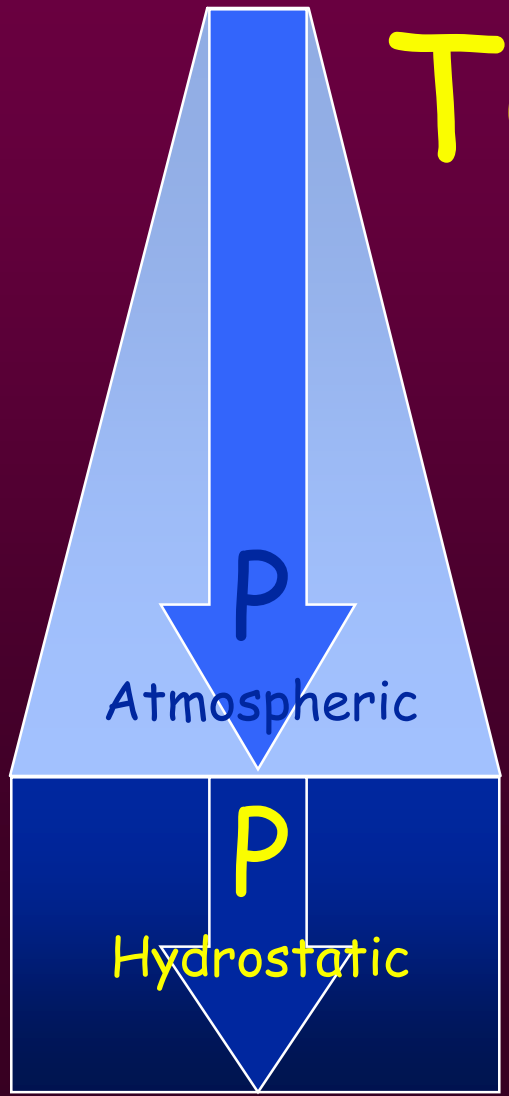
Lesson 1

Basic physics



TORRICELLI

Athmospheric P + Hydrostatic P

=

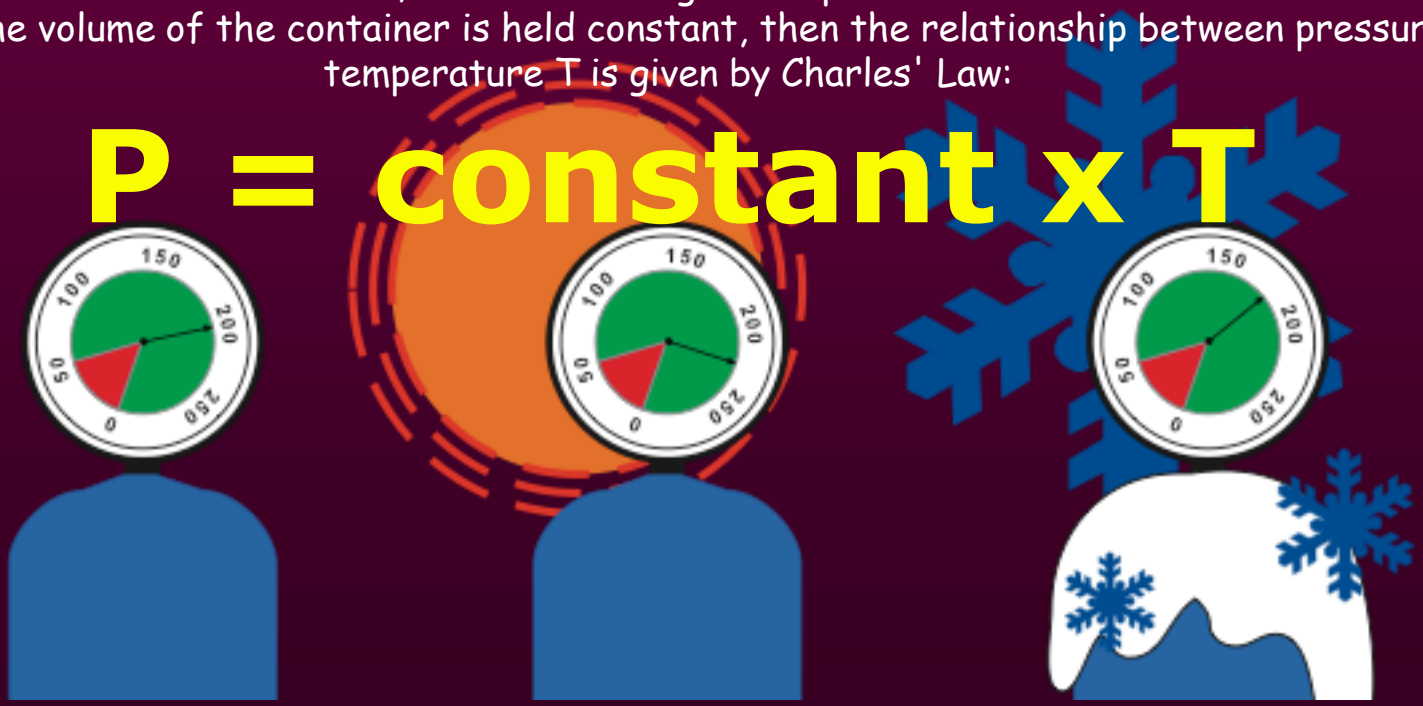
ABSOLUTE P

1 atm
1,01 bar
760 mm Hg
1.033 mBar
1 Kg/cm^2

CHARLES

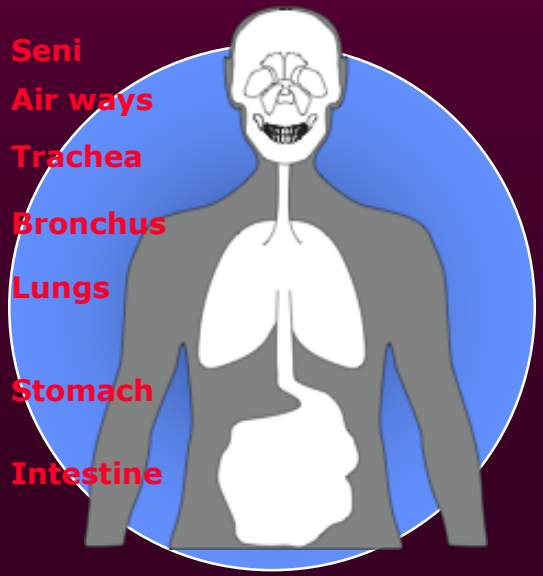
The pressure that a gas exerts on the walls of its container is determined by the momentum of the atoms and molecules of the gas, which in turn is determined by the temperature. As the temperature increases the atoms and molecules move faster, and so exert a greater pressure on the walls. If the walls are rigid, such that the volume of the container is held constant, then the relationship between pressure P and temperature T is given by Charles' Law:

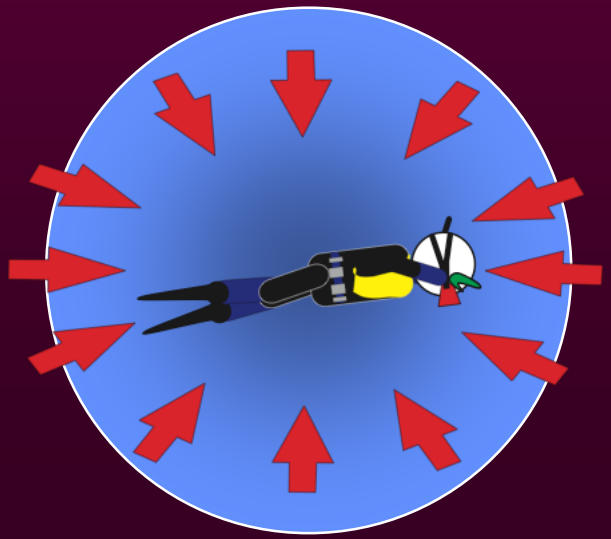
$$P = \text{constant} \times T$$

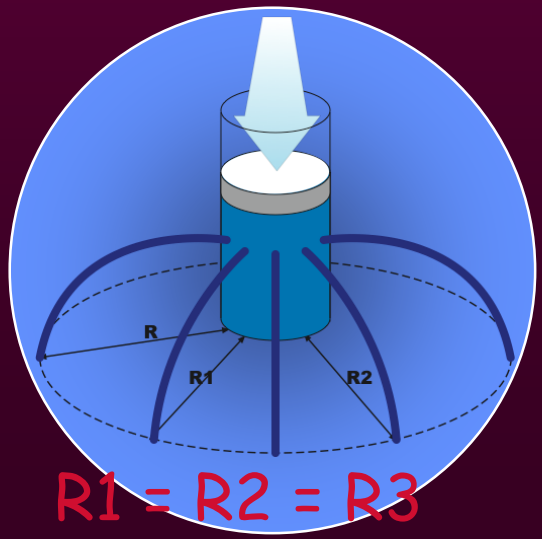


PASCAL

If pressure is applied to a non-flowing fluid in a container, the pressure is transmitted equally in all directions within the container







Lesson I

World Underwater Federation

ARCHIMEDE

A body immersed in water will receive an upthrust equal to the weight of water it displaces

Lesson I

World Underwater Federation

Buoyancy

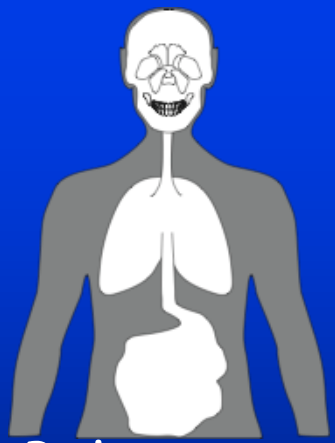
Suit

B.C.

