

SCUBA: the (not-so) dangerous underwater sport

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The what

- SCUBA = Self-Contained Underwater Breathing Apparatus
- Snorkeling != SCUBA
- Free diving != SCUBA

SCUBA



Snorkeling



SCUBA



Free diving



SCUBA



The how

- How to float with that giant Tank
- How to submerge in water with that giant suit of air
- Buoyancy – Your lungs are air bags!
- Decompression times
- Ear pressure balancing
- Land vs. ship
- Walking in the fins and gear



The feeling

- Before water
- Sounds underwater
- Sight
- Temperature
- Communication
- Afterwards



Common hand signals.

Signals may vary somewhat, so review them when planning a dive with a new buddy.



1. Stop, hold it, stay there



2. Something is wrong



OK? OK.



4. OK? OK. (glove on)



5. Distress, help



6. OK? OK. (on surface at distance)



7. OK? OK. (one hand occupied)



8. Danger



9. Go up, going up



10. Go down, going down



11. Low on air



12. Out of air



13. Buddy breathe or share air

The safety!

- The bends result when dissolved gases (mostly nitrogen) absorbed as air is breathed under pressure are released as gas back into the bloodstream.
- Embolism results when gases in the lung expand during ascent and rupture lung tissue, causing air bubbles to enter the bloodstream.
- These conditions can happen if a diver ascends too quickly.
- Dive computers
- Divers use enriched air (nitrox) which has a higher percentage of oxygen than air, but with a lower risk of oxygen toxicity.

The physics

- Ideal Gas Law: $PV = nRT$
- Air in a scuba tank is pressurized to about 3000 psi.

Gas Law	Variables	Importance to divers
Boyle's Law	<ul style="list-style-type: none">• Pressure• Volume	<ul style="list-style-type: none">• Rapid ascent could cause dissolved gases to form bubbles in the bloodstream, resulting in the bends• Rapid ascent could cause expanding air in the lungs to rupture lung tissue, resulting in embolism.
Charles' Law	<ul style="list-style-type: none">• Temperature• Volume	<ul style="list-style-type: none">• An overheated tank could explode.• Warming a diver could cause the bends or embolism.

Dive table

DOPPLER NO-DECOMPRESSION LIMITS BASED ON U.S. NAVY DIVE TABLES



TABLE 1 No-Decompression Limits and Repetitive Group Designation Table For No-Decompression Air Dives

HOW TO USE TABLE 1: Find the planned depth of your dive in feet or metres at the far left of Table 1. Read to the right until you find the time (minutes) you plan to spend at that depth. Read down to find the Group Designation letter.

DEPTH feet / metres	Doppler No-Decompression Limits (minutes)	60	120	210	300	225	350	240	325	245	205	160	140	160
10	3.0													
15	4.5													
20	6.0													
25	7.5	245												
30	9.0	205	15	30	45	60	75	95	120	145	170	205		
35	10.5	160	5	15	25	40	50	60	80	100	120	140	160	
40	12.0	130	5	15	25	30	40	50	70	80	100	110	130	
50	15.0	70		10	15	25	30	40	50	60	70			
60	18.0	50		10	15	20	25	30	40	50				
70	21.0	40		5	10	15	20	30	35	40				
80	24.0	30		5	10	15	20	25	30					
90	27.0	25		5	10	12	15	20	25					
100	30.0	20		5	7	10	15	20						
110	33.0	15			5	10	13	15						
120	36.0	10			5	10								
130	39.0	5			5									

GROUP DESIGNATION: **A B C D E F G H I J K**

HOW TO USE TABLE 2:

Enter with the Group Designation letter from Table 1. Follow the arrow down to the corresponding letter on Table 2. To the left of these letters are windows of time. Read to the left until you find the times between which your surface interval falls. Then read down until you find your New Group Designation letter. Dives following surface intervals of more than 12 hours are not repetitive dives.

TABLE 2 Residual Nitrogen Timetable For Repetitive Air Dives

REPETITIVE GROUP AT THE BEGINNING OF THE SURFACE INTERVAL

0:10														
12:00*	A													
3:21	0:10													
12:00*	B													
4:50	1:40	0:10												
12:00*	C	4:49	1:39											
5:49	2:39	1:10	0:10											
12:00*	D	5:48	2:38	1:09										
6:35	3:25	1:58	0:55	0:10										
12:00*	E	6:34	3:24	1:57	0:54									
7:06	3:58	2:29	1:30	0:46	0:10									
12:00*	F	7:05	3:57	2:28	1:29	0:45								
7:36	4:26	2:59	2:00	1:16	0:41	0:10								
12:00*	G	7:35	4:25	2:58	1:59	1:15	0:40							
8:00	4:50	3:21	2:24	1:42	1:07	0:37	0:10							
12:00*	H	7:59	4:49	3:20	2:23	1:41	1:06	0:36						
8:22	5:13	3:44	2:45	2:03	1:30	1:00	0:34	0:10						
12:00*	I	8:21	5:12	3:43	2:44	2:02	1:29	0:59	0:33					
8:51	5:41	4:03	3:05	2:21	1:48	1:20	0:55	0:32	0:10					
12:00*	J	8:50	5:40	4:02	3:04	2:20	1:47	1:19	0:54	0:31				
8:59	5:49	4:20	3:22	2:39	2:04	1:36	1:12	0:50	0:29	0:10				
12:00*	K	8:58	5:48	4:19	3:21	2:38	2:03	1:35	1:11	0:49	0:28			

