ICE DIVER

INSTRUCTOR GUIDE

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PADI Ice Diver
Instructor Guide

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INTRODUCTION

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

How to Use this Guide

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

Course Philosophy and Goals

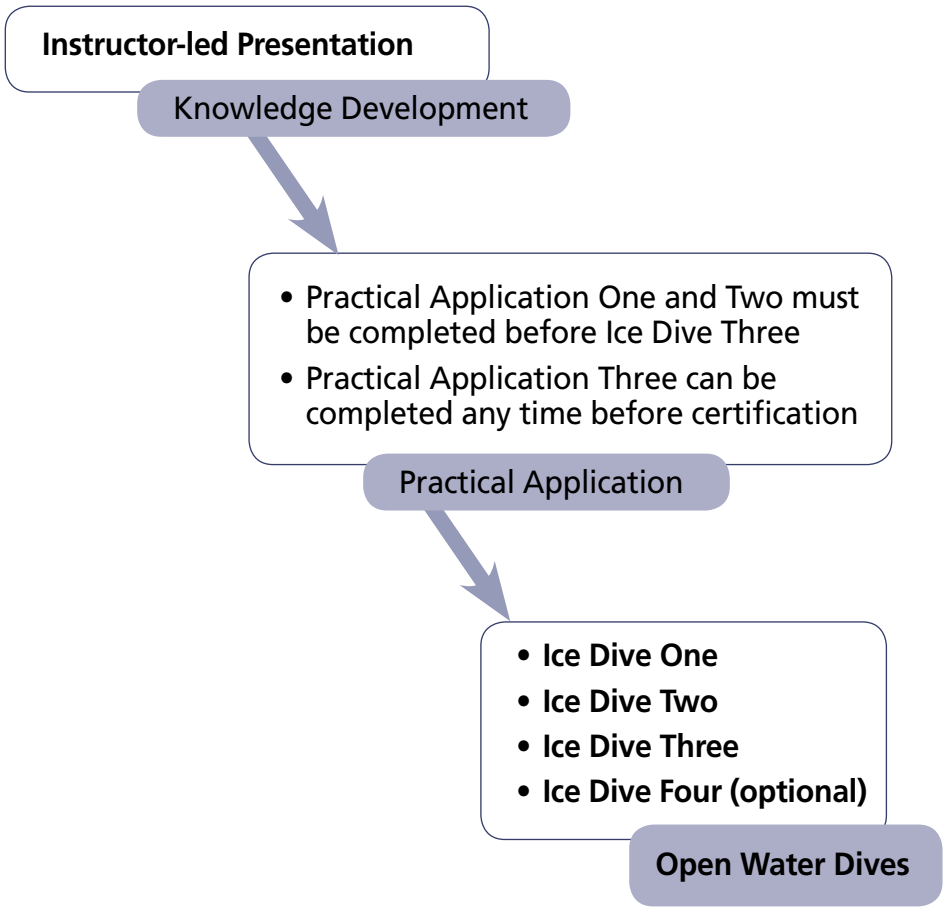
The purpose of the PADI Ice Diver Specialty course is to familiarize divers with the skills, knowledge, planning, equipment, organization, procedures, techniques, problems, hazards, and excitement of diving under ice. The Ice Diver Specialty course is intended and designed to be a supervised introduction to diving under ice. Training should emphasize fun and safety.

The goals of the PADI Ice Diver Specialty course are to:

- Explain the planning, organization, procedures, techniques, problems, and hazards of diving under ice.
- Train student divers in the use of specialized ice diving equipment, communications, line tending, and procedures.
- Guide student divers in the skills required to plan and make no stop recreational ice dives.

Course Flow Options

Conduct instructor-led presentations to develop diver knowledge prior to the practical application and the training dives. **Student divers must complete the knowledge development prior to the open water dives.** There are four open water dives, three required and one optional. **You may rearrange skill sequence within each dive, however the sequence of dives must stay intact.** You may add more dives as necessary to meet student divers' needs. Organize the course to accommodate student diver learning style, logistical needs and sequencing preferences. Incorporate environmentally friendly techniques throughout each dive.



SECTION ONE

Course Standards

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

Standards at a Glance

Topic	Course Standard	
Minimum Instructor Rating	**PADI Ice Diver Specialty Instructor**	
Prerequisites Minimum Age	**PADI Advanced Open Water Diver*** **18 years**	
Ratios	**Open Water: 2:1**	
Site, Depths and Hours	**Site: Under ice** (recommended 20 centimeres/8 inches) **Minimum Open Water Dives: 3** **Depth: Ice Dives One and Two – 18 metres/60 feet; Dive Three – 30 metres/100 feet. All within 40 metres/130 feet from the surface entry point.** Hours Recommended: 24	
Materials and Equipment	**Instructor:** • **PADI Ice Diver Course Instructor Guide** • **Communications equipment** • **Safety lines, hole-cutting tools and anchoring devices** • **Warm shelter** • **Equipment and materials for securing hole** • **Extra weight**	**Student Diver*:** • **Exposure suit and regulator suitable for ice diving** • **Dive light** • **Adequate exposure protection for surface**

* If using a rebreather, divers must be PADI Advanced Rebreather Divers. Rebreather divers must carry a bailout cylinder with a minimum capacity of 850 litres/30 feet^3 with a regulator and SPG. Rebreathers must be used within manufacturer's recommendations.

Instructor Prerequisites

To qualify to teach the PADI Ice Diver course, an individual must be a Teaching status PADI Open Water Scuba Instructor or higher. **PADI Instructors may apply for the Ice Diver Specialty Instructor rating after completing a Specialty Instructor Training course with a PADI Course Director, or by providing proof of ice diver certification and applying directly to a PADI Regional Headquarters**. For further detail, reference Membership Standards in the General Standards and Procedures section of your PADI *Instructor Manual*.

Certified Assistant Requirements

To qualify as a certified assistant for the Ice Diver course, an individual must be an active PADI Divemaster or higher *and* PADI Ice Diver (or qualifying certification) with specific ice diving rescue skills. It is recommended that certified assistants have completed and logged the optional Ice Dive Four, which focuses on ice diving rescue techniques.

Student Diver Prerequisites

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

1. **Certified as a PADI Advanced Open Water Diver.** Verify student diver prerequisite skills and provide remediation as necessary.
    a. **PADI Advanced Rebreather Diver** (if completing the course on a rebreather).
    b. **Prior to optional Ice Dive Four, student divers must be PADI Rescue Divers.**
2. **At least 18 years old.**

Supervision and Ratios

A Teaching status PADI Ice Diver Specialty Instructor must be present and in control of all activities. During Ice Dive One, the instructor must be in the water directly supervising student divers at a maximum ratio of 2:1. This ratio cannot be increased with the use of certified assistants.

During Ice Dives Two, Three and Four (optional), student divers must be directly supervised by either the course instructor or a certified assistant at a maximum ratio of 2:1. This ratio cannot be increased. The Ice Diver Specialty Instructor must ensure that all performance requirements are met.

Sequencing

1. **Knowledge Development must be completed before the open water dives.**
2. **Practical Application One and Two must be completed before Ice Dive Three.**
3. **Practical Application Three can be completed any time prior to certification.**
4. **Training dives must be conducted in order. You may rearrange skill sequences within a dive.**

Site, Depths and Hours

Site

Choose sites with conditions and environments suitable for completing requirements. Consider sites close to shore and away from any water inlets or outlets, or other areas of moving water where currents might make ice dangerously thin. Recommended ice thickness is at least 20 centimetres/8 inches of solid ice cover. Ideally, select sites familiar to student divers. Incorporate environment friendly techniques throughout each dive. Practice skills in confined water sessions first to better prepare divers to apply skills in open water later.

Depths

See individual dives. **Maximum depth is 30 metres/100 feet and penetration must not exceed 40 metres/130 feet linear distance from the entry hole, vertical and horizontal distance included.**

Hours

The PADI Ice Diver course includes three required open water dives, and one optional dive. If all four dives are completed the course will be conducted over at least two days. If three dives are planned on one day, in addition to meeting General Standards and Procedures for Open Water Dives, ensure dives are planned within the following parameters:

- **If student divers have participated in confined water training that day, they may complete no more than two open water dives.**
- **The maximum depth for the third dive is 12 metres/40 feet.**
- **Completing three dives in one day is at the discretion of both the student diver and instructor.**

Take into consideration all factors before planning a third dive for the day including:

- Task loading of student divers
- Diver stamina, ability and comfort
- A minimum surface interval of one hour between each dive, with adequate time to rest and prepare for the next dive
- Adequate student diver rewarming between and after dives.
- Diver interest, willingness and motivation to participate
- Adherence to safe diving practices
- Residual nitrogen
- Environmental conditions

The minimum number of recommended hours is 24.

Materials and Equipment

Instructor

- **PADI Ice Diver Specialty Instructor Guide**
- **Personal ice diving equipment (same as listed for student divers)**
- **Communications equipment appropriate for location**
- **Safety lines, hole-cutting tools, anchoring devices.**
- **Warm shelter** (may be a van or shelter erected at the site)
- **Equipment and materials for securing the hole after use.** Check local laws regarding re-covering the hole after the dive.
- **Extra weight**
- First-aid supplies and equipment
- Oxygen delivery system
- Hot water to defrost frozen equipment
- Safety reel
- Materials to improve footing around the entry hole
- Backboard or similar device
- Snow shovels and broom
- Toboggan or sled
- Extra mitts and hats

Student Diver

- **Standard equipment as listed in General Standards and Procedures.** Snorkels are not worn while diving in overhead environments because they can be an entanglement

hazard. Ice diving does not usually involve a surface swim but divers may carry snorkels in their pockets and deploy at the surface if needed.

- **Exposure suit appropriate for ice diving environment and depth, including hood, boots and gloves or mitts. If a dry suit is used, the diver must have previous experience with its use.**
- **Regulators must be suitable for cold water use.**
- **Dive light**. Two lights are recommended, a primary and a backup.
- **Personal clothing for adequate exposure protection at the surface**
- Drinks and snacks
- A redundant air source, such as a pony bottle or double cylinders, is recommended for open circuit divers.
- **If using a rebreather, divers must carry a bailout cylinder with a minimum capacity of 850 l/30 ft³ with a regulator and SPG. Rebreathers must be used within manufacturer's recommendations.**

Penetration

Open water dives must be conducted under ice. Penetration training dives are limited to within the light zone and within 40 metres/130 feet linear distance from the surface (linear distance includes vertical and horizontal distance).

Assessment Standards

The student diver must demonstrate accurate and adequate knowledge during the practical applications and open water dives, and must perform all skills (procedures and motor skills) in a reasonably comfortable, fluid, repeatable manner as would be expected of a diver at this certification level.

Certification Requirements and Procedures

To qualify for certification, student divers must have met all performance requirements by completion of the course. Give student divers who complete Ice Dive Four recognition of their extra achievement by signing their log book. **The instructor certifying the student diver must ensure that all certification requirements have been met.**

Links to Other Courses

Divers who are enrolled in the PADI Advanced Open Water Diver course may participate in Ice Dive One if they meet all other Ice Diver course requirements. Dive One may credit as an Adventure Dive toward the PADI Adventure Diver and/or Advanced Open Water Diver certifications.

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

SECTION TWO

Knowledge Development

Conduct

Divers complete the Knowledge Development for the PADI Ice Diver course through your formal or informal presentations based upon the following course presentation outlines. These presentations are the primary knowledge development method for this course.

Because the PADI Ice Diver course is primarily about developing the skills to explore a new environment, knowledge development prepares divers to develop and practice those skills under your direction. Demonstrating motor skill mastery during the practical applications and training dives, combined with asking divers questions and other verbal interactions, allows you to assess knowledge development mastery. **The Knowledge Review** (located in the Appendix) **must be completed and reviewed before the diver is certified**.

I. Introduction

Note to Instructor

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

A. Course Goals

1. Primary goal is to qualify and certify you to set up, plan and make recreational, no stop ice dives.
2. As a PADI Ice Diver, you are trained to plan and make recreational no stop ice dives within the light zone to a maximum depth of 30 metres/100 feet (or the depth to which you were trained, if shallower,) and within 40 metres/130 feet linear distance from the surface, in conditions as good as, or better than, those in which you train.
3. Important: Ice diving requires significant local environmental knowledge. Always seek out local knowledge before diving in a new area or in different conditions.