Weight belt

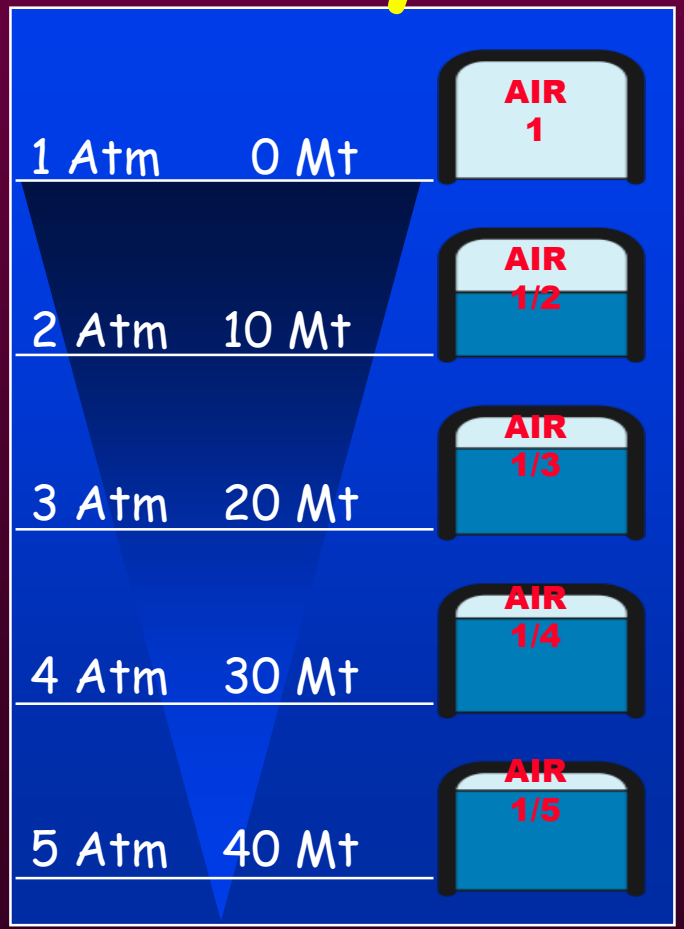
Depth

Body frame

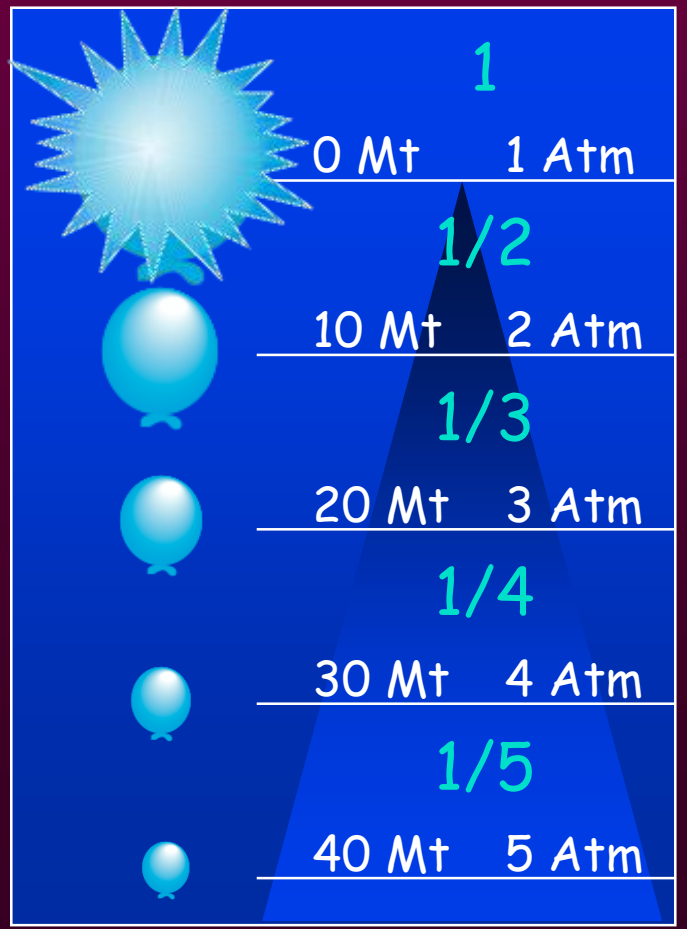


Pulmonary Capacity

Boyle and Mariotte



For a fixed mass of gas, at constant temperature, the pressure is inversely proportional to the volume

