multilevel diving — This is the main reason for having a computer.
   d. Repetitive diving — per the three groups listed above. It's important to understand how your computer behaves so you can stay within repetitive profiles shown in tests to have acceptably minimal risk of decompression sickness.

e. Decompression — Should be avoided; however, some computers tell how long your stop will be; others tell only when it's safe to ascend.

f. Air-time — Computes how long your remaining air will last.

g. Activation — Various methods: switches, pressure activated, electrodes.

h. Log — Review previous dives, some with great detail, others with maximum depth and time only.

2. A review of safety rules for all dive computers. It's crucial to not follow a computer (or table) blindly. Make computer-assisted, not computer-controlled, dives. Follow these guidelines, even if a computer indicates that a less conservative practice may be possible.

   a. Don't crowd the no decompression limits and avoid mandatory decompression.

   b. Topography permitting, make multilevel dives that start deep and work shallower. Avoid sawtooth profiles with repeated shallow and deep depths.

   c. Control your rate of ascent to 18 metres/60 feet per minute or slower.

   d. Take a safety stop on all dives for at least three minutes, preferably longer.

   e. Allow a surface interval of at least 60 minutes, regardless of what your computer tells you.

   f. Limit repetitive dives to less than 18 metres/100 feet. Make your deepest dive first, with subsequent dives progressively shallower.

   g. Don't get so caught up in your computer time limit that you neglect your air supply limit.

   h. Be aware that computers cannot account for physiological variations caused by age, dehydration, alcohol consumption, strenuous exercise before, during or after a dive, excessive fat tissue, injury or other factors that may predispose you toward decompression sickness. The more of these factors that apply, the more conservatively you should use any computer (or table).

### Note to Instructor

*The remaining academic portion of this outline may be conducted in the classroom, or in predive briefing and dive site discussions. You are to ensure that students can meet all performance objectives.*

## K. Decompression sickness

***Learning Objectives.***

***By the end of the session, you will be able to:***

- ***State ten symptoms/signs of decompression sickness.***
- ***List, in order of priority, the recommended steps and first aid to take for a diver suspected of having decompression sickness.***
- ***Describe the proper procedure for omitted emergency decompression.***

1. Decompression sickness symptoms and signs

**Note to Instructor**

*Sections a and b below are reviews of decompression sickness based on the PADI* Open Water Diver Manual. *You may wish to elaborate on these sections only briefly, or in detail, depending upon your students' background and most recent training.*

a. [Review.] Decompression sickness is caused by excessive nitrogen dissolved in the body forming bubbles after a dive. This is most frequently caused by failing to properly adhere to correct dive table/computer usage. However, because people differ in their susceptibility to decompression sickness, no dive table or computer can guarantee that decompression sickness will never occur, even when diving within the table (computer) limits. This is the reason for conservative dive planning.

b. [Review. Predisposing factors that may make a diver more susceptible to decompression sickness:
   - Fatigue
   - Cold
   - Older age
   - Dehydration
   - Alcohol consumption
   - Strenuous exercise before, during or after a dive
   - Being overweight
   - Injuries

c. **Signs :**
   - Shock
   - Blotchy rash
   - Staggering
   - Coughing spasm
   - Collapse
   - Rubbing a joint
   - Favoring an arm or leg

- Unconsciousness
- Death

d. **Symptoms:**
- Tingling
- Numbness
- Skin itch
- Dizziness
- Paralysis
- Extreme fatigue and weakness
- Limb, joint or torso pain
- Difficulty breathing

2. First aid and action for decompression sickness. If a diver is suspected of having decompression sickness, the actions to be taken, in order of priority, are:
   a. Discontinue all diving — A diver suspected of having decompression sickness should never be put back in the water.
   b. Administer emergency oxygen as soon as possible.
   c. Seek medical assistance and consult a physician.
   d. Secure transportation to a recompression chamber for treatment.

