INTRO TO SCUBA DIVING

- Welcome to the Course.
- What is SCUBA Diving?
- Why SCUBA Dive?
- What is SCUBA Certification?
- What is Nitrox?
- What is NAUI?
- What are the risks of SCUBA Diving?
- Other topics we will discuss:
  - Dive equipment
  - Diving skills
  - Diving science
  - Your body underwater
  - Dive safety
  - Marine Life
  - Navigation

What is SCUBA Diving?

Scuba diving is the most unique adventure sport on earth.

- **SCUBA is a word that stands for:**
  ***Self Contained Underwater Breathing Apparatus*.**

- You SCUBA dive with an air cylinder or tank that you wear on your back. The air is supplied to you by a regulator that reduces the high pressure (3000psi) in the tank to the same pressure as the water around you. This pressure is called the ambient pressure. This allows you to fill your lungs to their normal volume at any depth. Your regulator has a pressure gauge that allows you to constantly monitor your remaining air supply.
- During this course you will be shown how to clear your regulator, clear your mask, and trim your buoyancy, so that you can "hang or hover" without movement at any given depth. Modern equipment has made the sport of SCUBA diving safe.
- You will master the skills required to become a safe, certified SCUBA diver.

Why SCUBA Dive?

"There's nothing wrong with enjoying looking at the surface of the ocean itself, except that when you finally see what goes on underwater, you realize that you've been missing the whole point of the ocean. Staying on the surface all the time is like going to the circus and staring at the outside of the tent." Dave Barry

Why SCUBA Dive?

Water is the great gravity equalizer. Even if you have joint problems or are an amputee, the water will set you free. During a SCUBA dive you will be in a weightless state, gravity free. You can go up and down at your own will. Almost anybody can SCUBA dive, WITHIN THEIR LIMITATIONS. As long as you understand your limitations, a wonderful, weightless, world filled with remarkable beauty is waiting for you on each and every dive when you dive in warm coral environments.

Diver propulsion vehicles can also an aid for those with physical difficulties.

Why SCUBA Dive?

The pain of a knee injury or a back injury is usually mitigated in the water. In the water you are weightless. Unlike other training agencies, we teach you proper buoyancy in your entry level Scuba course, not urging you to take their "Additional Buoyancy Course" for more money. You are taught every thing in your NAUI Scuba Diver Course that PADI charges you more to teach you in their Buoyancy course. You will find resort boat crews are more than willing to help with your gear if you have physical limitations.

Divers who have limits should not dive too deep or in strong currents. The most vibrant colors and diverse fish life are found on reefs in the 20-40 foot range. Divers can spend countless time just absorbing this beauty and releasing the stresses of the world in the warm, tropical waters of the Caribbean.

Bahamas Scuba Adventures teaches you to dive in warm, clear, tropical, Caribbean waters filled with colorful marine life and living corals. This is easy, peaceful diving that makes you at one with the ocean.

Why Dive in Cold Water?

When you dive in cold water you have to wear a thick (5-7 millimeter), cumbersome wet suit. Wet suits are made from closed cell neoprene. It is a foam rubber with thousands of air spaces which helps keep you warm. This adds buoyancy which must be balanced by weight that you add to your weight belt. The wet suit must fit tight to your body, restricting water flow inside the suit to a minimum to work properly. This can be uncomfortable, the thicker the suit. Look how comfortable the diver on the lower left looks.

Cold water diving is stressful and has poor visibility. I doubt you got up this morning and were eager to suit up in a restrictive, tight fitting rubber suit and hood, strap on a heavy weight belt, and jump into water that is very cold with poor visibility.

Wouldn't you really rather be diving in warm, clear, tropical water?

Are we having fun yet?

Diving in Warm Water

When you dive in warm water there is no need for a cumbersome wetsuit that adds so much buoyancy to your body. You do not have to wear a heavy weight belt to balance this added buoyancy.

You wear only a dive skin made of lycra to protect you from abrasions, jelly fish, and sun on the surface. It offers a slight bit of thermal protection. A dive skin made of polypropylene with a soft brushed lining gives some thermal protection w/o added buoyancy.

If you are cold natured, you might wear a shorty 1-2 mil wetsuit over your dive skin, that has very little extra buoyancy. This is called layering. Even a 1 mil jump suit like the diver in the bottom 2 pictures are wearing, have very little added buoyancy. Wearing no skin, like the diver in picture #1, allows you to really feel the water!

Warm, tropical water offers much better visibility and more diverse and colorful marine life.

Wouldn't you really rather be diving in warm, clear, tropical water?

This is the water we train you to dive in.

We Are having fun!

Why Dive Deep?

As you get into the academics of your SCUBA course you will find as you go deeper, your time underwater is cut shorter. Also the deeper you go, colors become more muted as colors are filtered out by the water.

The best life and color is between the 20-40 foot reef range. However, there are times when there is a compelling reason to make deeper dives. Deep dives must be better planned, controlled, and conditions must be good. They are not for the novice. Junior Certified Divers are limited to 60 feet. You gain experience in increments. Reasons for a deep dive might be a wreck at 130 feet or a majestic reef formation at 120 feet. However your time limit at 130 feet is only 8 minutes and 12 minutes at 120 feet. You can stay over 2 hours at 40 feet. Why take all of the time to travel to a dive site to dive for only 8 minutes at 130 feet when you could have dived 55 minutes at 60 feet?

This is a big difference!

What is Scuba Certification?

- In most countries there are no laws governing recreational SCUBA Diving.
- Professional SCUBA Instructors have agreed on certain minimum standards of training for sport divers.
- You must meet specific standards to receive your NAUI SCUBA Diver certification.
- Your certification card will enable you to SCUBA dive under conditions similar to your training conditions. If you desire to try different diving conditions you should, at the least, dive with a Divemaster from that area. If the type of diving involves new types of equipment, seek additional training and guidance.
- After you complete your NAUI SCUBA Diver certification course you should take the NAUI Advanced Diver Course. You can also take Underwater Digital Photography along with the Advanced Course now and learn to take beautiful photos and videos of the underwater life and adventures you have experienced to show your family, friends, and use for school projects.

What is Nitrox?

NAUI is the only certification agency to offer **Nitrox** training and certification in combination with the entry level SCUBA certification program.

SCUBA tanks are normally filled with compressed air. They are not filled with oxygen as many in the uneducated public may think as this would be very dangerous. “Standard air” contains 21% oxygen (O2) and 79% nitrogen (N2). Our body must have the oxygen, but the nitrogen is just absorbed. You will learn in your SCUBA course that too much absorbed N2 can cause us a problem called decompression sickness, the “bends”. If we breathe a gas mix that has a lower N2 content, (32% O2 / 68% N2) our dives are much safer. There are many reasons to use Nitrox. As we age our circulation is not what it once was and it is more difficult to get rid of the excess N2 we have absorbed while we are ascending. Nitrox gives older divers a safer dive. Hence years ago Nitrox was knick named “Geezer Gas”.

The advantage to you is now you will have the choice since Nitrox training and certification is included in your program.

What is NAUI?

National Association of Underwater Instructors

- NAUI was founded in 1960 and the first Instructor Course was held.
- NAUI conducts the zero gravity water training program at the NASA Houston Space Center
- NAUI Facilities teach the programs at West Point, CG Academy, and Special Forces Underwater School in Key West
- NAUI courses are among the most thorough with rescue/self reliance and buddy system stressed at all levels of training
- NAUI Instructors conduct all of SCUBA training at Disney World
- NAUI certifies Divers, Advanced Divers, Master SCUBA Divers, Divemasters, and Instructors.

NAUI WORLDWIDE
DIVE SAFETY THROUGH EDUCATION

What are the risks of SCUBA diving?

Scuba diving, as a sport, has some risk and you must understand this before you become a diver.

- In any sport, there are risks – do not over step your training. You should know first aid and CPR as diving is usually done in remote locations with some travel time to medical help.
- A little apprehension is normal - NAUI training will help you become more comfortable in the water
- There are misconceptions about the sport - most marine life will not harm you unless you provoke it, bump into it, or are really stupid. Stupid is spear fishing in an area where there are sharks.

In This NAUI Program:

You will find that SCUBA diving is one of the most enjoyable activities that you will ever learn.

- **Become a NAUI Certified SCUBA Diver! Then:**
- **Travel and see the underwater world and after gaining diving experience you can**
- **Become a NAUI Divemaster! or**
- **Become a NAUI instructor! and**

Work In The Islands!

Your First Step is Certification

There are 3 phases in your SCUBA Course:

1. **Academics Phase:** is completed on-line with the NAUI SCUBA/Nitrox Diving Educational Systems. Your written exams are on-line. We are available for any questions.

2. **Pool Phase:** (7-8 hours, less for a private course) You will learn the skills and safety of snorkeling and SCUBA diving. Your comfort, the buddy system, self reliance, and safety is emphasized.

3. **Openwater Phase:** 4 dives over 2 days at:

- Fantasy Lake Scuba Park www.fantasyscubapark.com
  Summer, early Fall
- Florida: Palm Beach Area
  All year
- Bahamas: Stuart Cove's Dive Bahamas www.stuartcove.com
  All year

SCUBA Diving Equipment

- Basic personal gear
- Scuba regulators
- Buoyancy Compensators (BC)
- Scuba cylinders (tanks)
- Diving instruments
- Weighting systems
- Accessory equipment

Buying Equipment for Diving

There are several reasons to go to your NAUI dive store.

- You can see and wear gear before you buy.
- SCUBA retailers assemble your equipment.
- SCUBA retailers can help you with adjusting the equipment.
- SCUBA retailers provide instruction for specialized gear.
- SCUBA retailers usually service equipment.
- SCUBA retailers rent equipment.
- SCUBA retailers are your source for scuba cylinder fills and last minute required items.

Basic Personal Gear

- **Mask**
- **Snorkel**
- **Booties**
- **Fins**
- Dive Knife
- Dive Watch
- Dive Slate
- **Dive Tables**
- Dive Skin
- Small Net Bag
- **Mesh Gear Bag**
- Dry Bag (day pack)
- First Aid Kit
- Water Bottle













Items in RED are required **Personal Gear** for your Scuba course

Masks

Your mask enables you to see underwater objects clearly.

- The most important consideration:

  Does the mask fit your face?

- Some essential features of masks are:
  - Retaining band
  - Nose pocket
  - Double-feathered edge seal
  - Tempered glass lens
  - Adjustable strap
  - Low volume
- There are optional features:
  - Prescription lenses
  - Neoprene strap pad

Your New Mask

The lenses are covered with a thin film of lubricant.

- You can use toothpaste or "Soft Scrub" to remove this lubricant.
- Clean and rinse your mask before a dive trip.
- Treat the mask glass with a commercial defog solution prior to each dive.
- Each day you use your mask you will need to prepare it.
- You may have to apply a bit of defog between dives.

Snorkels

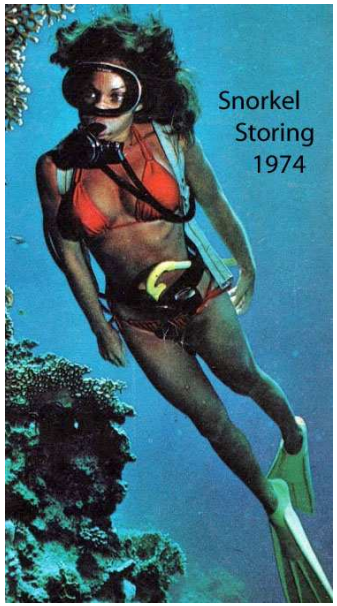
The snorkel enables you to breathe normally while you keep your face in the water and watch the beauty beneath you.

- There are many different features:
  - "J" shaped tube.
  - Flexible or adjustable mouthpiece so that the snorkel will fit more comfortably in your mouth.
  - A purge valve to allow easier clearing of water from the snorkel.
  - A molded or soft mouthpiece.
  - Large bore tube that allows more air exchange.
- Most Important:
  - Comfort.
  - Breathing ease.
- Stay away from "dry snorkels" as they impede the flow of air, in and out

The snorkel is worn on the left side.

Compact Snorkels

Many SCUBA divers object to wearing a snorkel while on SCUBA. All of "older" divers have been doing so long that it is just second nature. However, The snorkel is a very important piece of safety equipment. Through the years there have been many attempt to store the snorkel (yellow snorkel in picture) "off the mask" during the dive, but this was cumbersome. The dive industry responded with the compact snorkel made of silicone that can be rolled up and stored away in your BC. You can attach it to your mask when you surface as needed.



Booties

Booties provide protection and comfort for your feet.

- Booties are made from neoprene rubber.
- Some of the different types of booties you can find are tropical cut and full booties with zipper.
- The bootie should fit snugly but comfortably on your foot.
- Booties are designed to be used with open heel fins.

Open Heel Fins

Fins give you the thrust you need to swim with SCUBA gear.

- Fins MUST be open heel design with a heel strap.
- Open heel fins give the thrust required in the ocean and are much easier to manage than closed heel fins, especially going up and down the ladder, getting in and out of boats.
- Full foot fins must be worn over bare feet which leaves feet unprotected while walking over rocks or navigating around a shifting boat with a 35 pound tank on your back and very top heavy. Very dangerous. I have seen injuries.
- **We will not teach students that use full foot fins during my course.**

Dive Knife

A Piece of Safety Equipment.

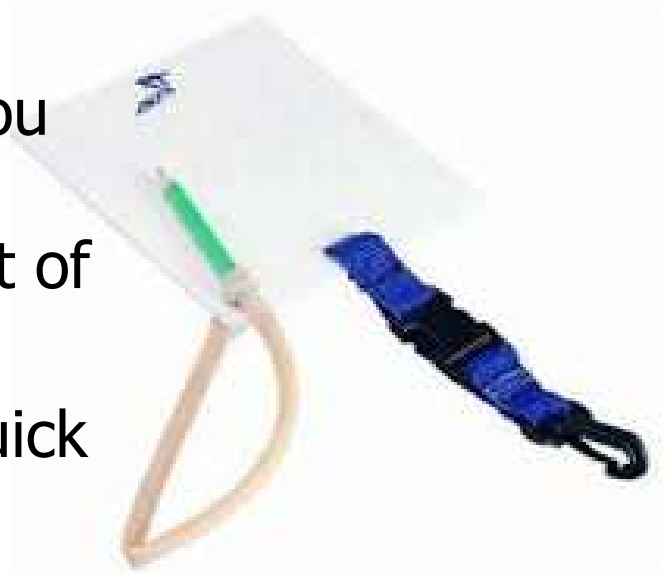
- Dive knives are a tool to signal with (Bang on your tank), cut a piece of monofilament fishing line off the reef, flip over a shell, or cut rope off a prop.
- It is definitely not a weapon!
- Dive knives are attached to the leg, BC strap, or console.
- Scissors are excellent for clearing fishing line off the reef.
- You should never spend a lot of money on a knife as it will be the first item you loose!!!

Dive Watch

A dive watch is required to time your dive. You must know how long you have stayed at depth so that you can calculate the amount of nitrogen that has been absorbed into your body from the air you have been breathing. Each buddy team must have a watch. It is best for each buddy to have a watch. Dive watchs can run the range from $45 to $25,000. The Timex to the left cost $45 and is rated to 200 meters. The rule of thumb is that the watch should be rated to 3X the depth you expect to visit. A 100 meter watch is perfect.

Dive Slate

- You should have a dive slate to carry on each dive so that you can communicate with your buddy. With the use of hand signals you can get across the basics, but a slate can be used for better communication. The pencil will write under water. On the boat you use the same soft Scrub that you use on your mask to erase and clean the slate. Underwater you can use a small bit of sand and rub it gently against the slate.
- You attach the slate to your BC with a quick release lanyard. Put the slate in a BC pocket, do not let it just dangle and snag on the reef.



Dive Tables

You should ALWAYS have a set of dive tables in your dive bag or dry bag on every dive trip. This rule is absolute even if you are using a dive computer. Take your NAUI Decompression Tables that you got in your NAUI SCUBA Diver Education System with you on every trip.

Even if you are using a Dive Computer, you should have your tables as a backup.