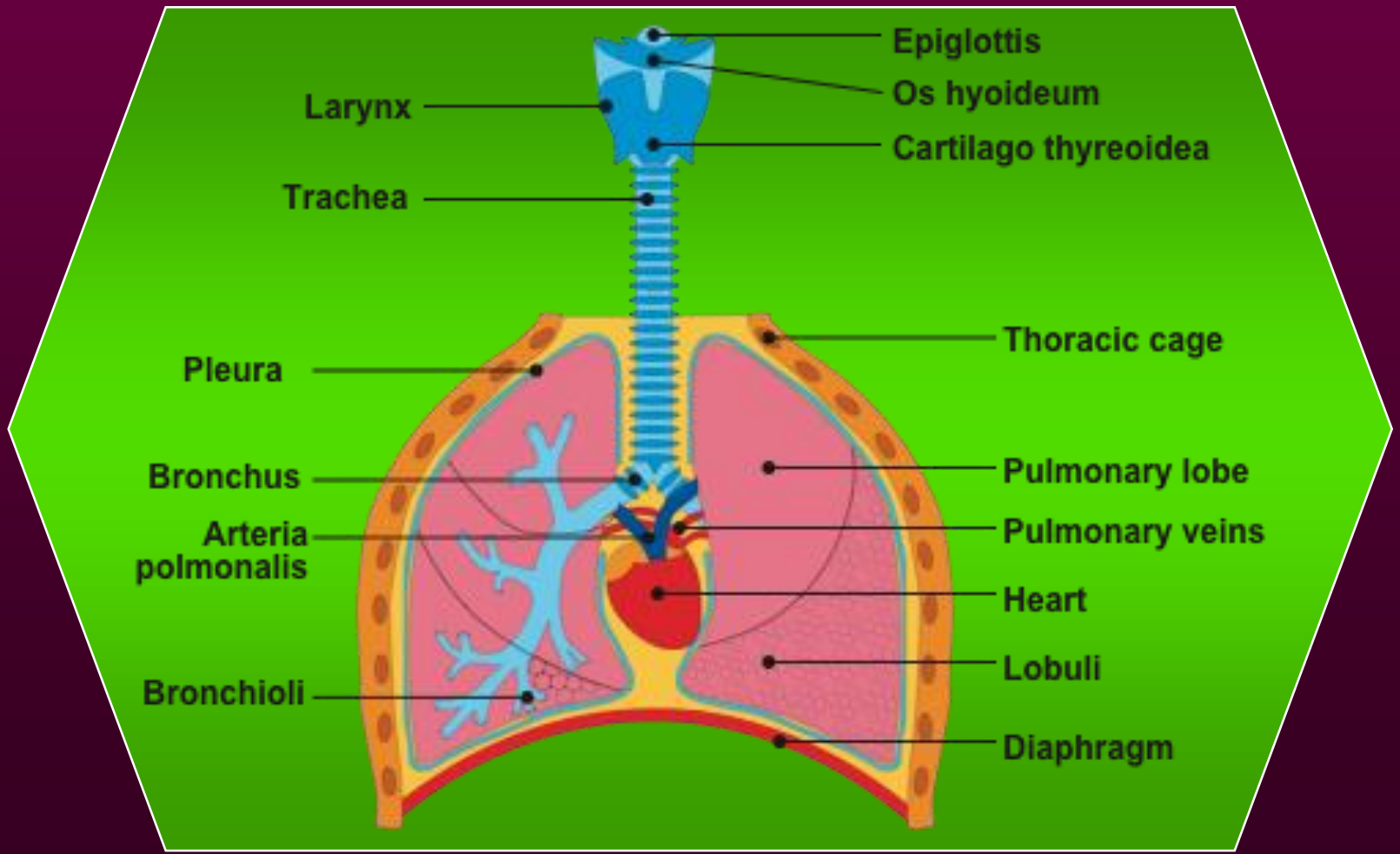


Human body

Lesson I

World Underwater Federation

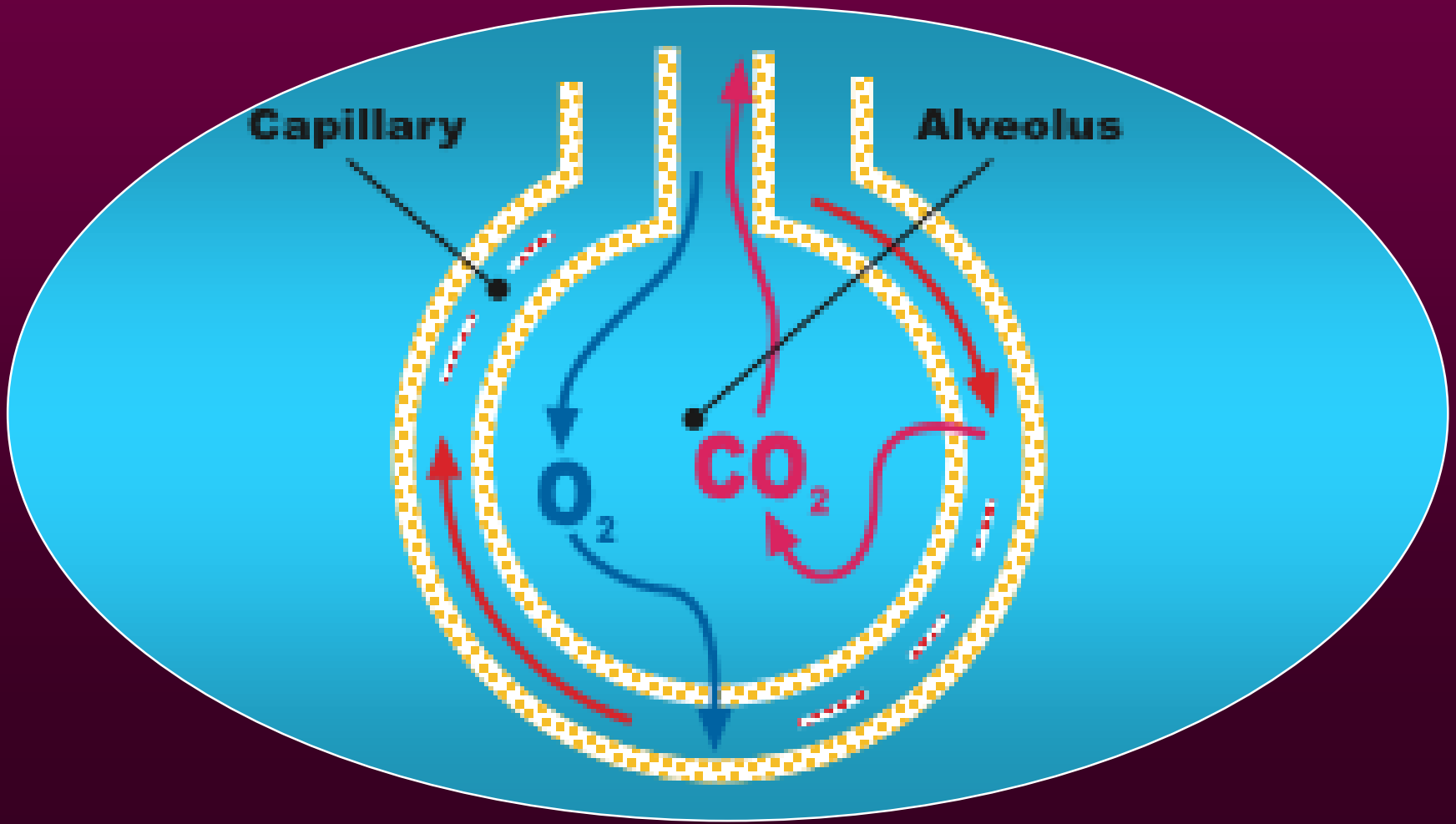
Respiratory system



Lesson I

World Underwater Federation

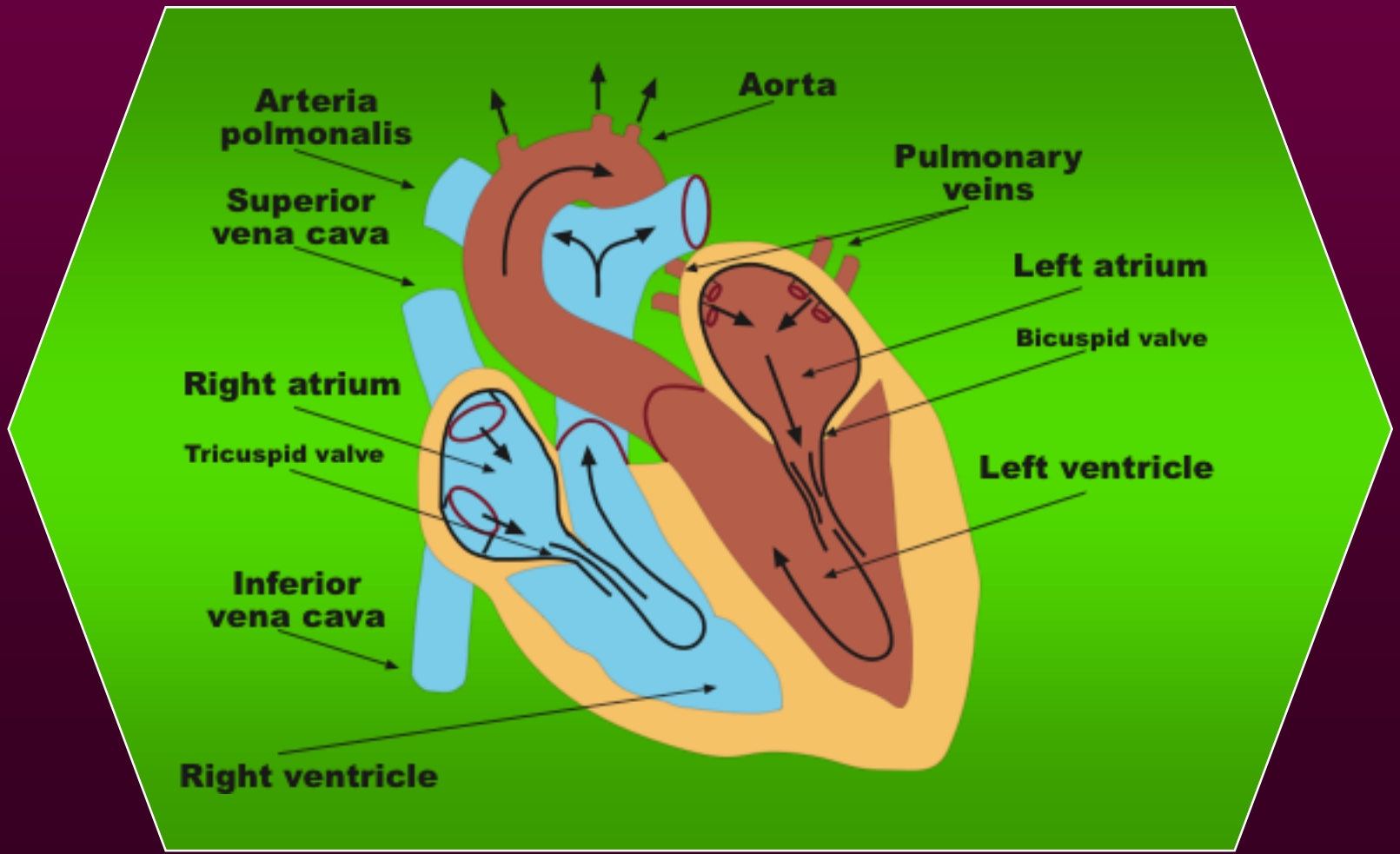
Alveoli pulmonaris



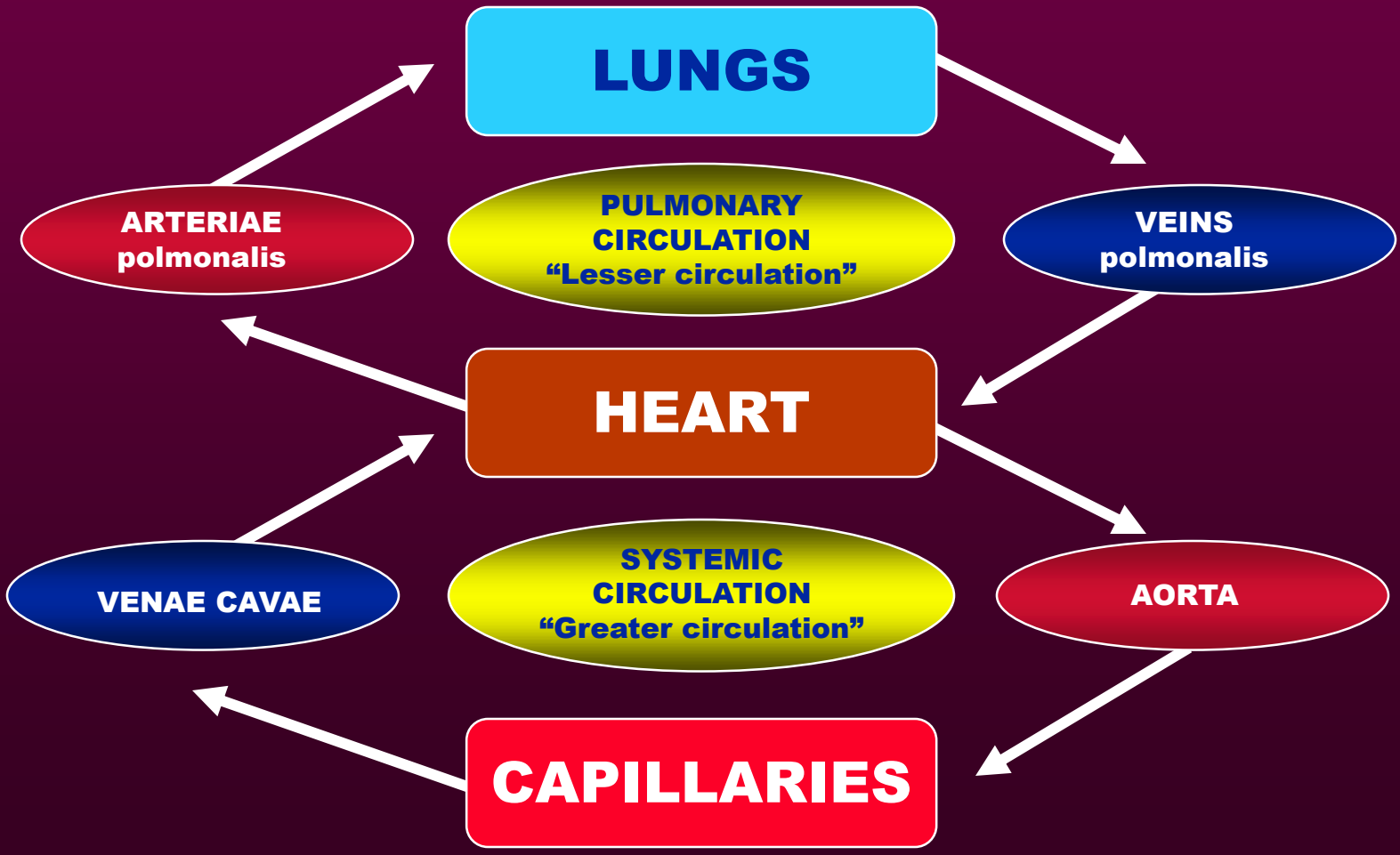
Lesson I

World Underwater Federation

Blood circulatory system



Blood circulatory system



Effects of pressure

Effects of pressure

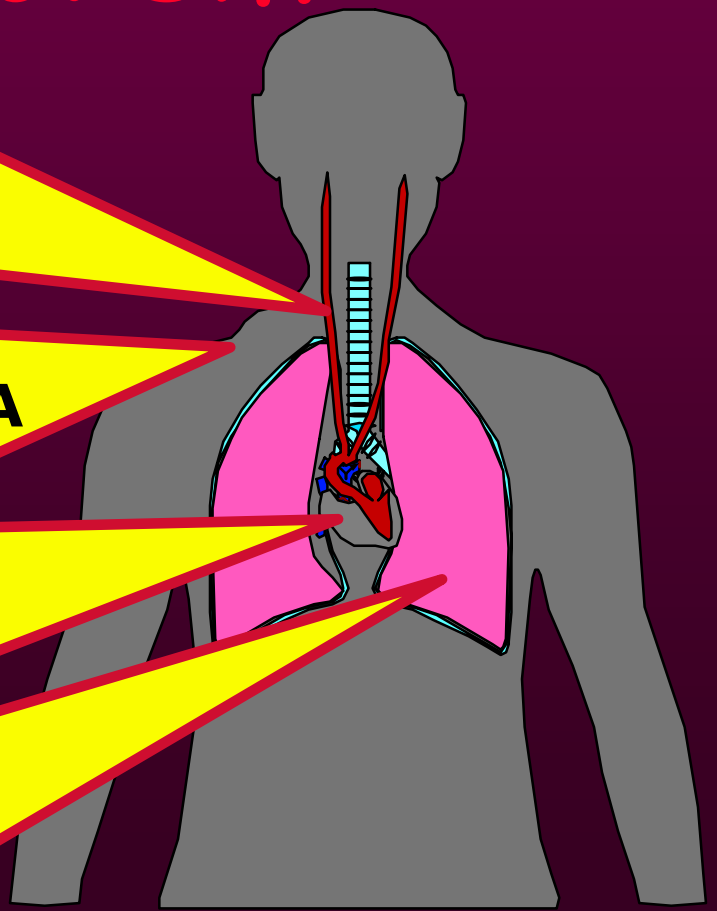