**Note to Instructor**

*If your area is served by a diver emergency medical service, such as the Divers Alert Network, describe it briefly at this point.*

   e. Stay with the diver, providing CPR and treating for shock if necessary.
   f. The patient should be kept comfortable, lying flat. The left-side-down, head-low position is no longer recommended for patients suspected of having decompression sickness.

**Note to Instructor**

*It's recommended that you briefly discuss the PADI Rescue Diver course and the skills students learn in it for handling diver emergencies.*

3. Omitted emergency decompression
   a. If a diver discovers he has surfaced without taking a required emergency decompression stop, he should discontinue diving for at least 24 hours, drink nonalcoholic-noncaffeine fluids, rest, monitor himself for decompression sickness symptoms and breathe oxygen if it is available.
   b. The Navy procedure for omitted decompression is no longer recommended. Under no circumstances should the diver go back in the water.

c. By making a safety stop at the end of all dives and reviewing your dive plan/computer during the stop, omitted decompression can be avoided.

### L. Multilevel dive equipment

*Learning Objectives.*

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

- ***Identify the equipment needed and its purpose, beyond standard and appropriate equipment required for the local environment, to conduct multilevel dives with or without a computer.***
- ***Identify the one piece of equipment each diver must have when making computer-assisted multilevel dives.***

1. Special equipment needed for all multilevel diving:
   a. The Wheel
      - To plan multilevel dives if a dive computer is unavailable.
      - To back up a dive computer
   b. Depth gauge and timer
      - To back up a dive computer
      - To use with The Wheel if a dive computer is not used
2. When computer-assisted multilevel diving, each diver must have his own computer. Computers follow dive profiles so closely that it's impractical for one computer to track two divers, so sharing one should not be attempted.

### M. Multilevel hazards

*Learning Objectives.*

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

- ***List three potential hazards in multilevel diving and describe how to avoid each.***
- ***List two common mistakes to avoid when multilevel diving, environment.***

1. Potential hazards of multilevel diving:
   a. Hypothermia — Multilevel diving extends in-water time, increasing exposure to cool water. Wear adequate thermal protection, and if shivering and other warning signs of hypothermia occur, end the dive.
   b. Running out of air — Available no decompression dive time on a multilevel dive can easily exceed your air supply. Pay close attention to air supply to allow a safety stop and a safe return to the boat or shore.
   c. Disorientation — Multilevel diving extends dive time so

it's easy to cover a long distance. Use a compass and navigational techniques to know where you are at all times. [Note to instructor: You may wish to mention the navigation skills acquired in the PADI Underwater Navigator course and the Advanced Open Water course.]

2. Common mistakes to avoid when multilevel diving
   a. Sharing a computer —Each diver should have his own computer when making computer-assisted multilevel dives.
   b. Making sawtooth dives, in which the diver moves up and down from shallow levels to deep levels and back again — All multilevel dives should start at deepest point and progress shallower. Do not drop back to a deeper depth, and make your shallower levels the longer levels.

### N. Multilevel dive planning

***Learning Objectives.***

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

- ***List three special considerations to be taken into account when planning a multilevel dive.***
- ***Demonstrate how to make at least one commonly available dive computer scroll its no decompression limits for a first and repetitive dive (if a computer is not available, you will be able to describe the method for at least one computer).***
- ***Demonstrate how to use The Wheel to estimate the dive time a computer will allow on a multilevel dive.***
- ***Describe the method for making one more dive after a computer failure.***
- ***State the minimum surface interval before resuming diving after a computer failure.***
- ***Describe the proper action to take if a computer fails while diving.***

1. Multilevel planning special considerations
   a. Topography — Estimate depth levels appropriate for planning a multilevel dive.
      - Topography similar to a sloping reef is nearly ideal for multilevel diving because a variety of levels may be chosen.
      - Shipwrecks and other single-depth dive sites may have few or no practical opportunities for multilevel diving.
      - If unfamiliar with the site, it may be impossible to plan the dive as a multilevel dive.
   b. Air supply — Be sure you have enough air for the dive you're planning
   c. Contingency plans — Have alternate plans prepared for:

- Computer failure (will be discussed in more detail shortly).
- Intermediate levels deeper than planned — Be prepared to skip up a level or revert to a single-depth plan.