Dive Skin

- A dive skin is essential to protect you from cuts and abrasions if you brush up against a ship wreck, piling, bulk head, or heaven forbid, the coral reef. The dive skin will also protect you to a degree from jelly fish, hydroid, and Portuguese-Man-of-War stings. The dive skin also offers some thermal protection.
- The dive skin will protect you from chaffing from the BC straps and protection from sun exposure while you are on the surface.
- When you are riding on the boat in a wet dive skin, it should be un-sleeved, pulled down to the waist, and the arms tied around the waist as air rushing across the suit wicks moisture away and will chill the diver causing hypothermia.

Polypropylene Dive Skin

Polypropylene Skin Suits provide maximum comfort for tropical diving. Ten ounce Polypropylene, soft brushed lining and flat lock construction form a comfortable fit to use alone or as layering garment. Other features include ankle & thumb stirrups, heavy duty zipper and fast drying. This skin adds no buoyancy and therefore you do not have to add any additional lead weights to compensate when using this suit.

Small Net Bag

A small net bag carried inside your mesh dive bag is used to put the following type items:

1. Dive slate
2. Mask cleaner
3. Defog
4. Spare mask strap
5. Spare fin strap
6. Extra QR lanyards
7. Any other small items that you do not want to just be freely moving around inside your dive bag.

Best size is one large enough to handle your dive slate.

Mesh Dive Bag

- Mesh dive bags are designed to hold all of your gear except your weight belt or weights.
- You can lay your bag on top of your weight belt and buckle it through the straps of the bag or you can wear your belt as you walk. Never put the belt in the bag. It is best to hand your belt on to a boat.
- **Never wear a weight belt while boarding or on a boat. If you were to fall over board, you would be in big trouble!!!**
- Mesh bags are best as they can be immersed in the rinse tank to facilitate rinsing after your dive. They are also easier to stuff away on the boat between dives.

Dry Bag – Day Pack

- This bag is used to carry your dry items such as:
  1. spare T-shirt
  2. shorts
  3. towel
  4. first aid kit
  5. snack or lunch
  6. Water bottle
  7. Dive tables
  8. Camera

- Unless you have a true "dry bag", be sure to put this bag in a place where it will not get wet or put item inside ziplock bags.
- However, this bag MUST not be stowed at your dive station or in an area designated for U/W cameras. Stow it forward.
- Be sure to write your name on the bag or put a luggage tag on it. A colorful bag is best, rather than black.

First Aid Kit

Most diving activities occur in remote areas. Usuall dive boats have good first aid kits, but you should go running to the crew if you have a small cut or abrasion. You should "Be Prepared" to handle the small things like yourself. You should have a FA kit with at least the following:

- 2 Sterile dressings 4"x4"
- 2 Sterile dressings 3"x3"
- 2 Conforming gauze bandages
- 1 Elastic bandage with Velcro 2"
- 3 Butterfly closure strips
- Assorted Band aids
- 1 Triangular bandage
- 2 Sting relief wipes
- 3 Antiseptic towelettes
- 2 Tincture of benzoin swabs
- Tube antibiotic ointment
- Aspirin
- Acetaminophen (500 mg)
- 3 Antihistamines
- 1 Splinter picker forceps
- Oronasal CPR mask

All of this can be put in a dry box or a ziplock bag,
Inside your dry bag.

Motion sickness

You need to think and be aware of motion sickness before it happens. There are many natural aids that can help. Crackers, ginger pills, and others work well. Try to stay from prescription meds as they may make you drowsy. There is an acupressure technique using an elastic band with a plastic button that puts pressure on the Nei-Kuan point in the wrist. These work very well and have no side effects like drugs. They are used by physicians for chemo patient's nausea.

Water Bottle

- Your water bottle is so important for so many reasons. As a diver, you MUST keep hydrated. You must not wait until you are thirsty to start drinking water. You loose water from your body with every breath you exhale underwater. The air in your tank has had virtually all of the moisture removed during the compression and filtration. Each time you inhale, this "dry air" is being re-moisturized by pulling moisture from your body. Therefore after, and BEFORE EACH DIVE, you must hydrate your body.
- Most dive boats have drinking, but it is so much easier to draw water into a bottle and mix some fruit drink mix with the water and hydrate.
- During your SCUBA course this is one point that you will hear me push continually. Hydration is so important for divers. There are so many problems with the transfers of breathing gasses that can occur if your blood and tissue is not properly hydrated. Also snack on carbs to keep your blood sugar in line. Some boats will provide fruit.

Hydrate!
Hydrate!
Hydrate!

Gloves?

- Why will not talk much about gloves. We talk about dive skins to protect you from cuts and abrasions, but what about cuts on your hands from getting cut on coral? The answer is –
- KEEP YOUR HANDS OFF THE CORAL AND YOU WILL NOT GET CUT!
- Most areas of the Caribbean today do not allow you to wear gloves on dives. If you have on gloves you have a tendency to put your hands on the live coral and that will kill the coral polyps.
- The only time you should wear gloves in warm water is when you catch lobster.
- However, be careful going up and down a mooring line as it will have growth that can abrade/sting you, but do not let go!

Snorkeling Skills

- Fit and adjust mask
- Cleaning mask
- Defogging mask
- Donning mask
- Adjusting snorkel
- Fit and adjust fins
- Snorkel clearing
- Swimming with fins
- Equalizing sinuses
- Surface dives
- Proper use of hands while snorkeling
- Underwater swimming
- Buddy system
- Use of safety vest
- Communication
- Entries
- Exits
- Retrieval of objects from the bottom
- Buddy assist
- Cramp release
- Surface tow of buddy
- Stowing and rinsing gear

SCUBA Diving Skills

- Assembling scuba equipment
- Donning scuba gear
- Entries and exits
- Mask skills
- Regulator skills
- Buoyancy skills
- Safety skills
- Equalizing sinuses
- Ascending and Descending
- Buddy system
- Communication
- Handling your scuba equipment in the water
- Removing and replacing your scuba unit on the surface
- Removing and replacing your weight belt
- Navigation skills
- Rescue and emergency procedures
- Disassembling you scuba gear
- Proper packing of your gear
- Rinsing and stowing your gear after the dive and after the trip

Mask Skills

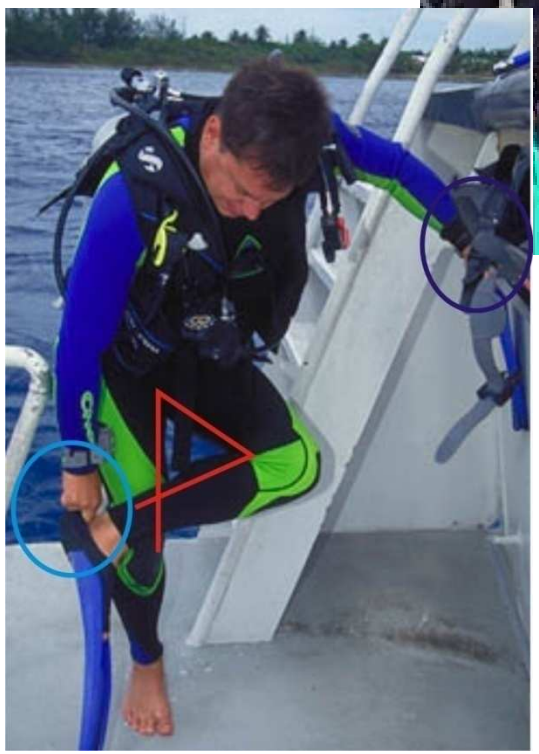
There are a number of ways that water can get into the mask during your dive.

- Clear water from your mask by pressing on the top of the face plate and exhaling as you roll your head back and look upwards.

Donning Your Fins

When you are ready to go diving, and have completed donning your SCUBA gear, the last item you don at the entry point is your fins.

- Your fins should be donned at the waters edge or dive platform.
- If you have to walk a short distance on land or deck with fins, walk backwards. Walking with fins is dangerous!
- When you put your fins on, use the "OPPOSITE HAND / OPPOSITE FOOT" method. Grasp your fin by the blade and use your left hand to put your right fin on and right hand for the left foot. Hold your leg in a "FIGURE 4" to put your fins on, while holding on to something or your buddy.



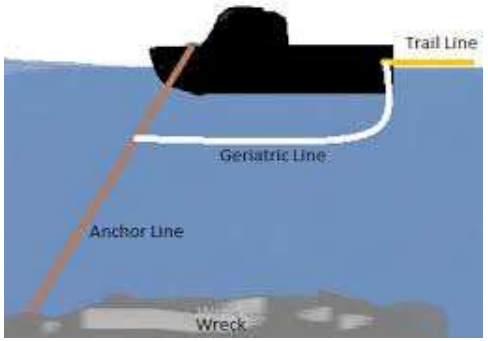
Entries From a Boat

Now that you have all of your equipment on, you are ready to make your entry.

1. Before you stepped to the entry point and put on your fins, you would have had a "buddy check" of each other's gear.
2. Step down onto the dive platform with your mask in place
3. Put your regulator in your mouth
4. Step forward and make a "Giant Stride" entry
5. Turn back to the boat and give an "OK" sign
6. Pair up with your buddy when they enter

Entries From Anchored or Moored Boats

- Buddy team swims together away from the entry area towards the anchor/mooring line so the next divers can follow
- In current conditions, some boats will have a line to pull or swim along to the anchor/mooring line, (geriatric line)
- When you get up to the down line, immediately go down at least 10 ft. **DO NOT HOLD ON TO THE LINE AT THE SURFACE**. Descend down the anchor/mooring line.



- **MAINTAIN CONTACT WITH THE LINE ALL THE WAY TO THE BOTTOM!**

IF YOU LET GO, CURRENT CAN SWEEP YOU AWAY.

THIS IS VERY IMPORTANT.

- Make your dive and remember where the anchor/mooring line is located. You must make your ascent up this line and swim to the dive platform to re-board. **(DO NOT HOLD ON TO THE LINE AT THE SURFACE)**
- **MAINTAIN CONTACT WITH THE LINE ALL THE WAY TO THE SURFACE!**
- Take turns moving to the ladder to exit. On anchored and moored boats there is usually a trail line behind the boat.

Entries From Moving Boats
"Float Dives"

- After you make your entry and give "OK" sign, group up with team leader to descend to the bottom as quickly as possible as you may drift off the reef.
- Stay together as a group and do not get ahead of your team leader.
- As your buddy team gets low on air go to team leader and indicate that buddy team is going up.
- Ascend the float line and let go of the line just as you break the surface. The float will move away from you. **DO NOT HOLD ON TO THE FLOAT LINE AT THE SURFACE**
- As you ascend, keep a loose "OK" with your thumb and index finger around the line, but let go just as you break the surface.
- Inflate your BC on the surface and you and your buddy turn towards the boat.
- Keep your eyes on the boat and wait for the boat to pick you up.
- The boat will run directly at you. When it stops beside you, the stern will be just beside you. Swim to the dive platform. DO NOT LET GO.
- Take turns moving to the ladder to exit. If there is a group, the DM may throw out a tag line. Always move hand over hand.

Exits- Getting Back on the Boat

- **NEVER TAKE YOUR MASK OFF UNTIL YOU ARE ON THE BOAT!**
- It also is helpful to keep your snorkel or regulator in your mouth, just in case you happen to fall back into the water w/o fins.
- Watch the movement of the ladder as it moves in the swells
- Grab the ladder **just below the surface** with 1 hand and take off you OPPOSITE fin and hand it up. **DO NOT GET ON THE LADDER!**
- Then take hold of the ladder with your other hand, but do not let go with you 1st hand UNTIL you have the firm grip with 2nd hand.
- Take you other fin off, by same method, OPPOSITE fin & hand up.
- **THEN**, climb up the ladder. **NEVER LET GO OF THE LADDER!**
- Gather up your fins and go to your space
- **Stow your gear.** Then you can setup for next dive or relax on the ride back

Entries and Exits from Shore

Entry:

- Enter the water with all of your gear on except your fins.
- Walk in holding your fins
- When you get to mid-chest or mid-gut depth, put on your fins using the Figure-4 method. Use your buddy for support.
- You should be wearing your mask and using your snorkel while putting on your fins.

Exit:

- Swim in to mid-chest or mid-gut depth and stand up.
- Keep your regulator in your mouth or put your snorkel in your mouth.
- Working as a buddy team, use the Figure-4 method, take off your fins.

Using Your Fins

Your fins provide you with thrust and stability in the water.

- The most common kick is the flutter kick.
- You can also use a dolphin kick when diving.
- When replacing a fin in the water, use the same figure four position you use to don your fins.

Assembling SCUBA Equipment

Only you are responsible for proper assembly and operation of your equipment.




You will learn how to properly assemble <u>your own</u> SCUBA equipment. You must assemble your own equipment. This cannot be done for you by anyone. SCUBA is a self-reliant sport.

Procedure When You Get on Your Dive Boat

When you get on board the boat, immediately pick a place on the boat as close to the dive platform (rear) as you can. Place your gear bag on the bench.

1. Pull out your regulator and check the pressure in each tank. If either tank is low, ask for a replacement.
2. Setup your 1st tank and check the regulator and BC, turn air off
3. Stow your gear bag beneath the bench
4. Do all of this before the boat leaves the dock
5. Remember to turn your air on before your dive

After you have setup and stowed, you should then stow your dry bag forward and then stake out a place for the ride out to the dive site.

Procedure Between Dives

When you get back on the boat after your 1st dive, immediately go to your area, take off your tank and bungee in place. Then go pick up your fins.

1. Break down your first tank
2. Setup your 2nd tank
3. Pressurize to check the system
4. Turn off the tank
5. Bungee the system in place
6. Stow your gear

After you have setup and stowed, you can rest, HYDRATE, and eat something between dives

Procedure After Your Dives

When you get back on the boat after your last dive, immediately go to your area, take off your tank and bungee in place. Then go pick up your fins.

1. Break down your tank
2. Bungee the tank in place
3. Do not put tape back over valves
4. Return weights to weight box
5. Stow your gear

After you have broken down and stowed, you can rest, HYDRATE, and eat something on the ride back to the dock

Regulator Skills

Learning to scuba dive includes more than just learning how to breathe from a regulator.

- When you breathe underwater you just breathe in and out in a normal fashion. NEVER HOLD YOUR BREATH!
- Clearing the regulator:
  - Exhale into the regulator and the water will go out the exhaust port.
  - Place your tongue in the mouthpiece and press the purge button to blow water out through the exhaust port.
- REMEMBER: Exhale small bubbles when the regulator is not in your mouth.

NEVER HOLD YOUR BREATH!

Recovering a Regulator

There are two ways to recover your regulator.

- **Sweep method:** Drop your right shoulder and sweep your right arm down and back, catching the regulator with your arm.

- **Reach method:** Reach back with your right hand till you find the valve. Hook your thumb under the hose and run your hand down the hose to the mouthpiece.

Other Regulator Skills

- **Changing from snorkel to regulator:** When you swim out to the dive float line you will use your snorkel. You will have just enough air in your BC to make you buoyant. Just before you get to the line, you switch from the snorkel to the regulator WITHOUT TAKING YOUR HEAD OUT OF THE WATER. You release the air from your BC with your left hand and put your right hand ON THE DOWN LINE. Come down the line while maintaining contact with the line <u>all the way to the bottom.</u>
- **Orally inflating your BC:** You can orally inflate your BC by taking a breath from your regulator and breathing into the BC inflator hose while holding down the manual inflator/deflator button. Be sure to release the button as you stop blowing or the air will escape. Then you put your regulator back in your mouth and clear it to take a breath.

Changing from snorkel to regulator

Orally inflating your BC

Monitoring your Air Supply

You must check your air consumption by frequently checking your submersible pressure gauge.

- **At a minimum, check your air every 5 minutes.**
- **Also ask you buddy how much air they have remaining.**

The buddy team's dive time is limited by the person with the least amount of air.

Review on Regulator Skills

What have you learned so far?

- Describe what you should do anytime the regulator is out of your mouth.

Review on Regulator Skills

What have you learned so far?

- Describe what you should do anytime the regulator is out of your mouth.

  Exhale small bubbles from your mouth when the regulator is not in your mouth.

NEVER HOLD YOUR BREATH!

Buoyancy Skills

If there is one skill that determines a person's diving ability, it is buoyancy control.