B. Course Overview and Schedule

Note to Instructor

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

C. Costs, Equipment Requirements and Paperwork

Note to Instructor

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

D. Performance Requirements and Certification

1. **To qualify for any PADI certification, you must meet specific performance requirements.**
   a. You pay for the course, but must earn the certification.
   b. This requirement exists because your ability to dive safely depends upon your ability to master and apply what you learn in this course.
   c. Performance-based learning is objective – a student either meets a requirement or not; your instructor is not arbitrary in assessing performance.
2. Although you must meet all performance requirements, having difficulty does not mean you will be unsuccessful.
   a. You take a course to learn – making mistakes and needing time to master knowledge and skill is part of learning.
   b. You may pick up some things quickly and others slowly; what matters is that you demonstrate mastery – not how long it takes.
   c. You move on at the pace you learn – you may need extra dives or other practice.

II. Reasons to Ice Dive

Learning Objectives

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

1. **What are six common reasons to ice dive?**
2. **What are two common types of ice diving?**

1. What are six common reasons to ice dive?

A. There are six common reasons that divers give for ice diving.
   1. Some amazing dive sites are only accessible to ice divers for part or all of the year. Learning to ice dive can expand your choice of sites and the seasons you can dive in your local area.
   2. Ice diving is a team activity; preparing for and sharing the challenge of conducting an ice dive with a team of like minded divers is rewarding.

3. Some sites are inaccessible in summer when there is boat traffic, but in the winter they can be accessed from the ice, making ice divers the only ones to see these sites.
4. Visibility in very cold water is often excellent, due to lower turbidity and less algae. Great visibility can make ice diving visually spectacular.
5. Ice forms amazing structures as it freezes and the water flows across it. Seeing this for yourself is often the primary reason divers start ice diving.
6. The amazing visual effects of great visibility, underwater structures and winter light can be a photographer's/videographer's dream.

2. What are two common types of ice diving?

B. There are two ways that divers may conduct ice dives.
   1. Most ice dives are conducted from an ice hole. This may be in the ocean or a lake. Sometimes the ice hole is at the side of a lake or quarry, if the water is deep enough at the entry point. More usually, divers must travel farther from shore to find an appropriate dive site and entry point.
   2. Sometimes, divers dive in brash (small or broken up) ice. However, you should not dive among large, moving ice because there's a high risk of ice movement cutting off your return access to the surface.

III. Equipment for Ice Diving

Learning Objectives

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

1. **What are two considerations for keeping warm at the surface?**
2. **Why do you use layering both on the surface and underwater?**
3. **What four layers do divers commonly use for insulation?**
4. **What are five ways you can stay warm underwater when ice diving?**
5. **What additional regulator requirements does ice diving have?**
6. **What considerations should you give to choosing a BCD and harness for ice diving?**
7. **What kind of weight system is suitable for ice diving?**
8. **Do ice divers wear snorkels? Why?**
9. **How do you avoid equipment becoming an entanglement hazard?**

1. What are two considerations for keeping warm at the surface?

A. At the surface you will need two things to keep warm:
   1. Plenty of warm, wind-proof clothes
   2. A shelter.

2. Why do you use layering both on the surface and underwater?

B. Layering for warmth works both on the surface and underwater.
   1. As with other outdoor activities, the best strategy is to layer your clothing. This means you wear garments in layers to provide insulation, rather than one thick garment.
   2. Layering insulation allows you to better adjust to changing activity levels and temperatures. It also promotes more effective transport of moisture away from the skin.

3. What four layers do divers commonly use for insulation?

C. There are four layers of insulation that divers use for warmth and protection.
   1. Underwear. You wear this both at the surface and underwater. This is the layer that is next to the skin, so it should consist of materials that will not hold moisture to your body. Polyester, merino wool or silk are recommended. Avoid cotton – it will make you colder by holding moisture.
   2. Insulation layer. You may modify this layer depending on activity level and environmental conditions. Polyester fleece, thinsulate and hollowfill fibres are the most popular types. Polyester fleece will also facilitate further wicking of moisture away from the body.
   3. Heated vests/undergarments. These are typically worn between the underwear and insulation layers, and are powered by internal or external batteries. Heated clothing suitable for surface use may not be suitable for underwater use; make sure that any electrical equipment used underwater is designed for this purpose just in case you get a leak! Heated garments are described as "active" layering because they require a power source; they can prolong comfort, but should not be relied upon in place of the other layering systems described, which are "passive" and do not rely on battery power.
   4. Outer layers. The outer layer may or may not contain insulation. Its primary function is to keep out wind and/or water. Breathable fabrics are advantageous on the surface since they allow body moisture to evaporate out.
   5. Don't forget to protect your hands, feet and head, as well as your body. You may use fewer layers in these areas, to allow ease of movement, but the same principles apply.

4. What are five ways you can stay warm underwater when ice diving?

D. There are five pieces of equipment and strategies that can help you stay warm underwater.
   1. Dry suits are the best exposure suit option when ice diving, but you must have previous experience before attempting to use one under ice.

   a. The guidelines for layering and insulation are the same as for surface clothing, but take separate sets for diving. This assures that you have dry clothing you can wear after the dive.
   b. You may find that you are warm enough in a wet suit for short exposures, but take care to avoid excessive chilling upon exit. Wet suits are not suitable when surface temperatures cause immediate freezing, due to the risk of the suit freezing before you can remove it after the dive.
2. In some areas, the ice hole is covered by a large tent or other (usually semi-permanent) structure. This protects you from some exposure and may be heated.
3. Most ice divers use dry gloves or thick wet suit gloves/mitts.
   a. Dry gloves are usually used with a dry suit and must be equalized (like a dry suit) – check with the manufacturer or your instructor for their recommendations on the technique best suited to your equipment.
   b. You may need assistance donning thick gloves. Have surface team help you.
   c. It is very important to get a good seal, especially with dry gloves.
   d. Dexterity in either type of glove can be challenging at first, but practice wearing them at the surface or during a confined water session will help you to adjust more quickly.
4. Although some dry suits have dry hoods, most divers use wet suit hoods, even with a dry suit. Use a thick (5-7mm) wet suit hood or double layered hood for extra insulation. An attached hood or specifically designed cold water hood helps you avoid accidental "seeps" of cold water.
5. Any active heat source should only be used to maintain body temperature. Ensure it is adequately insulated to avoid overheating.
   a. Reusable heatpacks become solid as they cool so don't put them where they could seriously impair dexterity.
   b. Single-use heatpacks should not be used underwater. The chemical reaction increases with greater pressure (depth) and may cause serious burns.
6. In recent years there has been concern that aggressive rewarming with external heat sources may contribute to decompression sickness (DCS) due to the variations in temperature and circulation they may cause.
   a. Using a direct heat source or adding hot water to wet suits or wet suit gloves to warm up after a dive may cause similar problems.
   b. Better options to avoid further cooling and encourage rewarming at a safe rate include removing wet clothing, drying off, adding insulation and taking shelter in a warmer environment.

5. What additional regulator requirements does ice diving have?

E. To avoid freezing, there are requirements for regulators used for ice diving.
   1. All regulators should be environmentally protected to avoid ice-up and freeflow.
   2. Redundant scuba systems are popular in overhead environments. If one regulator has a freeflow, you can switch the cylinder valve off and abort the dive using the other scuba system. Configurations include:
      a. Pony bottle and regulator.
      b. Y or H valve on your cylinder with extra regulator.
      c. Double cylinders with dual outlet manifold and two regulators.
      d. Double cylinders sidemounted
      e. Type R or T rebreather with bailout cylinder
   3. Regulators with a DIN fitting connection are recommended for ice diving. DIN fittings are more secure and the o-ring is better protected. Although you will aim to avoid any impact with the ice, a more secure fitting is preferable in the overhead environment.

6. What considerations should you give to choosing a BCD and harness for ice diving?

F. There are several considerations for choosing a BCD and harness for ice diving.
   1. Any BCD that is easy to don and doff and that has a secure attachment point can be used.
   2. Tec-style BCDs with harnesses, metal D-rings and backmounted buoyancy are increasingly popular due to the easy attachment points and their simplicity, which helps avoid entanglements.
   3. Metal D-rings give a secure point of contact for attaching the diver to the line.
   4. Some divers wear a chest harness under their BCDs with attachment points; others wear one device (usually a suitable BCD) that does both jobs.

7. What kind of weight system is suitable for ice diving?

G. For ice diving, look for weight systems that are secure.
   1. Any weight system can be used as long as it is secure. While you may remove weights at the surface, dropping them underwater can be more hazardous in an overhead environment, because a rapid ascent could cause impact with the ice (as well as increasing the risk of decompression illness (DCI).
   2. It is a good idea to have extra weights available. The additional insulation required for ice diving may mean you need more weight than anticipated.

8. Do ice divers wear snorkels? Why?

H. You will not need a snorkel in most ice diving situations
   1. In ice diving, as in other types of diving in overhead environments, a snorkel attached to a mask can be an entanglement hazard.
   2. A pocket snorkel can be used. It remains stowed while diving under the ice and can be deployed for a surface swim, if necessary.

9. How do you avoid equipment becoming an entanglement hazard?

I. In an overhead environment, untidy equipment may become caught on the line or in the environment itself.
   1. To avoid problems, straps should not have loose ends. Use tape/rubber retainers to tidy up normal straps or use straps that are specifically designed to be streamlined, such as spring straps for fins and neoprene straps for masks.
   2. Attach accessories using good quality stainless steel or brass P clips (also known as bolt snaps or dog clips). Avoid clips that can accidentally become snagged on a line.
   3. Stow all accessories neatly. Exposure suit or accessory pockets are ideal.

IV. Avoiding Equipment Problems

Learning Objectives

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

1. **What are five general rules for avoiding equipment problems in very cold conditions?**
2. **What problem can regulators experience in very cold conditions and how do you prevent it?**
3. **How are masks affected by extreme cold?**
4. **What five ways can you prevent dry suit flooding?**

1. What are five general rules for avoiding equipment problems in very cold conditions?

A. Avoiding equipment problems in cold conditions may take a little more effort. Use these five general rules.
   1. Keep equipment in a warm area until as close to the dive as possible.
   2. Water freezing in/on equipment can cause damage, so keep equipment dry before the first dive and dry it as soon as possible after each dive.
   3. To reduce effects caused by cold damage, change visible o-rings more frequently than in warmer water. Keep accessible o-rings lubricated (if appropriate for the specific o-ring; check with the equipment manufacturer if unsure).

4. Make sure your regulator and cylinder(s) have been serviced according to manufacturer guidelines and local laws. (Water freezing in your cylinder could cause serious damage to your regulator and must be avoided!)
5. Have plenty of spare equipment available and do not dive with any equipment that is not in full working order.

2. What problem can regulators experience in very cold conditions, and how do you prevent it?

B. In very cold conditions regulator function may be disrupted by icing, which can lead to freeflow.
   1. Make sure your regulator is environmentally protected. Typically, the first stage should be environmentally sealed and parts used in the second stage designed for cold water use.
   2. Only breathe through the second stage when in the water. Air temperatures are often much colder than the water, when ice diving, so breathing on the surface can cause regulator freeflow. Check your regulator at the surface before you descend – keeping the regulator submerged, breathe from it and monitor your SPG (submersible pressure gauge) as you do during your usual predive check.
   3. Stay shallow. As depth increases, the increased flow through a regulator causes colder temperatures that can promote freezing. Most ice dives are conducted between 6-15 metres/20-50 feet.
   4. Redundant scuba systems, such as a pony/bailout bottle or double cylinder configuration, give you the option to close one cylinder and switch to a working regulator if you have a freeflow. You should gain experience with new equipment before ice diving with it.

Note to Instructor

Promote Rebreather or TecRec courses to divers who meet the prerequisites and want to learn more about redundancy.

3. How are masks affected by extreme cold?

C. Temperature differences affect masks.
   1. The temperature difference between the water and your face may cause fogging of the mask.
   2. Using a commercial defogging agent should reduce fogging.
   3. Don't spend more time than necessary at the surface once you have entered the water, because once wet, ice may form on the outside of the lens. Likewise, dry your mask as soon as possible after the dive.

4. What five ways can you prevent dry suit flooding?

D. There are five ways to prevent dry suit flooding.
   1. Make sure your dry suit is well maintained, including lubricating the zip. If in doubt, check your suit's integrity in confined water first.
   2. Make sure the zipper is properly closed; failing to do this is the most common cause of flooding.
      a. If your zipper freezes after a dive, don't try to force it because it may break. Thaw it out properly using either warm water, gentle heat or by leaving it in a warm place.
   3. Ensure the seals are flat against your skin and dry gloves (if worn) are properly attached.
   4. Avoid sharp objects, including ice fragments, which may cause punctures.
   5. Check dry suit integrity before descending.
      a. Do not ignore a dry suit leak. Even a small ingress of water is serious in very cold water. Abort the dive immediately if you have a leak.
   6. Before using a dry suit for ice diving, you should have sufficient training and experience diving in a dry suit. The PADI Dry Suit Diver Specialty course is recommended.