2. Multilevel planning with a computer

### Note to Instructor

*Your students should already know how to use The Wheel in multilevel planning from the previous sessions on using The Wheel.*

a. Obtaining no decompression limits from a computer. [Demonstrate how to make one or more commonly available dive computers scroll its no decompression limits and have your students practice doing so. If a computer is unavailable, explain that most computers automatically scroll their no decompression limits when activated and do so periodically between dives for repetitive dive no decompression limits.]

b. Using The Wheel to plan dives with a computer

- On the first dive, use The Wheel's multilevel ability to calculate the planned dive. It will give an approximation of what your computer will allow.
- On a repetitive dive:
  1) Scroll the computer and find the no decompression limit for 12 metres/40 feet.
  2) Set the yellow p.g. index on the no decompression limit, and align with the NDL mark for 12 metres/40 feet. (This is like computing a minimum surface interval problem.) Use the white p.g. index to determine find your pressure group.
  3) Use that pressure group on The Wheel for approximating what your computer will allow on the repetitive dive.
- Considerations
  1) Because computers can follow your actual dive profile closely, they will usually permit more dive time than The Wheel.
  2) Buhlmann computers have an algorithm with lower no decompression limits than The Wheel. Because of this, on some dives (particularly the first dive) these computers may not permit as much dive time as The Wheel.
- Computer contingency planning
  1) If a computer fails during a surface interval, it is possible to make one more dive if you have been periodically scrolling your repetitive no decom-

pression limits and recording them. You can make one single-depth dive, not exceeding the limits you recorded. After that dive, do not dive again for at least 24 hours (or longer if prescribed by the computer manufacturer) before resuming with The Wheel or another computer.

2) If a computer fails during a dive, make a controlled ascent not to exceed 18 metres/60 feet per minute to 5 metres/15 feet per minute and make a safety stop as long as your air supply allows. Do not dive again for at least 24 hours (or longer if prescribed by the computer manufacturer) before resuming with The Wheel or another computer.

3) A computer failure does not have to end diving if during all dives you stay within the depth and time limits of each level of your precalculations with The Wheel, and you have been tracking your Pressure Groups when repetitive diving. In that instance, you may continue diving with The Wheel.

## V. General Open water Considerations

A. Involve students in dive planning, which is the key to successful and safe multilevel diving. Demonstrate each part of planning, where possible, and have the students practice as you demonstrate.

B. Allow ample time for predive briefings. Multilevel planning will take a little longer than single-depth dive planning for divers new to it.

C. Assign buddy teams according to ability. (It is highly recommended that you have a certified assistant accompany each buddy team during open water training.) Establish a check-in and check-out procedure. Use of divemasters is highly recommended.

D. Assign logistical duties to staff and review emergency protocols.

E. During the dive briefing, tell students at what tank pressure and maximum bottom time they are to begin their final ascent to the safety stop.

F. Select dive sites with a maximum depth appropriate to student training and experience. The site should allow for at least one, but preferably two or more levels above maximum depth based on the minimum ascent between levels on The Wheel.

G. The rate of ascent on a multilevel dive, between levels from the last level to the surface, may not exceed 18 metres/60 feet per minute. If a student's dive computer stipulates a slower rate, that rate should be followed.

# VI. Open Water Sessions

## A. Open Water Training Dive One

***Performance Requirements.***

***By the end of this open water training session, you will be able to:***

- ***Calculate the no decompression limits of a two-depth level dive using The Wheel.***
- ***Execute a no decompression, two level dive that begins with a direct descent to the deepest level and progresses to the second level.***
- ***Apply the principles of the PADI S.A.F.E. Diver program by ascending between levels and from the last level to the surface at a rate not to exceed 18 metres/60 feet per minute, and make a safety stop of at least three minutes at 5 metres/15 feet.***
- ***Accurately monitor depth, time and air supply on a multilevel dive.***
- ***Dive avoiding hypothermia, running out of air, disorientation, saw-tooth dive profiles and dive computer sharing.***