Gas embolism

GAS EMBOLISM

SUBCUTANEOUS EMPHYSEMA

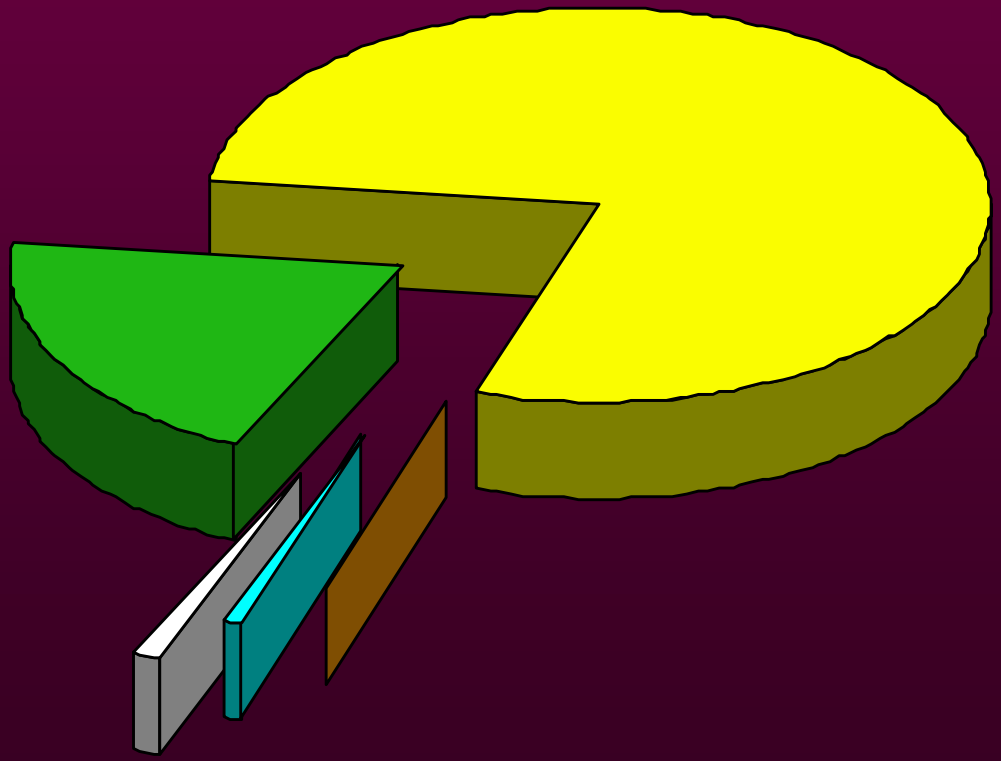
MEDIASTINAL EMPHYSEMA

PNEUMOTHORAX



Air composition

Air composition



- Nitrogen
- Oxygen
- Carbon Dioxide
- Hydrogen
- Other gases

Dalton

The total pressure exerted by a mixture of gases is equal to the sum of the partial pressures of the gases that compose the mixture

	%	PP
Nitrogen	78	0,78
Oxygen	20	0,20
Carbon Dioxide	0,04	0,0004
Hydrogen	1	0,01
Other gases	1	0,01