V. Team Equipment

Learning Objectives

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

1. **What are seven pieces of equipment commonly used for cutting an entry hole?**
2. **What is the most suitable type of safety line and how is it secured to the diver?**
3. **What five items of equipment are used for securing and managing the dive team's safety lines?**
4. **What are three ways to secure safety lines at the surface?**

1. What are seven pieces of equipment commonly used for cutting an entry hole?

A. To cut an entry hole in the ice, use one of the following as appropriate for the environment and local protocol.
   1. The most popular tool for cutting the hole is a chain saw. Only personnel suitably trained and equipped with safety clothing, including eye and ear protection, should use chain saws.

   a. The chain saw should be long enough to cut through the ice and have a safety brake. The person using the chain saw should be attached to a safety line, with another person in attendance to tender the line in an emergency.
   b. Most chain saws contain an automatic lubrication system that uses oil to lubricate the chain. This oil can be detrimental to both the environment and the diver's equipment. A biodegradable nonpetroleum lubricant with a low freezing point can be used with many types of saws. Check with the manufacturer.
2. A coarsely serrated ice saw can be used to cut ice manually. It is usually a long-handled, coarsely serrated tool, although smaller folding versions are available. Even if a chain saw is used, ice saws can be used for trimming rough edges around the hole and for freeing items frozen to the ice sheet.
3. An axe can be used for cutting thinner ice, however it is more useful for freeing gear or ice blocks. Always wear eye protection to protect your eyes from the ice chips and water that are sprayed up.
4. Ice tongs are useful for removing and replacing small ice blocks.
5. Shovels are used for removing snow and digging reference marks on the ice sheet. Flat, broad-bladed snow shovels are best.
6. Block and tackle and ice screws are the best way to remove large ice blocks (more details in the next section).
7. Ice augers are used for drilling test holes to determine the thickness of the ice. These holes are sometimes drilled in a pattern that enables the ice in between to be removed with an axe as above.

2. What is the most suitable type of safety line and how is it secured to the diver?

B. Using safety lines and proper tethering are key to ice diving.
   1. The dive team tether should be a clearly visible line with a minimum diameter of 5 millimetres/1/4 inch (12 millimetres/1/2 inch thickness is recommended for ease of handling with mitts/gloves on).
      a. The tether line will need to be a minimum of 30 metres/100 feet or sufficient length for the planned dive.
      b. The penetration line is no more than 40 metres/130 feet, plus enough line for the tender.
      c. Both floating (polypropylene) and nonfloating line (nylon) may be used. Nonfloating line may tangle in objects on the bottom and absorb water, causing it to freeze to the ice sheet when brought to the surface.
   2. The safety diver team should have at least 60 metres/200 feet of clearly visible line for emergency searches. A different color safety line can be advantageous, as it can be easily differentiated from the dive team line.

3. A storage device such as a crate or line bag is used to hold the line when not deployed. The line should be stored in the device so that it can be deployed without tangling. Ideally, the end of the line that is to be anchored protrudes from one side of the storage device, and the running end from the other side. That way it can be set in place, anchored and the line fed directly.

3. What five items of equipment are used for securing and managing the dive team's safety lines?

C. Securing and managing safety lines are key skills you'll learn.
   1. The safety line is secured to you, either by your harness which, as previous mentioned, fits under your BCD or directly to your BCD. Whichever option you choose must be snug, but comfortable and strong enough that the tender could retrieve you by pulling you in by the safety line.
   2. Aluminum or stainless steel carabiners/clips are required to attach the line to a diver. If open gate carabiners are used, two with the gates reversed are often used per connection.
   3. If diving in salt water, stainless steel P clips (also known as boltsnaps or dog clips) are preferred because they resist salt water corrosion for longer.
   4. Polypropylene unties easily, so splicing all rope connection points is recommended. Knotting, whipping and splicing lines are separate skills. Seek assistance from someone expert in these techniques, or purchase ready prepared lines.

4. What are three ways to secure safety lines at the surface?

D. There are three ways to secure safety lines based on the environment and local protocol.
   1. Ice screws can be screwed into the ice sheet as a very secure point. They are the most reliable and versatile way to secure lines to the ice sheet.
   2. Using an unmovable object ashore, such as a tree, is the most secure anchor of all, as long as the hole is close to shore and enough line is available.
   3. If neither of the above options are available, a cement block, preferably frozen to the ice sheet, will suffice as an anchor. In the unlikely event the block is pulled into the hole (the tender will be monitoring this), it will come to rest directly below the opening, orientating the divers to ascend and exit.

VI. Site Selection, Preparation and Post Dive Procedures

Learning Objectives

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

1. **How does ice develop on a lake or ocean?**
2. **What are six types of ice formations?**
3. **What is the minimum and recommended thickness of ice required for ice diving?**
4. **Other than thickness, what are three factors that may affect the load bearing ability of ice?**
5. **What is the ideal weather for ice diving?**
6. **Why should you choose a site you are already familiar with?**
7. **How do you check the strength and thickness of the ice?**
8. **What shape(s) are used for the entry hole and how is it cut?**
9. **What are five other areas of site preparation?**
10. **How do you close the hole?**
11. **How do you secure the hole?**
12. **How do you ensure all equipment is accounted for after the dive?**

1. How does ice develop on a lake or ocean?

A. The freezing process causes ice to form on the water surface.
   1. Lakes and oceans are normally thermally stratified, with warmer water nearer the top and colder on the bottom.
   2. In ice diving areas, as surface temperatures drop the water cools to a similar temperature throughout, 0-4° C/32-39° F. Once this temperature is reached, ice may begin to form on the surface.
      a. Sea water forms ice at approximately -2° C or 28° F, colder than fresh water due to dissolved salts; therefore, colder conditions are required to develop ice safe for ocean ice diving.
   3. During the freezing process, the physical properties of water cause it to expand. The resulting ice is less dense than water in a liquid state and floats. This results in a temperature inversion with ice at the surface, the coldest water just underneath the ice and (slightly) warmer water at depth.
   4. As salt water freezes, the salt is left behind and the ice formed is made of fresh water.

2. What are six types of ice formations?

B. There are six types of ice formations.
   1. New ice is generally the strongest type of ice. It is formed by long cold freezes. The ice is usually very clear even if it is quite thick.

2. Slush or snow ice (white ice) is formed from thawed and refrozen snow and ice. This ice may be weak. It appears milky white in color.
3. Brash is broken up ice. This ice may refreeze and obtain suitable strength, but care should be taken when venturing out on refrozen brash ice since its thickness may vary greatly.
4. Pack ice is brash ice that has been piled up on itself by wind action, current, tides or large ship traffic. Pack ice can easily reach 3-6 metres/10-20 feet in thickness.
5. Pressure ridges are formed by the natural expansion of the ice as it freezes, or the collision of large ice masses. They are distinguished by a pile of broken ice that may extend for miles.
6. An ice keel is the underwater equivalent of a pressure ridge. Divers must take care not to foul the safety line in keels or hit their heads while swimming near the ice sheet.
7. Take extra care when walking around on refrozen brash ice, pack ice and pressure ridges. Uneven surfaces can make walking difficult and open water may be present between fractures.

3. What is the minimum and recommended thickness of ice required for ice diving?

C. Ice must be thick enough to support the dive team.
1. When ice reaches eight centimetres/three inches thickness, one person might be able to walk on it, but it is not safe for ice diving.
2. 15-20 centimetres/6-8 inches is the recognized minimum ice thickness for safe ice diving. It will support several people in one area.
3. To support vehicles, ice needs to be at least 30 centimetres/12 inches.
4. Ice thickness is only one consideration when considering ice suitability. Other considerations such as ice formations (previously discussed), and the factors below (in Learning Objective 4) must be taken into account in your site assessment. It is recommended that new ice divers dive with a dive center that specializes in ice diving to gain experience.

4. Other than thickness, what are three factors that may affect the load bearing ability of ice?

D. Varying temperatures cause expansion and contraction of the ice sheet. This may cause cracks in the ice. These three factors may affect the ice load bearing.
1. Rumbling noises heard on the ice may be the ice responding to these thermal changes. Generally, the colder the temperature the stronger the ice, but check out recent weather to see whether temperature fluctuations could have weakened the ice.

2. Moving water thins and weakens ice and makes thickness vary drastically. For example, ice as thick 30 centimetres/12 inches in one place may thin to only two centimetres/one inch just three metres/10 feet distance away.
    a. Ice is weaker near shore and around protruding obstructions such as pilings, breakwaters or logs.
    b. Underground springs or rivers bring in moving and perhaps even warmer water, which weakens ice.
3. Snow accumulation may conceal weak ice underneath.

5. What is the ideal weather for ice diving?

E. A cloudless sky is most desirable and visibility is greatly improved when it is not snowing and there is no snow on the ice.
    1. Recreational ice diving is not done at night, so ice diving should be planned only when the sun's elevation permits light penetration through the ice and provides good illumination for personnel on the ice working around the hole.
    2. Remember that the sun sets early in the winter and the onset of dusk could push clean-up operations into darkness.
    3. Extreme cold, especially when combined with wind chill, has a detrimental effect on divers and support personnel standing on the ice. Make sure you see a weather report the night before, and if conditions are not suitable or there is a possibility that the weather will deteriorate, cancel the dive(s).
    4. *Watch out for extreme temperatures!* Diving in conditions where the air temperature approaches -18° C/0° F or lower creates a much higher incidence of equipment malfunction, immediate icing of divers and gear upon surfacing, increased risk of hypothermia and frostbite, and generally uncomfortable conditions on the surface. Limit ice diving to air temperatures of -12° C/10° F or higher, and to wind chill conditions less than -4° C/25° F.

6. Why should you choose a site you are already familiar with?

F. Prior knowledge of the site is essential to choosing a site with a suitable depth, away from water inlets or outlets, without appreciable current (remember you need to return to the hole to exit the dive) and close to shore if possible.

7. How do you check the strength and thickness of the ice?

G. Someone wearing an exposure suit and buoyancy aid, connected to a safety line, which is tendered by another person from a safe location, should check the ice.
    1. Unless diving from shore, choose an area that has at least has 20 centimetres/eight inches of solid ice cover.

   a. Do not drive a vehicle out onto the ice if there is less than 30 centimetres/12 inches of ice cover, or if there is an excessive accumulation of slush or water on top of the ice sheet.
2. Because thickness is only one consideration in ice strength, one person should test the ice sheet to be certain it is suitable for diving.
3. Drill a test hole to determine water depth and confirm ice thickness; water depth should measure at least 6 metres/20 feet.
   a. Measure depth by dropping a weighted line.
   b. If water is too shallow, divers' entry and exit through the hole may stir up the bottom and reduce visibility.
4. Monitor ice strength and thickness regularly. Bubbles from divers and high traffic in some areas on the surface may reduce ice thickness.

8. What shape(s) are used for the entry hole and how is it cut?

H. The entry hole needs to be large enough to accommodate three divers comfortably for training dives.
   1. For general diving, the hole should allow a tender in an exposure suit to assist a diver in the water on the surface.
      a. The most popular shape is a triangular hole to ease egress for the divers and approximately three metres/10 feet on a side.
      b. Another popular shape is a square profile cross (+) because it accommodates several divers, makes entry and exit simple, allows the surface tender easy access to assist divers in the water and is very compact.
   2. Once the site has been selected, a team of two should cut the entry hole. With both divers in exposure suits, one should cut the entry hole while the other maintains a safety line. A tether to the chain saw may also be advisable. Care should be taken to ensure the line does not become fouled in the chain saw.
      a. A suitable and environmentally friendly material may be spread onto the ice to improve traction.
      b. As already mentioned, using a chain saw without the correct training and safety gear can be extremely dangerous.
   3. First, mark the outline of the hole to be cut onto the ice. Next, cut blocks no larger than 1x1 metres/3x3 feet (smaller if the ice is extremely thick) and remove them, one at a time, using block and tackle or similar.
      a. **Do not slide the ice blocks under the ice sheet.** Although it may seem easier than removing them, blocks under the ice sheet can cause the safety line to jam due to entanglements or obstructions. Ice blocks can float back into the hole which can be a significant hazard if it happens

during a dive. A diver being retrieved by a safety line may strike the blocks. Ice blocks may also freeze to the ice so that they can't be replaced.

4. When blocks have been removed they should be placed at least six metres/20 feet away from the hole to provide a windbreak/snow fence, and facilitate dislodging and replacement into the entry hole at the close of diving.
5. The area around the hole can become very slippery, so exposure suits should be worn and care should be taken to avoid falling into the hole while removing the blocks.
6. It is sometimes possible to cut the hole the day before and rope off the area.
   a. The slush in the hole will refreeze overnight and will need to be recut in the morning; however, there will be less to do. This also reduces divers chilling while standing on the ice sheet during dive preparation on the day of the dive.
   b. In areas where ice diving is frequent, holes may be maintained over longer periods.