- **Many factors affect your buoyancy in the water:**
  - Weight of your equipment
  - Type of tank you are using
  - Body density
  - Air in BC
  - If you have on a wet suit
  - The thickness of the wet suit
  - Weight on your weight belt

You must begin your dive properly weighted.

Buoyancy Skills

If there is one skill that determines a person's diving ability, it is buoyancy control.

During your NAUI Scuba Diver Course you will learn to:

- Determine the exact weight you need, so you're not too light or too heavy.
- Trim your weight system and scuba gear so you're perfectly balanced in the water.
- Streamline to save energy, use air more efficiently and move more smoothly through the water.
- Hover effortlessly in any position – vertical or horizontal.

PADI has you pay for an additional course to learn these skills

NEVER DIVE OVER WEIGHTED!

- Never use your BC to compensate for excess weight
- When you start the dive you should be neutrally weighted with no air in your BC
- Excess weight causes drag and will cause you to use more air!
- You should try to maintain a horizontal attitude during the dive
- **Over weighting is EXTREMELY DANGEROUS!**

Checking Buoyancy

- You must test your buoyancy at the surface before you begin your dive.
- You will control your buoyancy during your dive by adding to or removing air from your BC, but there should be no air in the BC at the surface to be neutral.

NEVER DIVE OVER WEIGHTED!

Checking Buoyancy

STUPID PEOPLE DIVE OVER WEIGHTED!

NEVER DIVE OVER WEIGHTED!

It is one of the most dangerous mistakes you could ever make. Always check your buoyancy BEFORE you get on the boat!

Descending

Being able to descend easily in the water is one of the important skills of diving.

- **Some of the general steps for descending:**
  - Descend feet first and dump all of the air from your BC as you descend.
  - Never turn and try to go down head first with air in your BC.
- **You will lose buoyancy as the pressure compresses your wetsuit and any air in your BC.**

Descending

Your rate of descent should not be rapid. It is recommended not to exceed a rate of 75 feet per minute.

- **As your wetsuit compresses, you may need to adjust your weight belt.**
- **Use your fins as little as possible during descent.**
- **Doing a controlled descent down an anchor or mooring line will allow you to concentrate on:**
  - **CLEARING YOUR EARS!**
  - **Your surroundings**
  - **Your buddy**
  - **Your equipment**
  - **KEEP YOU FROM BEING SWEPT AWAY BY CURRENT**
  - **Where you are headed**

Ascending

For every descent you make, you make an ascent.

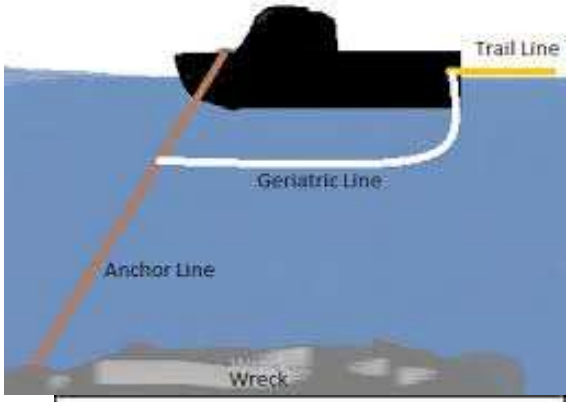
- **Proper ascents:**
  - Look up , swim towards the surface
  - Turn 360 degrees as you ascend, if possible
  - Ascend at a rate of no faster than 30 feet per minute, ascend no faster than your bubbles.
  - Vent air from your BC as needed, as any air in your BC will expand during ascent.
  - **DO NOT RIDE YOUR BC TO THE SURFACE.**
  - Ascend up a anchor/mooring line if possible and **MAINTAIN CONTACT WITH THE LINE ALL OF THE WAY TO THE SURFACE.**
  - Do not hold on to the line at the surface. The surface surge can lift you several feet out of the water and slam you back down if there is surface action. If the seas are running 4-6 feet, at one minute you are at the water's surface and then you can be 6 feet above the water. The diver at the right is making 2 major stupid mistakes:
    1. Holding the anchor line at the surface and
    2. He does not have his snorkel or regulator in his mouth

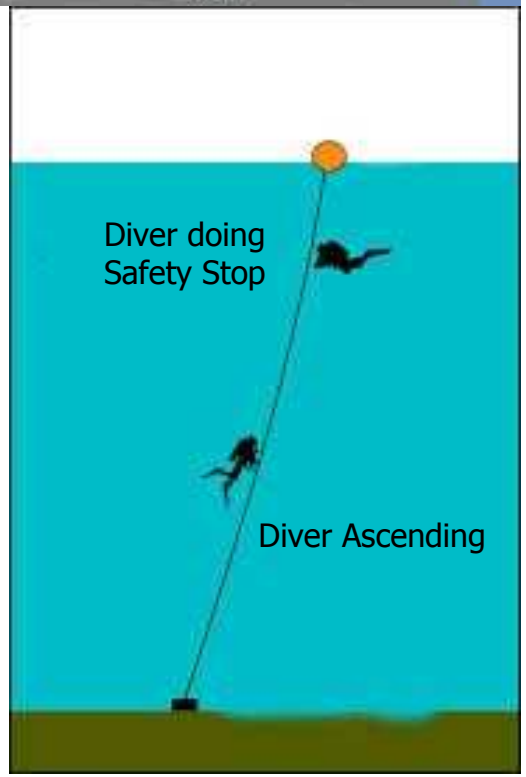
Ascending

For every descent you make, you make an ascent.

- When you descend or ascend a line, ALWAYS maintain contact with the line from the surface to the bottom and from the bottom all the way to the surface. If you let go of the line, the current very well may sweep you away and you may not be able to swim back to the line.

DANGEROUS!!!!





- When you get to the surface, let go of the line and swim to the stern of the boat. Some boats will have a line (geriatric) line tied off at 10-15 feet on the anchor/mooring line. You can do a safety stop here before you swim to the stern.

- After you swim to the stern, hold on to the trail line and wait your turn to climb the ladder.

Ascending

If you do not find your way back to the anchor/mooring and make your ascent up that line OR ascend "off the line", you can be swept far away from the boat by the current. When you surface several ocean waves may separate you and the boat.

If this happens, the boat WILL NOT BE ABLE TO SEE YOU!!!

Always know where the anchor/mooring line is during your dive and have enough air to get back to and make your ascent. When you make your ascent MAINTAIN CONTACT WITH THE LINE ALL THE WAY TO THE SURFACE.

These divers did not surface on the line. They are lucky in that they have safety sausages and the seas are calm. The are waiting for the boat to pull anchor and come get them.

Buddy System

The Buddy System is one of the most important concepts in Scuba Diving

The following points help you keep track of your buddy:

- Agree on a leader.
- Establish your dive direction.
- Maintain your same position relative to each other for the entire dive.
- Plan your dive and dive your plan.
- Use the lost buddy procedure if you get separated.
  - Get vertical and look in all directions
  - Rise about 10 feet & look for bubbles
  - Ascend to surface after about 1 min
  - At surface wait for buddy
  - After about 5 min signal for help in finding your buddy

Communication

There are standard signals you need to know to communicate under water as well as on the surface.

- Remember, for a signal to be effective, all concerned must discuss it and agree upon it before you start the dive.
- At the surface, you can use different types of audible and visual signals to communicate.

Communication

Come here

Watch me

Go under

Level off

Go that way

Which direction?

Ears

Cold

Slow down

Hold hands

Get with your buddy

Lead and follow

Stop, stay

Problem, trouble,
Something is wrong

OK, OK?

Distress

OK, OK? (On surface at distance)

Danger

Go up, going up

Go down,
Going down

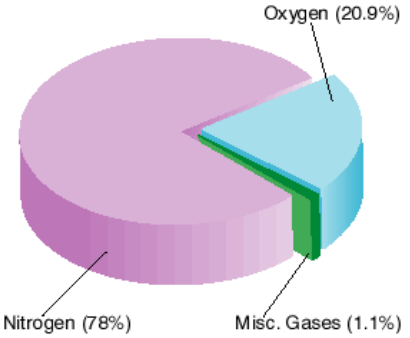
Low on air

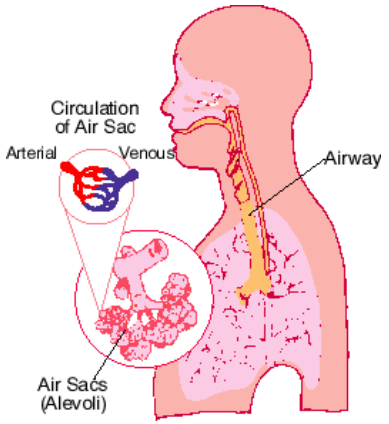
Out of air

Share air

Diving Science

- Characteristics of Air and Water.
- Buoyancy.
- What is Pressure?
- Your Body.
- The Anatomy of Your Lungs.
- Indirect Effects of Pressure.





Direct Effects of Pressure

You will learn how pressure increases under water and how it affects your body.

When we descend in water, the force from the combined weight of air in the atmosphere above the water and water above us will subject our bodies to increasing pressure as we descend, go down deeper.

Direct Effects of Pressure

Our bodies must adjust to this increasing pressure as we descend (go down to depth). Then we must adjust to the decreasing pressure as we ascend, come back to the surface. We have all felt the effects of this pressure as we go to the bottom of a swimming pool. Now as we are going deeper, we MUST make adjustments, or we cannot go any deeper.

The Air You Breathe

Most of the time, we do not think about air, because breathing is an automatic activity.

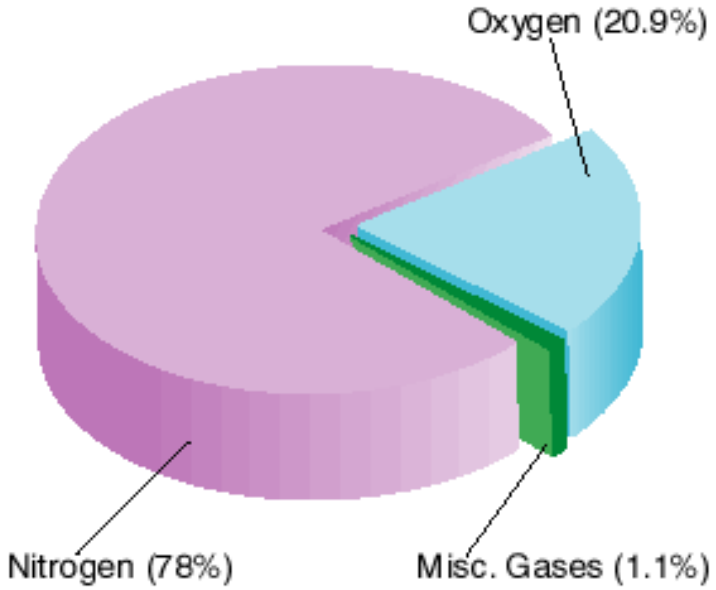
- Air is a mixture of gases, basically

  21% Oxygen

  78% Nitrogen

- Air can be easily compressed.

  Therefore we can compress a lot of breathing air into our SCUBA tank.



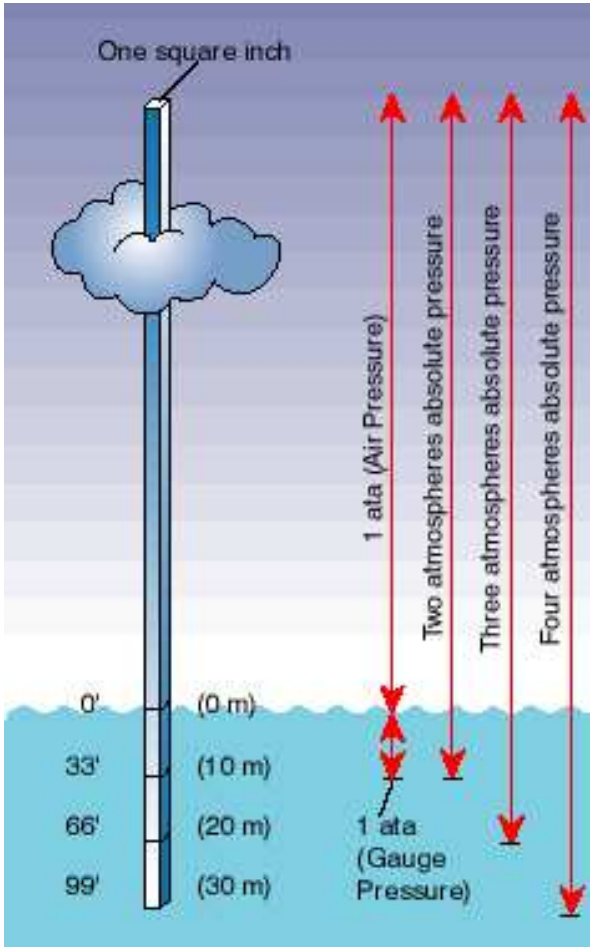
What is Pressure?

When you descend in water, the force from the <u>weight of the air</u> and the weight of the water above affects you.

- This force is called pressure.
- If you weighed a column of air which is 1 inch by 1 inch (1 square inch), and as tall as the atmosphere above the earth, it would weigh 14.7 pounds.
- It would exert a pressure of 14.7 Pounds per Square Inch (psi)
- This constant pressure is also called 1 atmosphere of pressure.

  (14.7 psi = 1 atmosphere)

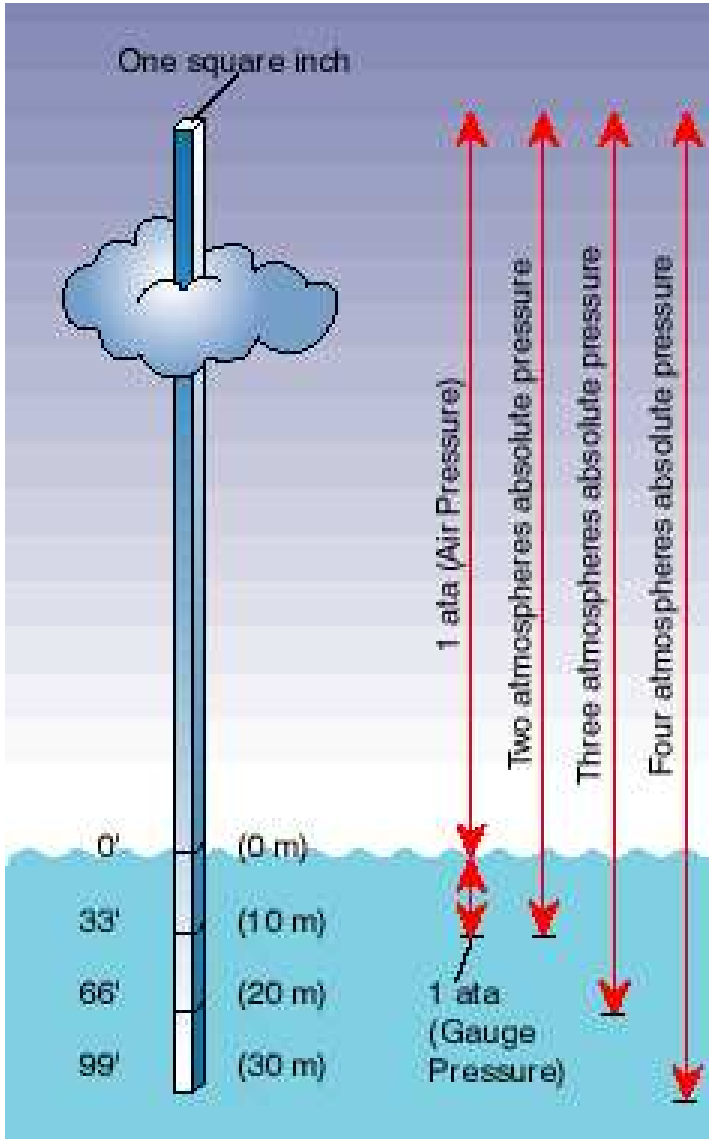
In SCUBA diving we call this 1 AT or 1 ata



What is Pressure?