1. Briefing
   a. Evaluate conditions
   b. Facilities at dive site
   c. Entry technique to be used — location
   d. Exit technique to be used — location
   e. Bottom composition and topography
   f. Depth and depth levels
   g. Plan dive with The Wheel and (optional) computers

**Note to Instructor**

*On this first dive, you will provide the two depth levels, and your students will use their Wheels to plan a multilevel dive based on the levels.*

   - Depth and time of each level
   - Maximum dive time
   - Air pressure at which to begin ascent to safety stop
   - Review S.A.F.E. (Slowly Ascend From Every) dive principles

   h. Interesting and helpful facts about dive site
   i. What to do if separated from class/buddy
   j. Emergency procedures
   k. Buddy assignments
2. Predive procedures
   a. Prepare personal diving equipment
   b. Prepare safety stop contingency air supply, if appropriate
   c. Don personal equipment

d. Predive safety check

e. Demonstrate proper entry technique

3. Dive

a. **Each team adheres to multilevel plan, maximum limits and/or limits of The Wheel and/or computer.**

b. **Ascent at less than 18 metres/60 feet per minute or as specified by computer (whichever is slower).**

c. **Safety stop for at least three minutes at 5 metres/15 feet.**

d. **Exit as appropriate for environment.**

4. Debriefing

a. Comments on student performance

b. Discuss any problems or considerations

c. Log dive (Instructor signs log)

### B. Open water Training Dive Two

***Performance Requirements.***

***By the end of this open water training session, you will be able to:***

- ***Plan and execute a no decompression, three-level dive using The Wheel and (optional) a dive computer that begins with a direct descent to the deepest depth and progresses to two shallower levels.***
- ***Apply the principles of the PADI S.A.F.E. Diver program by ascending between levels and from the last level to the surface at a rate not to exceed 18 metres/60 feet per minute, and make a safety stop of at least three minutes at 5 metres/15 feet.***
- ***Accurately monitor depth, time and air supply on a multilevel dive.***

1. Briefing (if same site as Dive One, it isn't necessary to repeat some of these points)

a. Evaluate conditions

b. Facilities at dive site

c. Entry technique to be used — location

d. Exit technique to be used — location

e. Bottom composition and topography

f. Depth and depth levels

g. Plan dive with The Wheel and (optional) computers

**Note to Instructor**

*On this dive, each buddy team will establish its multilevel plan, including choosing two or more levels, which you will review and approve before the dive.*

- Depth and time of each level
- Maximum dive time

- Air pressure at which to begin ascent to safety stop

h. Interesting and helpful facts about dive site.
i. What to do if separated from class/buddy
j. Emergency procedures
k. Buddy assignments

2. Predive procedures
   a. Prepare personal diving equipment
   b. Prepare safety stop contingency air supply, if appropriate
   c. Don personal equipment
   d. Predive safety check
   e. Demonstrate proper entry technique
3. Dive
   a. Each team adheres to multilevel plan, maximum limits and/or limits of The Wheel and/or computer.
   b. Ascent at less than 18 metres/60 feet per minute or as specified by computer (whichever is slower).
   c. Safety stop for at least three minutes at 5 metres/15 feet.
   d. Exit as appropriate for environment.
4. Debriefing
   a. Comments on student performance
   b. Discuss any problems or considerations
   c. Log dive (Instructor signs log)

Name _____ Date _____

# Multilevel Diver
# Knowledge Review Answer Key

To the student: Answer the following questions and bring this completed Knowledge Review with you to your next training session.

1. Describe how no decompression limits are determined.

   Through the actual results of manned dives.

2. Because people vary in their **physiology** and susceptibility to decompression sickness, no **table** or **computer** can guarantee decompression sickness will never occur, even when diving within its limits.

3. Describe the recommended ascent procedure for any dive computer or table.

   Ascent should be no faster than 18 metres/60 feet per minute (slower if specified by computer or table) with a three minute safety stop at 5 metres/15 feet.