9. What are five other areas of site preparation?

I. To prepare a site, follow these five steps:
   1. Snow should be cleared in a six-metre/20-feet radius from the hole to enhance light penetration and traction, and prevent snow from freezing wet gear.
   2. It is also common to clear a concentric circle approximately 30 metres/100 feet from the entry hole (another circle may also be cleared 15 metres/50 feet from the entry hole). Then clear four to eight radiating spokes (like a wagon wheel) from the hole to the perimeter. You may also shovel arrow marks along the radiating spokes pointing toward the entry hole. This pattern is cleared for two reasons: light illumination and lost diver aid.
   3. Place environmentally appropriate materials around the entry hole to improve footing, e.g. sand, carpet. Check local regulations.
   4. Secure all safety lines. Anchoring primary and safety lines to opposite sides of the hole is recommended. This reduces the potential for confusion and entanglement.
   5. Prepare shelters and any other surface support. Make sure areas are provided for divers to get out of the wind and cold.

10. How do you close the hole?

J. Open holes are hazardous to others. Unless in an area dedicated to diving, always replace the ice blocks.
   1. In some areas, snow is used to freeze the gaps, while in others this is not preferred if the site will be used again soon.

11. How do you secure the hole?

K. If leaving a hole, it must be secured.
   1. Clearly mark the hole and the fact that is it a hazard.
   2. Local legislation may have requirements that you need to meet – be sure to check.

12. How do you ensure all equipment is accounted for after the dive?

L. Use a checklist to ensure that you recover all equipment.
   1. Handle equipment carefully after the dive to avoid damage, particularly in extremely cold surface conditions.
   2. Dry equipment as soon as possible.
   3. Make sure you take all garbage with you when you leave.

VII. Ice Diving Teamwork

Learning Objectives

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

1. **What are the three functions of buddy teams while ice diving?**
2. **What are five inwater ice diving procedures?**
3. **What are two roles of the surface support team (tenders)?**
4. **How does the safety diver team prepare to assist in an emergency?**
5. **What are two general rules for communication?**
6. **What are four ways ice divers communicate?**

1. What are the three functions of buddy teams while ice diving?

A. There are dive teams, safety dive teams and surface tender teams.
   1. The dive team usually consists of two divers, but sometimes three, such as during training when instructional staff accompany students.
   2. The safety dive team consists of two ice divers with rescue skills, who are ready to respond in an emergency.
   3. The surface tender team of two people for each dive team communicates with the dive team and are their first point of assistance in an emergency.
      a. The surface tender team do not get in the water, even in an emergency – they remain on the surface to tend the line(s).
      b. Even though they do not get in the water, the surface tenders should be ice divers to ensure that they understand the roles and importance of each team. Ice diving students under supervision may fulfill this role during this course.

2. What are five inwater ice diving procedures?

B. Let's look more closer at ice diving procedures.

1. The dive team usually connects to a single safety line to simplify surface support, enhance buddy contact and avoid line entanglement underwater.
   a. Diver B should be connected to the end of Diver A's line, approximately 2-3 metres/6-10 feet along the line.
   b. Diver A is the dive leader and controls line signals to the surface tender, this diver is usually the more experienced ice diver. In some areas divers use separate lines.

Note to Instructor

Draw a diagram on the board for the class or have student divers simulate the positioning on land. The procedure discussed uses a single safety line for the diving team. Use of multiple safety lines is acceptable, if it is the normal protocol in your area. If multiple lines will be used, describe the technique used in your local area.

2. The dive leader should stay in constant communication with the surface support team by signalling "okay" on the line every one or two minutes (discussed later).
3. The penetration limit is a maximum of 40 metres/130 feet from the entry, both vertical and horizontal distance included, and within the daylight zone. Use of a 40-metre/130-feet line or shorter will help your team stay within these limits.
4. Both divers in a team should maintain constant line awareness to avoid becoming entangled and ensure the line does not get caught on any obstructions.
   a. This means you will need to pay constant attention to the line's position relative to yourself, your buddy and any underwater obstructions that could cause the line to foul.
   b. Line entanglement is one of the most prevalent, although not usually dangerous problems encountered while ice diving, so it's important to maintain line awareness at all times.
5. You need extra buddy awareness while ice diving as well, not only to be alert for potential problems such as regulator freeflow, but also to overcome potential for a false sense of security created by the team being connected together by a line.

3. What are two roles of the surface support team (tenders)?

C. There are primary tenders and second tenders.

1. One person is responsible for tending the dive team line, making sure the dive team is securely tethered, and keeping in constant communication with the

divers. This person is the primary tender. This procedure ensures that none of the divers enter the hole without being connected to the line and that, in case a diver accidently slips into the hole during preparation, the diver may be easily retrieved.

a. The primary tender is also responsible for maintaining line tension. The line must not be slack, because it could become entangled, but it should also not be too taut that is will interfere with the divers' movements. Every few seconds the tender gently pulls on the line to check tension.

2. Once divers are connected to the line, the second tender (often known as rescue tender) may assist the divers with gear adjustments and last-minute items such as lights and cameras.
   a. If the tenders have not donned wet or dry suits, they should wear personal flotation devices in the event one falls into the hole or the ice collapses.
   b. During the dive the second tender is responsible for keeping the lines and hole free of ice and entanglement, timing the divers' bottom times, making sure the safety team is adequately prepared to respond, and assisting the divers with entries and exits.
   c. In the event that the safety team had to enter the water, the second tender would take control of their line, hence also being referred to as the rescue tender.

4. How does the safety diver team prepare to assist in an emergency?

D. Safety divers only dive in pairs and should be certified ice divers with rescue skills. The PADI Ice Diver course optional Dive Four is recommended as the ideal way to learn to apply rescue skills to the ice diving environment.
   1. The safety dive team should be ready to respond as quickly as possible.
   2. The safety team must take care to remain warm so, depending on the environment, they should be either dressed in an exposure suit or with their exposure suit ready to don, if the surface conditions are too harsh for them to wear their exposure suit while waiting.
   3. All normal and ice diving equipment should be together and ready for rapid deployment, including the safety divers' line.

5. What are two general rules for communication?

E. Communication is critical to dive safety.
   1. All signals should be clear and concise. Confusion can easily occur if not, which could lead to real or perceived problems.
   2. Always confirm that signals have been understood by repeating the signal back to the sender.

6. What are four ways ice divers communicate?

F. There are four ways that ice divers can communicate.
   1. Underwater, ice divers communicate by using hand signals. Signals should be reviewed prior to the dive.
      a. Hand signals can be more difficult to understand when wearing dry gloves or mittens, so make sure the signals are large and clear.
      b. Use your dive light to illuminate the hand giving signals and try to hold your hands away from your body when signalling. Using light or brightly colored gloves also helps. Black gloves with a black suit behind makes signals very hard to see.
   2. Light signals can be used underwater and are particularly effective when divers use a primary light (powerful, rechargeable lights).
   3. If you can't make yourself understood using signals, you can write on a slate or wet book. This is not easy with thick gloves and can be time consuming, so consider whether you really need to explain or if it would be preferable to signal to your buddy that you have a problem, end the dive and explain what the problem was when you are safely back at the surface.
   4. Line signals are the way divers communicate with the surface team. Line pulls need to be long, sharp and distinct and should be confirmed by the receiver. Any set of signals may be used as long as they are agreed upon in advance and are easily distinguished. This simple set of signals will cover most situations:
      - One Pull – Let line out, slack
      - Two Pulls – OK
      - Multiple rapid pulls – Pull in the line

Note to Instructor

Review hand signals, light signals and any other rope signals you'll use during dives.

VII. Ice Diving Planning and Techniques

Learning Objectives

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

1. **Why is being cold an issue with respect to decompression sickness risk?**
2. **What should you do if you are cold on a dive?**
3. **How do you make sure you have enough gas to get back to the entry hole, even in an emergency?**
4. **How do you calculate your gas consumption?**
5. **How do you calculate your reserve?**
6. **How do you check that you have enough gas available in your cylinder(s)?**
7. **How do you calculate thirds and your turn point?**
8. **What are three entry procedures for ice diving?**
9. **What are a descent check and bubble check, and why are they common in ice diving?**
10. **How do you dive under ice?**

1. Why is being cold an issue with respect to decompression sickness risk?

A. If you get cold during a dive, you may end the dive with more dissolved nitrogen than calculated by your dive computer (or tables).
   1. At the beginning of the dive you are warm and nitrogen uptake is likely to be normal.
   2. During the dive you start to chill, reducing circulation in some areas (typically the extremities, such as hands and feet).
   3. During ascent the release of nitrogen from these areas may be slower than normal due to the circulation changes caused by cooling. This is thought to increase your DCS risk.
   4. Plan your dive conservatively to account for cold.

2. What should you do if you are cold on a dive?

B. If you are cold during a dive, be more conservative.
   1. Stay well within the no stop limits, being even more conservative than normal. There should always be plenty of no stop dive time remaining throughout the dive.
   2. Some computers allow you to set them to be more conservative, though you usually have to do this before the dive. See the manufacturer literature.
   3. With the RDP Table and the eRDPML, you plan cold/strenuous dives as though they are four metres/10 feet deeper than their actual depth.
   4. Safety stops are recommended after all dives, but they're especially prudent after a cold and/or strenuous dive.

3. How do you make sure you have enough gas to get back to the entry hole, even in an emergency?

C. In an out-of-gas emergency, divers can't necessarily surface straight away when they are in an overhead environment, they must return to the entry/exit. In ice diving this means returning to the ice hole.

1. The most common technique for ensuring adequate gas to deal with an out of gas emergency is called the rule of thirds. This means that you use a maximum of one third of your gas for penetration of the overhead environment; this is called your turn point.
2. When you reach a turn point, signal "end the dive" (thumb up). Your buddy(ies) respond with the same signal to show their comprehension and the team start to make their return journey.
3. The second third of your gas supply is used for the return journey and safety stop.
4. You save one third of your supply purely for emergency use. This includes unexpected delays and out-of-gas emergencies. Remember, this is the minimum you should save, choosing to reserve more gas will make your dive more conservative.

4. How do you calculate your gas consumption?

D. You need to collect some data so that you can work out your breathing rate.

1. Most dive planning software and applications have gas planning capabilities. This simplifies and speeds up calculating gas consumption and how much gas you need to plan for a specific dive. Before you can do this though, you need data.
2. Start by recording your breathing rate on different dives. Record how many bar/psi you use, the cylinder size, dive time and depth (if your dive computer shows average depth use this, otherwise use the maximum depth). If you are working in cubic feet, you will also need to know the working pressure of your cylinder.
3. Work out your Surface Air Consumption (SAC) rate in litres per minute (lpm) or cubic feet per minute (cfpm) by plugging these numbers into your software or app.
4. By recording your SAC rate over several dives and averaging them, you can determine your normal breathing rate.
5. Once you know your SAC rate you can use it to determine how much gas you need for a particular dive at a particular depth, and even account for the cylinder(s) you plan to use.

Note to Instructor

Use dive planning software to work through the examples below. Bear in mind that different software may apply different rounding so answers may vary very slightly. If dive planning software is not available or if students express an interest in the manual calculations, you may choose to teach this method.

Example Calculation

Metric example:

Using a 12-litre cylinder, you use 82 bar during a 20-minute dive at 10 metres. What is your SAC rate?

Answer: 24.6 litres per minute; for practical purposes, most divers round this to 25 lpm

Imperial example:

Using an 80-cubic foot cylinder, working pressure 3000 psi, you use 1200 psi during a 20-minute dive at 33 feet. What is your SAC rate?

Answer: 0.8 cubic feet per minute

Finding your SAC rate:

Metric:

SAC lpm = [(bar used x cylinder size in litres)/(depth in metres + 10) ÷ 10]÷ minutes

litres per minute = [(82 x 12)/(10 + 10) ÷ 10]÷ 20 litres per minute (lpm) = 24.6

Imperial:

SAC cfpm = [(psi used ÷ working pressure of cylinder in psi) x total cylinder capacity in cubic feet /(depth in feet + 33) ÷ 33]÷ minutes

cfpm = [(1200÷3000) x 80/(33 + 33) ÷ 33]÷ 20 cubic feet per minute (cfm) = 0.8

6. Once you have your SAC, rate you can determine what volume of gas you need for a specific dive by inputting your SAC rate and dive plan data into your dive planning software.

Example Calculation

Metric example:

A diver with a SAC rate of 25 lpm plans a 15-minute dive to 22 metres. What volume of gas will he breathe?

Answer: 1200l

Imperial example:

A diver with a SAC rate 0.8 cfpm plans a 20-minute dive to 50 feet. What volume of gas will he breathe?