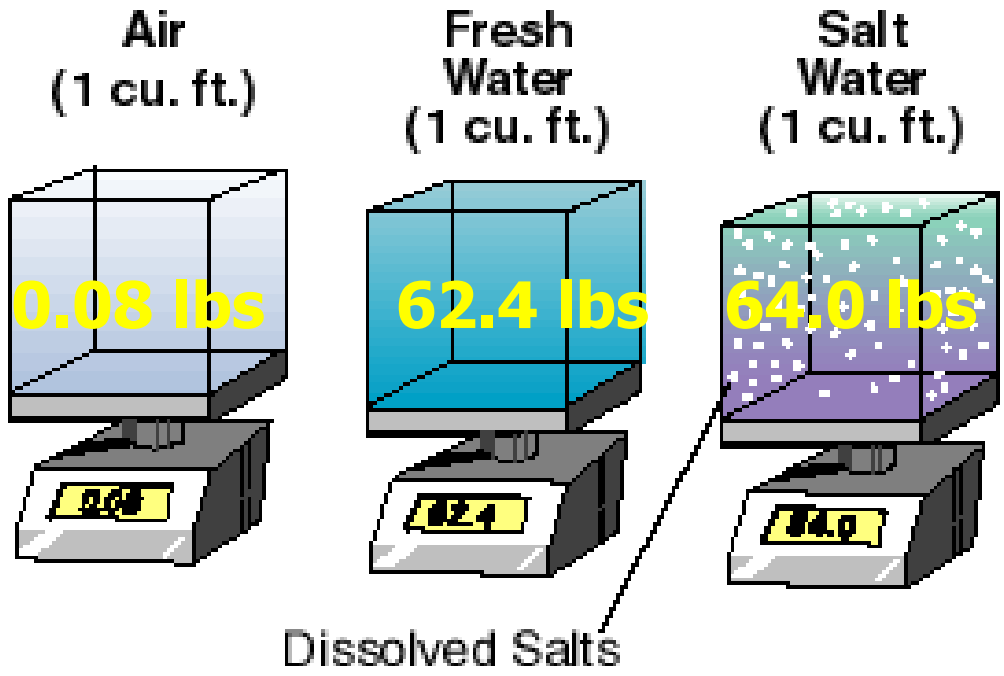
- As we descend the weight of the water added to the weight of the atmosphere subjects our body to increased pressure.
- Each 33 feet we descend adds an additional 14.7 psi or one atmosphere of pressure
- At 33 feet of salt water we have 2 times the pressure we have on us in this room at this time.
- At 66 feet we have 3 times as much
- At 99 feet you would have 4 times as much pressure as you have on you right now.
- At 99 feet we have 4 ATs of pressure on us. (3 ATs for the water and 1 AT for the air above)

Your body must compensate or there will be big problems!



What is Pressure?

- Air: weighs less than 1 ounce per cubic foot.
- Fresh Water: weighs 62.4 pounds per cubic foot.
- Salt Water: weighs 64 pounds per cubic foot.



What is Pressure?

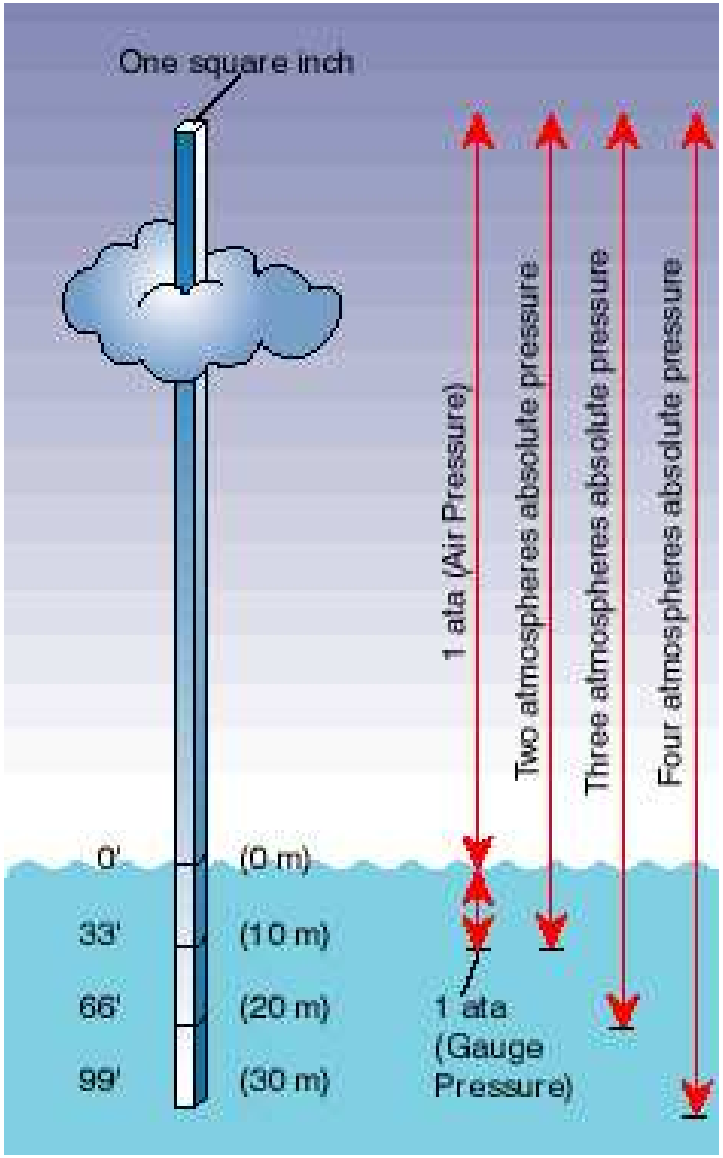
- Fresh Water:
  34 feet = 1 Atmosphere = 14.7 psi

- Salt Water:
  33 feet = 1 Atmosphere = 14.7 psi

- Air:
  All of the air above the earth
  = 1 Atmosphere = 14.7psi

- Each foot of salt water = 0.445psi

- Each foot of fresh water = 0.432psi



Review on What is Pressure?

What have you learned so far?

- State the depths that are equal to one atmosphere in salt and fresh water.

Review on What is Pressure?

What have you learned so far?

- State the depths that are equal to one atmosphere in salt and fresh water.

  Salt Water – 33 feet

  Fresh Water – 34 feet

Review on What is Pressure?

What have you learned so far?

- State how many times greater the pressure is at 99 feet of sea water, than at the surface.

Review on What is Pressure?

What have you learned so far?

- State how many times greater the pressure is at 99 feet of sea water, than at the surface.

99/33=3 for the water;

3 for the water + 1 for the air = 4 times greater

How Pressure Affects Volume

To understand the direct effects of pressure, consider the effects of pressure on an <u>open</u> and closed system.

- **Open system:**

  If you take a bucket full of air and pull it down into the water, the air will be compressed into the bucket.

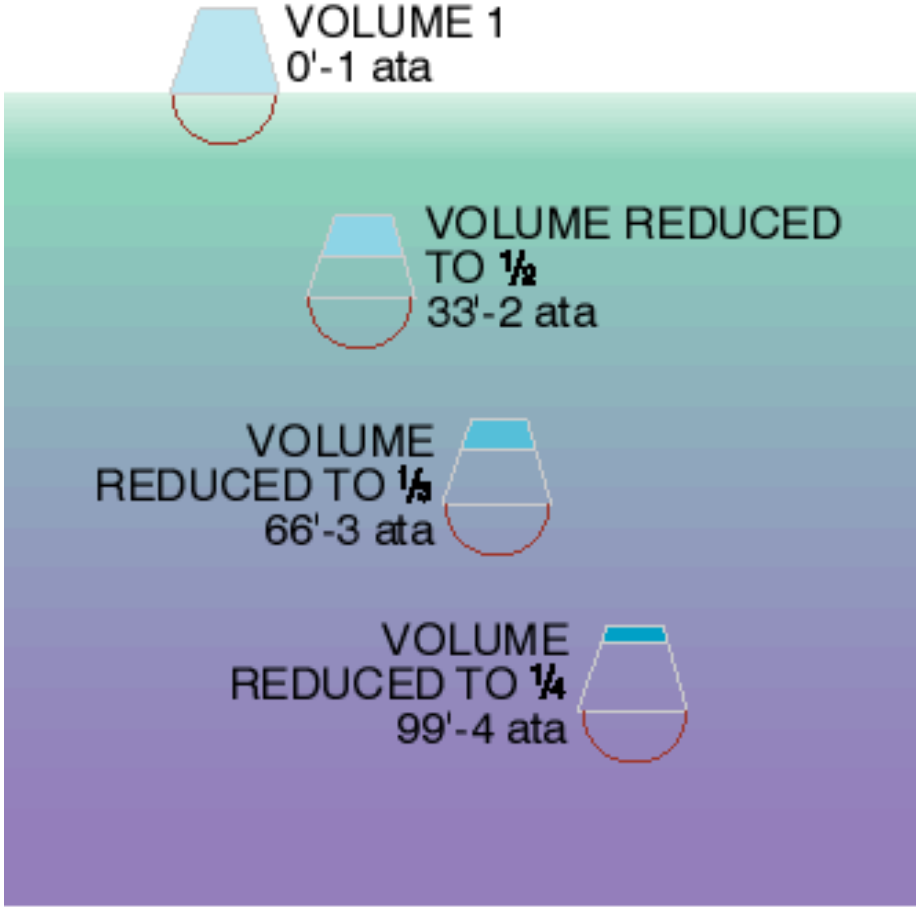
  At 33 feet, the air will occupy ½ of the volume of the bucket.

  At 66 feet, the air will occupy 1/3 of the volume of the bucket

  At 99 feet, the air will occupy i/4 of volume the bucket.

  This is all happening because the water pressure is compressing the air into the bucket.

  As you bring the bucket back to the surface, the pressure decreases and the air will expand, pushing the water out, to again fill the bucket.



OPEN SYSTEM – DESCENT

How Pressure Affects Volume

The effects of pressure on a closed system can be much more dramatic.

If you blow up a balloon and let it start rising towards the surface, the decrease in pressure around the balloon will cause the balloon to expand and it can eventually rupture!

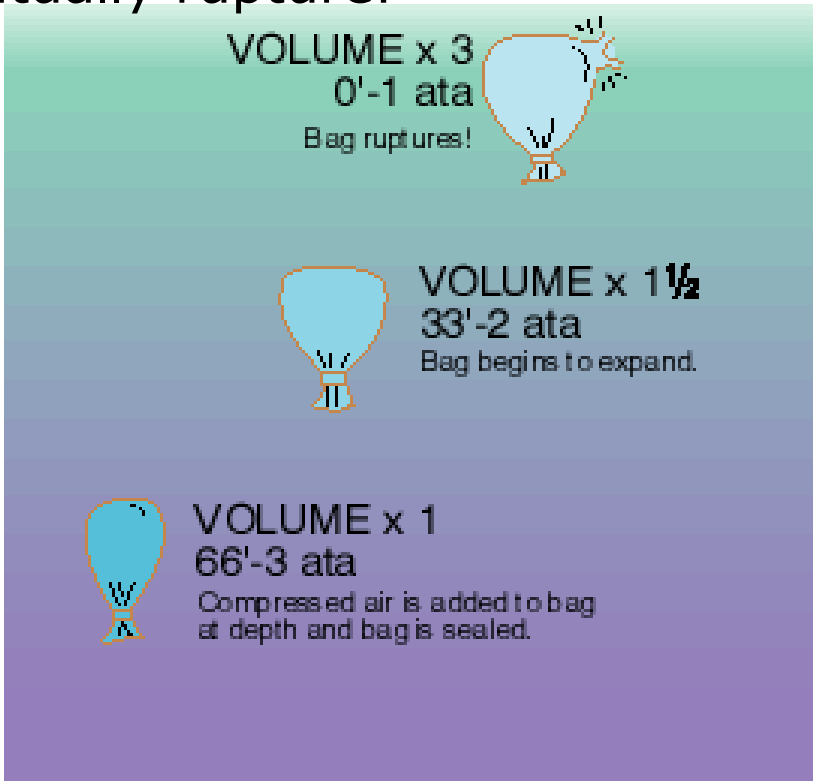
You must

NEVER HOLD YOUR BREATH

when breathing compressed air under water.

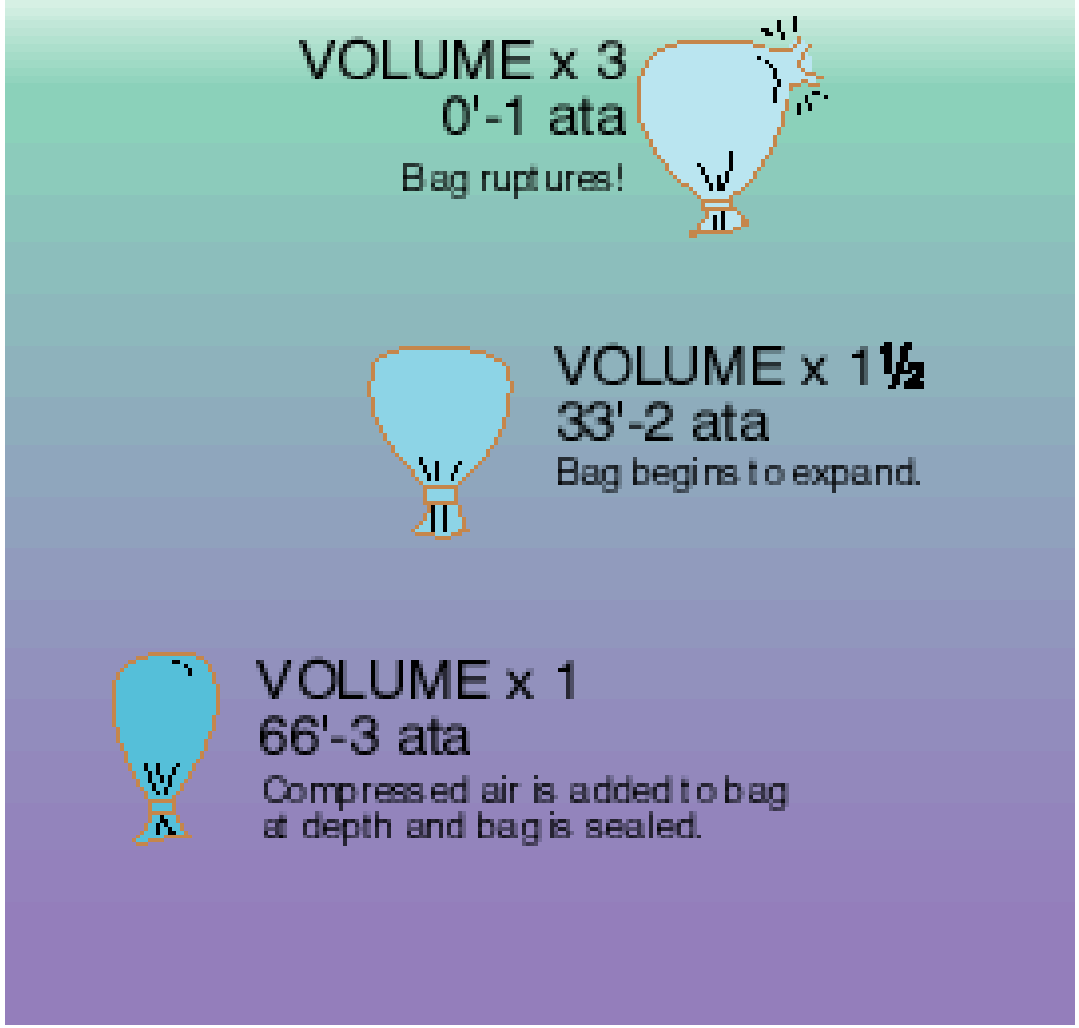
The balloon is a closed system and it will explode.

If you hold your breath, your lungs become a closed system.



CLOSED SYSTEM – ASCENT

What do you think will happen to your lungs if you hold your breath and swim to the surface?



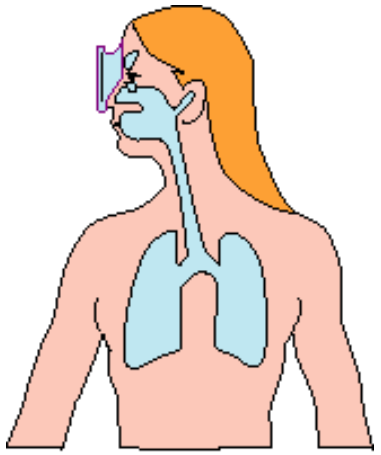
CLOSED SYSTEM – ASCENT

NEVER HOLD YOUR BREATH

Your Body

When you dive, the increase in pressure caused by the water as you descend affects air spaces inside your body.

