Self-Reliant Diver

Distinctive Specialty Course Instructor Guide

Distinctive Specialty Course Instructor Outline

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Self-Reliant Diver

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General Purpose

The purpose of the Self-Reliant Diver specialty course is to recognize and accept the role of the buddy system and its contributions to diver safety while identifying and developing self-reliance and independence while diving. There are two reasons for an experienced diver to take the Self-Reliant diver course:

- To develop the skills of planning and carrying out dives without a partner when preferred or necessary.
- To sharpen skills of diving self-reliance, making the diver a stronger partner in a dive pair or team.

This course covers when diving alone may be applicable, and the need to compensate for those situations, including dive planning, life support system readiness, adaptive training, equipment and responsibility.

This course is an introduction to self-reliant diving that helps student divers develop the skills, knowledge and techniques necessary to rely on themselves first, whether or not they are diving with a partner, including:

- The value and application of the buddy system.
- The philosophy of, and motivation for, diving without a partner.
- Potential risks of diving alone, and how to manage those risks.
- The value of equipment redundancy and what back-up equipment is needed.
- Dive planning and gas management.

Instructor Prerequisites

To apply for the PADI Self-Reliant Diver Specialty Instructor rating, you must:

- **Be a Teaching status PADI Open Water Scuba Instructor**
- **Have certified at least 25 divers**
- **Be a PADI Self-Reliant Diver or PADI TecRec Diver, or have a qualifying certification from another training organization**
- **Have logged at least 20 self-reliant dives (dives using redundant equipment and following techniques of self-reliance)**

Course Overview and Standards

A. **Prerequisite** – to qualify for the Self-Reliant Diver course, an individual must:

1. **Be certified as a PADI Advanced Open Water Diver or have a qualifying certification from another training organization.**
2. **Have a minimum 100 logged dives.**
3. **Be 18 years of age or older.**
4. **Successfully complete a dive skills assessment by a PADI Self-Reliant Diver Specialty Instructor.**

B. **Supervision**

1. **Courses are conducted by a Teaching status PADI Instructor who is a PADI Self-Reliant Diver Specialty Instructor.**
2. **The maximum student diver to instructor ratio for open water training dives is eight students per instructor (8:1). This ratio cannot be increased with the use of certified assistants.**
3. **The instructor must be in the water directly supervising the dive activities for Dives 1 and 2.** The instructor may indirectly supervise Dive 3.

C. **Considerations for Open Water Dives**

1. **The course includes three open water dives, which may be conducted on one day.**
2. **Review information necessary to safely complete each dive with divers before the dive.** You may do this through predive briefings or structured discussions. **The Knowledge Review must be completed and reviewed before the diver is certified.**
3. **The maximum depth for open water dives is 30 metres/100 feet.**
4. **Dives must be conducted within the no decompression limits of the Recreational Dive Planner (RDP) or dive computer.**

D. **Equipment Requirements – Student Diver**

1. **Standard dive equipment as outlined in the General Standards and Procedures Guide of the PADI *Instructor Manual*.**
2. **Surface marker buoy, such as a delayed surface marker buoy (DSMB) or lift bag with at least 30 metres/100 feet of line.**

3. **Redundant gas source – pony cylinder, twin cylinders with isolation valve or sidemount configuration. Redundant gas supply must be configured so that the diver can access it with one hand.**
4. **Redundant depth gauge and bottom timer, or dive computer.**
5. **Redundant surface signaling devices (both visual and audible)**
6. **Knife/cutting tool (except where locally prohibited)**
7. **Slate and pencil**
8. Back-up mask (recommended)

E. **Equipment Requirements – Instructor**

1. **Standard dive and safety-related equipment for instructors as outlined in the General Standards and Procedures Guide of the PADI *Instructor Manual*.**
2. **Examples of redundant air sources – pony cylinder, twin cylinders with isolation valve, H-valve and independent doubles**.

F. Reference and Teaching Materials

1. RDP Table, eRDPML or *How to Use and Choose a Dive Computer* book
2. **PADI Self-Reliant Diver Course Liability Release and Assumption of Risk Agreement**
3. Dive roster
4. PADI *Adventures in Diving* manual.
5. PADI *Rescue Diver Manual*
6. PADI *Divemaster Manual*
7. *The Encyclopedia of Recreational Diving*
8. PADI *Tec Deep Diver Manual*
9. **PIC envelope or online**
10. Specialty Diver certificates

Knowledge Development Topics

I. Introduction and Overview

A. Introductions

1. [Introduce yourself and your assistants.]
2. [Have student divers introduce themselves and explain why they are interested in developing self-reliant diving skills.]
3. [Ensure that student divers have read, completed and signed the PADI Self-Reliant Diver Course Liability Release and Assumption of Risk Agreement.]

B. Course Goals

1. To develop understanding of the value and application of the buddy system and the philosophy of, and motivation for, diving without a partner.
2. To introduce the potential risks, risk management techniques and the need for equipment redundancy in self-reliant diving.
3. To improve self-reliant dive skills, dive planning and gas management abilities.

C. Course Overview

1. Responsibilities — A self-reliant diver not only has to accept the increased risk that comes with choosing to dive alone, but also has a responsibility to ensure that family and loved ones understand this choice.
2. Knowledge development — Information may be presented through classroom presentations and/or predive briefings.
3. Diving skills assessment — Before beginning open water dive skills, you'll complete a skill assessment to demonstrate your comfort-level in the water. This will include a general assessment of your dive knowledge.
4. Open water training dives — There will be three open water training dives during this course. [Provide times, dates and location of dives.]
5. Performance requirements — Skills will be directly observed and assessed during Dives 1 and 2. Dive 3 may be indirectly supervised. Knowledge assessment will be accomplished through discussion and a Knowledge Review.

6. Certification — On successful completion of the course, you'll be awarded the PADI Self-Reliant Diver certification.
7. Course requirements — [Explain all course costs, discuss equipment and material needs, and explain attendance requirements.]
8. Administration — [Collect course fees, complete administrative paperwork and other enrollment forms.]

II. Self-Reliant Diving: PADI Worldwide's Position

Learning Objective:

By the end of this session, you will be able to state PADI Worldwide's position on self-reliant diving.

A. Why does the PADI organization advocate the use of the buddy system?
   1. The buddy system for scuba diving came from a decades-old water safety concept found in swimming and lifeguard training.
      a. It was adopted because it applied to diving and because it made good safety sense.
      b. Early support of buddy diving safety procedures was referenced by Jacques Cousteau and the crew of the *Calypso* in the book *The Silent World.*
   2. Even though a goal of diver training includes developing the skills to take personal responsibility and to be self-reliant, the buddy system provides divers-in-training with a safety redundancy that diving alone simply can't provide.
   3. The PADI System of diver education trains divers to use the buddy system based on its proven benefit to diving, divers and dive safety.

B. Practicality and Convenience
   1. The buddy system has provided tangible contributions to millions of dives.
      a. Buddies provide an extra set of eyes and hands for each other.
      b. Providing assistance in putting on equipment, adjusting straps, assisting with weights and tanks, entering the water, helping to load and unload gear are but a few practical arguments that support the buddy system.