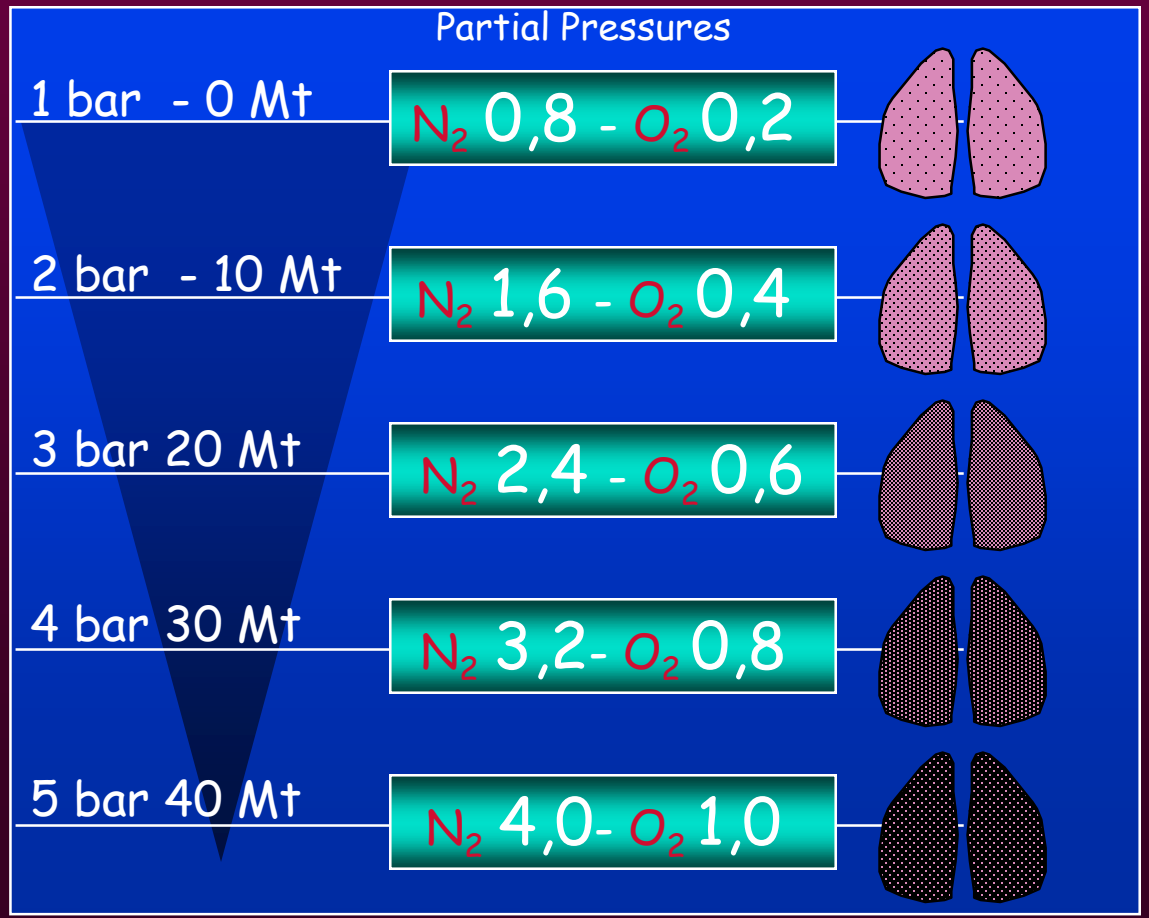
AT SEA LEVEL

Tot 1 bar

Lesson I

World Underwater Federation

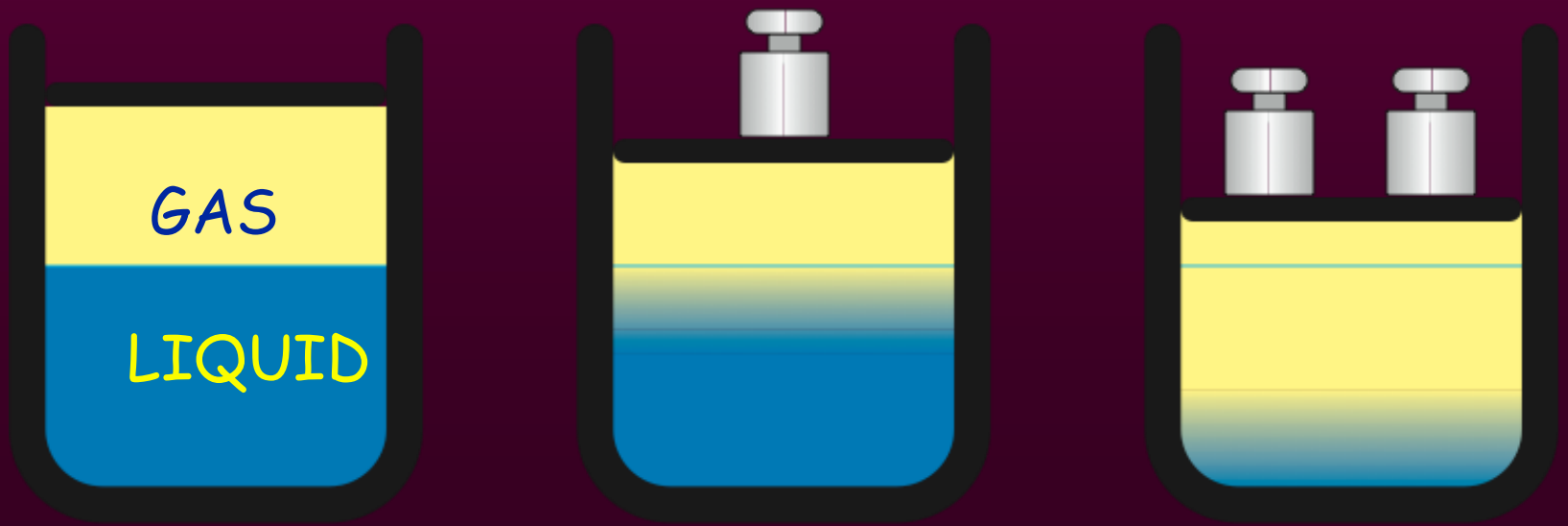
Dalton



The total pressure exerted by a mixture of gases is equal to the sum of the partial pressures of the gases that compose the mixture

Henry

The amount of a gas that will dissolve in a liquid is directly proportional at the pressure of the gas that is in contact with the liquid



Diving accidents

Lesson I

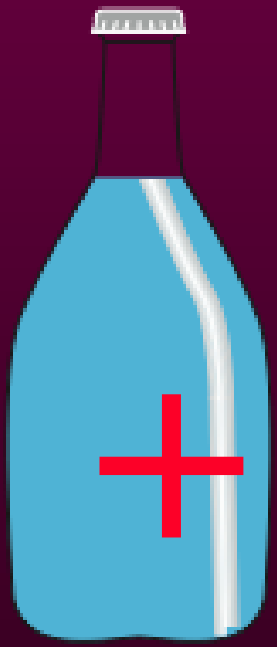
World Underwater Federation

Effects of pressure

Decompression sickness

HENRY'S LAW

Higher Internal pressure



Gas in solution

Lesson I

World Underwater Federation

Effects of pressure

Decompression sickness

HENRY'S LAW

GAS OUT

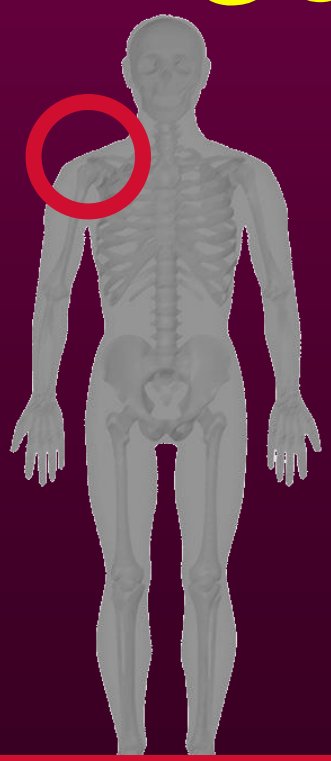
Internal pressure

External pressure

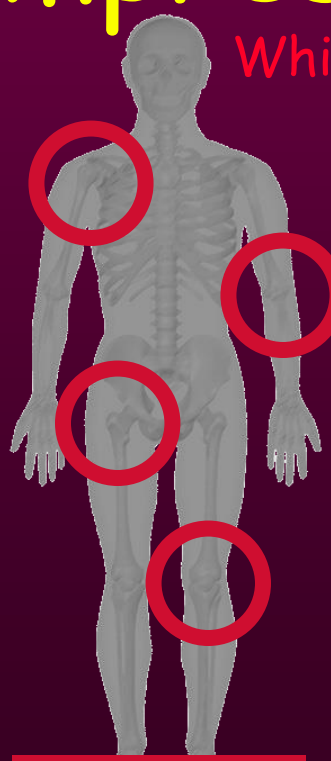
Effects of pressure

Decompression sickness

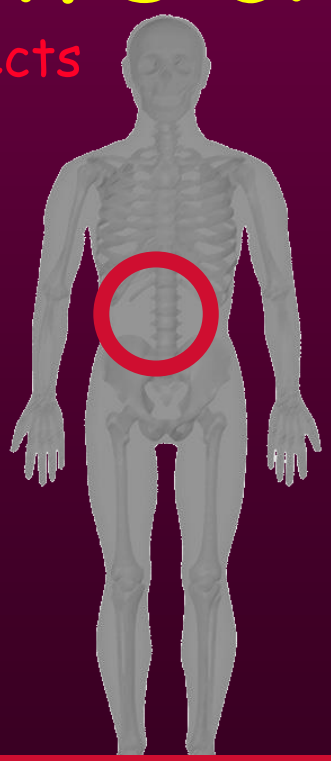
Which affects



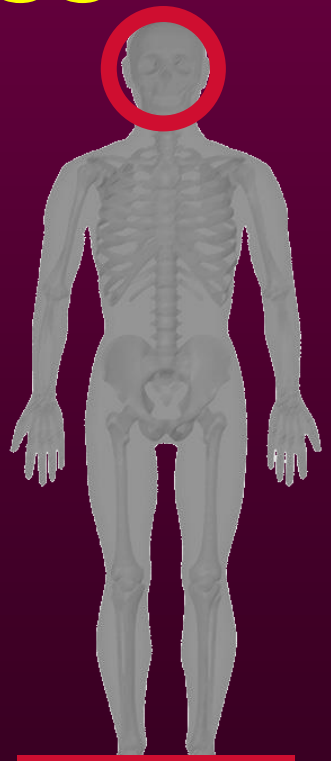
The skin



The joints



The spinal cord



The brain

S.C.U.B.A. equipment

Lesson I

World Underwater Federation

S.C.U.B.A. equipment

Tank

Regulator

A.A.S.

B.C.D.

USE
CHOICE
MODELS
MATERIALS
CARRIAGE
TEST
MAINTENANCE

Lesson I

World Underwater Federation

S.C.U.B.A. equipment

Tank

Regulator

A.A.S.

B.C.D.