How pressure affects your air spaces.



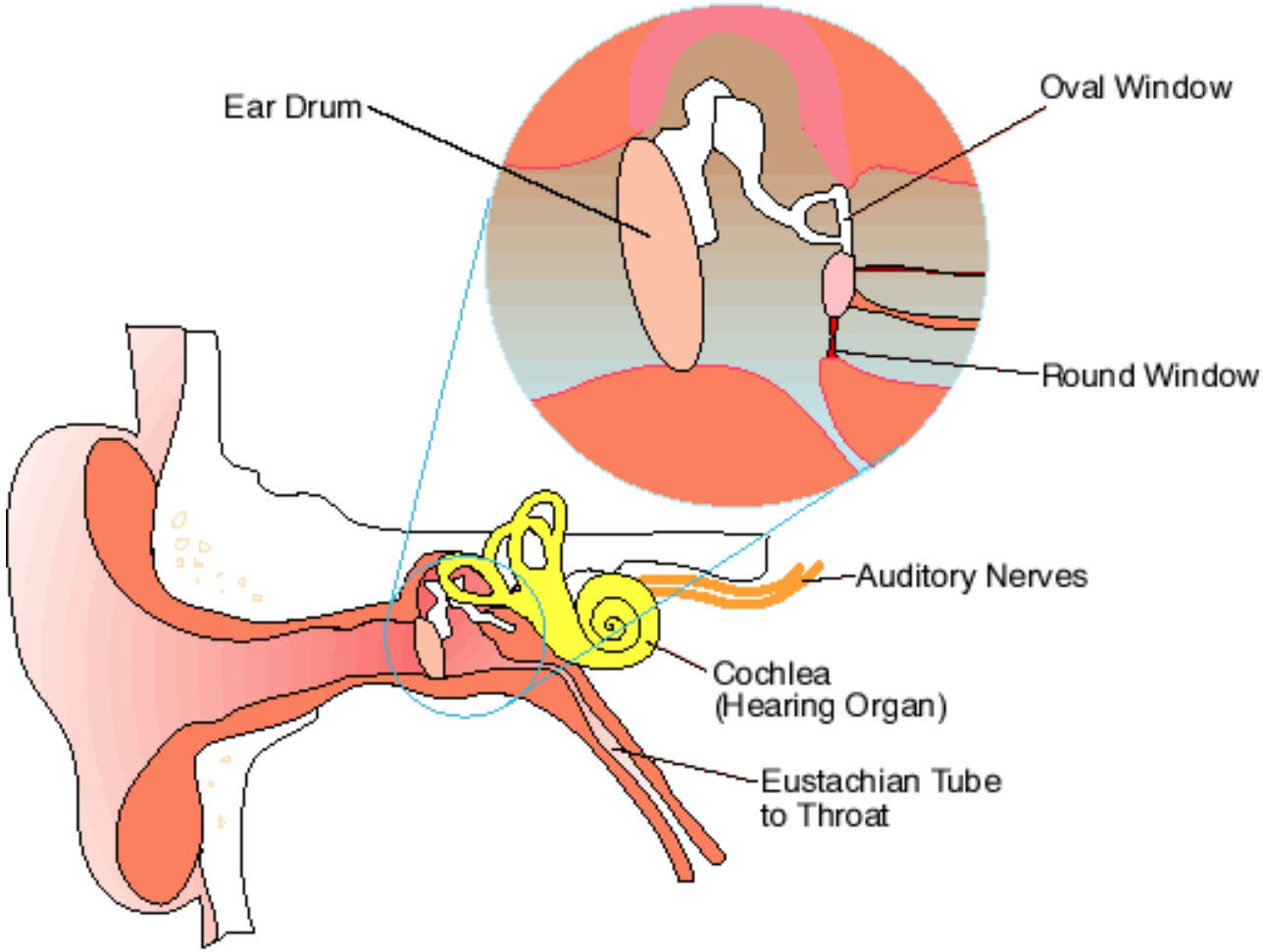
- **Squeezes:** Whenever the pressure outside an air space is greater than the pressure inside the air space, the situation is called a squeeze and it can cause damage to your body.

- **Blocks:** When air is trapped inside an air space and the pressure outside the air space is less, the air tries to expand and can cause damage to your body.

The Middle Ear

You must be able to equalize the pressure inside your ears to comfortably and safely dive.

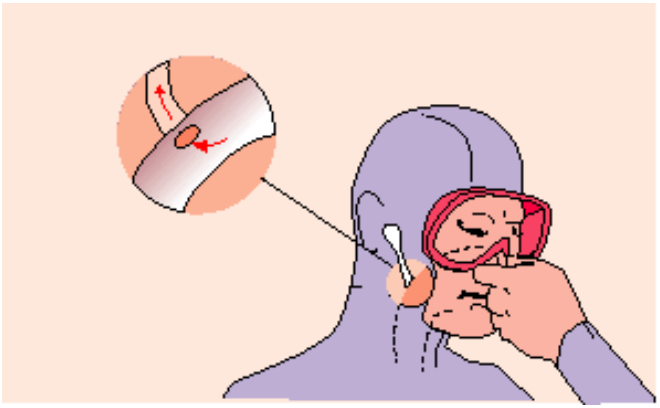
- **Anatomy of the ear:**



Middle Ear Squeezes

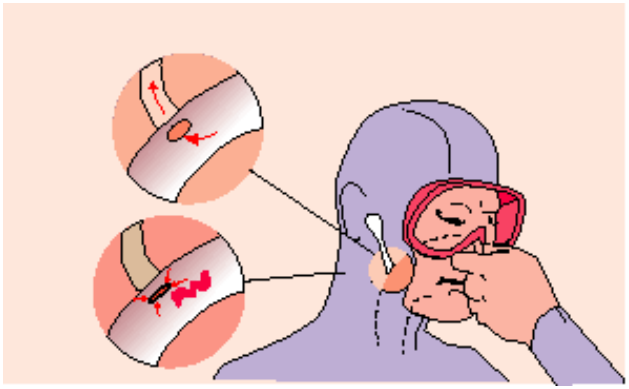
Occurs when the air or water pressure in your outer ear is greater than the air pressure in your middle ear.

- **Equalizing your middle ear:**
  - Move air from your throat through the eustachian tube into your middle ear, by blowing gently while holding your nose, or wiggle your jaw, or yawn.
  - For most people this is not an automatic process.
  - If you can not equalize during a dive, you must end the dive.



Diver holds his nose and blows gently. Air flows up the eustachian tube to the inner ear to equalize pressure. If there is a blockage, the air cannot flow up the tube.

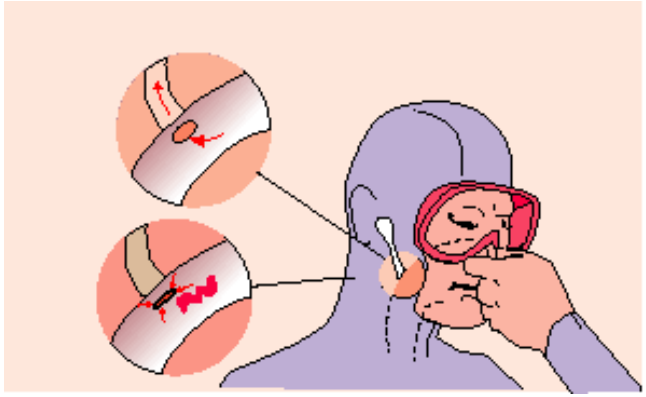
- **Before you feel the slightest pressure in your ears, you need to equalize.**



Middle Ear Squeezes

Never force equalizing your ears. You could cause serious damage to your ears.

- **The key to successful ear equalization:**
  Start as soon as you start descending. Do not wait for pain to begin!
- **If problems occur:**
  - Ascend a few feet and try to equalize again
  - Look up while clearing as this stretches the eustachian tube
  - Never try to clear with forceful blowing
  - Remember to descend feet first
- **If you have a head cold, you must not attempt to equalize by any method.**
- **You have to be clear of blockages. The best way is to clear out the mucus with a sinus rinse.**

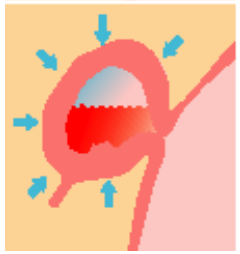


Sinuses

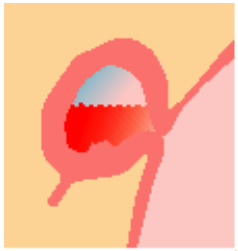
Your sinuses are air cavities lined with mucous membranes and surrounded by the bones of your head.

- **Sinus squeeze and blockage:** The sinus has a small opening that allows air to enter the sinus if this opening is blocked by mucus, the sinus cannot equalize. If air is trapped inside a clogged sinus, the air will expand on ascent, can cause pain and push the mucus plug out and any trapped sinus fluid out into your mask.

Congested sinus

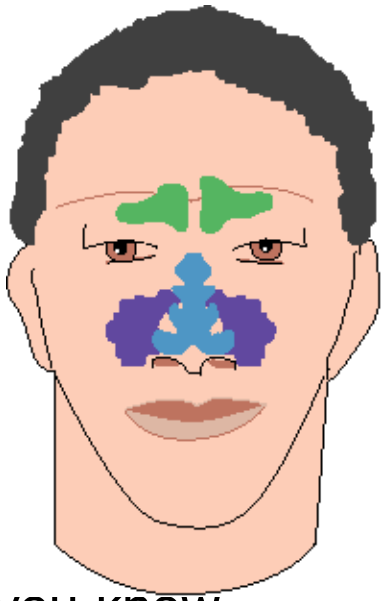


Response to a squeeze



Congested sinus under pressure

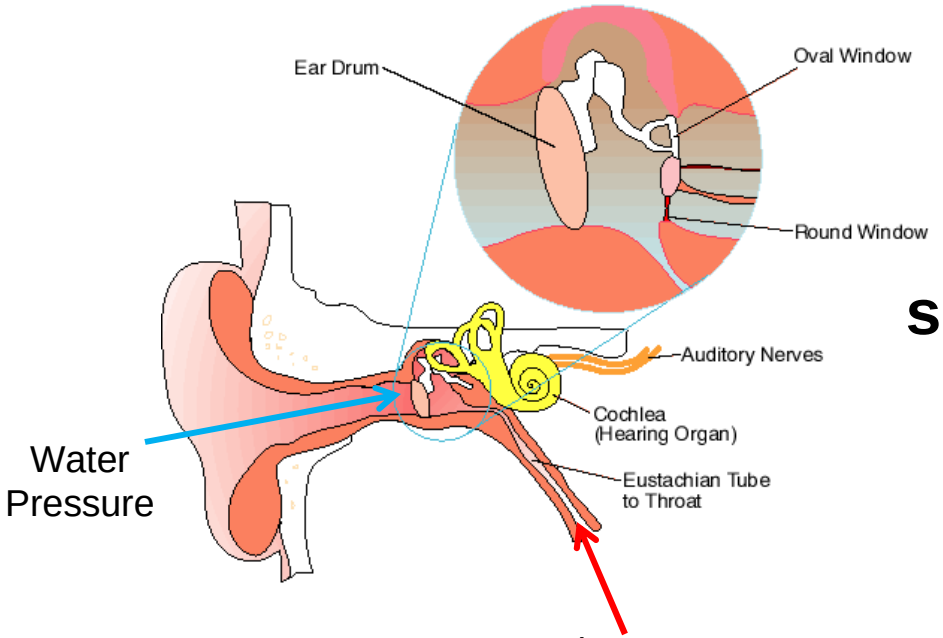
Effect of ascent



- Do not dive when you have a cold or sinus congestion.
- Decongestant drugs: Avoid taking any medications that you know produces side effects such as drowsiness when you use them.
- Clean your sinuses out with a sinus rinse to prevent problems

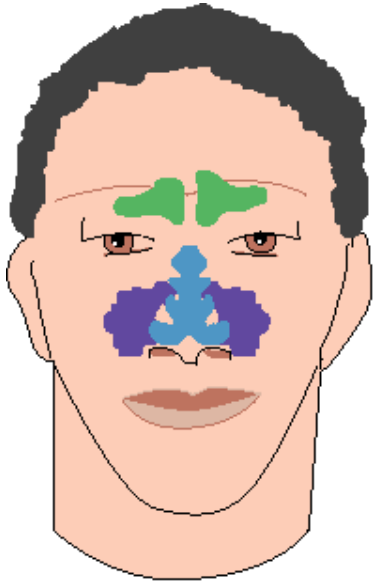
NeilMed Sinus Rinse

https://www.youtube.com/watch?v=uNwWjALegDA



Air Pressure must get up the Eustachian Tube to equalize the water pressure that is on the outside of the eardrum

Your ears and sinuses are your major limiting factor, Take <u>Proper Care of Your Ears</u>!



Swimmer’s Ear

The diving has been great all week. Now, while sitting in your room, you notice that one of your ears itches and the ear canal feels wet. You look in the mirror and don't see any problem, so you go to bed. Next morning when you wake up, you feel a fullness in your ear and a twinge of pain. What a time for an earache!

You wonder if you should cancel the day's diving. Your problem is probably otitis externa, a fancy name for an external ear infection sometimes called swimmers ear. As the name implies, it's usually associated with someone who swims a lot - and divers certainly fit that bill on dive-intensive scuba holidays.

Swimmer's Ear

The Cause

Despite what most people believe, otitis externa is not caused by bacteria in the water: instead, it's triggered by the bacteria normally found in your external ear canal. Here's how these normally innocuous bacteria can become troublesome.

With frequent immersion, water swells the cells lining the ear canal. Eventually, these cells pull apart - far enough for the bacteria normally found on the surface of your ear canal to get underneath the skin, where they find a nice warm environment and start to multiply.

Next thing you know, your ear canal itches, is sore and becomes inflamed. If left untreated, the swelling can spread to the nearby lymph nodes and cause enough pain that moving your jaw becomes uncomfortable. At this point, the only treatment is antibiotics, and diving is definitely out.

Swimmer's Ear

Prevention

Medical papers have stressed that it is the acidic pH that is the most important feature of solutions used for prevention of swimmer's ear. A 2 percent acetic acid solution has a pH of 3.0 and was found to drop the ear canal pH to 4-5: bactericidal to the normally found bacteria in the ear canal. White wine vinegar is 4-6 percent acetic acid, and if it's mixed with an equal amount of isopropyl alcohol, it would probably work fine. Using undiluted vinegar may make the solution too acidic and cause irritation. Using less alcohol may be wise if you find that the 50:50 mix provides too much drying - this can make your ear canal sore after several days of use. You can add water if you are using the solution for an extended trip. I use a 50:50 mix.

Swimmer's Ear

Using the Solution: *The head is tilted to one side and the external ear canal gently filled with the solution, which must remain in the canal for five minutes. The head is then tilted to the other side, the solution allowed to run out, and the procedure repeated for the other ear. The five-minute duration must be timed with a watch. If the solution does not remain in the ear a full five minutes, the effectiveness of the procedure is greatly reduced.* -From the U.S. Navy Diving Manual

No matter what solution you use, remember its effectiveness is drastically reduced unless it remains in the ear canal a full five minutes. Another caution: the above solutions are for use in the otherwise normal ear with an intact eardrum. If there is any hint that the eardrum may be torn, do not use these solutions as they may cause damage to middle ear structures. And if any solution causes irritation, stop using it.

Other Air Spaces

Any air space trapped in or around your body will be affected.

- **Teeth:** Air at depth can seep into a cracked tooth or filling and cause pain or can expand during ascent and cause pain. Make sure your teath are in good condition.