C. Safety

1. The early days of diver training heralded the buddy system as an important safety procedure because only through the buddy system could a diver reasonably expect to escape from entanglement, entrapment, out of air situations, disorientation, a head injury, chest pains, cramping and dozens more.
2. Diver training and dive equipment have improved, yet these same values apply today.
3. Like all safety-based systems, the buddy system is not perfect. However, the simple fact is that without a buddy in the water, the distressed diver has little or no chance of assistance.
4. The buddy system is the most basic form of a scuba diving fail-safe.
   a. Buddies have helped each other in subtle and profound ways for decades.
   b. Often the smallest buddy intervention averts a string of errors that could have resulted in a negative outcome or tragedy.
5. The safety record of scuba diving has improved dramatically over the past few decades, while the number of certified divers has increased.
   a. During this time, buddy system training techniques have been an integral component of this training.
   b. While there is no way to quantify the accidents that were prevented or did not happen because of one buddy looking after another, empirical outcomes support the relevancy and integrity of this training.

D. Enjoyment

1. Diving is a social activity, so the buddy system is more than a safety rule.
   a. Diving with someone you know, and are comfortable with, adds to the fun. Most divers actually enjoy companionship in and out of the water.
   b. It is fun to share exciting adventures and experiences with others.
   c. Fundamentally, the buddy system is about dive companionship, something that may not appeal to all personality types.

E. Can diving alone be done responsibly?

1. Diving without a partner requires experienced scuba divers willing to make the necessary commitment to train and equip themselves properly, and to accept the added risks involved.
    a. A person must have the required attitude and aptitude to pursue responsible independent diving. This is true in other adventure sport activities such as independent rock climbing.
2. PADI Worldwide's position is that responsible independent scuba diving is not for everybody, however, it does have a place.
    a. To responsibly engage in independent scuba diving, a diver must first be highly experienced, have a hundred or more logged buddy-accompanied scuba dives, be absolutely self-reliant and apply the specialized procedures and equipment needed to engage in the activity.
    b. This includes, but is not limited to redundant air sources, specialized equipment configurations, specific dive planning, and management of independent diving problems and emergencies.
    c. Diving without a partner requires mental discipline as well as the right attitude and equipment. However, no amount of redundant equipment can effectively back up a diver's brain better than another individual.
    d. Photographers, videographers, dive leaders and others will find the principles of self-reliant diving useful when diving as a group, or when otherwise choosing to dive without a partner.
    e. Experienced divers who typically dive with a partner will find the self-reliant diver course bolsters their skill and confidence when diving with unknown partners or those less experienced.
    f. TecRec divers can apply the principles of the self-reliant specialty to team diving – learning to rely first on themselves before others.

F. What concerns exist with regard to independent diving?

1. When a problem occurs on an independent dive, or when the diver is alone in the water, there is little or no chance of assistance for the distressed diver. This decreases the chances of a diver surviving the problem or having a favorable outcome.

2. Since 1989, there have been more than 500 fatalities where it was clear that the divers were either intentionally diving independently, or became separated from a buddy and were alone.
3. It's concerning that certain proponents of diving without a partner within the dive industry promote it by stating that "the buddy system is dangerous."
   a. This is both irresponsible and reckless.
   b. Suggesting that the buddy system fosters a false sense of security and increases the likelihood of panic is contrary to the empirical evidence.
   c. Claims that divers shouldn't use the buddy system for fear of being sued by a diving companion are uninformed.
4. PADI Worldwide's position is that proponents of diving without a buddy should advocate responsible independent diving on its own merits, requisite training, and equipment needs.

III. Self-Rescue

Learning Objective:

By the end of this session, you will be able to explain self-rescue in scuba diving.

A. Self-rescue is an action that most individuals consider when participating in almost all sporting endeavors.
   1. While problem prevention is the key, the ability to rescue oneself from a situation is an important skill.
   2. Self-rescue or self-sufficiency (independence) is also necessary for the diver who may be diving alone or who gets separated from a buddy.

B. Self-rescue in scuba diving refers to actions and techniques taken by a diver to retreat or advance from situations which would leave the diver otherwise unprepared or stranded.

C. There are three areas of preparation which increase your self-rescue abilities:
   1. Physical preparation involves proper health, fitness and diet. Being in good shape prepares you to deal with increased physical demands should the need arise.

2. Mental preparation involves confidence and a feeling of well-being about the dive. This includes diving within the limits of your training and experience.
3. Equipment preparation involves familiarity with the use, inspection and general recommended service for dive equipment and emergency equipment.

IV. Self-Reliant Diving

Learning Objectives:

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

- Explain the concept of self-reliant diving and how it relates to other dive philosophies.
- Identify who should consider diving without a partner and why.
- Explain what is meant by a self-reliant diver mentality.

A. What is self-reliant diving and how does it relate to other forms of diving?

1. Self-reliant diving — planning dives to respond to emergencies independently, whether diving with or without a partner.
    a. A self-reliant diver has the skills and knowledge to respond to diving emergencies without assistance.
    b. However, a self-reliant diver also identifies others who may be diving nearby and may be able to help in an emergency.
        - A self-reliant diver should understand the roles these divers can play – source of gas, navigation assistance, etc.
2. Buddy diving — diving with a partner.
    a. As discussed, diving with a buddy can provide you with assistance before, during and after the dive through predive planning and safety checks, underwater reminders of gas supply and depth and time limits, and help should an emergency occur.
    b. Diving with someone also adds to the fun and together, you and your buddy, share experiences and underwater adventures.
    c. If you encounter a problem while diving with a buddy, your self-reliance training can help you self-correct. This strengthens the overall dive experience for both partners.

3. Team diving — usually a group of three or more divers planning the dive together and diving as a team.
    a. Team diving embraces and applies the philosophy that divers work together, integrating each team member's needs and efforts during predive checks, meeting equipment requirements, planning and executing the dive, and other details, while pursuing a common goal.
    b. As with buddy diving, dive teams that follow self-reliant diver principles rely first on the individual and second on other members of the team, thereby strengthening the overall team.

B. Who should develop self-reliant diving skills and why?
    1. Instructors and Divemasters
        a. Instructors and divemasters are often with a group of students or certified divers exploring the local dive sites, however, they may not have a specific dive buddy.
        b. Being self-sufficient and self-reliant provides the skill set needed for instructors and divemasters to respond to emergencies independently.
    2. Photographers and videographers
        a. A photographer's or videographer's buddy is usually in the viewfinder and sometimes a distance away.
        b. Photographers or videographers may pay attention to the environment around them, but not pay much attention to a dive buddy
        c. Because divers capturing images are typically concentrating on their subjects (such as fish or environment), and often not as much on their buddies, photographers/videographers and their dive buddies benefit from learning self-reliant diving skills.
    3. Traveling divers
        a. While traveling, divers may end up with a dive buddy they have not met and that may not share the same dive objectives.
        b. Buddy separation can be avoided in many ways, but if it does happen a self-reliant diver is better prepared to handle the situation.