Answer: 40 cf

Finding the volume of gas required:

Metric:

litres required = (SAC x minutes) x [(depth in metres + 10) ÷ 10]

litres required = (25 x 15)x [(22m + 10) ÷ 10]= 1200

Imperial:

cubic feet required = (SAC x minutes) x [(depth in feet + 33) ÷ 33]

cf required = (0.8 x 20) x [(50 + 33) ÷ 33] = 40

5. How do you calculate your reserve?

E. The previous calculations show the gas you plan to use, but it does not allow for any reserve, so that is the next thing you need to calculate.

1. To determine your gas requirements with a one-third reserve, choose a 33 pecent or one-third reserve in the settings for your software.

Example Calculation

Metric example:

You have calculated that you will use 1200 litres for your planned dive. How much gas do you need to start the dive so that you can leave one-third/33% in reserve?

Answer: 1800l

Imperial example:

You have calculated that you will use 40 cf your planned dive. How much gas do you need to start the dive so that you can leave one-third/33% in reserve

Answer: 60 cf

Calculating how much gas you need with one-third reserve:

Planned gas x 1.5 = total gas required, including one-third reserve

Metric:

1200 x 1.5 = 1800l

Imperial:

40 x 1.5 = 60 cf

6. How do you calculate how much gas you will need in your cylinder(s) at the beginning of a dive?

F. To determine how much gas you need in your cylinder at the beginning of a dive, you need to add cylinder data to your dive plan.

Example Calculation

Metric example:

Continuing on from the previous example, you want to start the dive with at least 1800l. You are using a 12-litre cylinder; what is the minimum starting pressure in bar?

Answer: 150 bar

Imperial example:

Continuing on from the previous example, you want to start the dive with at least 60 cf. You are using a 80 cf cylinder with a working pressure of 3000 psi; what is the minimum starting pressure in psi?

Answer: 2250 psi

Calculating starting fill pressure:

Metric:

bar required = l required/cylinder size in l

bar required = 1800/12 = 150

Imperial:

psi required = (cf required/cylinder capacity in cf) x working pressure in psi

psi required = (60/80) x 3000 = 2250

7. How do you calculate thirds and your turn point?

G. Although you can use software and apps to calculate thirds and your turn point, this is one calculation that is often done just before the dive, so learning how to do it manually is a good idea.

1. Once you have had your cylinders filled, to calculate your turn point and reserve divide your gas pressure reading by three and subtract the answer from total gas pressure to determine when you've used the first third.

Example Calculation

Metric example:

If your SPG reads 210 bar, 210 ÷ 3 = 70; 210 - 70 = 140 bar. This is your turn point.

Imperial example:

If your SPG reads 3000 psi, 3000 ÷ 3 = 1000; 3000-1000 = 2000 psi. This is your turn point.

2. If your pressure isn't evenly divisible by three, round down to the next "round" number that is, then divide by three and subtract from the total pressure.

Example Calculation

Metric example:

If pressure is 200 bar, round down to 180 bar; 180 ÷ 3 = 60; 200 - 60 = 140 bar

Imperial example:

If pressure is 2900 psi, round down to 2700. 2700 ÷ 3 = 900; 2900 - 900 = 2000 psi

3. If there is a big difference between the air and water temperature, especially if the air temperature is significantly colder than the water, it is better to leave your equipment somewhere that has a similar temperature to the water. Excessive cooling of your equipment may cause problems with function, which we will discuss later; but from a gas planning point of view, large changes in temperature can alter your SPG reading to the extent that you may need to recalculate your turn point.

Example Calculation

Metric example:

A diver checks his SPG on the surface. The surrounding temperature is -18°C and the SPG reads 210 bar. One third of the gas is 70 bar so the turn point is 140 bar. When the diver enters the water the water is 2°C at the surface and the SPG reading increases to 225 bar. One third of 225 is 75 bar, so the turn point is now 150 bar. Using the calculations made at the surface puts the turn point beyond the rule of thirds.

Imperial example:

A diver checks his SPG on the surface. The surrounding temperature is 3°F and the SPG reads 2850 psi. One third of the gas is 950 psi so the turn point is 1900 psi. When the diver enters the water the water is 35°F at the surface and the SPG reading increases to 3000 psi. One third of 3000 is 1000psi, so the turn point is now 2000 psi. Using the calculations made at the surface puts the turn point beyond the rule of thirds.

4. Rebreather divers have an open-circuit bailout cylinder that does the same job as the "reserve third" in open-circuit scuba.
   a. Open-circuit bailout cylinders should be used on all ice dives.
   b. Rebreather divers learn to calculate reserves in the Rebreather and Advanced Rebreather Diver courses. If using a rebreather, make sure you properly calculate your reserve.

8. What are three entry procedures for ice diving?

H. Follow these three procedures when entering the water while ice diving.
   1. Prior to entry, the primary tender will check that you are attached to the line.
   2. Entry into an ice hole is usually a controlled seated entry (sitting at the edge of the hole, with all equipment in place and pushing off with both hands on the ice and on one side of your body). If entering from shore, use the most appropriate entry.
   3. At the surface, keep regulators in the water while breathing from them, to avoid freezing and the potential for freeflow.

9. What are a descent check and bubble check and why are they common in ice diving?

I. In ice diving, you normally conduct a descent check and a bubble check at the beginning of a dive. Your descent check is a final check that everything is in order.
   1. After confirming the team is ready, everyone descends together to a shallow depth, usually just under the ice.
   2. Allow yourself to acclimatize, reconfirm gas pressures and make yourself neutrally buoyant.
   3. Confirm all second stages work by breathing off all of them underwater. This should be done one at a time, with your buddy watching you just in case there is a problem. You commonly conduct a bubble check at the same time by checking all first and second stages, valves and connections for leaks.
   4. Conducting these checks usually only takes a minute or two, but make sure that all equipment is working correctly and all divers are ready to proceed.

10. How do you dive under ice?

J. Swim side by side with your buddy and keep the safety line to one side to avoid entanglement.
   1. Swim slowly and match your depth and pace to your buddy.
   2. To make an ascent, go up no faster than 18 metres/60 feet per minute or within with your dive computers maximum ascent rate, whichever is slower.
      a. Look up every few seconds during ascent and extend one hand over your head to protect you from the ice sheet or other structures.
      b. A safety stop adds conservatism to any dive, so plan to make a safety stop whenever possible. Follow the recommendations of your dive computer.

VIII. The Effects of Cold

Learning Objectives

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

1. **What is hypothermia and when does it occur?**
2. **What are the mechanisms of heat loss underwater and at the surface?**
3. **What are seven signs and symptoms of hypothermia?**
4. **What is the proper procedure for rewarming a patient with hypothermia?**
5. **How can you prevent hypothermia?**
6. **What is frostnip and frostbite, and how do you rewarm afflicted areas?**
7. **How do you prevent frostbite and frostnip?**

1. What is hypothermia and when does it occur?

A. Hypothermia occurs when the body cannot maintain its normal core temperature. It is a potentially hazardous situation.
   1. Hypothermia in divers usually results from diving in cool water with insufficient exposure protection, but can occur from failing to wear adequate protection before or after a dive, particularly in ice diving locations where surface temperatures can be extremely cold.

2. What are the mechanisms of heat loss underwater and at the surface?

B. Whether on the surface or underwater, you continually radiate heat away from your body via the skin when the surrounding temperature is colder than you are.
   1. Underwater, you lose heat primarily through conduction. Conduction is the transfer of heat between objects in contact with each other. Exposure suits slow, but do not stop this process.
   2. Air passing over exposed surfaces also cools us. On the surface, this is one reason wind chill can be so detrimental. Keeping your body covered, particularly your head, can help reduce this effect.
   3. Evaporation is another cause of cooling. It is not a significant factor underwater, but it can be when wet at the surface. Very cold air tends to have little moisture, so evaporation can take away heat from a wet person, even as the water freezes.
   4. Perspiration will chill you prematurely. Kit up slowly to avoid it. High tech undergarments that wick moisture away from the body help to reduce this problem.
   5. Heat is lost through breathing when you inhale cold air, either from an open-circuit regulator or surface air, and exhale warmer air. Rebreathers generate heat through the chemical process that removes carbon dioxide and help reduce this.

3. What are seven signs and symptoms of hypothermia?

C. It's important to recognize the signs and symptoms of hypothermia.
   1. Signs and symptoms begin with shivering, numbness and blueness in fingers, lips and toes (may be difficult to see underwater). Any of these mean the dive should end immediately.
   2. As hypothermia worsens, the diver loses coordination, becomes weak and confused.
   3. In severe cases, body systems fail, shivering stops and the patient loses consciousness.
   4. Short of immediately life-threatening symptoms, hypothermia has three effects that concern us as divers.
      a. Cold distracts divers from safety related tasks.
      b. Numbness in the extremities can seriously impair manual dexterity.
      c. More advanced hypothermia impairs mental processes. This may even cause the diver to deny there is a problem!
   5. In some instances, hypothermia can occur or become more severe after a diver leaves the cold environment. This is believed to be caused by flow of cooled blood to the core as circulation restores.

4. What is the proper procedure for rewarming a patient with hypothermia?

D. Divers with suspected hypothermia (even mild) should discontinue diving for the rest of the day.
   1. Although the diver may feel normal, it may take several hours for normal temperature to return throughout the body.
   2. For more severe cases, first aid begins with primary assessment. Keep the patient lying down and don't let the patient walk or exercise.
   3. Take an alert patient with mild hypothermia to warmth, remove the exposure suit and dry the person, rewarming by covering the head and applying heat to the neck, armpits and groin.
   4. For severe hypothermia, contact emergency medical care and protect the patient from further cooling.
   5. Leave rewarming of severe hypothermia to EMS (or follow their advice) because doing so is medically complicated and can cause further injury to the patient if handled incorrectly.

5. How can you prevent hypothermia?

E. Prevent hypothermia by maintaining adequate exposure protection, both underwater and on the surface.
   1. Limit exposure times and watch for signs and symptoms of hypothermia in

yourself and your buddies. End the dive before you feel significantly chilled, and leave a margin in case you're delayed in reaching warmth.

2. Maintain good health, eat properly and do not ice dive if you do not feel well.

6. What is frostnip and frostbite, and how do you rewarm afflicted areas?

F. Frostnip and frostbite may occur when exposed to cold temperatures.

1. Frostnip is the cooling of the outer layer of the skin and commonly affects the extremities, such as ears, nose, cheeks, chin, fingers and toes. The skin appears pale (sometimes turning pink first), feels cold and can be rewarmed easily by methods such as putting hands into armpits.
2. When the cooling spreads from the skin to the tissue below, it becomes frostbite. In serious cases, freezing spreads from the skin and underlying tissues to the nerves and blood vessels.
   a. In frostbite, the skin is pale and waxy, and as the cold penetrates underlying tissues will become hard and lose all feeling.
   b. Contact emergency medical care if you suspect frostbite and protect the patient from further cooling.
3. Leave rewarming to EMS (or follow their advice) because reheating too quickly can cause further injury to the patient.
4. To avoid damage during transport, do not use or rub frozen parts.

7. How do you prevent frostbite and frostnip?

G. Reducing exposure will help prevent frostbite and frostnip.

1. Keep all flesh covered, especially if wind chill is high, and take extra dry clothing to replace clothing that accidentally becomes wet.
2. Monitor the weather and avoid extreme conditions.

IX. Ice Diving Emergency Procedures

Learning Objectives

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

1. **What should you do if you have a freeflowing regulator?**
2. **What should you do if you run out of gas during an ice dive?**
3. **What should you do if you have an uncontrolled ascent during an ice dive?**
4. **What should the dive team do if they separate from the line?**
5. **What should the surface team do if there is no response to the tender's signal?**
6. **What is ice sag/collapse and how do you prevent it?**
7. **What do you do if an unprotected individual falls into the water?**
8. **What should you do if line signals are interrupted due to ice formations?**

1. What should you do if you have a freeflowing regulator?

A. If you have a freeflowing regulator, the best option is usually to switch to a second regulator, either a redundant system (e.g. pony bottle) or your buddy's alternate. Then either turn off the freeflowing regulator yourself or have your buddy do it for you.

1. You can breathe from a freeflowing regulator as you were taught in your Open Water Diver course, by breathing normally from the regulator, but do not seal your mouth around the mouthpiece to allow the excess gas to escape.
2. Freeflowing gas is very cold and the bubbles can be disorienting. It also causes freezing to spread around the regulator.
3. Either way, signal your buddy and swim calmly to the exit hole together.

2. What should you do if you run out of gas during an ice dive?

B. As a certified diver, you know that the best way to avoid an out of air emergency is to monitor your gas supply, but if something goes wrong, you need to know how to handle an out-of-gas situation under ice.