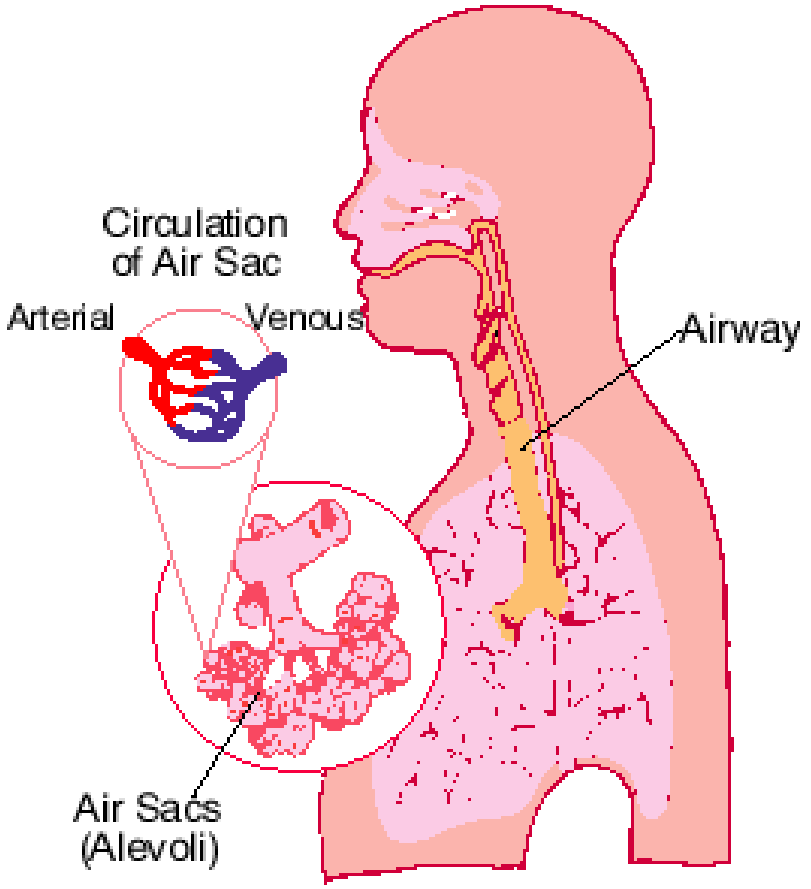
- **Mask space:** Simply exhale once in a while from your nose into the mask to equalize the closed space in the mask. If you do not, you can get a mask squeeze, also known as a giant hickie of the face.

The Anatomy of Your Lungs

Your lungs consist of millions of tiny air sacs, called alveoli. If the pressure outside these sacs increases, the sacs will expand and rupture, causing serious injury!

Lung over-expansion injuries:

- **Air Embolism**
- **Pneumothorax**
- **Tissue Emphysema**

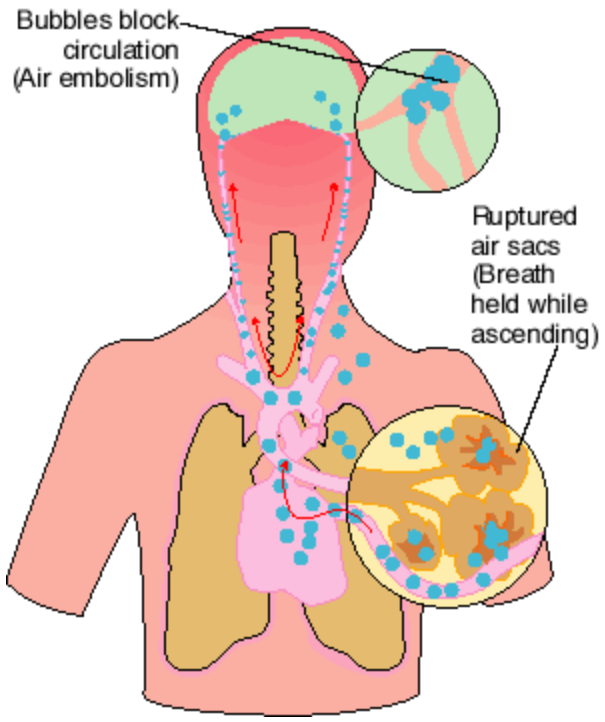


Lung over-expansion injuries

Air embolism: The most serious injury..

If You Hold your Breath while Ascending:

- Air in an aveoli expands and ruptures, allowing air to enter the blood stream.
- These bubbles pass through the blood stream and finally get to the brain, expand there and cause a blockage.
- Can cause unconsciousness, paralysis, brain damage, and even death.



Lung over-expansion injuries

Air embolism: The most serious injury..

ALWAYS BREATH NORMALLY

INHALE, FOLLOWED BY A NORMAL EXHALE

NEVER HOLD YOUR BREATH!
ALWAYS, BREATH NORMALLY

Lung over-expansion injuries

Air embolism: The most serious injury..

Remember we stated that each of foot fresh water would cause a change of 0.432psi per foot. (A little less than half a pound of pressure change per foot of water.) This means that in the 5 foot end of the pool, there is about a 2 psi change between the bottom to the surface.

5 psi x 0.432 psi/ft = 2.16psi

Theoretically, it only takes an over pressure of 2 psi to cause a tear in an alveoli that can cause an air embolism. So, **THEORETICALLY,** if you took a full breath and stood up in 5 feet of water without exhaling, alveoli could expand, tear, and you could get an air embolism.

NEVER HOLD YOUR BREATH!

ALWAYS, BREATH NORMALLY

Hyperbaric Treatment

If you suffer an air embolism, you will need to treated in a hyperbaric chamber.

If an Air Embolism occurs:

- Basic Life Support (CPR)
- Place victim on 100% oxygen (reduces bubbles and size)
- Transport victim to the nearest medical facility and contact the Diver's Alert Network (DAN) to locate the nearest hyperbaric chamber.

Medical Emergency Hotline: 919-684-9111

DAN Oxygen Kit

https://www.youtube.com/watch?v=05R-xaOaLKU

Review on Lungs and Breathing

What have you learned so far?

- Describe the cause of lung over-expansion injuries.
- Describe what your lung volume should be during ascent.
- Describe the proper way of breathing on scuba.

Review on Lungs and Breathing

What have you learned so far?

- Describe the cause of lung over-expansion injuries.

  Holding your breath while ascending on SCUBA

- Describe what your lung volume should be during ascent.

  Remain normal size

- Describe the proper way of breathing on scuba.

  Breathe in and out normally,

  DO NOT HOLD YOUR BREATH!

Diver First Aid and Safety

Divers must be prepared to handle emergencies. NAUI teaches divers how to prevent accidents and manage emergency situations.

- Divers participate in activities in remote areas.
- Divers must be prepared to be self-reliant.
- NAUI teaches Self-Reliance - "BE PREPARED"
- NAUI incorporates rescue training and awareness at all levels of training
- DAN/NAUI First Aid Courses:
  - CPR-BLS/First Aid
  - CPR-HCP/First Aid
  - Oxygen Provider
  - Hazardous Marine Life Injuries
  - Neurological Assessment
  - Dive Emergency Management
  - First Aid for the Diving Professional

Who Makes the Decision If You Make a Dive That You Are Qualified to Make?

You and you alone have the final decision as to whether you will or will not make a specific dive.

If you are not feeling well, or do not feel good about the dive that is planned, do not be afraid to ask to go to a different dive site.

If the 1st dive of the day for your dive boat is to be an 80 foot dive and you do not want to make an 80 foot dive, move to another boat that is making a shallow reef dive. Never allow other members of your group to "talk you into" diving in conditions that you do not feel comfortable with.

This could be because you did not get a good night's sleep or you are having ear problems. You always have the last word!

Marine Life Injuries

Cause:

- Careless divers bumping into or handling marine animals
- Animals defending themselves or their territory if it has been invaded

General care

- Clean the wound
- Use clean fresh water, sterile water or saline, and flush (irrigate) the wound
- Use sea water to flush jelly fish tentacles away, not fresh water

First aid (dependent on injury type)

- Heat
- Vinegar or other neutralizer
- Immobilization

Marine Life Injuries continued

Treating by Applying Heat

- Injected toxins from urchins, fish spines, etc. are heat labile (break down from heat).
- Immerse the wounded area in hot water - not scalding (110°–113° F or 43°–45° C).
- Soak for 30 to 90 minutes; be sure the water stays as hot as can be tolerated.
- Repeat above step until the pain diminishes.
- For spines that have broken off in the tissue, use vinegar soaks.
- Transport the victim to medical attention as the wound may need medical attention.

Marine Life Injuries continued

Treat with white vinegar

Toxin from stinging cells of jelly fish, fire coral, stinging hydroids, Portuguese Man-of-War

1. First rinse the area with SEA WATER. Fresh water will cause more stinging cells to activate.
2. Gently scrape any tentacles and stinging cells off that may still stick and be present. A credit card or C-card is a good tool to do this task.
3. Apply vinegar to neutralize the stinging cells and reapply vinegar in 15 minutes.
4. You can also use a paste of baking soda
5. Wash the area with soap and water
6. Apply a thin layer of hydrocortisone cream
7. Monitor for signs of an allergic reaction
8. Seek medical attention, if necessary
9. Reapply hydrocortisone at night

Vinegar being applied with a spray bottle

Marine Life Injuries continued

Treating by Pressure Immobilization

Used for blue-ringed octopus, sea snake bites, or cone shell punctures which can be life threatening.

- Call for help - 911.
- Place a four inch by four inch (10 cm by 10 cm) by an inch (3 cm) thick cloth or gauze pad over the wound.
- Wrap with an elastic bandage at least an inch (2.5 cm) above and below the pad, tight enough to press the pad into the skin, but not cut off circulation.
- Apply a splint to immobilize the limb.
- Monitor for breathing, circulation, and signs of an allergic reaction.
- Administer oxygen
- Transport the victim to medical attention.

Marine Life Injuries
continued

Bites - Morays, sharks, barracuda, and other fish will bite if threatened, or when you try to feed them

First aid:

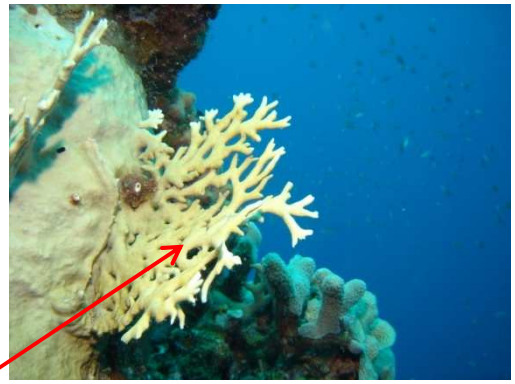
- It may be necessary to unhook by pushing inward first before withdrawing
- Assist the diver to the surface
- Clean the wound and remove any tooth fragments
- Control the bleeding and bandage as necessary
- Give oxygen to prevent shock and transport the victim to medical attention for possible stitches and antibiotics, if necessary

Marine Life Injuries
continued

Envenomation

- Jellyfish
- Sea urchins
- Stingrays
- Stonefish, scorpionfish, lionfish, or catfish
- Blue-ringed octopus
- Cone snails (family Conidae)
- Sea snakes
- Bristleworms or fireworms
- Sea cucumbers
- Crown of Thorns seastar
- Sea sponges

Marine Life Injuries
continued



Coelenterate:

- Portuguese man-of-war, **jellyfish**, **fire coral**, box jellyfish, sea nettles, **hydroids**, sea wasps, and **anemones**
- Nematocysts (stinging cells) inject venom on contact with living tissue.

Prevention

- Exposure protection-Dive skin

First Aid

- Use “Treating by white vinegar” as described
- Chironex box jellyfish (Australia) can be lethal, antivenin is available

Marine Life Injuries
continued

Portuguese man-of-war :

Special note should be made of this coelenterate. They float on the surface with tentacles extending downward over 30 feet in length. The floating gas filled bladder is at the mercy of the wind. The tentacles are almost transparent and extremely difficult to see. Divers have ascended into the tentacles or the chopped up particles from boat props.

Care should also be taken with man-of war that have washed up on shore as the nematocysts can still be active and sting.

Marine Life Injuries
continued

Sea Urchin Puncture:

- Spines remain embedded, and can pierce gloves or wetsuit

Treatment

- Use “Treating by Heat” as described
- Attempt to remove spines
- Deeply embedded spines may require medical treatment/removal

Stingray Puncture:

- barbed spine in their tails injures leg or foot when stepped upon, usually in shallow waters.

Treatment

- Local lidocane, use “Treating by Heat”
- Seek medical attention to avoid infection/complications

Marine Life Injuries

continued

Fish Spine Envenomations:

- Stonefish, scorpionfish, and catfish have spines and venom
- Excellent natural camouflage make these animals dangerous to divers, especially if handled or molested
- NOTE: Lionfish are described later

Treatment

- Use “Treating by Heat” as described
- Medical attention may be necessary

Blue-Ringed Octopus Bite:

- Small, tidal pool creature found in Australia and Indo-Pacific
- Bite may go unnoticed, but is deadly
- Small bruise or blood blister may be only sign

Treatment

- Pressure immobilization as described
- Immediate medical care is required

Marine Life Injuries
continued

Cone Snail Sting: (Found only in the Pacific)

- Proboscis at the narrow end of the shell has a harpoon that can penetrate skin and light clothing

Treatment

- Pressure immobilization as described
- Immediate medical care is required

Lion Fish: **You will find these from NC to the Caribbean**

- Inhabit tropical/temperate waters of Atlantic and Caribbean
- **Do not try to handle this fish**
- Spines contain venom
- If venom has been injected, can be deadly

Treatment

- Pressure immobilization as described
- Hot water treatment
- Life support as needed - oxygen

Marine Life Injuries

continued

LIONFISH STING

FIRST AID GUIDELINES

Remember: Prevention is the best first aid. Seek proper training and use proper tools and techniques to avoid stings.

MANAGING A LIONFISH STING WHILE DIVING

- Remain calm.
- Allow small punctures to bleed.
  - » *This may decrease venom load.*
- Notify the dive leader and/or your buddy.
- Safely end your dive.
  - » *Perform a normal ascent rate, safety stop & any deco obligation.*
- Provide first aid.

Marine Life Injuries
continued

Bristleworms (fireworms):

- Segmented worms found throughout the tropical seas.
- Can bite, or bristles may penetrate skin.

Treatment

- Use “Treating by Heat” as described

Sea Cucumbers:

- Elongated tubular creatures with tentacles around the oral opening.
- Can cause rash if eaten inadequately cooked, or if you have contact with excrement.
- Dangerous to eyes and can lead to blindness.

Treatment

- Use “Treating by White Vinegar” as described, or if eye injured, flush with 1-2 gallons (4-8 liters) fresh water.

Marine Life Injuries
continued

Crown of Thorns Seastar:

- 13 to 16 arms with spines as long as 2” (5 cm)
- Contact with spines and venom injected

Treatment

- Use “Treating by Heat” as described

Sea Sponge:

- Grow attached to shells and stones
- Contact with spicules can cause rash

Treatment

- Use “Treating by White Vinegar” as described

Marine Life Injuries continued

Ingested Fish Poisoning:

- Some fish and shellfish are poisonous to eat
- Fish toxins are unaffected by cooking, soaking
- May not be an obvious “off” taste or smell

Ciguatera Poisoning (food chain poisoning)

- 400 species implicated – but sporadic and unpredictable
- Eating a fish that has eaten something that has made it toxic to human consumption such as red tide
- Some species are:
  - Barracuda
  - Grouper
  - Snapper
  - Sea bass
  - Surgeonfish
  - Mackerel
  - Parrotfish
  - Wrasse
  - Jackfish
  - Amberjacks
  - Moray eels
  - Large reef fish

Marine Life Injuries
continued

Ciguatera Poisoning (continued)

- **Signs and Symptoms**
  - Reversal of hot and cold perception
  - Chills
  - Weakness
  - Numbness
  - Paresthesias-tingling, burning of the skin
  - Arthralgias
  - Dizziness
  - Diarrhea, nausea, and vomiting
  - Abdominal pain
- **First Aid**
  - Induce vomiting if eaten within the last three hours.
  - Mannitol given by medical personnel.
  - Freeze a piece of the fish for analysis.
  - Transport the victim to medical attention.