4. Wreck divers
    a. Recreational wreck, cavern and ice divers should not dive alone in overhead environments.
    b. However, the wreck diver who has the skills and knowledge of a self-reliant diver is more likely to properly handle buddy separation and to deal with emergency situations.
5. TecRec divers
    a. Diving without a partner is not unusual for TecRec divers.
    b. In some cases, trained cave divers dive without a partner in no mount and sidemount areas.

C. What is a self-reliant diver mentality?

1. Self-reliant divers perform a dive readiness assessment before the dive that includes evaluating your physical health and fitness for diving; and your familiarity with the dive site and conditions on that particular day and how they match with your skill level and ability to handle the rigors of the site.
2. The best way to be self-reliant is to stay out of trouble. Three procedures will head off the vast majority of problems:
    a. Maintain your equipment as recommended by the manufacturer. This lessens the chance of malfunctions. A predive inspection allows you to catch potential equipment problems before you get in the water.
    b. Think about potential problems as part of your dive plan. Remember, dive planning involves risk assessment. Anticipate what problems may arise and devise your dive plan to avoid them.
    c. Don't ignore small problems. Many major accidents start as small problems. If you recognize that a problem is occurring or is about to occur, take immediate action to keep a small problem from becoming a big one. Problem recognition and immediate correction are essential for the self-reliant diver.
3. Divers with self-reliant training and experience are prepared divers who continue to follow well-established buddy procedures when diving with a partner. This includes following buddy separation procedures – search for one minute, then surface to reunite.

V. Equipment for Self-Reliant Diving

Learning Objectives:

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

- Explain the concept of redundancy.
- Identify what equipment is required and recommended for the self-reliant diver.
- Determine an appropriate equipment configuration.

A. What is the concept of redundancy?

1. Redundancy means carrying a backup for any equipment that is either critical for survival or critical to the dive objective's success.
2. This allows any individual diver the opportunity to initiate an emergency exit from a life-threatening situation without undue stress and with a minimum of confusion in the event of a major equipment malfunction.

B. What equipment is required for the self-reliant diver?

1. Standard diver equipment, at a minimum: Fins, mask, snorkel, compressed gas cylinder and valve, buoyancy control device and low pressure inflator, primary regulator and alternate air source, breathing gas and depth monitoring device(s), quick release weight system and weights (if needed), adequate exposure protection, at least one audible surface signaling device and dive computer or RDP.
2. Surface marker buoy
   a. Delayed Surface Marker Buoy (DSMB) with at least 30 metres/100 feet of line
   b. Lift bag with at least 30 metres/100 feet of line
3. Redundant air sources
   a. Pony cylinder
   b. Twin cylinders with isolation valve
   c. Bailout cylinder
   d. Sidemount configuration
4. Redundant surface signaling devices (both visual and audible)
5. Redundant depth gauge and bottom timer or dive computer
6. Other equipment:

a. Two knives/cutting tools as permitted locally
b. Back-up mask (recommended)
c. Slate and pencil

C. What additional equipment is recommended for the self-reliant diver?
   1. Ascent/descent lines with float and flag
   2. Navigation tools including compass
   3. Back-up cutting tool (knife, scissors, dive tool, etc.)
   4. Additional audible or visual signaling devices:
      a. Dye markers
      b. Signal mirrors
      c. Flares
      d. Emergency Position Indicating Radio Beacons (EPIRBs)
   5. First Aid and Oxygen Equipment
      a. First aid kit
      b. Oxygen system with demand valve and nonrebreather mask
      c. Pocket mask

D. What is an appropriate equipment configuration for the self-reliant diver?
   1. There is no standardized equipment configuration for self-reliant diving.
      a. There are a variety of systems available that provide for redundancy in air supply and decompression calculation as well as alternate ascent systems to provide for back-up buoyancy.
      b. The configuration for carrying back-up and redundant equipment follows a philosophy of streamlining so that nothing dangles and everything is accessible.
      c. Your redundant gas supply should be configured so that you can access it with just one hand. This is important when responding to equipment issues, such as a regulator free-flow when you are holding the regulator with one hand, and can use the other to access your redundant gas supply.
      d. Maintain your equipment according to manufacturer's specifications and have any equipment that doesn't appear to function normally inspected and serviced before using it.

VI. Dive Planning

Learning Objectives:

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

- Formulate a dive plan for a dive without a partner.
- Demonstrate dive planning ability according to local environmental conditions.
- Establish your Surface Air Consumption (SAC) rate using gas consumption data from a dive.
- Calculate the gas consumption for a given depth and time.
- Use your SAC rate to plan an appropriate reserve for a dive.
- Determine which cylinder size you need to use and what the pressure in the cylinder needs to be.
- Establish when to turn your dive around.
- Explain when to end your dive (start your ascent) as a self-reliant diver.

A. Dive planning provides the foundation of self-reliant diving and is the key to the dive objective's success.

1. A responsible self-reliant diver plans and executes each dive as though it's necessary to make the dive and handle all emergencies alone, whether or not there are other divers in the area.
2. Think of dive planning in four steps: advance planning, preparation, last-minute preparation and predive planning.
3. After planning your dive, you perform a predive "self" safety check (BWRAF) and then you dive as planned. Any alterations to the dive plan need to be considered and the steps of dive planning repeated.

B. Advance Planning

1. Planning a dive starts when you decide to go diving. At this stage, you generally: establish a dive objective, choose a dive site, determine the best time to dive and consider logistics.
   a. Check your log book for relevant information about the site if you've been there before.
   b. Plan an alternate dive site in case you can't dive at your primary site (poor conditions, speed boat competition, etc.).

c. Decide on the best time to go, perhaps based on tides and other activities in the area.

d. Finally, think about logistics, such as when to leave for the dive, how to get there, what to take and emergency contact information.

C. Preparation

1. It's a good idea to start preparing for a dive trip or excursion at least a day or two ahead of time.
2. Carefully inspect all the equipment you'll use. This provides ample time to fix or replace anything broken or missing.
3. Make sure your tank and redundant air supply system are filled.
4. Gather your equipment into one place and use an equipment checklist to make sure you've got everything.
5. If possible, check local information sources like television, internet, and your dive center, etc., for a report on dive site conditions.

D. Last-minute Preparation

1. Just before you leave for the dive:
   a. Check the weather report.
   b. Let someone who isn't going with you know about your planned dive, including where you are going, your alternate site, when you expect to be back and what to do if you're delayed. Include your mobile phone number if you take one with you.
   c. Gather those last-minute items like a jacket, hat, sunglasses, wallet, lunch, ice chest, certification card, log book, etc.
2. If you haven't yet, pack your gear bag. If you're boat diving, pack so the first thing in is the last thing out.
3. Make a final check so that you don't leave anything behind.