1. You learned in your Open Water Diver course that if you feel your breathing becoming harder, check your SPG, it could mean that you are very low on gas.
2. If you run low on or out of gas, you switch to an alternate gas source. This may be either a redundant cylinder, such as a pony/bailout bottle, or your buddy's alternate.
   a. If switching to your buddy's alternate, remember to give the correct "out of air" signal, if possible.
   b. If switching to a redundant cylinder, alert your buddy to the situation.
3. Give the appropriate line signal and end the dive.

3. What should you do if you have an uncontrolled ascent during an ice dive?

C. Buoyancy control is always important, but even more so when you are attached to a line, which is also attached to your buddy.

1. Losing control of your buoyancy can affect both you and your buddy, so monitor your depth frequently and make buoyancy adjustments to remain neutral.
2. If you do have an uncontrolled ascent while under ice, vent your BCD and dry suit (if applicable) as much as possible.
3. Position yourself to avoid hitting the ice head first; use your cylinders, or rebreather case to protect you if possible (this may not work in a sidemount configuration). Have equipment that has impacted the ice checked before diving it again.
4. Remember to breathe continuously during the ascent.
5. Do not dive again that day, monitor yourself and buddy for signs of DCI.

4. What should the dive team do if they are separated from the line?

D. Line separation is rare, but if it happens you need to know what to do.
   1. Look for your buddy; if only you have become detached, you will find the line with your buddy.
   2. If both you and your buddy have become detached from the dive line, ascend directly to just below the ice sheet.
   3. Look for the ice hole or the snow patterns to show you the direction of the hole. Do not swim off searching, this is likely to take you farther from the hole and make it harder for the safety team to find you.
   4. If not sure, remain in position, just under the ice and watch for the safety team line. Some divers use their knife to secure themselves to the ice; this enures they do not drift away and the safety divers will be able to find them with a sweep search pattern.

5. What should the surface team do if there is no response to the tender's signal?

E. If there is no response to line signals, the tender will ask the safety divers to kit up.
   1. The surface tender should not pull the line in, because it may help the safety divers locate the dive team.
   2. Safety divers are dispatched on a separate line, tended by the rescue tender, to follow the dive team's line.
   3. If the dive team is located the safety divers assist them to the exit, using normal rescue techniques.
   4. If the dive team is not located on the line, the safety divers follow line separation procedures:
      a. The safety divers follow the dive team's line to the end, then execute a circular sweep based on the maximum length of the dive team's line, just under the ice sheet at the surface. This sweep should help find the divers so that the safety team can lead them to the exit.
      b. If the divers are not found just under the surface, the safety divers may repeat the sweep at the bottom, if possible.
      c. The safety team searches until they have used all but one third of their gas supply, or consumables (in the case of rebreathers) or reach their no decompression limit, are too cold to continue or the divers are located, whichever comes first.
   5. Successful resuscitation of cold water near-drowning victims, even after long periods of submersion, are well-documented. Therefore, resuscitation should always be attempted.

6. What is ice sag/collapse and how do you prevent it?

F. On warm sunny days, ice sag/collapse can develop due to warming of the ice around the hole and warming of the ice by the surrounding water.
   1. It can cause large sections of ice, even ice up to 20 centimetres/eight inches thick, to sag, and eventually break under the weight of equipment or people.
   2. To avoid this problem, keep an eye on weather conditions and try to locate thicker ice, and keep dive personnel and heavy objects such as gear and ice blocks at least six metres/20 feet from the hole.

7. What do you do if an unprotected individual falls into the water?

G. Once water gets on the ice around the hole it becomes extremely slippery, and someone could fall in
   1. Be sure anybody who is near the hole is tethered and wearing an exposure suit, and that provisions are made to increase traction around the hole as discussed earlier.
   2. If an unprotected individual falls into the water, quick response is imperative since incapacitation will occur in just a few minutes.
   3. Rescuers should be dressed in exposure suits and attached to a line or, if rescuing from land, attached to a safety line with a flotation device to extend to the victim.
   4. Upon reaching the victim, the rescuer should handle the victim carefully to prevent further injury.
   5. If the ice will not support the weight of two people, the safety line may be used to pull them out.

8. What should you do if line signals are interrupted due to ice formations?

H. Lines may become caught on ice formations. If this happens signals to and from the tenders may be interrupted.
   1. As discussed earlier, this can often be prevented by removing ice rather than pushing it underneath the ice sheet to avoid potential entanglement with the safety line.
   2. If ice keels or other objects foul the safety line, the dive team should follow the line to the point of entanglement and free it, giving the "okay" signal to the tender once the line is free.

SECTION THREE

Practical Application

The Practical Application sessions provide hands-on training that emphasizes the team surface roles and responsibilities while ice diving.

Practical Application One focuses on predive set up and dive planning, including cutting the hole.

Practical Application Two covers the roles of the Surface Tender.

Practical Application Three has divers complete post-dive activities, such as striking the site.

Sequencing Practical Applications

1. **Practical Application One and Two must be completed before Open Water Dive Three.**
2. **Practical Application Three may be completed any time prior to certification.**

Supervision

A PADI Ice Diving Instructor may indirectly supervise Practical Application One and Three. **A PADI Ice Diving Instructor or certified assistant must directly supervise Practical Application Two. The course instructor must ensure that all performance requirements have been met.**

Practical Application One

Performance Objectives

By the end of Practical Application One, you will be able to:

- **As part of a team, plan at least two ice dives, using the rule of thirds to plan gas consumption and taking into consideration the environmental conditions.**
- **Demonstrate the general setup and preparation of the ice diving site, including preparing the entry hole, taking environmental considerations into account.**

Recommended Sequence

1. Involve student divers in activities prior to the dive day, such as checking the long-term weather forecasts.
2. Guide divers through the process of planning two ice dives. Explain how to use the RDP or dive computers for use in cold water. Plan dives before getting to the dive site to avoid unnecessary exposure.
3. Explain local protocols and regulations.
4. If possible, have divers identify and gather all the necessary equipment before heading to the dive site.
5. Brief divers on the overall plan and individual roles – this may be done before reaching the dive site to limit exposure to cold.
6. Guide the divers in assessing the dive site.
7. As a team, have divers and staff set up the dive site.
8. Divers cutting the hole must comply with all local safety regulations for the use of any power tools.

Practical Application Two

Performance Objectives

By the end of Practical Application Two, you will be able to:

- **Demonstrate the role of a Primary Tender, including securing and checking line attachment, communicating with a dive team and responding to an emergency signal.**

Recommended Sequence

1. Make sure divers are appropriately dressed for surface conditions.
2. Have divers practice being a tender by completing the following tasks:
    - Assist divers kitting up and entering the water as necessary.
    - Attach and check the tender line, prior to the diver's entry.
    - Pay out line, maintain line tension and awareness throughout the dive.

- Communicate with the dive team, regularly checking that they are ok and answering their signals.

- Respond to a simulated emergency signal, pulling the dive team in at a safe rate (18m/60ft per minute is one metre/three feet every three seconds). Divers can take turns pulling the team. The purpose of the skill is to practice the correct pulling rate and to avoid entanglements, not necessarily to pull divers all the way back.

3. Remind student divers to detach the line for the divers only when they have exited and are clear of the hole.

Practical Application Three

Performance Objectives

By the end of the Practical Application Three, you will be able to:

- **Demonstrate post-dive procedures including securing the site, removing all garbage and any other environmental considerations.**

Recommended Sequence

1. As a team, have divers secure the hole, taking into account whether it will be reused, local protocols, the safety of others and environmental considerations.
2. As a team, have divers clear the site making sure that all equipment and garbage is removed.
3. Use staff to help remind divers of steps and to assist as necessary.

SECTION FOUR

Ice Diver Training Dives

Conduct

The PADI Ice Diver specialty course has three required open water training dives and one optional open water training dive. You also have the option of adding a confined water dive if desired to practice the skills before diving in an overhead environment.

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

The purpose of Dive One is to introduce divers to the ice diving environment and basic skills. To enhance inwater control, supervision and student comfort, the instructor could be on the same tether as the buddy team, at the apex of a Y configuration. On Dives Two and Three, the divers in each team take turns being the dive leader. Dive Four is optional and introduces ice diving rescue skills to PADI Rescue Divers.

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

Team Roles and Supervision

The minimum team size for an ice diver training dive is two safety divers and two surface tenders (primary and rescue), in addition to the dive team of up to two student divers and one instructor/certified assistant. (See supervision requirements in Section One.)

Surface tenders may be ice diver students completing Practical Application Two under the direct supervision of an Ice Diver Instructor or certified assistant. After successful completion of Practical Application Two, ice diver students may fulfill the role of surface tenders under the indirect supervision of the instructor.

Safety divers must be certified ice divers, preferably with rescue diver training. It is recommended that safety divers have completed and logged Ice Dive Four, which focuses on rescuing ice divers.

Ice Dive One must be directly supervised by an Ice Diver Instructor. This may be the divers' first dive in an overhead environment and/or very cold water. **The instructor must assess diver comfort and is responsible for ensuring that they are ready for supervision by a certified assistant on later dives.** Subsequent dives may be supervised by a certified assistant or the course instructor, at the discretion of the instructor.

Ice Dives, Two, Three and Four must be directly supervised by an Ice Diver Instructor or a certified assistant. To qualify as a certified assistant, an individual must be an active PADI Divemaster or higher and PADI Ice Diver (or qualifying certification) with specific ice diving rescue skills. It is recommended that certified assistants have completed and logged the optional Ice Dive Four. The course instructor should ensure that a certified assistant is familiar with the performance requirements and ice diving techniques necessary to meet course requirements.

Dives, Times, Depths and Gases

1. **The minimum number of dives for certification as a PADI Ice Diver is three open water dives.**
2. **All dives must be planned as no stop (no decompression) dives.** Divers may use enriched air to extend no stop time or add conservatism if they are certified as PADI Enriched Air Divers (or qualifying certification).
3. **Dives must not exceed 30 metres/100 feet. Penetration must not exceed 40 metres/130 feet linear distance from the entry hole, vertical and horizontal distance included.**
4. **Open water dives must be conducted under ice.** Unless diving from shore, the minimum recommended thickness for ice is 20 centimetres/8 inches. The course instructor must evaluate all site conditions to ensure suitability.

General Considerations

1. Plan the schedule to give divers ample time, but avoid excessive exposure either inwater or at the surface.
2. Have appropriate spares available so that any equipment problems can be solved in a timely manner.
3. If possible, choose sites that divers have visited without ice. The PADI Ice Diver course is primarily an overhead environment course, so choose environments that are not particularly challenging so student divers can focus their attention on the new environment, equipment and the skills they apply using it.
4. Use certified assistants.

Sequence Options and Dives

1. **Knowledge Development must be completed before the open water dives.**
2. **Practical Application One and Two must be completed before Open Water Dive Three.**
3. **Training dives must be conducted in order.** You may rearrange skill sequences within a dive.

Ice Dive One

Performance Objectives

By the end of Ice Dive One, you will be able to, with a buddy and with instructor guidance as appropriate:

1. **Assemble, don and adjust equipment that will be used on the dive.**
2. **Complete a predive safety check.**
3. **Demonstrate an entry appropriate for the local ice diving environment.**
4. **Perform a buoyancy check, and adjust for proper weighting.**
5. **Throughout the dive demonstrate proper habits for minimizing the potential for equipment freezing.**
6. **Perform a proper descent under control, pausing below the surface to acclimatize and perform a bubble check with a buddy.**
7. **With instructor assistance, as necessary, demonstrate staying within the rule of thirds, surfacing with at least one third gas remaining.**
8. **Establish neutral buoyancy and swim maintaining awareness of the tender line and your buddy.**
9. **With instructor assistance, as necessary, remain within depth, penetration and light limits of the entry hole.**
10. **Throughout the dive, initiate and respond correctly to line and hand signals with the surface tender and dive team.**
11. **Ascend at a maximum rate of 18 metres/60 feet per minute or according to dive computer limits.**
12. **Perform a safety stop.**
13. **Demonstrate an exit appropriate for the local ice diving environment.**

I. Ice Dive One Standards

A. Environment: Open water, under ice

B. Maximum Depth: 18 metres/60 feet

II. Suggested Sequence

A. Briefing

1. Evaluate dive site conditions.
2. Give a dive site overview for diver comfort and planning purposes. This can be done ahead of the dives to avoid divers cooling on the surface. Include:
   a. Depth, temperature, entry/exit techniques, noteworthy features.
   b. Facilities and where to find emergency equipment, etc.
3. Describe entry and exit techniques for the dive site.
4. Plan the dive with student divers. (This may be done as part of Practical Application One.)
   a. Provide an overview of what the divers will be doing and the dive time required for planning purposes.
   b. It's recommended that you provide skill descriptions and details as close to the dive as possible, unless surface conditions make this unfavorable.
5. Assist with any problems found during the predive planning and setup.
6. Agree on depth and time limits, emergency signals, etc.