Marine Life Injuries
continued

Scombroid Poisoning

- Results from eating fish not preserved or refrigerated after caught and includes:
  - Albacore, bluefin, and yellowfin tuna
  - Mackerel
  - Wahoo
  - Skipjack
  - Bonito
  - Bluefish
  - Dolphinfish (mahi-mahi)
  - Sardines
  - Anchovies
  - Amberjack
  - Herring

Marine Life Injuries
continued

Scombroid Poisoning (continued)

- **Signs and Symptoms**
  - Flushed skin of the face, neck, and upper torso that gets worse with exposure to the sun
  - Sensation of warmth but normal temperature
  - Itching or hives
  - Red eyes
  - Puffy face and hands
  - Difficulty breathing with wheezing
  - Nausea, vomiting
  - Headache
  - Thirst
  - Difficulty swallowing
- **First Aid**
  - Induce vomiting if eaten within the last three hours
  - Transport the victim to medical attention

Marine Life Injuries

continued

Tetrodotoxin Poisoning - eating puffer (fugu), sunfish or porcupine fish

- **Signs and symptoms**
  - Oral numbness and tingling
  - Lightheadedness, general numbness and tingling
  - Drooling
  - Difficulty swallowing
  - Sweating
  - Fatigue
  - Headache
  - Vomiting or nausea
  - Abdominal pain
  - Weakness
  - Difficulty walking, incoordination
  - Paralysis

Marine Life Injuries
continued

Tetrodotoxin Poisoning (continued)

- **Prevention**
  - Do not eat fish without scales.
  - Only eat Fugu prepared by a licensed chef.
- **First Aid**
  - Induce vomiting if the victim ate the fish within the last three hours.
  - Perform artificial respiration if the victim is not breathing.
  - Seek immediate medical attention.

Marine Life Injuries

continued

Paralytic Shellfish Poisoning

- Eating shellfish that have ingested quantities of plankton and protozoans that cause “red tides”
- Clams, Oysters, Scallops, Mussels

- **Signs and Symptoms**
  - Numbness and tingling inside and around the mouth, including the tongue and gums
  - Neck, hands, and feet numbness
  - Weakness
  - Floating sensation
  - Loss of balance
  - Incoordination
  - Difficulty speaking or swallowing
  - Vomiting, nausea and diarrhea
  - Paralysis

Marine Life Injuries
continued

Paralytic Shellfish Poisoning (continued)

- **Prevention:**
  - Lower the risk by thoroughly cooking.
  - Avoid eating any shellfish where there have been “red tides,” or reports of “fish kills.”
- **First Aid**
  - Induce vomiting if the victim ate the shellfish within the last three hours.
  - Perform artificial respiration if needed.
  - Reassure the victim. They might be completely paralyzed but still conscious and able to hear.
  - Seek immediate medical attention.

Cuts and Scrapes

Cuts and scrapes while diving must be attended to as they are more susceptible to infection than an ordinary cut or scrape due to all of the micro organisms in the marine environment. This is especially true if the wound is from an encounter with live coral. This means that actual polyp tissue and stinging cells are in the wound.

Wounds must be cleaned with soap and water and antibiotic ointment out on them. Failure to do this can result in a small wound getting infected and becoming a large problem. All divers should travel with a first aid kit as described at the beginning of this program.

DO NOT DEPEND ON SOMEONE ELSE FOR YOUR CARE.

CPR

Every diver should take a CPR course. If you have not taken a CPR course, you can still administer "Hands Only CPR"

https://www.youtube.com/watch?v=-Yqk5cHXsko

These are the steps for a non-CPR trained person.

I highly recommend our DAN-NAUI CPR-BLS course. The academics are on-line and the skills and written exam are completed in a 2-3 hour session. Everyone should know CPR. You receive a oronasal CPR mask as part of the course.

Underwater Navigation

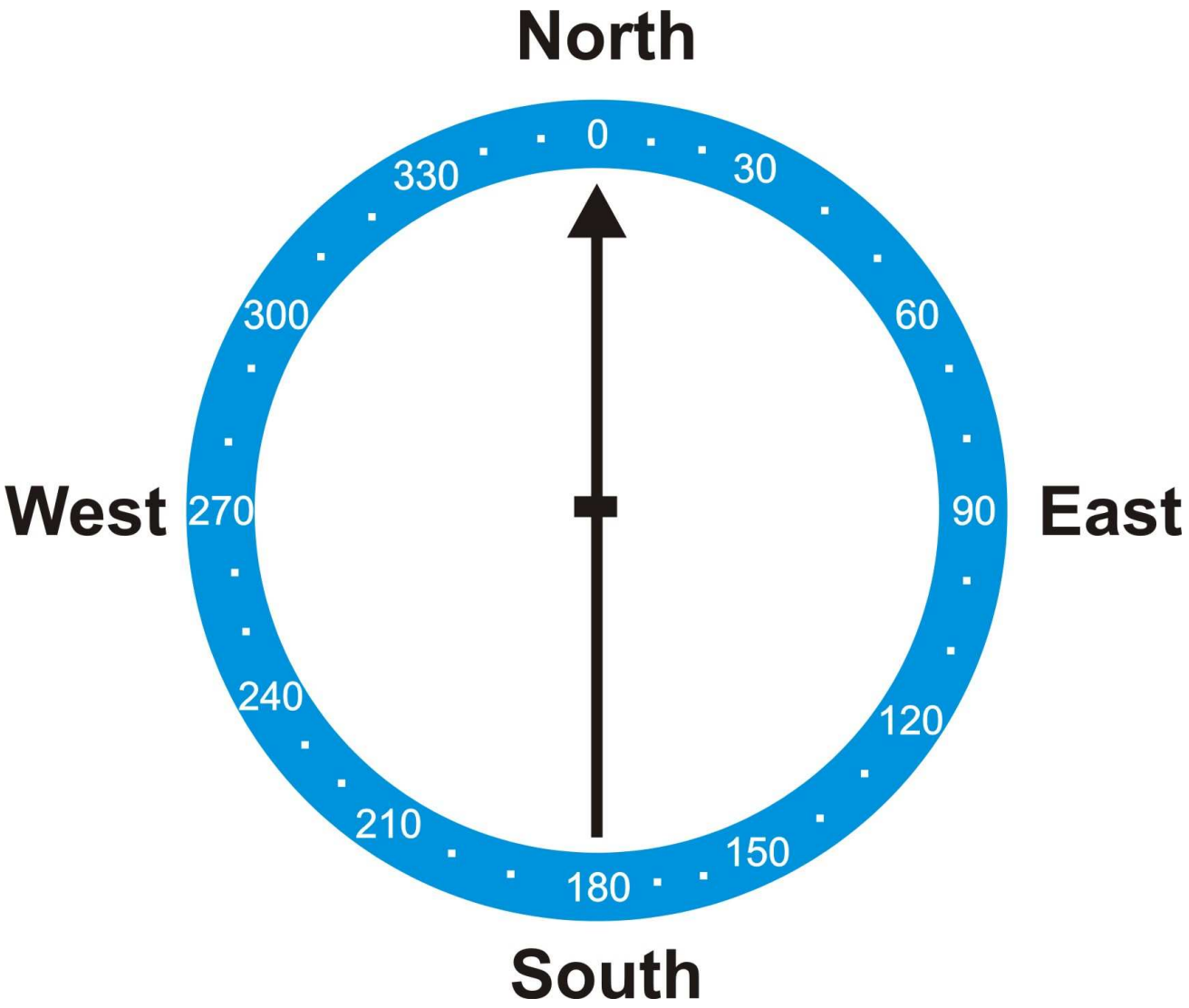
- Navigational Equipment for Divers
- Measuring Distance Underwater
- Means of Navigation
- Combining Navigational Techniques
- Navigational Problems
- Use of Charts
- Advanced Underwater Navigational Equipment

Navigational Equipment for Divers

Compass, watch and depth gauge

- Diving compasses
- Parts of a compass

COMPASS ROSE



Navigational Equipment for Divers

- There are two basic types of diver compasses:

1. **Direct reading**

2. **Indirect reading.**

There are various models of each type.

A bezel is a rotating collar on a diving compass equipped with alignment marks to indicate a course to be followed, an azimuth or for sighting.

Direct reading compasses have a bezels that rotates and read 0 to 360 degrees in a clockwise direction.

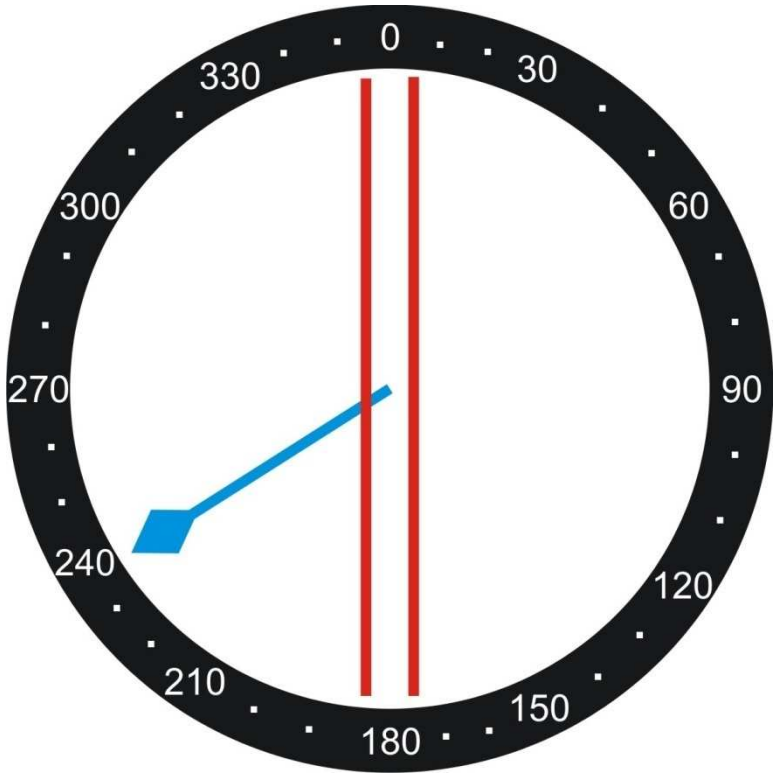
Indirect reading compasses have an inner rotating bezel that has the alignment marks on it.

Navigational Equipment for Divers

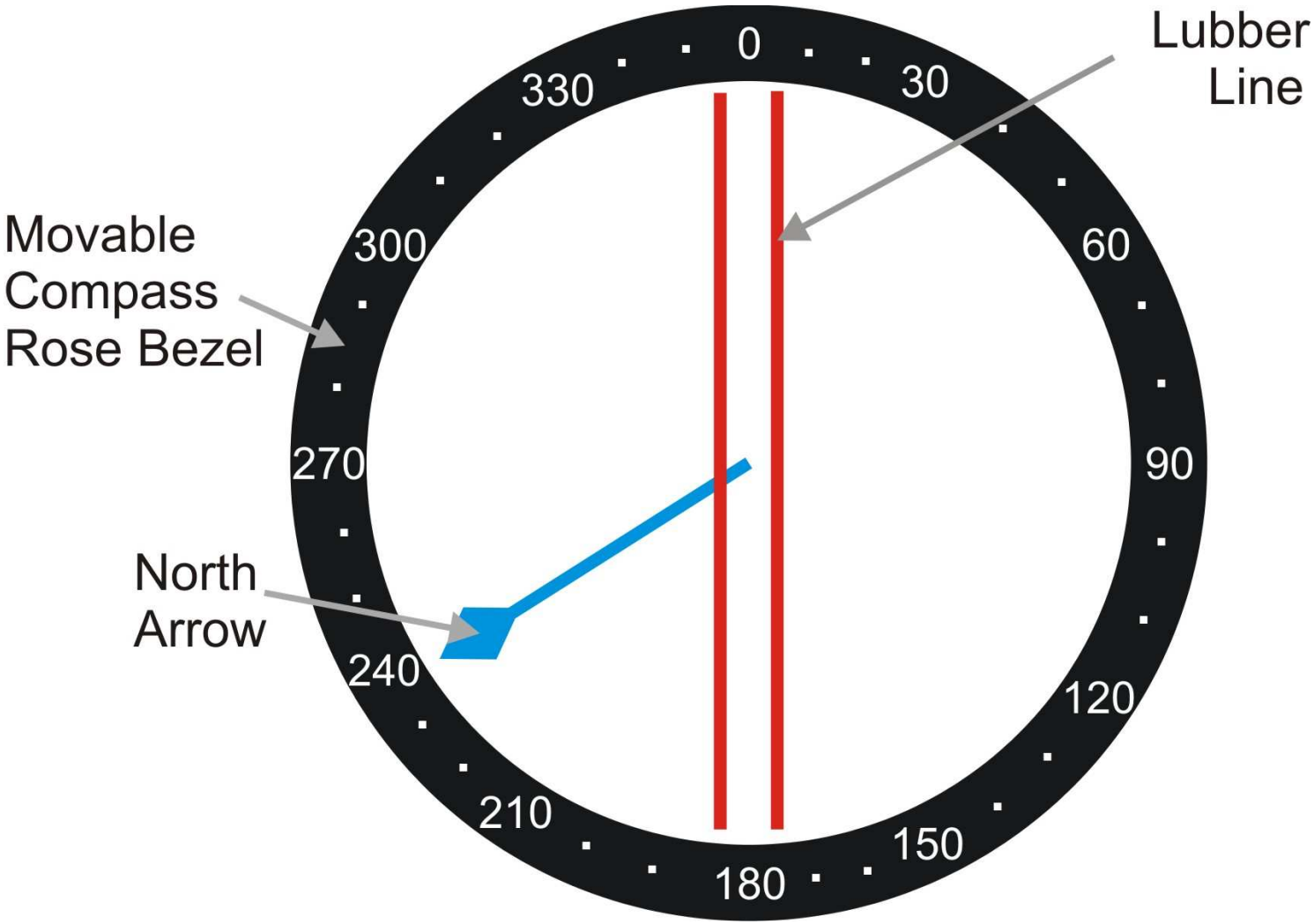
- Diving compasses have a lubber line, which is a reference line that is aligned with the user to obtain and follow a course or a bearing. You follow the direction the lubber line is pointing. It is important to keep the lubber line aligned with your body as you kick and keep the lubber line aligned with your compass course.

- Direct Reading Compass:

  reads 0° to 360° in a clockwise direction on a circular compass bezel. This type of compass has a north seeking needle and has its numbers on a rotating bezel.