E. Predive Planning

1. At the dive site, you plan the details. It's best to do the following before you start putting your gear together:
   a. Evaluate the conditions. Take your time, especially if you're watching wave patterns.
   b. Decide whether or not conditions favor the dive and your objective. If they don't, go to your alternate site, and if conditions are bad there, too – don't dive. Diving's supposed to be fun; if it's not going to be fun, do something else.

c. Decide on where to enter, the general course to follow, and the techniques to use on the dive and where to exit.

d. Where applicable, take into consideration diving into the current and returning with the current; and consider the possible changes in current due to changing tides.

e. Decide on time, depth and air supply limits. Plan your dive according to the no-decompression limit of either the Recreational Dive Planner (RDP) or your dive computer.

f. Determine the one-third-used pressure point for your primary gas supply.

g. Calculate your gas consumption based on your SAC rate and the depth of the site. Write down information regarding the turn point of the dive, both based on gas consumption and time.

h. Make sure you know what to do if an emergency arises.

2. The idea in predive planning is to anticipate as much as possible before you get in the water.

F. Predive Check

1. As a self-reliant diver you'll use an expanded predive "self" safety check following the familiar BWRAF:

B – BCD: confirm connection and proper operation of all valves for your BCD, your dry suit (if used) and your back-up buoyancy system.

W – Weight: confirm that your weight system is properly secured and that you have ample buoyancy and adequate back-up buoyancy. If unsure about the required amount of weight needed conduct a buoyancy check at the surface prior to the dive.

R – Releases: confirm all releases and straps are secure and intact (including mask, fin, gauges and stage straps), and that all redundant air system cylinders can be easily released for ditching.

A – Air (Gas): confirm that all valves are open, test breathe primary and secondary air supply system. Confirm that the alternate air supply system is pressurized but the valve is closed. Confirm that you have ample gas supply for the dive.

F – Final Check: check yourself for missing or loose gear and confirm that you are ready to participate in the dive.

G. Dive the Plan

1. It doesn't make much sense to form a dive plan, then not use it. You'll have more fun and fewer problems when your dive follows what you planned.
2. You'll get what you want out of the dive by following a solid dive plan, and you're much less likely to run into any hazards, and more likely to handle them if you do.

H. How can you establish your surface air consumption (SAC) rate using gas consumption data from a dive?

1. Your SAC rate is the rate you use gas if swimming at a moderate speed in all your equipment.
2. Your SAC rate changes with variables that affect your efficiency in the water, such as temperature and equipment changes, and also if you gain skill and fitness.
3. SAC is expressed as gas volume (litres/cubic feet) per minute or sometimes as bar/psi per minute. If you always use the same cylinder size, then you can calculate SAC rate using bar/psi per minute.

NOTE: Have divers write the following formulas down on waterproof paper or slates. Tell them to keep the formulas with their dive equipment for easy access.

METRIC:

For litres per minute (l/min):

$$SAC = \frac{(\text{bar used}) \times (\text{cylinder volume in litres})}{(\text{depth in metres} + 10 \text{ metres}) \div 10} \div (\text{time in minutes})$$

EXAMPLE: You breathe 50 bar using a 10 litre cylinder while swimming at 15 metres for 10 minutes. What is your SAC rate?

$$SAC = \frac{(50 \text{ bar}) \times (10 \text{ l}) \quad = 500}{(15 \text{ m} + 10 \text{ m}) \div 10 \quad = 2.5} = 200 \text{ l} \div 10 \text{ min} = \mathbf{20 \text{ l/min}}$$

IMPERIAL:

For cubic feet per minute (ft^3/min):

$$SAC = \frac{(\text{psi used} \div \text{full pressure}) \times (\text{capacity in } ft^3)}{(\text{depth in feet} + 33 \text{ feet}) \div 33} \div (\text{time in minutes})$$

EXAMPLE: You breathe 900 psi from an 80 cubic foot cylinder while swimming at 66 feet for 10 minutes. What is your SAC rate?

$$SAC = \frac{(900 \div 3000 \text{ psi}) \times 80 = 24}{(66 + 33) \div 33 = 3} = 8 \text{ ft}^3 \div 10 \text{ min} = \mathbf{0.8 \text{ ft}^3/\text{min}}$$

I. How do you calculate your gas consumption for a given depth and time?

1. You'll use your SAC rate to estimate gas supply requirements for a given depth. Here are a few examples:

METRIC:

Litres required = (SAC x time) x [(depth + 10 metres) ÷ 10]

EXAMPLE: If your SAC rate is 20 l/min, how much air do you need for a dive to 18 metres for 40 minutes?

Litres required = (20 l/min x 40) x [(18 + 10) ÷ 10]

Litres required = (800) x [2.8] **= 2240 litres**

IMPERIAL:

Cubic feet required = (SAC x time) x [(depth + 33 ft) ÷ 33]

EXAMPLE: If your SAC rate is 0.8 ft^3/min, how much air do you need for a dive to 99 feet for 15 minutes?

Cubic feet required = (.8 ft^3 x 15) x [(99 + 33 ft) ÷ 33]

Cubic feet required = (12) x [4] **= 48 ft^3**

J. How can you plan for a reserve with your gas consumption?

1. Since gas supplies are estimates, to allow for the unforeseen, always plan a reserve.
2. The most common reserve for self-reliant diving is 33 percent ("thirds" or "rule of thirds"). This means 33 percent of your supply is purely for contingency use.
3. To determine your gas requirements with reserve, use this formula:

Total gas required = Gas litres/cubic feet x 1.5

METRIC:

EXAMPLE: If your gas consumption is 1680 litres what is your total gas requirement including a reserve?

Total gas required = 1680 litres x 1.5 **= 2520 litres**

IMPERIAL:

EXAMPLE: If your gas consumption is 48 cubic feet, what is your total gas requirement including a reserve?

Total gas required = 48 ft^3 x 1.5 **= 72 ft^3**

K. How can you determine which cylinder size you need to use and what the pressure in the cylinder needs to be?

- If you have a choice of cylinder sizes to use for a planned dive, you'll need to calculate which size is adequate and what the pressure in the cylinder needs to be.

METRIC:

- You can establish the cylinder size needed for a planned dive by first calculating your gas needs at depth plus a reserve, then figure out the minimum cylinder size required in litres using the maximum cylinder pressure.

Gas required = (SAC) x [(depth + 10m) ÷ 10] x (time) x 1.5 reserve

Cylinder size in litres = gas required ÷ maximum pressure

EXAMPLE: If your SAC rate is 20 litres per minute and you plan a dive to 18 metres for 23 minutes, what is your gas requirement and what size cylinder do you need?

Gas required = 20 l/min x [(18 +10) ÷ 10] x 23 x 1.5 = 1932 l

Cylinder size = 1932 l ÷ 220 bar = **8.78 litre cylinder**

IMPERIAL:

- You can establish the cylinder size needed for a planned dive by first calculating your gas needs at depth plus a reserve, then figure out the minimum cylinder size required in cubic feet.

Gas required = (SAC) x [(depth + 33 ft) ÷ 33] x (time) x 1.5 reserve

EXAMPLE: If your SAC rate is 0.8 cubic feet per minute and you plan a dive to 60 feet for 23 minutes, what is your gas requirement and what size cylinder do you need?

Cylinder size = 0.8 ft^3/min x [(60 + 33) ÷ 33] x 23 x 1.5
= **77.8 ft^3 cylinder**

- If you know what cylinder size you will use, you can also make sure that it is filled to the minimum pressure you need to make the dive.