B. Predive Procedures

1. Have student divers prepare all standard and specialized equipment.
2. Put on all equipment.
3. Review check-out/in procedure with surface support staff (as required).

C. Ice Dive One

1. Predive check
   a. Buddies conduct a predive check.
   b. Watch for and correct errors as appropriate.
   c. Divers check surface team preparedness.
2. Entry
   a. Surface tender attaches and confirms line, divers enter the water using a method appropriate for the environment.
3. Buoyancy check and proper weighting
   a. Divers check their buoyancy and adjust their weight as necessary.
4. Surface procedures
   a. Divers should avoid breathing from regulators that are not submerged to minimize potential for freeflow.

5. Gas management
    a. Before beginning the descent, remind divers to check their starting pressure and make a note of their turn pressure.
    b. During the dive, check cylinder pressures at irregular intervals to confirm appropriate gas management.
6. Descent
    a. Buddies execute a five-point descent.
    b. Bubble check and acclimatization below the surface (3-6 metres/10-20 feet recommended).
7. Locate SPGs and signal pressures
    a. Divers should signal the team when they have used one third of their gas and should plan to surface by the time they have used two thirds of their gas.
8. Neutral buoyancy and line awareness swim
    a. Divers swim maintaining appropriate line tension and position relative to each other.
9. Underwater navigation
    a. Divers should remain within depth and penetration limits.
    b. Instructor may lead the dive or provide assistance as needed.
10. Underwater communication
    a. Divers initiate and respond to signals with the surface tender and dive team, appropriately for their team role.
    b. Instructor prompts and corrects as necessary.
11. Ascent
    a. Divers ascend at a maximum rate not exceeding 18 metres/60 feet per minute or according to dive computer.
    b. Divers complete a safety stop.
12. Exit
    a. Divers establish positive buoyancy at the surface.
    b. As a team, divers exit the water appropriately for the environment, with assistance as necessary.

D. Post Dive

1. Divers stow dive equipment as appropriate to avoid freezing if a repetitive dive is planned.
2. Take suitable measures to re-warm or avoid divers cooling between dives.
3. Debriefing – Have student divers critique themselves on their performance. Add your observations as appropriate.
4. Divers log the dive for the instructor's signature/approval. This can be done at the end of the dive day if a repetitive dive is planned.

Ice Dive Two

Performance Objectives

By the end of Ice Dive Two, you will be able to, with a buddy:

1. **Assemble, don and adjust equipment that will be used on the dive.**
2. **Complete a predive safety check.**
3. **Demonstrate an entry appropriate for the local ice diving environment.**
4. Perform a buoyancy check, and adjust for proper weighting.
5. **Throughout the dive, demonstrate proper habits for minimizing the potential for equipment freezing.**
6. **Perform a proper descent under control, pausing below the surface to acclimatize and perform a bubble check with a buddy.**
7. **Demonstrate staying within the rule of thirds, surfacing with at least one third gas remaining.**
8. **Swim neutrally buoyant while maintaining line awareness.**
9. **Remain within depth, penetration and light limits of the entry hole.**
10. **Throughout the dive, initiate and respond correctly to line and hand signals with the surface tender and dive team, as appropriate for the team role.**
11. **Ascend at a maximum rate of 18 metres/60 feet per minute or according to dive computer limits.**
12. Perform a safety stop (recommended).
13. **At at least 10 metres/30 feet penetration, but not more than three metres/10 feet deep, simulate an emergency by giving the emergency line signal and being pulled in at a rate not to exceed 18 metres/60 feet per minute.**
14. **Demonstrate an exit appropriate for the local ice diving environment.**

I. Ice Dive Two Standards

A. Environment: Open water, under ice

B. Maximum Depth: 18 metres/60 feet

II. Suggested Sequence

A. Briefing

1. Evaluate dive site conditions.
2. Give a dive site overview for diver comfort and planning purposes. This can be done ahead of the dives to avoid divers cooling on the surface. Include:
   a. Depth, temperature, entry/exit techniques, noteworthy features.
   b. Facilities and where to find emergency equipment, etc.
3. Describe entry and exit techniques for the dive site.

4. Plan the dive with student divers. (This may be done as part of Practical Application One.)
    a. Provide an overview of what the divers will be doing and the dive time required for planning purposes.
    b. It's recommended that you provide skill descriptions and details as close to the dive as possible, unless surface conditions make this unfavorable.
5. Assist with any problems found during the predive planning and setup.
6. Agree on depth and time limits, emergency signals, etc.

B. Predive Procedures

1. Have student divers prepare all standard and specialized equipment.
2. Put on all equipment.
3. Review check-out/in procedure with surface support staff (as required).

C. Ice Dive Two

1. Predive check
    a. Buddies conduct a predive check.
    b. Watch for and correct errors as appropriate.
    c. Divers check surface team preparedness.
2. Entry
    a. Surface tender attaches and confirms line, divers enter the water using a method appropriate for the environment.
3. Buoyancy check and proper weighting
    a. Divers check their buoyancy and adjust their weight, if necessary.
4. Surface procedures
    a. Divers should avoid breathing from regulators that are not submerged to minimize potential for freeflow.
5. Gas management
    a. Before beginning the descent, remind divers to check their starting pressure and make a note of their turn pressure.
    b. During the dive, check cylinder pressures at irregular intervals to confirm appropriate gas management.
6. Descent
    a. Buddies execute a five-point descent.
    b. Bubble check and acclimatization below the surface (3-6 metres/10-20 feet recommended).
7. Locate SPGs and signal pressures.
    a. Divers should signal the team when they have used one third of their gas and should plan to surface by the time they have used two thirds of their gas.

8. Team roles
    a. Divers conduct the dive according to their team roles.
    b. Diver A leads the dive, maintains line awareness and tension and communicates with the surface tender and Diver B.
    c. Diver B maintains line awareness and tension and communicates with Diver A.
9. Underwater navigation
    a. Divers should remain within depth and penetration limits.
10. Underwater communication
    a. Divers initiate and respond to signals with the surface tender and dive team, appropriately for their team role.
    b. Instructor prompts and corrects as necessary.
11. Ascent
    a. Divers ascend at a maximum rate not exceeding 18 metres/60 feet per minute or according to dive computer.
    b. A safety stop is recommended after every dive.
12. Simulated Emergency
    a. Divers are positioned at least 10 metres/30 feet penetration, but not deeper than three metres/10 feet – just under the ice is recommended. On the instructor's signal, divers give the emergency signal.
    b. The surface tender responds to the emergency signal and pulls the divers in at a safe rate.
    c. Emphasize line awareness, avoiding line traps and a safe ascent rate.
    d. Divers protect themselves by looking where they are going and raising an arm above their heads.
13. Exit
    a. Divers establish positive buoyancy at the surface.
    b. As a team, divers exit the water appropriately for the environment, with assistance as necessary.

D. Post Dive

1. Divers stow dive equipment as appropriate to avoid freezing if a repetitive dive is planned.
2. Take suitable measures to re-warm or avoid divers cooling between dives.
3. Debriefing – Have student divers critique themselves on their performance. Add your observations as appropriate.
4. Divers log the dive for the instructor's signature/approval. This can be done at the end of the dive day if a repetitive dive is planned.

Ice Dive Three

Performance Objectives

By the end of Ice Dive Three, you will be able to, with a buddy:

1. **Assemble, don and adjust equipment that will be used on the dive.**
2. **Complete a predive safety check.**
3. **Demonstrate an entry appropriate for the local ice diving environment.**
4. Perform a buoyancy check, and adjust for proper weighting.
5. **Throughout the dive demonstrate proper habits for minimizing the potential for equipment freezing.**
6. **Perform a proper descent under control, pausing below the surface to acclimatize and perform a bubble check with a buddy.**
7. **Demonstrate staying within the rule of thirds, surfacing with at least one third gas remaining.**
8. **Swim neutrally buoyant while maintaining line awareness.**
9. **Remain within depth, penetration and light limits of the entry hole.**
10. **As either Diver A or Diver B (whichever role the diver did not complete on Dive Two), throughout the dive initiate and respond correctly to line and hand signals with the surface tender and dive team, as appropriate for the team role.**
11. **Ascend at a maximum rate of 18 metres/60 feet per minute or according to dive computer limits.**
12. Perform a safety stop (recommended).
13. **Directly beneath the ice hole, but not more than six metres/20 feet deep, respond to a simulated freeflow/out-of-gas emergency/rebreather problem by switching to a redundant gas source or sharing gas with your buddy and ascending to the surface.**
14. **Demonstrate an exit appropriate for the local ice diving environment.**

I. Ice Dive Three Standards

Environment: Open water, under ice

Maximum Depth: 30 metres/100 feet (24 metres/80 feet recommended)

II. Suggested Sequence

A. Briefing

1. Evaluate dive site conditions.
2. Give a dive site overview for diver comfort and planning purposes. This can be done ahead of the dives to avoid divers cooling on the surface. Include:
   a. Depth, temperature, entry/exit techniques, noteworthy features.
   b. Facilities and where to find emergency equipment, etc.
3. Describe entry and exit techniques for the dive site.

4. Plan the dive with student divers. (This may be done as part of Practical Application One.)
    a. Provide an overview of what the divers will be doing and the dive time required for planning purposes.
    b. It's recommended that you provide skill descriptions and details as close to the dive as possible, unless surface conditions make this unfavorable.
5. Assist with any problems found during the predive planning and setup.
6. Agree on depth and time limits, emergency signals, etc.

B. Predive Procedures

1. Have student divers prepare all standard and specialized equipment.
2. Put on all equipment.
3. Review check-out/in procedure with surface support staff (as required).

C. Ice Dive Three

1. Predive check
    a. Buddies conduct a predive check.
    b. Watch for and correct errors as appropriate.
    c. Divers check surface team preparedness.
2. Entry
    a. Surface tender attaches and confirms line, divers enter the water using a method appropriate for the environment.
3. Buoyancy check and proper weighting
    a. Divers check their buoyancy and adjust their weight, if necessary.
4. Surface procedures
    a. Divers should avoid breathing from regulators that are not submerged to minimize potential for freeflow.
5. Gas management
    a. Before beginning the descent, remind divers to check their starting pressure and make a note of their turn pressure.
    b. During the dive, check cylinder pressures at irregular intervals to confirm.
6. Descent
    a. Buddies execute a five-point descent.
    b. Bubble check and acclimatization below the surface (3-6 metres/10-20 feet recommended).
7. Locate SPGs and signal pressures
    a. Divers should signal the team when they have used one third of their gas and should plan to surface by the time they have used two thirds of their gas.

8. Team roles
    a. Divers conduct the dive according to their team roles.
    b. Diver A leads the dive, maintains line awareness and tension and communicates with the surface tender and Diver B.
    c. Diver B maintains line awareness and tension and communicates with Diver A.
9. Underwater navigation
    a. Divers should remain within depth and penetration limits.
10. Underwater communication
    a. Divers initiate and respond to signals with the surface tender and dive team, appropriately for their team role.
    b. Instructor prompts and corrects as necessary.
11. Ascent
    a. Divers ascend at a maximum rate not exceeding 18 metres/60 feet per minute or according to dive computer.
    b. A safety stop is recommended after every dive.
12. Simulated out-of-gas emergency
    a. Conduct this skill directly beneath the ice hole, not more than six metres/20 feet deep (three metres/10 feet recommended.)
    b. Divers respond to a simulated freeflow/out-of-gas emergency or rebreather problem by switching to a redundant gas source or sharing gas with a buddy.
    c. In the event of a simulated freeflow, divers may prefer to close the cylinder valve after switching to a working gas source to prevent further gas loss and/or disorientation.
    d. If sharing gas with a buddy, divers swap roles and repeat the gas sharing before ascending.
    e. Divers ascend to the surface using either their redundant regulator or sharing gas with their buddy (donor or receiver).
    f. At the surface, divers either orally inflate BCDs, use inflators attached to a "working" regulator or are assisted by surface support to attain positive buoyancy.
13. Exit
    a. Divers establish positive buoyancy at the surface.
    b. As a team, divers exit the water appropriately for the environment, with assistance as necessary.

D. Post Dive

1. Divers stow dive equipment as appropriate to avoid freezing if a repetitive dive is planned.
2. Take suitable measures to re warm or avoid divers cooling between dives.
3. Debriefing – Have students critique themselves on their performance. Add your observations as appropriate.
4. Divers log the dive for the instructor's signature/approval. This can be done at the end of the dive day if a repetitive dive is planned.