Lesson I

World Underwater Federation

S.C.U.B.A. equipment

Tank

Regulator

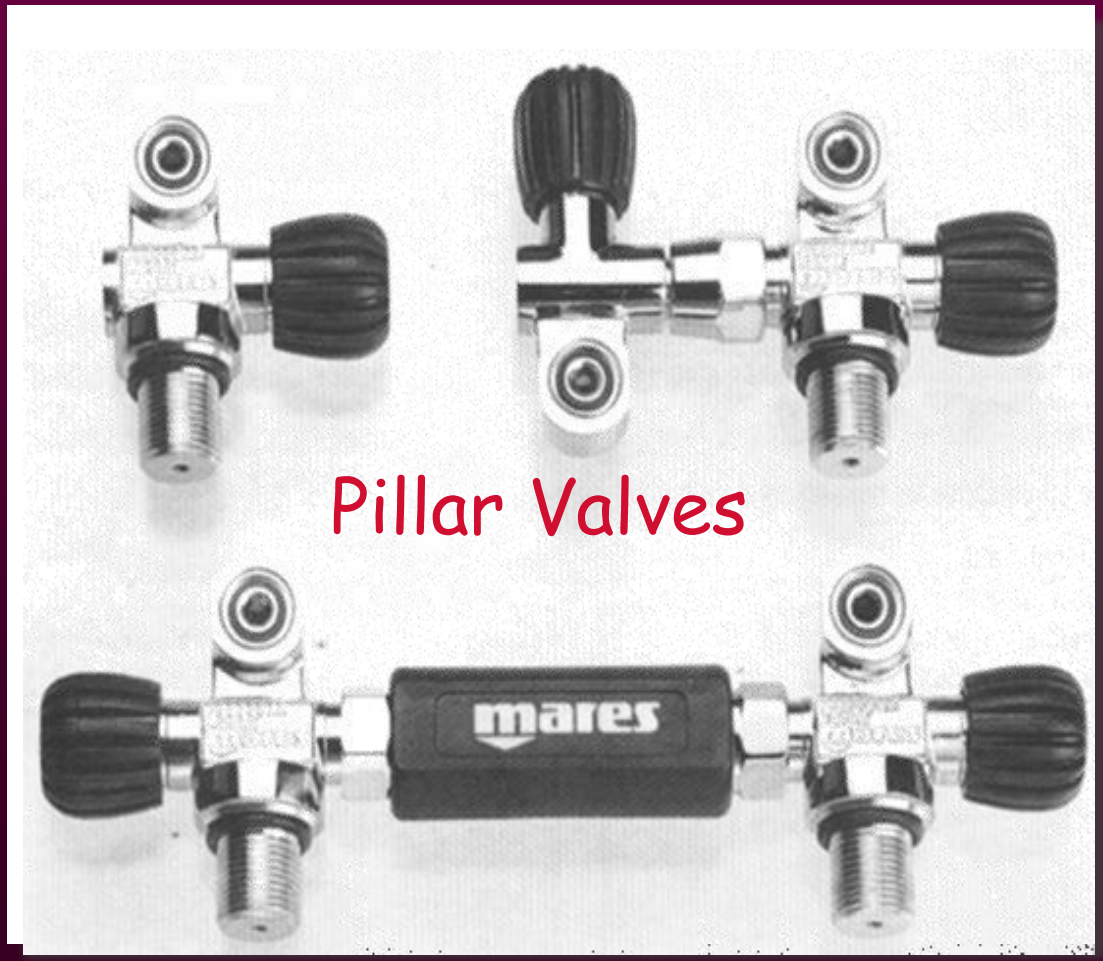
A.A.S.

B.C.D.

TEST

S.C.U.B.A. equipment

- Tank
- Regulator
- A.A.S.
- B.C.D.



S.C.U.B.A. equipment

Tank

Regulator

A.A.S.

B.C.D.

Lesson I

World Underwater Federation

S.C.U.B.A. equipment

Tank

Regulator

A.A.S.

B.C.D.

Lesson I

World Underwater Federation

S.C.U.B.A. equipment

Tank

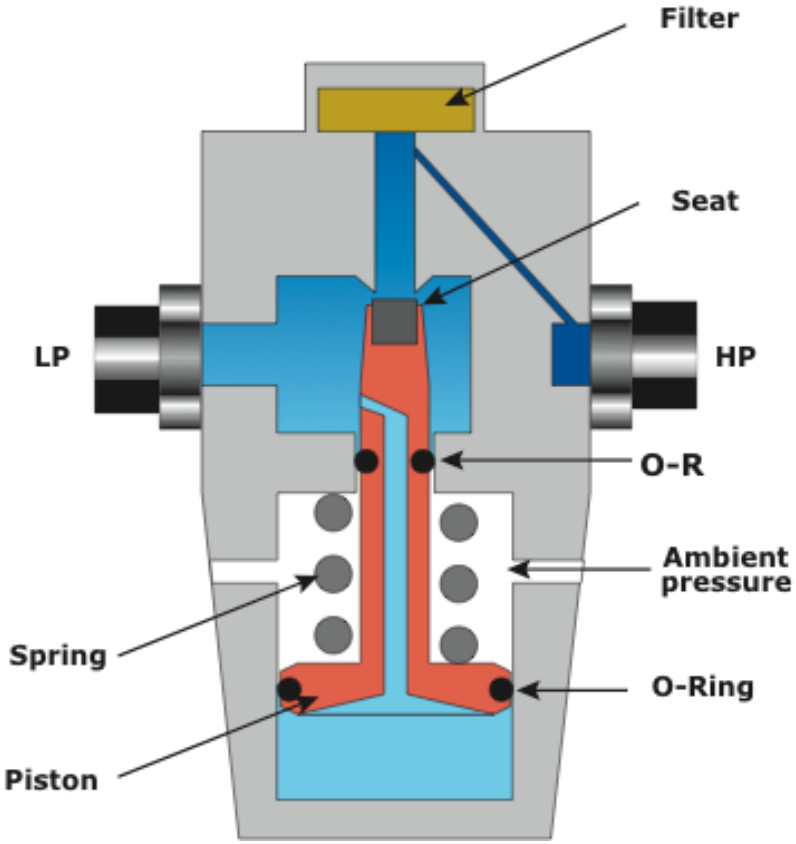
Regulator

First Stage

A.A.S.

B.C.D.

NOT BALANCED PISTON



Lesson I

World Underwater Federation

S.C.U.B.A. equipment

Tank

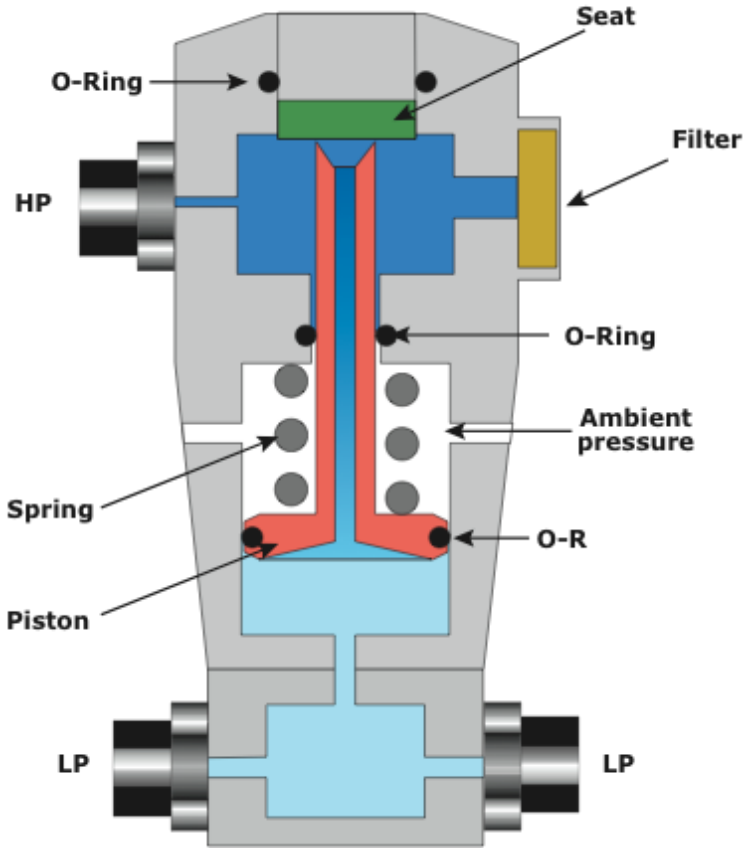
Regulator

First Stage

A.A.S.

B.C.D.

BALANCED PISTON



S.C.U.B.A. equipment

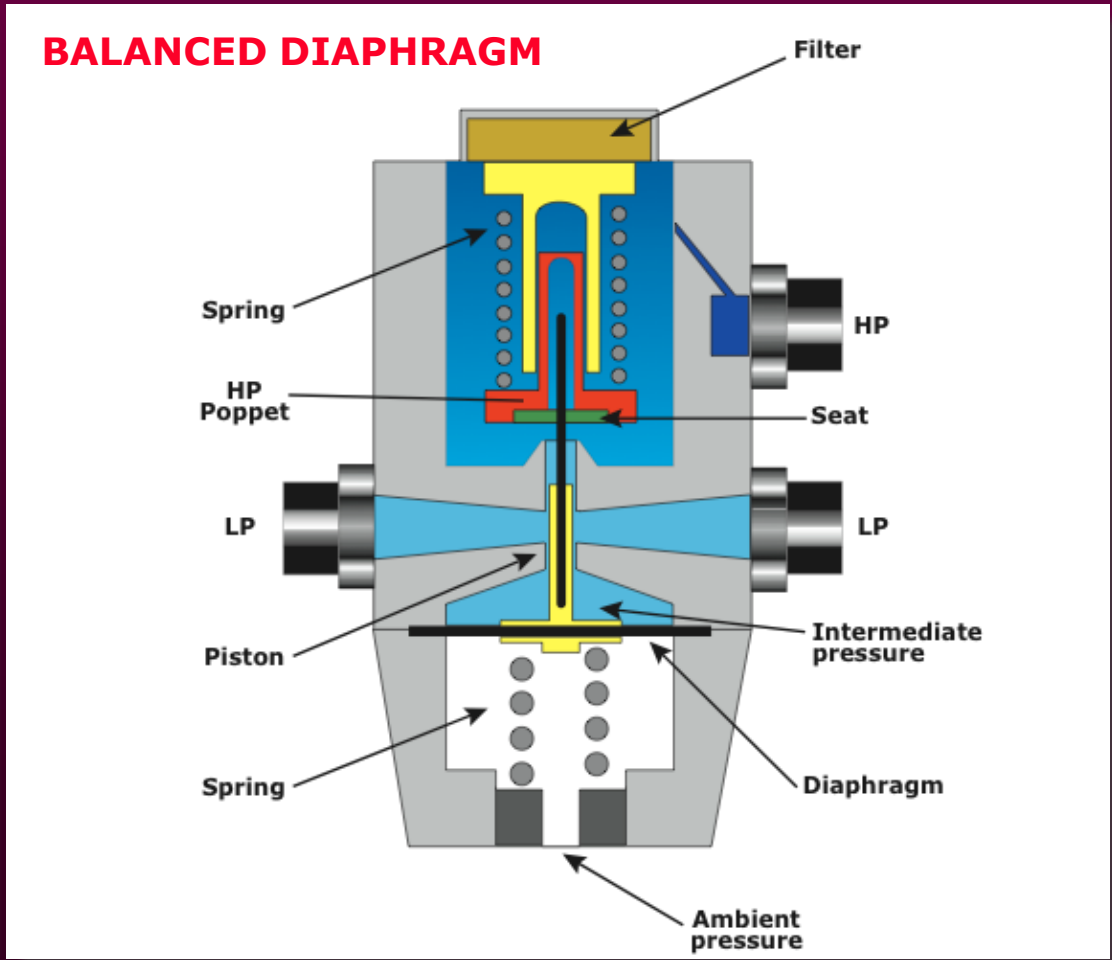
Tank

Regulator

First Stage

A.A.S.