METRIC:

Total gas required ÷ cylinder size = minimum pressure

EXAMPLE: If your total gas requirement is 1932 litres, what is the required minimum tank pressure when diving with a 10 litre cylinder?

1932 l ÷ 10 l **= 193 bar**

IMPERIAL:

(gas required x full pressure) ÷ cylinder size = minimum pressure

EXAMPLE: If your total gas requirement is 77.3 ft^3, what is the required minimum tank pressure when diving with a 80 ft^3 cylinder?

(77.3 ft^3 x 3000 psi) ÷ 80 ft^3 **= 2898.75 psi**

L. How can you establish when to turn your dive around?
   1. To establish when you should head back for the boat or shore, you can follow the simple "rule of thirds."
      a. Use one third of your gas supply to swim out (away) from your entry point.
      b. This leaves one third to return and one third in reserve in case you experience any difficulties.
   2. Another common turnaround reserve for self-reliant diving is to halve your supply, then subtract 15 bar/200 psi and turn your dive when you reach that amount.
      a. This means you have 50 percent of your supply plus a reserve to return and make your ascent, which is an option for no-decompression, no overhead environment diving.
   3. Another option is to use elapsed time to establish a turn around point.
      a. Take your planned bottom time, subtract a reserve of five minutes, and divide the reminder by two.
      b. Start to turn your dive when you have reached the time calculated.

M. When do you end your dive (start your ascent) when diving alone?

1. Unless you have the training and experience of a TecRec diver for diving in overhead environments (such as cave training,) dive where you have direct access to the surface. This allows you to end the dive at any point.
2. Your dive should end when you reach any of the following, whichever comes first:
   a. You reach the planned bottom time according to the Recreational Dive Planner (RDP) or your dive computer.
   b. Your dive computer shows less than 5 minutes of no-decompression time remaining.
   c. When your gas supply is getting low and you still have more than enough to safely ascend, and make a safety stop.
   d. You experience any equipment malfunction, difficulties or are not feeling well.

VII. Independent Management of Dive Emergencies

Learning Objectives:

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

- Explain what you should do when you encounter a problem while diving.
- Identify dive emergencies that can be approached using the principles of self-reliance.
- Identify five skills that increase your self-rescue ability.

A. What should you do when you encounter a problem while diving without a partner?

1. If you find yourself with a problem, you need to initiate a self-rescue through the proper action.
2. Remember to:
   a. Stop.
   b. Breathe. Maintain or reestablish normal breathing patterns.
   c. Think. Analyze the problem and plan possible appropriate actions.
   d. Act. Take logical action rather than react thoughtlessly. Be prepared to take a different action if the first doesn't solve the problem.

3. Mentally rehearse responding to and solving problems to help you make the right choices quickly.
4. Practice emergency procedures often to keep your skills sharp.

B. What diving emergencies can be managed using the principles of self-reliance?

1. There are many dive emergencies that can arise when diving. Every self-reliant diver needs to be prepared to handle different situations that could be life-threatening.
2. Following the stop-breathe-think-act procedures, proper visualization before the dive going through all possible scenarios, should help you prepare for most dive emergencies.
3. The following is a list of potential problems, however, it is not exhaustive. You need to be prepared to handle situations in the local environment.
   a. Free flowing regulator — during previous training, you learned that regulator failure will most likely cause a free flow.
      - In self-reliant diving, you breathe using free flow regulator breathing techniques while getting your redundant air supply system ready.
      - After changing to this gas supply, you immediately ascend to the surface, not exceeding the recommended ascent rate and complete a safety stop if required.
   b. BCD inflator malfunctions — If you have a redundant BCD, switch to it. If not, you can control buoyancy via oral inflation of the BCD, or ascend and abort the dive, using oral inflation to secure buoyancy at the surface.
   c. Mask issues — If you have a back-up mask, switch to it. If not, be prepared to end the dive.
   d. Managing currents — during a planned drift dive, you coordinate pick up procedures with the boat crew and surface support.
      - In self-reliant diving, if you are carried away in a current and have to ascend away from your planned ascent point, deploy your DSMB or a lift bag to ascend along and complete your safety stop.
      - Watch tide tables and observe weather reports, to avoid diving in conditions that could jeopardize your dive plan.

e. Entanglements — during previous training, you learned to avoid entanglement by moving slowly, watching where you go and keeping your equipment secure so it doesn't snag or tangle.
   - In self-reliant diving, if you're low on air and severely entangled, you may need to use your knife/tool to carefully cut yourself free.

f. Exceeding your planned depth/time — having a contingency profile is part of regular dive planning, particularly if using an RDP. Dive computers will automatically provide information based on your actual dive profile.
   - As a self-reliant diver, stay well within the no-decompression limits, and refer to your redundant depth gauge and bottom timer, or dive computer as necessary.

g. Panic and stress — divers often underestimate how hard it is to deal with panic and stress. As a self-reliant diver, you need to understand that panic and stress can affect anyone.
   - Panicked divers become overwhelmed by stress and abandon rational responses, reacting entirely through instinct and fear.
   - If the diver handles stress early, it is not likely to affect subsequent behavior. Responses include recognizing the stressor and eliminating or minimizing it, or canceling the dive.
   - Learning to deal with panic and stress can be a life-saving skill.

h. Out of gas — running low on or out of gas should not occur if you plan appropriately, monitor your gas supply and turn your dive at the right point. Make it a habit to write down the information you need to recalculate your SAC rate and gas consumption.
   - As a self-reliant diver, your redundant air supply system covers you for low on or out of gas problems.

i. Physiological problems (e.g. cramps, overexertion, barotraumas, DCS and hypothermia) — you can prevent or control most physiological problems underwater by relaxing and diving within your limitations.
   - As a self-reliant diver it's important to make sure you're fit, healthy and comfortable with any dive you are about to do.

- Always monitor your gas supply, depth and time and wear adequate exposure protection for the local dive environment.

j. Environmental hazards — besides entanglement and currents, there may be other environmental hazards at a dive site that a self-reliant diver should consider. For example, some sites are deep with sheer drop offs and may not appear hazardous due to unusually clear water.

- If you dive at a site you are unfamiliar with make sure you complete a local area orientation, such as a Discover Local Diving experience.

C. What are five skills that increase your self-rescue ability?

1. There are at least five skills that will increase your ability to rescue yourself if a problem arises.

a. Good buoyancy control helps you avoid struggling to maintain your position either at the surface or underwater. It also helps you stay off the bottom, reducing risk of aquatic life injuries, while protecting aquatic life from damage.

b. Proper airway control allows you to breathe past small amounts of water in your regulator or snorkel, thus avoiding choking.

c. Proficiency at cramp removal may stop the pain of a cramp from escalating into a bigger problem.

d. Handling air-depletion without buddy assistance requires that you have and know how to use an independent alternate air source, such as a pony cylinder, self-contained ascent cylinder, isolator valves or bailout cylinder.

e. Responding correctly to vertigo prevents an unpleasant experience from becoming a serious problem. Reorienting yourself by making contact with a fixed object or hugging yourself, or watching your bubbles and consulting your depth gauge for up-and-down orientation will help.