4. Explain why a dive requiring emergency decompression should be the last, and preferably only, dive of the day.

   Mathematical decompression models can't adequately predict the combination of a repetitive dive with a decompression dive.

5. List eight rules that apply to diving with a computer.

   1. Stay within the computer's limits.
   2. When multilevel diving – start deed work shallower.
   3. Control rate of ascent – 18 metres/60 feet or slower.
   4. Make a safety stop at 5 metres/15 feet for three minutes.
   5. Take a 60 minute surface interval between dives.
   6. Limit repetitive dives to 30 metres/100 feet or shallower.
   7. Watch air supply.
   8. Beware of predisposing factors leading to decompression sickness – dive conservatively.

6. List the three pieces of equipment you should have on any multilevel dive, beyond the regular equipment for the environment.

   1. The Wheel
   2. Depth gauge
   3. Timer

7. Identify the three potential hazards of multilevel diving.
   1. Hypothermia
   2. Running out of air
   3. Disorientation

8. Identify two common mistakes to avoid while multilevel diving with and without a computer.
   1. Sharing a computer
   2. Sawtooth diving

9. List three considerations for planning a multilevel dive.
   1. Topography
   2. Air supply
   3. Contingency plans

10. The Wheel may be used to **estimate** the time a computer will allow on a first dive and repetitive dives.

11. Describe the proper action to take if a computer fails during a dive.
    Immediately stop dive and make a normal ascent to 5 metres/15 feet. Make a safety stop for as long as your air supply permits. Do not dive again for 24 hours.

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

Name _____ Date _____

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# Adventure Dive: Multilevel

## Skills Overview

- Knowledge Review
- Briefing — Plan Dive with The Wheel and (optional) Computer
- Suiting Up
- Predive Safety Check (BWRAF)
- Entry
- Descent to Deepest Depth-Level
- Ascent to Second Depth-Level
- Ascent — Safety Stop
- Exit
- Debrief
- Log Dive — PADI Instructor Completes Advanced Open Water Training Record Sheet

# PADI Adventure Dive Training Record

**Adventure Dive:**

## MULTILEVEL AND COMPUTER DIVE

### Skills Overview

- Knowledge Review
- Briefing
- Suiting Up
- Predive Safety Check (BWRAF)
- Entry
- Descent to Deepest Depth-Level
- Ascent to Second Depth-Level
- Ascent – Safety Stop
- Exit
- Debrief
- Log Dive – Complete Training Record

### Instructor Statement

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

Instructor Name _____
First Middle Initial Last

Instructor Signature _____

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

### Instructor Contact Information (Please Print)

Instructor Mailing Address _____

City _____ State/Province _____

Country _____ Zip/Postal Code _____

Phone/FAX/email _____

### Student Diver Statement

"I verify that I have completed all of the Performance Requirements for this Adventure Dive. I realize that there is more to learn about multilevel diving and that completion of a PADI Multilevel and Computer Diver course is highly recommended. I also agree to abide by PADI Standard Safe Diving Practices."

Diver Signature _____ Date _____
Day/Month/Year

## PADI Specialty Training Record

# Multilevel Diver

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

Instructor Name _____ PADI#_____

Instructor Signature _____ Completion Date _____

## Open Water Dives

### Dive One

I verify that this student has satisfactorily completed Dive One as outlined in the PADI standardized outline for Multilevel Diver including:

- Adhere to multilevel plan, maximum limits of The Wheel and/or computer (two level dive)
- Ascent at less than 18 metres/60 feet per minute
- Perform safety stop for 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 _____

### Dive Two

I verify that this student has satisfactorily completed Dive Two as outlined in the PADI standardized outline for Multilevel Diver including:

- Adhere to multilevel plan, maximum limits of The Wheel and/or computer (three level dive)
- Ascent at less than 18 metres/60 feet per minute
- Perform safety stop for 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 _____

I verify that I have completed all performance requirements for this Multilevel 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 _____