B.C.D.



S.C.U.B.A. equipment

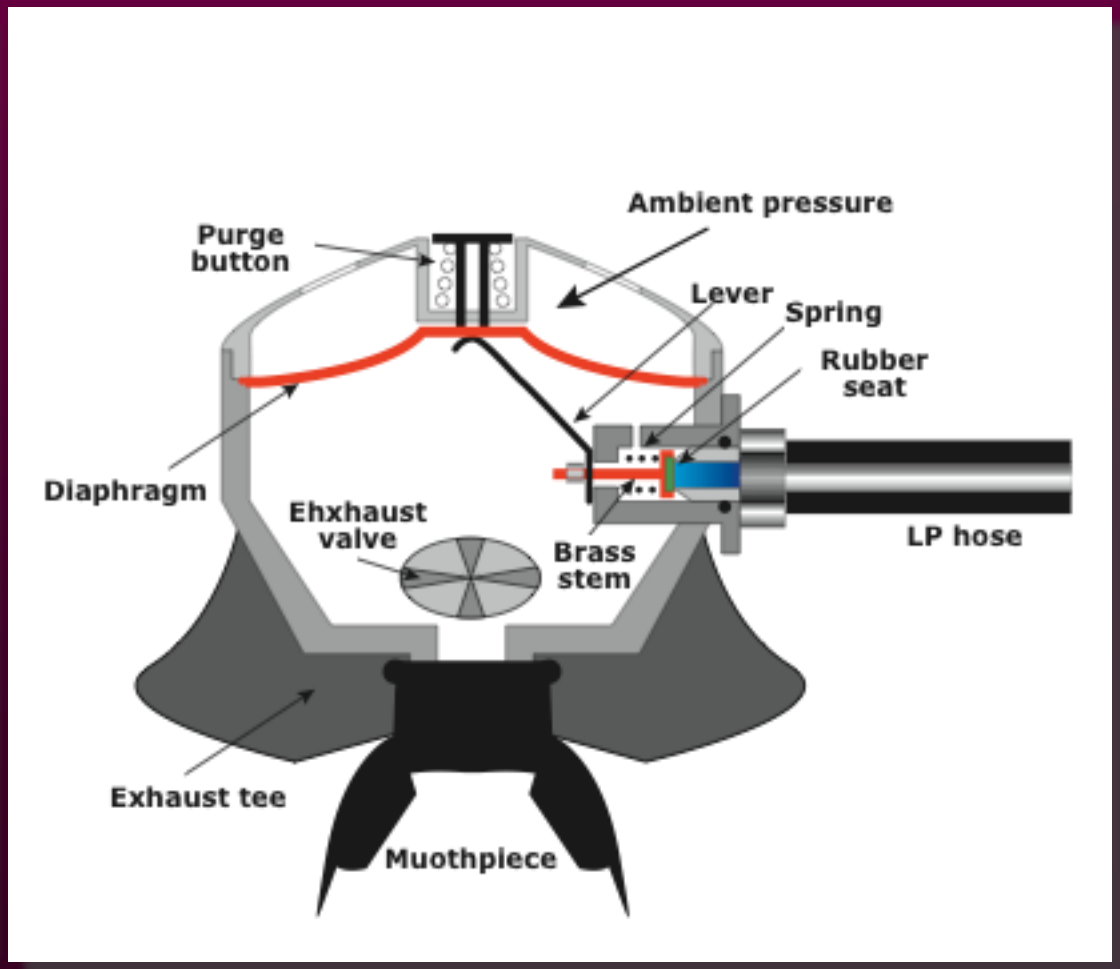
Tank

Regulator

Second Stage

A.A.S.

B.C.D.



Lesson I

World Underwater Federation

S.C.U.B.A. equipment

Tank

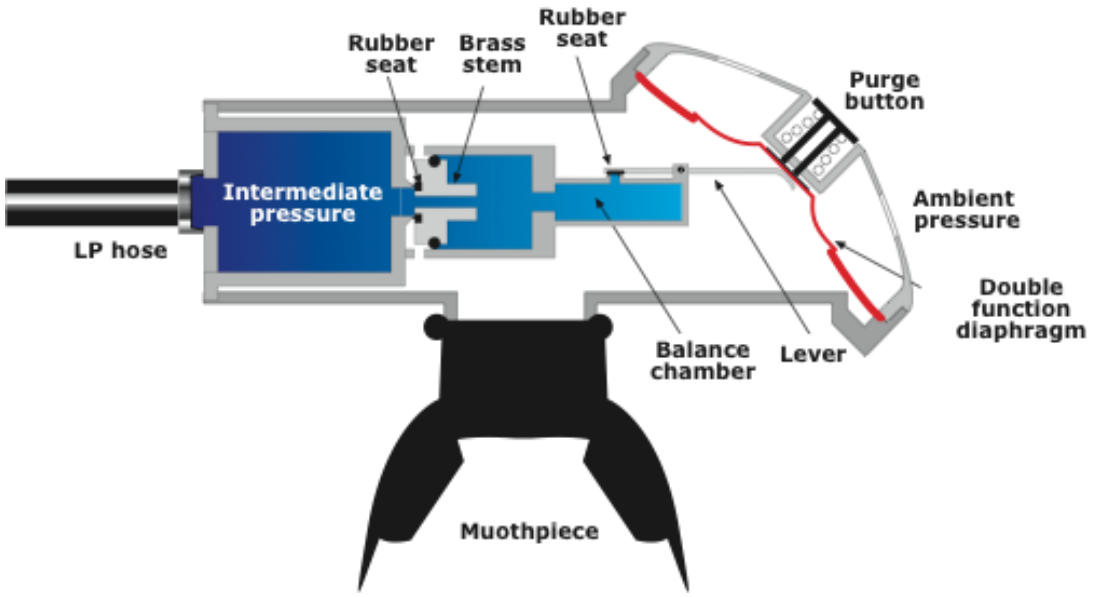
Regulator

Second Stage

A.A.S.

B.C.D.

Servoassistito



Lesson I

World Underwater Federation

S.C.U.B.A. equipment

Tank

Regulator

A.A.S.

B.C.D.

Lesson I

World Underwater Federation

S.C.U.B.A. equipment

Tank

Regulator

A.A.S.

B.C.D.