Open Water Dives

General Open Water Considerations

1. **Before beginning open water dives, assess the diver's skills and comfort level in-water and generally assess dive knowledge.** This evaluation may include checking the diver's buoyancy control, familiarity with dive equipment such as being able to easily access and understand instrument readings (the SPG, dive computer, depth gauge, timing device), and the ability to perform self-rescue skills. If the diver exhibits lack of dive readiness, remediate before training progresses.
2. Use good judgment in choosing dive sites that are appropriate and conducive to meeting dive requirements.
3. Involve students in all dive planning activities. Have divers help prepare any surface floats and reference lines.
4. Always conduct a thorough dive briefing to help divers visualize the dive and anticipate any problems that might occur. Remind them of check-in and check-out procedures, and review emergency procedures .

Dive One

Performance Requirements:

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

- Conduct a buoyancy check at the surface to determine the correct amount of weight needed for a dive with all standard and specialized equipment.
- Perform a relaxed, nonstop 200 metre/yard surface swim with all standard and specialized equipment.
- Demonstrate neutral buoyancy while wearing all standard and specialized equipment underwater by hovering for one minute without sculling or kicking.
- Demonstrate the ability to switch to a redundant air supply system simulating a regulator free flow, and breathe from the redundant air source for at least two minutes.
- Perform a SAC rate swim by swimming for approximately five minutes at a level depth, recording the appropriate information for later calculation.
- Deploy a lift bag or DSMB from the bottom.

Suggested Sequence – Dive One

1. Briefing
    a. Evaluate dive site conditions
    b. Identify facilities at the dive site
    c. 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)
    d. Describe entry and exit techniques for the dive site
    e. Plan a turn around point for the dive based on gas supply limits
    f. Plan the dive by establishing maximum depths and bottom times
    g. Plan contingency profiles for longer and deeper dives than planned
    h. Review the dive sequence and performance requirements
    i. Review communication and other emergency protocols as required by local regulations
2. Predive Procedures
    a. Prepare all standard and specialized equipment
    b. Note all dive data: turn around gas pressure, maximum depth and bottom time on a slate
    c. Put on all equipment
    d. Perform a predive "self" safety check including a check that the redundant air-source is both full and functioning. Instructor confirms safety check.
    e. Check-out with surface support staff (as required)
3. Open Water Dive One
    a. Demonstrate proper entry technique
    b. Conduct a buoyancy check at the surface to determine the correct amount of weight needed for a dive with all standard and specialized equipment
    c. Perform a relaxed, nonstop 200 metre/yard surface swim with all standard and specialized equipment
    d. Descend while maintaining control of depth and descent speed by adjusting buoyancy
    e. Demonstrate neutral buoyancy while wearing all standard and specialized equipment underwater by hovering for one minute without sculling or kicking

f. Simulate regulator free flow and then demonstrate the ability to switch to a redundant air supply system and breathe from it for at least two minutes
g. Perform a SAC rate swim by swimming for approximately five minutes at a level depth, recording gas use for later calculation
h. Deploy a lift bag or DSMB from the bottom in water too deep in which to stand
i. Perform a controlled ascent, stopping at 5 metres/15 feet for a three minute safety stop
j. Demonstrate proper exit techniques

4. Post-dive Procedures
   a. Check-in with surface support staff (as required)
   b. Remove and safely stow equipment
5. Debriefing
   a. Provide positive reinforcement and assess performance
   b. Make suggestions to avoid encountered problems
   c. Calculate SAC rate based on recorded information from the dive
   d. Log dive (instructor signs logbook)

Dive Two

Performance Requirements:

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

- Demonstrate time, depth and gas supply awareness by writing the depth and cylinder pressure on a slate at 10-minute intervals.
- Swim for at least two minutes and cover a distance of at least 18 metres/60 feet without a mask while underwater.
- While continuously swimming, simulate an out-of-air emergency and change from your primary air supply to your redundant air supply system within 30 seconds, then breathe from the redundant air supply system for at least two minutes.
- Navigate without surfacing to a predetermined location and return to within 6 metres/20 feet of the starting point using a compass and estimated distance measurement.
- Navigate to a predetermined location and return to within 15 metres/50 feet of the starting point using natural references and estimated distance measurement.
- Perform a SAC rate swim by swimming for approximately five minutes at a level depth, recording the appropriate information for later calculation.
- Deploy a lift bag or DSMB from the bottom.

Suggested Sequence – Dive Two

1. Briefing
   a. Evaluate dive site conditions
   b. Identify facilities at the dive site
   c. 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)
   d. Describe entry and exit techniques for the dive site
   e. Plan a turn around point for the dive based on SAC rate calculated from Dive One
   f. Plan the dive by establishing maximum depths and bottom times

g. Plan contingency profiles for longer and deeper dives than planned
h. Review the dive sequence and performance requirements
i. Review communication and other emergency protocols as required by local regulations

2. Predive Procedures
   a. Prepare all standard and specialized equipment
   b. Note all dive data: turn around gas pressure, maximum depth and bottom time on a slate
   c. Put on all equipment
   d. Perform a predive "self" safety check including a check that the redundant air-source is both full and functioning. Instructor confirms safety check.
   e. Check-out with surface support staff (as required)
3. Open Water Dive Two
   a. Demonstrate proper entry technique
   b. Conduct a buoyancy check at the surface
   c. Maintain buddy contact at the surface
   d. Descend while maintaining control of depth and descent speed by adjusting buoyancy
   e. Demonstrate time, depth and gas supply awareness by writing the depth and cylinder pressure on a slate at 10-minute intervals
   f. Swim for at least two minutes and cover a distance of at least 18 metres/60 feet without a mask while underwater
   g. While continuously swimming simulate an out-of-air emergency and change from your primary air supply to your redundant air supply system within 30 seconds, then breathe from the redundant air supply system for at least two minutes.
   h. Navigate without surfacing to a predetermined location and return to within 6 metres/20 feet of the starting point using a compass and estimated distance measurement, such as kick cycles or elapsed time
   i. Navigate to a predetermined location and return to within 15 metres/50 feet of the starting point using natural references and estimated distance measurement, such as kick cycles or elapsed time

j. Perform a SAC rate swim by swimming for approximately five minutes at a level depth, recording gas use for later calculation
k. Deploy a lift bag or DSMB from the bottom
l. Perform a controlled ascent, stopping at 5 metres/15 feet for a three minute safety stop
m. Demonstrate proper exit techniques

4. Post-dive Procedures
   a. Check-in with surface support staff (as required)
   b. Remove and safely stow equipment
5. Debriefing
   a. Provide positive reinforcement and assess performance
   b. Make suggestions to avoid encountered problems
   c. Calculate SAC rate based on recorded information from the dive
   d. Log dive (instructor signs logbook)

Dive Three

Performance Requirements:

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

- Demonstrate time, depth and gas supply awareness by writing the depth and time on a slate for each 20 bar/300 psi of gas consumed.
- Demonstrate turn around pressure and time limit awareness when either the pressure or time limit established during the briefing is reached by writing the time (if pressure limit reached first) or the pressure (if time limit reached first) on a slate.
- Demonstrate navigational control and return to the exit with no assistance from the instructor.
- While continuously swimming, simulate an out-of-air emergency and change from your primary air supply to your redundant air supply system within 30 seconds, then deploy a lift bag or DSMB and ascend to the surface, stopping at 5 metres/15 feet for a three minute safety stop.
- Surface from the dive within the established time frame and with no less than the planned pressure remaining in the cylinder.