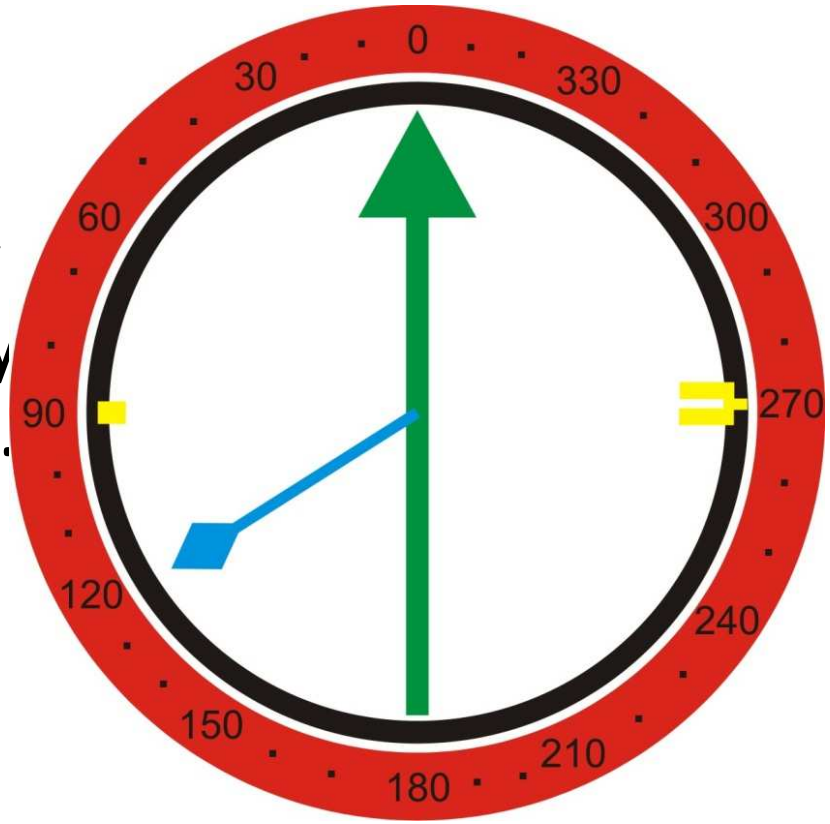


- Direct Reading Compass:

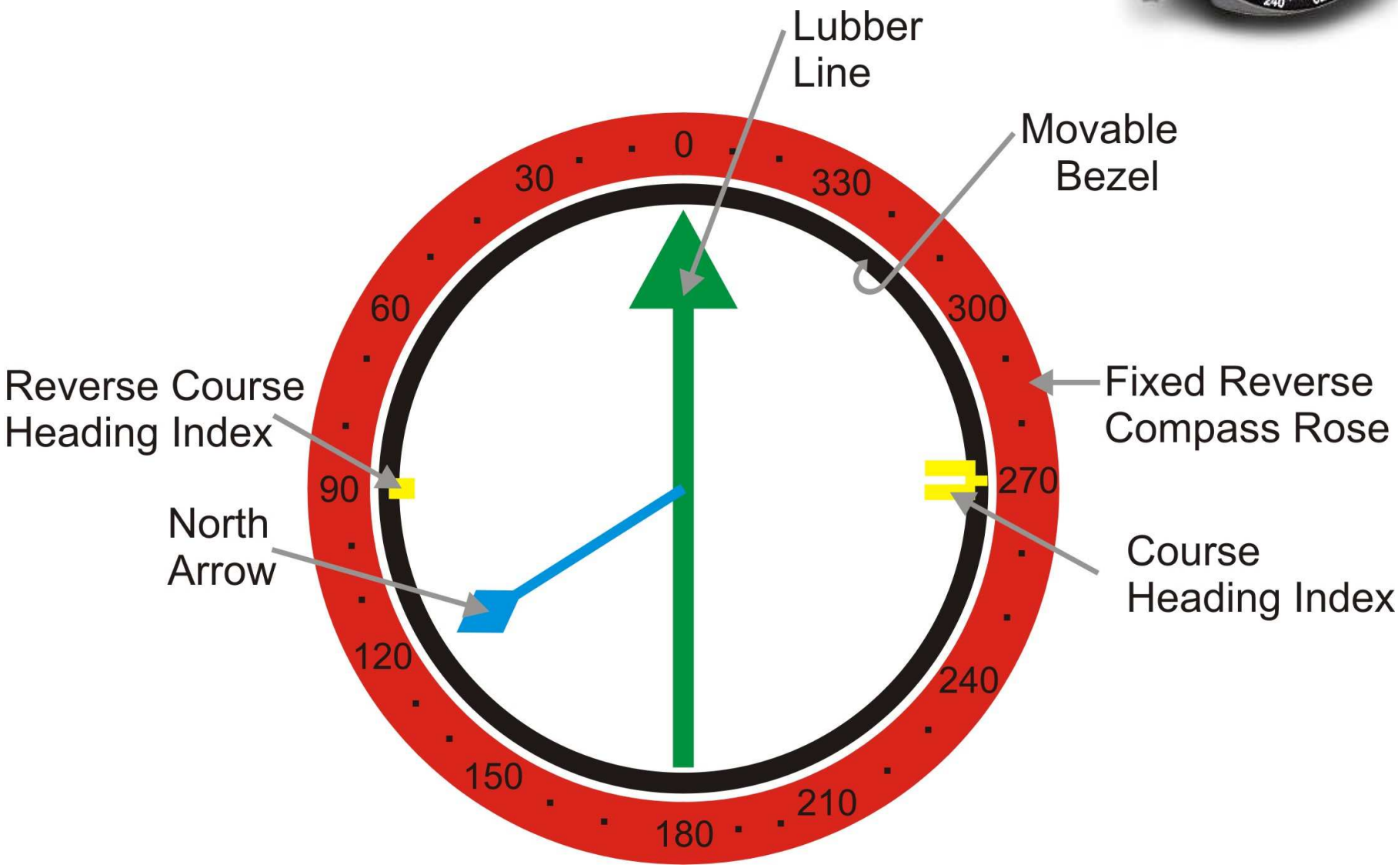


- Indirect Reading Compass:

  has fixed degree markings on the compass body which read from zero to 360 degrees in a counter clockwise direction. The compass also has a rotatable bezel containing only index marks, which temporarily indicate a heading or a bearing.



- Indirect Reading Compass:



Measuring Distance Underwater

- Kick cycles
- Arm spans
- Measured line

Measuring Distance Underwater

- The cycle of a kick is defined as **one complete kick of both legs**, and is usually counted when one leg reaches the top of the kicking motion. A diver needs to know the distance traveled with each kick cycle when swimming at normal speed. This can be determined by counting the number of kick cycles required to swim a known distance (along a line that is 50-100 ft) and then dividing the number of kick cycles into the distance. This would give you a factor like X number of kicks per 10 feet.

Measuring Distance Underwater

- When visibility is limited, when the situation requires starting and stopping, or when very accurate distance measurements are required, arm spans may be used.
- A very accurate means of distance measuring underwater is with a measured line. One end of the line is secured to a stationary object or held by your buddy while you unreel the line and swim the distance to be measured.

Means of Navigation

You may navigate by using:

- natural aids to navigation,
- by using your compass for reference or
- by using all of these in combination.

Means of Navigation

Natural Navigation

There are many aids to navigation in the underwater environment. A diver can estimate his or her approximate location reasonably well by means of natural aids to navigation. One aid is sand ripples on the bottom, which usually run parallel to the shore and are steepest and closest together nearer the shore. At the quarry there are various items on the bottom as well as the road bed going out to airplane and then on to the bus. Studying the map can be a great aid before the dive.

Means of Navigation

Other natural aids include:

- sun and shadows,
- direction of water movement,
- orientation of certain stationary marine life (such as sea fans or kelp),
- bottom contour and depth,
- formations, and
- underwater landmarks (such as a wreck).

Means of Navigation

Surge is stronger in shallow water near shore or around pinnacles, and decreases in deeper water. Another key to natural navigation is the use of a dive pattern, which is the total course or dive path to be followed on a dive.

Means of Navigation

When the direction and distance to two or more land-based objects is known, the resulting position is known as a fix.

Direction is established by natural means through the selection of objects that align with one another, such as a phone pole that is in line with the edge of a house. Two such sets of in-line objects result in a very precise fix.

Compass Navigation

- Magnetic north and True north
- Deviation
- Reciprocal course

Compass Navigation

Compass Navigation

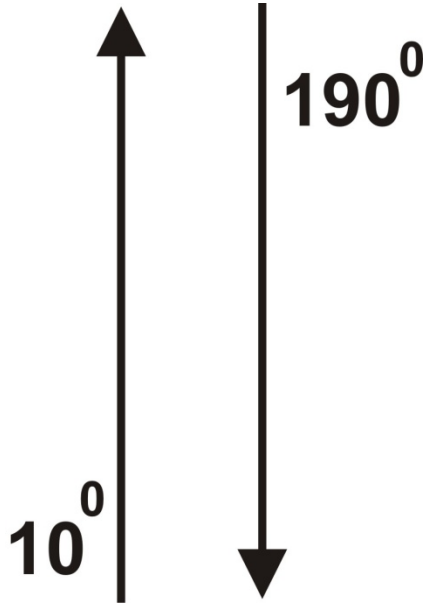
- A compass provides a navigational reference even when natural aids are not available. The magnetic needle of a compass aligns itself with the earth's magnetic poles.
- Magnetic north is a point in extreme northern Canada towards which a magnetic needle points.
- True north is a geographical location with reference to the earth's axis rather than to the magnetic poles and is not the same as magnetic north.

Compass Navigation

- Compass declination, or variation, is the local differences in degrees between true (on a map or chart) and magnetic north. Fortunately, diving navigation involves relative direction rather than true direction, so the effects of variations do not pose problems for divers.

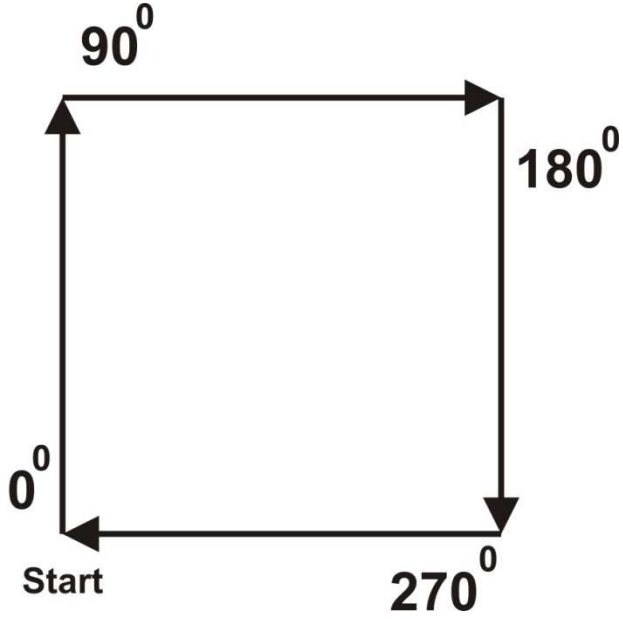
Compass Navigation

- An out-and-back pattern is referred to as a reciprocal course, which is always 180° opposite that of an initial heading. If you swam away from a boat on a heading of 10°, your reciprocal course to return to the boat would be 190°.



Compass Navigation

- Your compass can assist you in conducting very precise dive patterns. You can swim a square pattern by swimming the first leg on a heading of 0°, the second leg on a heading of 90°, the third leg on a heading of 180° and the fourth leg on a heading of 270



Compass Navigation

To find your reciprocal course, you either add or subtract 180 degrees.

- If you course out was 90 degrees, you add:

  90

  +180

  270 degrees

- If your course out was 330 degrees, you subtract

  330

  -180

  150 degrees

Compass Navigation

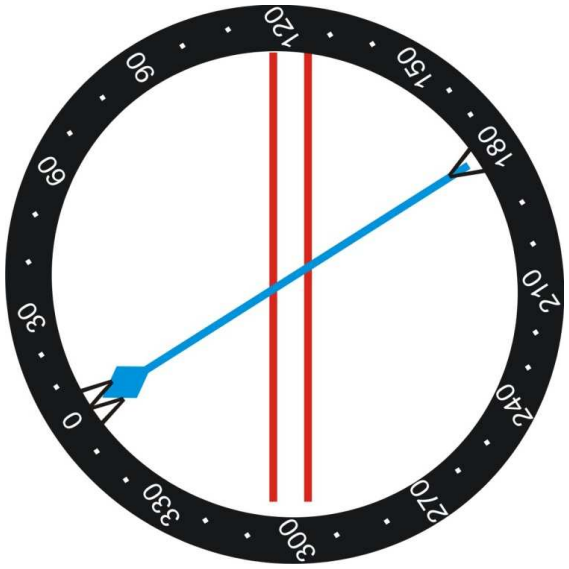
However on modern dive compasses, you do not have to do the math of adding or subtracting 180 degrees to find your reciprocal course.

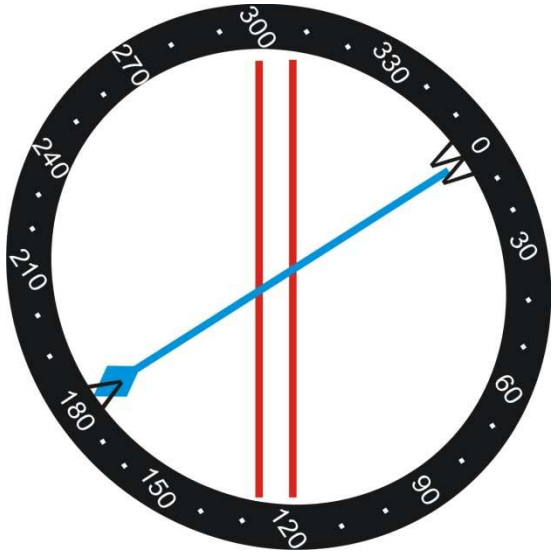
On your bezel there are two index (tic) marks,

- one for your azimuth and
- one for your back azimuth or reciprocal course.

Compass Navigation

- It is easy to set a reciprocal course on your compass. Just turn around until the north end of the needle is aligned with the single index (tic) mark. Just follow your lubber line and keep the north arrow on the proper index mark. And Remember:



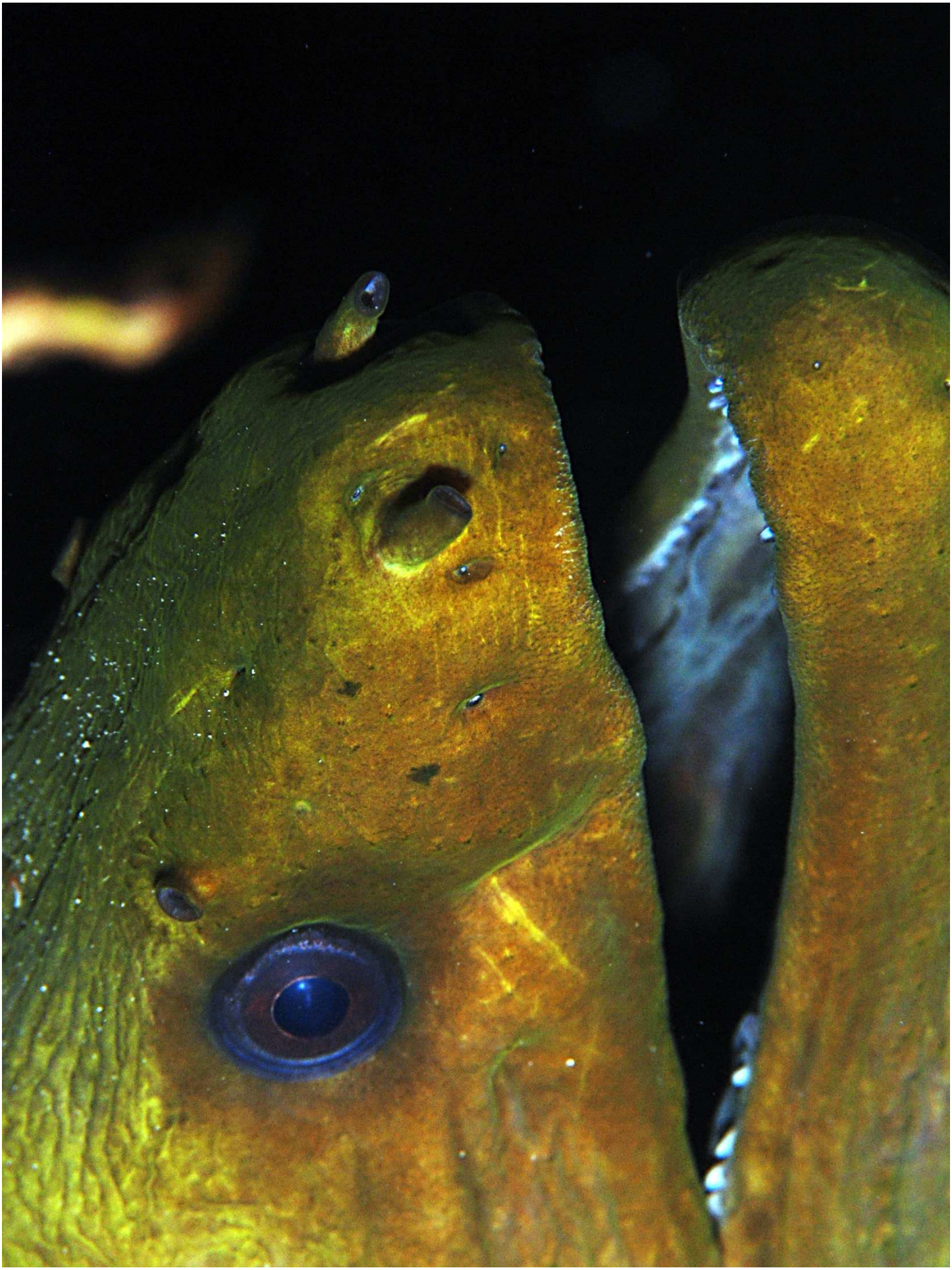


Compass Navigation

KEEP YOUR COMPASS LEVEL!

If you do not hold the compass level, the north arrow can “peg” (get stuck against the compass base) and you can actually swim in a circle!

Once in a while, as you swim your compass course, jiggle your compass a bit, to see if the north arrow swings, if not it is pegged.




TRIMM COVE'S

Ultimate Dive Adventure!
Stuart Cove's
Shark Adventure Dive

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