Ice Dive Four (optional)

Performance Objectives

By the end of Ice Dive Four, you will be able to, with a buddy:

1. **Assemble and prepare the equipment that will be used as a safety diver.**
2. **Respond to a simulated emergency by donning equipment, completing a predive safety check and entering the water in a timely fashion.**
3. **Perform an underwater search for a dive team simulating that divers have become separated from their line.**
4. **Remain within no decompression limits and the rule of thirds during a simulated rescue.**
5. **Remain within depth, penetration and light limits of the entry hole during a simulated rescue.**
6. **Ascend at a maximum rate of 18 metres/60 feet per minute or according to dive computer limits.**
7. Perform a safety stop (recommended).
8. **With the surface team, assist the rescued divers to exit the water.**
9. **Demonstrate inwater rescue of a team member who has fallen through the ice or into open water.**
10. **Demonstrate the proper first aid for hypothermia.**

I. Ice Dive Four Standards

A. Environment: Open water, under ice

B. Maximum Depth: 12 metres/40 feet (six metres/20 feet recommended)

II. Suggested Sequence

A. Briefing

1. Evaluate dive site conditions.
2. Give a dive site overview for diver comfort and planning purposes. This can be done ahead of the dives to avoid divers cooling on the surface. Include:

   a. Depth, temperature, entry/exit techniques, noteworthy features.
   b. Facilities and where to find emergency equipment, etc.
3. Describe entry and exit techniques for the dive site.
4. Plan the dive with student divers. (This may be done as part of Practical Application One.)
   a. Provide an overview of what the divers will be doing and the dive time required for planning purposes.
   b. It's recommended that you provide skill descriptions and details as close to the dive as possible, unless surface conditions make this unfavorable.
5. Assist with any problems found during the predive planning and setup.
6. Agree on depth and time limits, emergency signals, etc.

B. Predive Procedures

1. Have student divers prepare all standard and specialized equipment.
2. Put on all equipment.
3. Review check-out/in procedure with surface support staff (as required).

C. Ice Dive Four

Scenario One – Missing Divers

1. Preparation
   a. The roles of dive team and surface tenders may be played by ice diving students who have successfully completed Ice Dive Three, certified ice divers or certified assistants.
   b. Divers completing Ice Dive Four take the role of the safety team.
   c. Divers prepare their equipment for easy donning and quick response.
   d. Divers check surface team preparedness.
2. Surface
   a. Dive team enters the water and positions themselves just below the ice, at least 10 metres/30 feet from the ice hole .
   b. The surface tender simulates not receiving a response to signals.
   c. Surface tender alerts the rescue tender and safety team.
   d. Safety team kit up, buddy check and enter the water in a timely fashion.
   e. Rescue Tender checks that the safety team divers are attached to the line prior to entry.
3. Underwater search
   a. Safety team conducts a radial search until they find either the divers or the diver's line.

   b. Safety team assist the dive team to the surface.
   c. Safety team assist the dive team with exiting the water, as required.
4. Limits
   a. If any member of the dive team or safety team reaches one third of their gas supply or their no decompression limit, they should end the dive.

Scenario Two – Fallen into the water

1. Preparation
   a. Rescuers and victims should wear full exposure protection.
   b. Student divers rotate roles to play rescuer and victim.
   c. Scenario assumes that rescue from shore is not possible.
2. Approach
   a. Victim enters the water, either at the ice hole or in an area of open water.
   b. Both rescuers and victims should be attached to tender lines.
   c. Rescuers approach the victim, checking for ice failure.
   d. If the ice does fail, the rescuers swim to the victim through the brash ice.
3. Communication
   a. As in any surface rescue, the rescuer speaks to the victim, giving instructions and reassurance.
4. Rescue
   a. Make contact with the victim, wrapping arms around each other (if the victim still has sufficient strength) or grasping the victim from behind under the arms.
   b. Tenders pull you both to firm ice.
   c. With surface assistance, help the victim to exit the water.
5. First Aid
   a. Demonstrate proper procedures for hypothermia first aid.

D. Post Dive

1. Divers stow dive equipment as appropriate to avoid freezing if a repetitive dive is planned.
2. Take suitable measures to re-warm divers.
3. Debriefing – Have students critique themselves on their performance. Add your observations as appropriate.
4. Divers log the dive for the instructor's signature/approval. This can be done at the end of the dive day if a repetitive dive is planned.

APPENDIX

Ice Diver

Knowledge Review

Note to Instructor
To assess knowledge, review the Knowledge Review student divers completed in their PADI *Ice Diver Manual.* Prescriptively teach answers to questions student divers may have missed, or have answered incorrectly or incompletely. Ensure student divers understand what they have missed.

1. Which of the following techniques are recommended to stay warm while underwater when ice diving? (Choose all that apply.)
   - ☐ Wearing a dry suit with appropriate, layered, undergarments.
   - ☐ Wearing dry gloves or thick wet suit gloves or mitts.
   - ☐ Inserting single use heat packs underneath a wet suit.
   - ☐ Drinking alcoholic beverages before the dive.

2. _____ scuba systems are popular when ice diving. If one regulator has a freeflow, I can switch the cylinder valve off and abort the dive using the other scuba system.

3. When ice diving, to avoid a potential freeflow I would check my regulator at the surface before I descend by keeping the regulator submerged while breathing from it and monitoring my SPG (submersible pressure gauge).
   - ☐ True
   - ☐ False

4. What is the recommended minimum number of people in an ice diving team?
   - ☐ Three: Two divers and one tender.
   - ☐ Four: Two divers, one tender and one safety diver.
   - ☐ Five: Two divers, two tenders and one safety diver.
   - ☐ Six: Two divers, two tenders and two safety divers.

5. If a dive team's penetration line is 30 metres/100 feet long, at least how long should the safety divers' line be?
   - ❑ 30 metres/100 feet, because anything longer increases entanglement risk.
   - ❑ 40 metres/130 feet, because this keeps safety divers within recommended limits.
   - ❑ 60 metres/200 feet, because this ensures adequate line for a search in case it's needed.

6. When ice diving, I should only use _____ of my gas supply before turning the dive and heading back to the entry/exit point.

7. If my SPG reads 210 bar/3000 psi before the dive, at what SPG pressure should I turn the dive?
   - ☐ 50 bar/500 psi
   - ☐ 70 bar/1000 psi
   - ☐ 100 bar/1500 psi
   - ☐ 140 bar/2000 psi

8. You are the primary tender for an ice diving team. It's been10 minutes since the divers left the surface and you are unable to get a response to your line signal. What is your first course of action?
   - ☐ Immediately pull in the line as quickly as possible.
   - ☐ Have the safety divers kit up and prepare to follow the line to the divers.
   - ☐ Have the safety divers kit up and conduct a circular search just below the ice.
   - ☐ Contact emergency services.

9. You are 15 minutes into your dive and you notice that you can't get line signals to or from your surface tender. What do you do?
   - ☐ Unclip the trapped line and keep it in visual contact for the rest of the dive.
   - ☐ Swim back along the line, clear any entanglements, and signal "okay" to the tender.
   - ☐ Pull as hard as you can on the line to try and free it.
   - ☐ Abort the dive.

10. If someone is suffering from mild hypothermia, the correct procedure is to take him to warmth, remove the exposure suit, dry him and rewarm him by covering the head and applying heat to the neck, armpits and groin.
    - ☐ True
    - ☐ False

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

Diver Name _____

Signature _____ Date _____

Ice Diver

Knowledge Review Answer Key

Note to Instructor
To assess knowledge, review the Knowledge Review student divers completed in their PADI Ice Diver Manual. Prescriptively teach answers to questions student divers may have missed, or have answered incorrectly or incompletely. Ensure student divers understand what they have missed.

1. Which of the following techniques are recommended to stay warm while underwater when ice diving? (Choose all that apply.)
   - ■ **Wearing a dry suit with appropriate, layered, undergarments.**
   - ■ **Wearing dry gloves or thick wet suit gloves or mitts.**
   - ☐ Inserting single use heat packs underneath a wet suit.
   - ☐ Drinking alcoholic beverages before the dive.

2. **Redundant** scuba systems are popular when ice diving. If one regulator has a freeflow, I can switch the cylinder valve off and abort the dive using the other scuba system.

3. When ice diving, to avoid a potential freeflow I would check my regulator at the surface before I descend by keeping the regulator submerged while breathing from it and monitoring my SPG (submersible pressure gauge).
   - ■ **True**
   - ☐ False

4. What is the recommended minimum number of people in an ice diving team?
   - ☐ Three: Two divers and one tender.
   - ☐ Four: Two divers, one tender and one safety diver.
   - ☐ Five: Two divers, two tenders and one safety diver.
   - ■ **Six: Two divers, two tenders and two safety divers.**

5. If a dive team's penetration line is 30 metres/100 feet long, at least how long should the safety divers' line be?
   - ☐ 30 metres/100 feet, because anything longer increases entanglement risk.
   - ☐ 40 metres/130 feet, because this keeps safety divers within recommended limits.
   - ■ **60 metres/200 feet, because this ensures adequate line for a search in case it's needed.**

6. When ice diving, I should only use **one third** of my gas supply before turning the dive and heading back to the entry/exit point.

7. If my SPG reads 210 bar/3000 psi before the dive, at what SPG pressure should I turn the dive?
   - ☐ 50 bar/500 psi
   - ☐ 70 bar/1000 psi
   - ☐ 100 bar/1500 psi
   - ■ **140 bar/2000 psi**

8. You are the primary tender for an ice diving team. It's been 10 minutes since the divers left the surface and you are unable to get a response to your line signal. What is your first course of action?
   - ☐ Immediately pull in the line as quickly as possible.
   - ■ **Have the safety divers kit up and prepare to follow the line to the divers.**
   - ☐ Have the safety divers kit up and conduct a circular search just below the ice.
   - ☐ Contact emergency services.

9. You are 15 minutes into your dive and you notice that you can't get line signals to or from your surface tender. What do you do?
   - ☐ Unclip the trapped line and keep it in visual contact for the rest of the dive.
   - ■ **Swim back along the line, clear any entanglements and signal "okay" to the tender.**
   - ☐ Pull as hard as you can on the line to try and free it.
   - ☐ Abort the dive.

10. If someone is suffering from mild hypothermia, the correct procedure is to take him to warmth, remove the exposure suit, dry him and rewarm him by covering the head and applying heat to the neck, armpits and groin.
    - ■ **True**
    - ☐ False

PADI Specialty Training Record

Ice Diver Course

Instructor Statement

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

Instructor Name _____ PADI #_____

Instructor Signature _____ Completion Date _____

Open Water Dives

Dive One

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

- Maintain proper buoyancy during all phases of the dive
- Acclimatization to diving under ice
- Keep air supply within rule of thirds limits
- Perform a safety stop

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

Instructor Name _____ PADI #_____

Instructor Signature _____ Completion Date _____

Dive Two

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

- Initiate and respond correctly to line and hand signals
- Simulate an emergency by giving the emergency line signal and being pulled in

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

Instructor Name _____ PADI #_____

Instructor Signature _____ Completion Date _____

Dive Three

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

- Initiate and respond correctly to line and hand signals
- Respond to a simulated free flow/out of gas emergency/rebreather problem by switching to a redundant gas source or sharing gas with your buddy and ascending to the surface

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

Instructor Name _____ PADI #_____

Instructor Signature _____ Completion Date _____

Dive Four (optional)

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

- Perform an underwater search for a dive team simulating that divers have become separated from the line
- With the surface team, assist the rescued divers to exit the water.

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

Instructor Name _____ PADI #_____

Instructor Signature _____ Completion Date _____

Student Diver Statement:

I verify that I have completed all performance requirements for this Ice 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.

Diver Name _____

Diver Signature _____ Date: _____

PADI Adventure Dive Training Record

Adventure Dive: Ice Diver

Skills Overview

- Knowledge Review
- Briefing
- Predive Safety Check (BWRAF)
- Entry
- Buoyancy Check
- Techniques to Avoid Gear Freezing
- Descent – Acclimitization and Bubble Check
- Gas Management – Thirds
- Line and Buddy Awareness During Netural Swim
- Remain within Depth, Penetration and Light Limits
- Line Signals
- Ascent – Safety Stop
- Exit
- Debrief
- Log Dive – Complete Adventure Dive Training Record

Instructor Statement

I verify that this student diver has satisfactorily completed the Knowledge Review and Performance Requirements (as described in PADI's 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 _____ PADI # _____

Instructor Signature _____ Completion Date_____

Instructor Contact Information (Please Print)

Instructor Mailing Address _____

City _____ State/Province _____

Country_____ Zip/Postal Code _____

Phone _____ Fax _____

Student Diver Statement:

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

Student Diver Name: _____

Student Diver Signature: _____ Date: _____