Suggested Sequence – Dive Three

1. Briefing
   a. Evaluate dive site conditions
   b. Identify facilities at the dive site
   c. 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)
   d. Describe entry and exit techniques for the dive site
   e. Plan a turn around point for the dive based on SAC rate calculated from Dives One and Two
   f. Plan the dive by establishing maximum depths and bottom times
   g. Plan contingency profiles for longer and deeper dives than-planned

h. Review the dive sequence and performance requirements
i. Review communication and other emergency protocols as required by local regulations

2. Predive Procedures
   a. Prepare all standard and specialized equipment
   b. Note all dive data: turn around gas pressure, maximum depth and bottom time on a slate
   c. Put on all equipment
   d. Perform a predive "self" safety check including a check that the redundant air-source is both full and functioning. Instructor confirms safety check.
   e. Check-out with surface support staff (as required)
3. Open Water Dive Three
   a. Demonstrate proper entry technique
   b. Conduct a buoyancy check at the surface
   c. Maintain buddy contact at the surface
   d. Descend while maintaining control of depth and descent speed by adjusting buoyancy
   e. Demonstrate time, depth and gas supply awareness by writing the depth and time on a slate each for 20 bar/300 psi of gas consumed
   f. Demonstrate turn around pressure and time limit awareness when either the pressure or time limit established during the briefing is reached by writing the time (if pressure limit reached first) or the pressure (if time limit reached first) on a slate.
   g. Demonstrate navigational control during the dive and return to the exit point (boat or shore) with no assistance from the instructor.
   h. While continuously swimming, simulate an out-of-air emergency and change from your primary air supply to your redundant air supply system within 30 seconds. Then, deploy a lift bag or DSMB from the bottom and ascend along the line to the surface, stopping at 5 metres/15 feet for a three minute safety stop.
   i. Surface from the dive within the time frame established during the briefing and with no less than the planned pressure remaining in the cylinder

j. Demonstrate proper exit techniques

4. Post-dive Procedures
   a. Check-in with surface support staff (as required)
   b. Remove and safely stow equipment
5. Debriefing
   a. Provide positive reinforcement and assess performance
   b. Make suggestions to avoid encountered problems
   c. Log dive (instructor signs logbook)
   d. Complete certification documents as required

Self-Reliant Diver

Appendix

Knowledge Review

Knowledge Review Answer Key

Self-Reliant Diver Course Liability Release and Assumption of Risk Agreement (10037)

Self-Reliant Diver

KNOWLEDGE REVIEW
Self-Reliant Diver

Answer the following questions. Your instructor will review your answers with you.

1. TRUE or FALSE. Once you become a self-reliant diver, there is no value in diving with a buddy any more.

2. TRUE or FALSE. Experienced divers (those with advanced certification and 100+ dives) can dive responsibly without a partner by applying the techniques of diving self-reliance and by appropriately equipping themselves.

3. TRUE or FALSE. Self-reliant divers accept the increased risk that comes with diving alone when they choose to, and should ensure their families and loved ones understand their choices.

4. Which areas of preparation increase your self-rescue abilities? (choose all that apply)
   a. Physical preparation
   b. Mental preparation
   c. Equipment preparation

5. A self-reliant diver applies what mentality to stay out of trouble? (choose all that apply)
   a. Maintains equipment only if it is broken.
   b. Thinks about potential problems as part of the dive plan and does not ignore small problems.
   c. Always goes diving without a buddy.
   d. Carries a redundant air supply, but no other back-up equipment.

6. TRUE or FALSE. The concept of redundancy means you carry a back-up for any equipment which is either critical for survival or critical to the dive objective's success.

7. What specialized equipment is required for a self-reliant diver? (choose all that apply)
   a. Redundant air source and surface marker buoy
   b. Redundant depth gauge and bottom timer, or dive computer
   c. Redundant signaling devices (both audible and visual)

8. TRUE or FALSE. A responsible self-reliant diver plans and executes each dive as though it will be necessary to handle all emergencies alone.

9. What is the Surface Air Consumption (SAC) rate for a diver using 60 bar/990 psi while swimming at 20 metres/66 feet for 10 minutes when using 12 litre/80 ft^3 cylinder (full pressure 3000 psi)?

METRIC:	IMPERIAL:
a. 24 l/min	a. 0.88 ft^3/min
b. 32 l/min	b. 1.32 ft^3/min
c. 18 l/min	c. 0.08 ft^3/min

10. A diver's SAC rate is 18 litres per minute/0.62 cubic feet per minute. The diver plans another dive using the same size cylinder to 20 metres/66 feet for 28 minutes. How much gas must be available in the cylinder to make the dive including the appropriate reserve?

METRIC:	IMPERIAL:
a. 1512 litres	a. 52.08 cubic feet
b. 1890 litres	b. 65.1 cubic feet
c. 2268 litres	c. 78.12 cubic feet

11. As a self-reliant diver, when boat diving, how do you establish when to turn your dive around and head back to the boat? (choose all that apply)
    a. Dive until you run low on air, then surface and swim back to the boat.
    b. Based on your gas supply, follow the "rule of thirds" – one third out, one third back and one third in reserve.
    c. Halve your gas supply and subtract 15 bar/200 psi and turn your dive around when you reach that gas supply level.
    d. Take your planned bottom time, subtract a reserve of five minutes, and divide the remainder by two. Start to turn your dive when you have reached the time calculated.

12. What should you do when you encounter a problem while diving?
    a. Stop and reestablish normal breathing patterns.
    b. Analyze the problem and plan possible appropriate actions.
    c. Take logical action rather than react thoughtlessly.

13. TRUE or FALSE. In preparation for the dive, a self-reliant diver will leave dive planning and logistical information with someone who is not going on the dive.

14. TRUE or FALSE. As a self-reliant diver, you're qualified to dive at sites that you are unfamiliar with without receiving a local area orientation.

Student Diver Statement:

I've completed this Knowledge Review to the best of my ability and any questions I answered incorrectly or incompletely I've had explained to me, and I understand what I missed.

Signature _____ Date _____

KNOWLEDGE REVIEW — Answer Key
Self-Reliant Diver

1. FALSE Once you become a self-reliant diver, there is no value in diving with a buddy any more.

2. TRUE Experienced divers (those with advanced certification and 100+ dives) can dive responsibly without a partner by applying the techniques of diving self-reliance and by appropriately equipping themselves.

3. TRUE Self-reliant divers accept the increased risk that comes with diving alone when they choose to, and should ensure their families and loved ones understand their choices.