NEW GROUP DESIGNATION > **A B C D E F G H I J K**
 REPETITIVE DIVE DEPTH ▼ **RESIDUAL NITROGEN TIMES DISPLAYED ON REVERSE** ▼

The where

- UBC Aquatics Club
- Diving Locker
- International Diving Center



Equipment

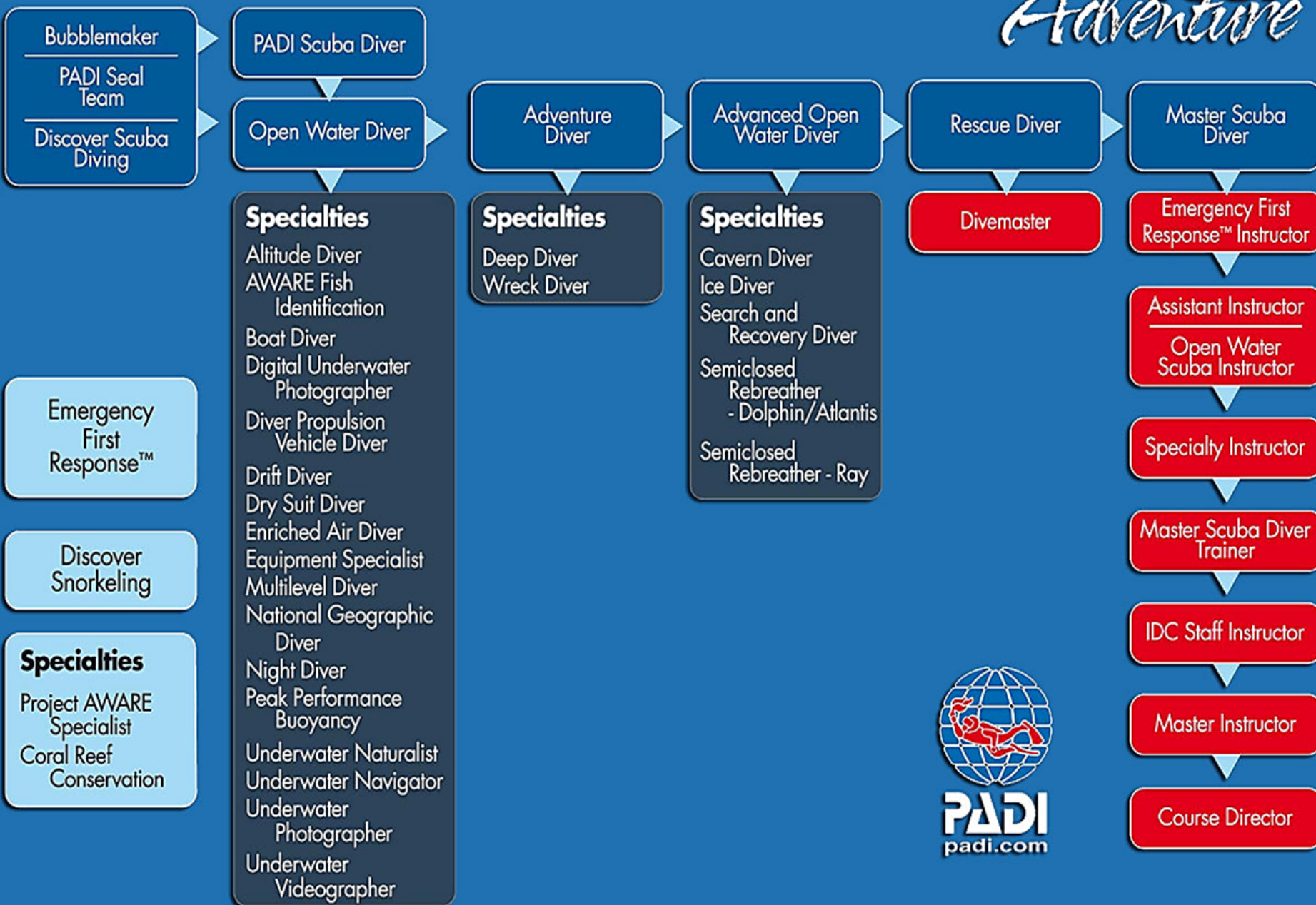
Need to rent equipment, and pay for the trip/courses

~ 60 CAD for wetsuits, BCD, tank, regulators, weight belt

Certifications

The Way the World Learns to DiveSM

Continue
Your
Adventure



Safety Quiz

- How much pressure increase(in atm.) for every 10m descend?
- Is it safe to dive after taking blood thinners?
- Is it safe to climb a mountain and then go diving? Vice versa?
- Is it ok to hold your breath while diving?
- Is diving safe?

I'd like to be under the sea