4. Which areas of preparation increase your self-rescue abilities? (choose all that apply)
   a. Physical preparation
   b. Mental preparation
   c. Equipment preparation

5. A self-reliant diver applies what mentality to stay out of trouble?
   a. Maintains equipment only if it is broken.
   b. Thinks about potential problems as part of the dive plan and does not ignore small problems.
   c. Always goes diving without a buddy.
   d. Carries a redundant air supply, but no other back-up equipment.

6. TRUE The concept of redundancy means you carry a back-up for any equipment which is either critical for survival or critical to the dive objective's success.

7. What specialized equipment is required for a self-reliant diver? (choose all that apply)
   a. Redundant air source and surface marker buoy
   b. Redundant depth gauge and bottom timer, or dive computer
   c. Redundant signaling devices (both audible and visual)

8. TRUE A responsible self-reliant diver plans and executes each dive as though it will be necessary to handle all emergencies alone.

9. What is the Surface Air Consumption (SAC) rate for a diver using 80 bar/990 psi while swimming at 20 metres/66 feet for 10 minutes?

METRIC:	IMPERIAL:
a. 24 l/min	a. 0.88 ft^3/min
b. 32 l/min	b. 1.32 ft^3/min
c. 18 l/min	c. 0.08 ft^3/min

10. A diver's SAC rate is 1.8 bar per minute/23 psi per minute. The diver plans another dive using the same size cylinder to 20 metres/66 feet for 28 minutes. How much pressure must be in the cylinder to make the dive including the appropriate reserve?

METRIC:	IMPERIAL:
a. 1512 litres	a. 52.08 cubic feet
b. 1890 litres	b. 65.1 cubic feet
c. 2268 litres	c. 78.12 cubic feet

11. As a self-reliant diver, when boat diving, how do you establish when to turn your dive around and head back to the boat? (choose all that apply)
    a. Dive until you run low on air, then surface and swim back to the boat.
    b. Based on your gas supply, follow the "rule of thirds" – one third out, one third back and one third in reserve.
    c. Halve your gas supply and subtract 15 bar/200 psi and turn your dive around when you reach that gas supply level.
    d. Take your planned bottom time, subtract a reserve of five minutes, and divide the remainder by two. Start to turn your dive when you have reached the time calculated.

12. What should you do when you encounter a problem while diving? (choose all that apply)
    a. Stop and reestablish normal breathing patterns.
    b. Analyze the problem and plan possible appropriate actions.
    c. Take logical action rather than react thoughtlessly.

13. TRUE In preparation for the dive, a self-reliant diver will leave dive planning and logistical information with someone who is not going on the dive.

14. FALSE. As a self-reliant diver, you're qualified to dive at sites that you are unfamiliar with without receiving a local area orientation.

SELF-RELIANT DIVER COURSE LIABILITY RELEASE AND ASSUMPTION OF RISK AGREEMENT

Please read carefully and fill in all blanks before signing.

I, _____, hereby affirm that I am aware that skin and scuba diving have inherent risks which may
Participant Name

result in serious injury or death. I further acknowledge that choosing to dive without a dive buddy, as a "Self-Reliant" Diver has additional inherent risks and hazards.

I understand that diving with compressed air involves certain inherent risks; including but not limited to decompression sickness, embolism or other hyperbaric/air expansion injury that require treatment in a recompression chamber. I further understand that the open water diving trips which are necessary for training and for certification may be conducted at a site that is remote, either by time or distance or both, from such a recompression chamber. I still choose to proceed with such instructional dives in spite of the possible absence of a recompression chamber in proximity to the dive site. I further understand that by choosing to dive alone, I will not have a buddy to assist me should any of these or other issues occur.

I understand and agree that neither my instructor(s), _____, the facility through which I receive
Instructor(s) Name

my instruction, _____, nor PADI Americas, Inc. nor its affiliate and subsidiary corporations, nor
Facility Name

any of their respective employees, officers, agents, contractors or assigns (hereinafter referred to as "Released Parties") may be held liable or responsible in any way for any injury, death or other damages to me, my family, estate, heirs or assigns that may occur as a result of my participation in this diving program or as a result of the negligence of any party, including the Released Parties, whether passive or active.

In consideration of being allowed to participate in this course I hereby personally assume all risks of this course, whether foreseen or unforeseen, that may befall me while I am a participant in this course including, but not limited to, the academics, confined water and/or open water activities.

I further release, exempt and hold harmless said course and Released Parties from any claim or lawsuit by me, my family, estate, heirs or assigns, arising out of my enrollment and participation in this course including both claims arising during the course or after I receive my certification.

I also understand that skin diving and scuba diving are physically strenuous activities and that I will be exerting myself during this course, and that if I am injured as a result of heart attack, panic, hyperventilation, drowning or any other cause, that I expressly assume the risk of said injuries and that I will not hold the Released Parties responsible for the same. I again affirm that by choosing to dive alone, I will not have a buddy to assist me should any of these or other issues occur.

I further state that I am of lawful age and legally competent to sign this liability release or that I have acquired the written consent of my parent or guardian.

I understand the terms herein are contractual and not a mere recital, and that I have signed this Agreement of my own free act and with the knowledge that I hereby agree to waive my legal rights. I further agree that if any provision of this Agreement is found to be unenforceable or invalid, that provision shall be severed from this Agreement. The remainder of this Agreement will then be construed as though the un-enforceable provision had never been contained herein.

I understand and agree that I am not only giving up my right to sue the Released Parties but also any rights my heirs, assigns, or beneficiaries may have to sue the Released Parties resulting from my death. I further represent I have the authority to do so and that my heirs, assigns, or beneficiaries will be estopped from claiming otherwise because of my representations to the Released Parties.

I, _____, BY THIS INSTRUMENT AGREE TO EXEMPT AND RELEASE MY
Participant Name

INSTRUCTORS, _____, THE FACILITY THROUGH WHICH I RECEIVE
Instructor(s) Name

MY INSTRUCTION, _____, AND PADI AMERICAS, INC., AND ALL
Facility Name

RELATED ENTITIES AS DEFINED ABOVE, FROM ALL LIABILITY OR RESPONSIBILITY WHATSOEVER FOR PERSONAL INJURY, PROPERTY DAMAGE OR WRONGFUL DEATH HOWEVER CAUSED, INCLUDING BUT NOT LIMITED TO THE NEGLIGENCE OF THE RELEASED PARTIES, WHETHER PASSIVE OR ACTIVE.

I HAVE FULLY INFORMED MYSELF AND MY HEIRS OF THE RISKS OF CHOOSING TO DIVE WITHOUT A BUDDY. I HAVE ALSO FULLY INFORMED MYSELF AND MY HEIRS OF THE CONTENTS OF THIS LIABILITY RELEASE AND ASSUMPTION OF RISK AGREEMENT BY READING IT BEFORE I SIGNED IT ON BEHALF OF MYSELF AND MY HEIRS.

_____ _____
Participant Signature Date (Day/Month/Year)

_____ _____
Parental Signature Date (Day/Month/Year)

PRODUCT NO. 10037 (04/11) Version 1.0

Self-Reliant Diver