Lesson I

World Underwater Federation

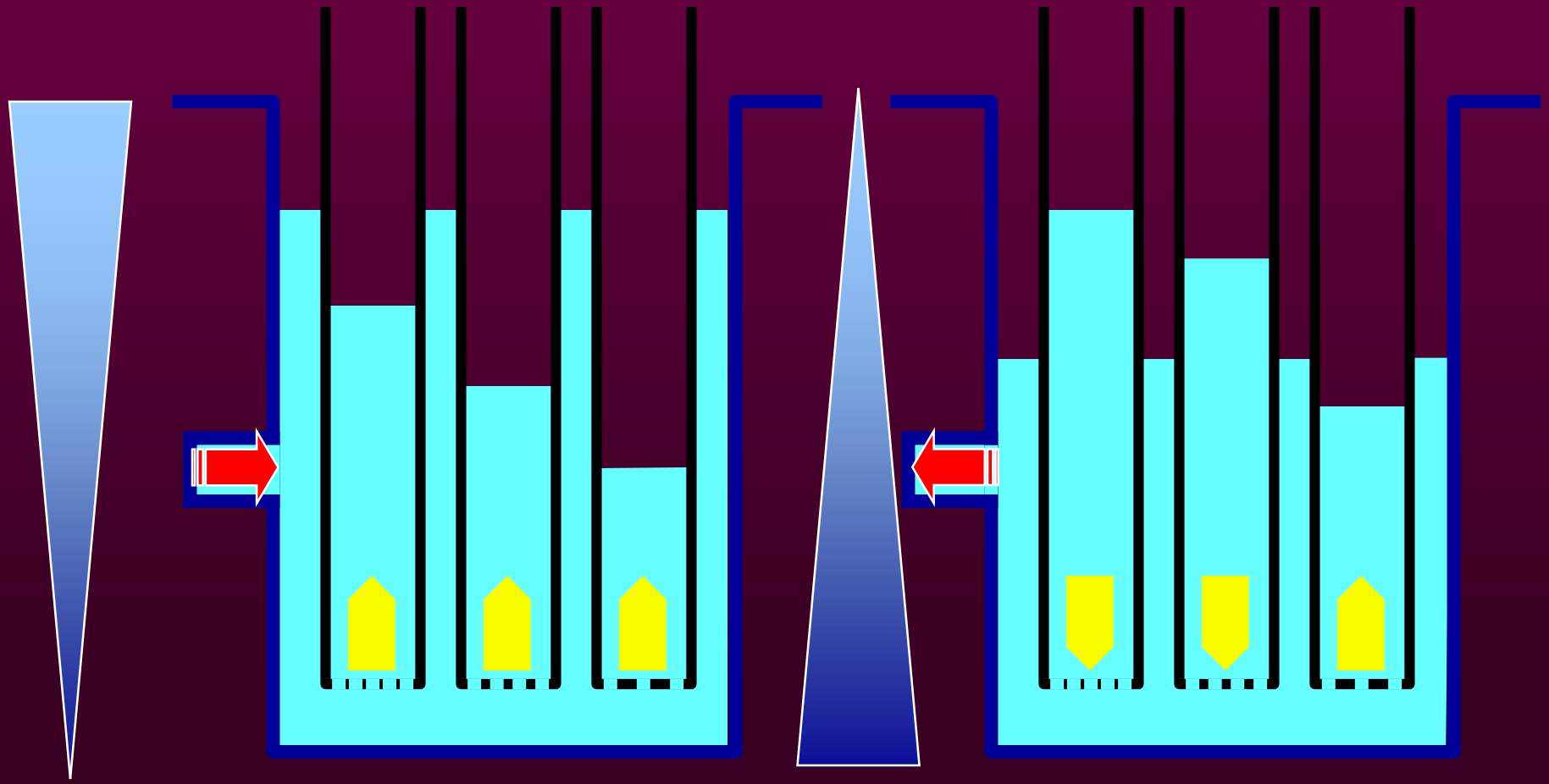
Lesson 2

Nitrogen and The human body

Lesson II

World Underwater Federation

Nitrogen and the human body



Haldane's principles

Haldane's principles

Division of the tissues into classes

Speed of absorption and release (half-saturation times)

The 2/1 ratio

Decompression can start with a sharp drop in ambient pressure

Haldane's principles

Division of the tissues into classes

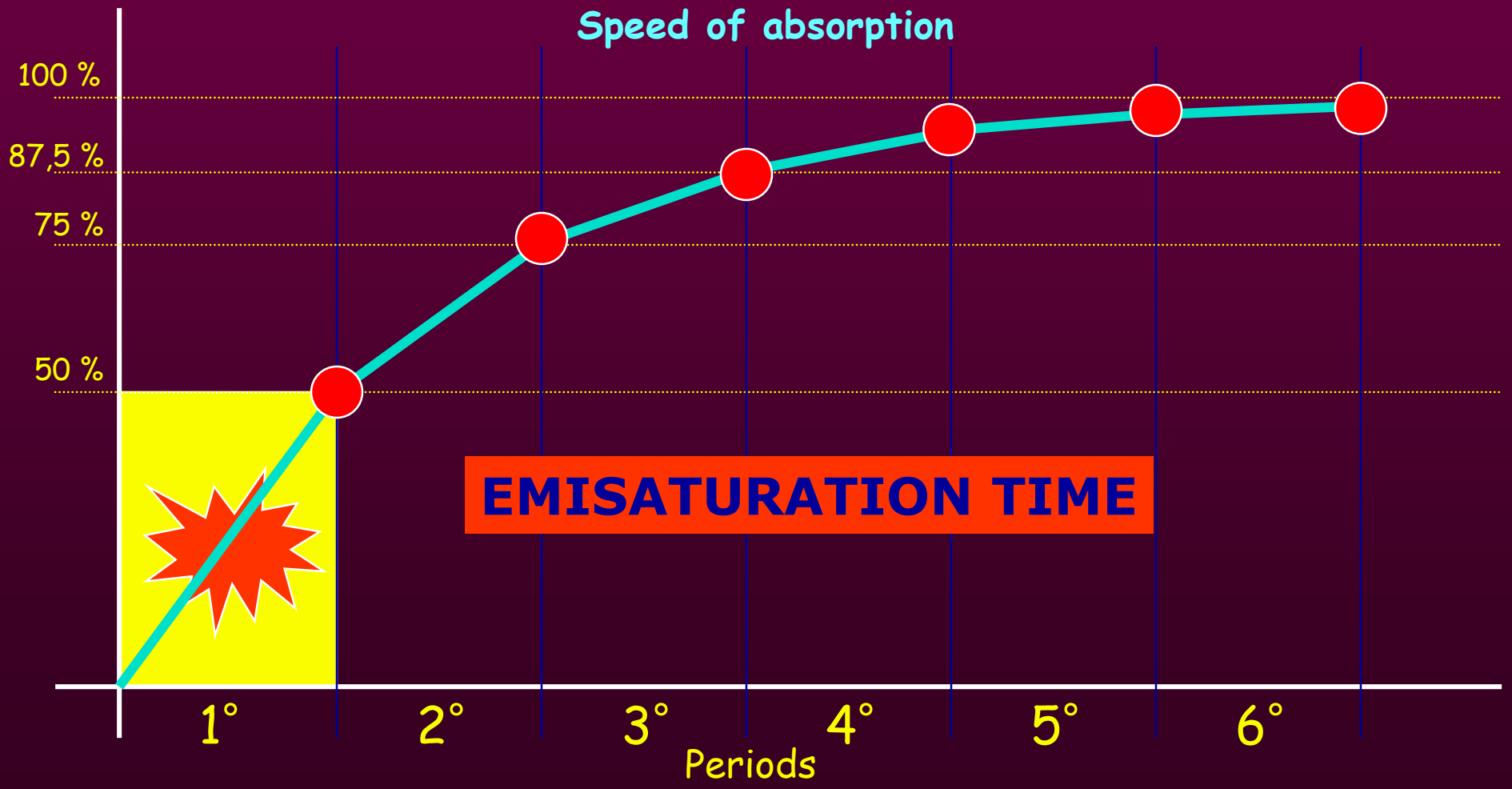
FAST TISSUES

BLOOD
BRAIN

SLOW TISSUES

FAT
BONE

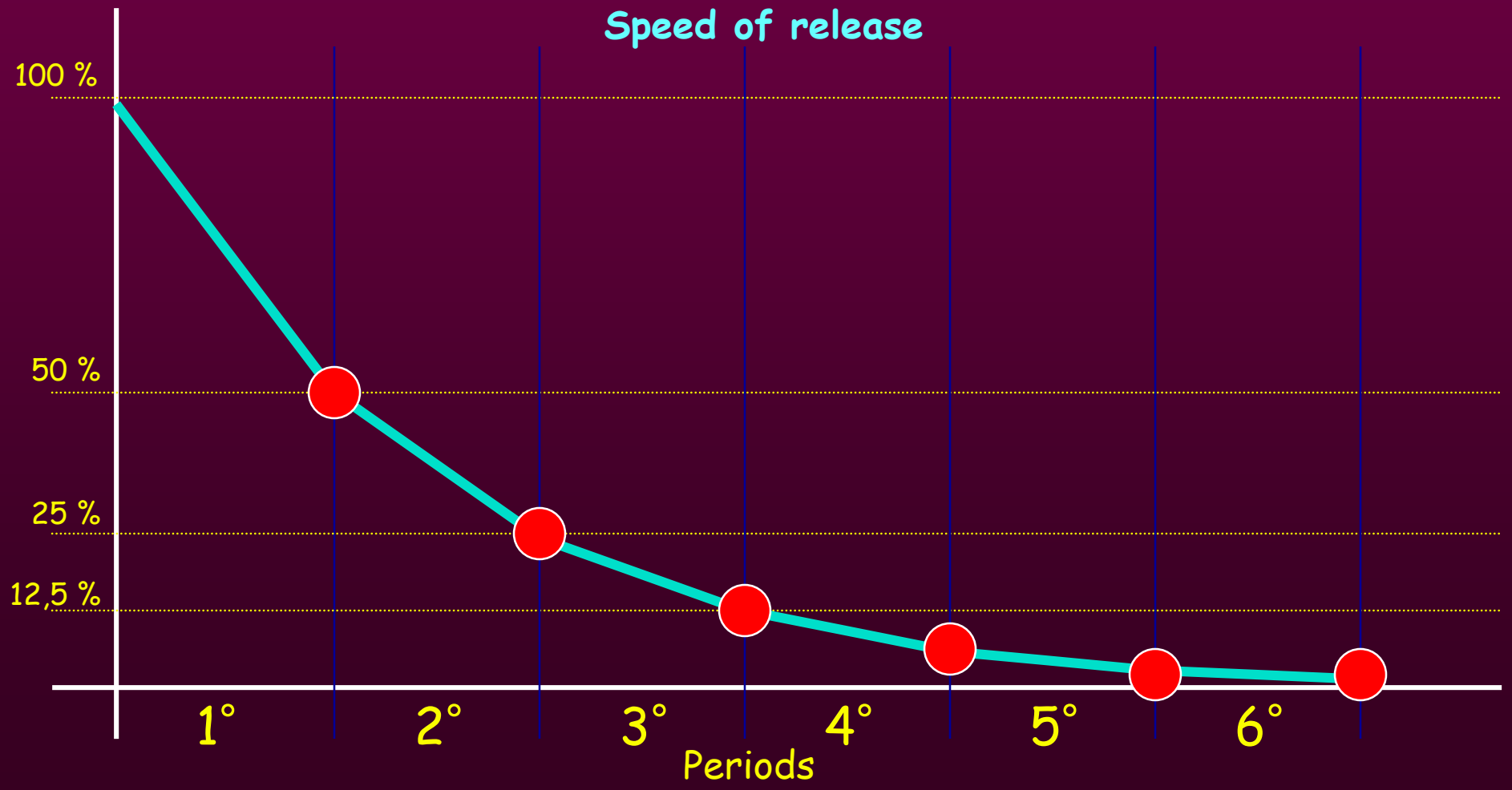
Haldane's principles



Lesson II

World Underwater Federation

Haldane's principles

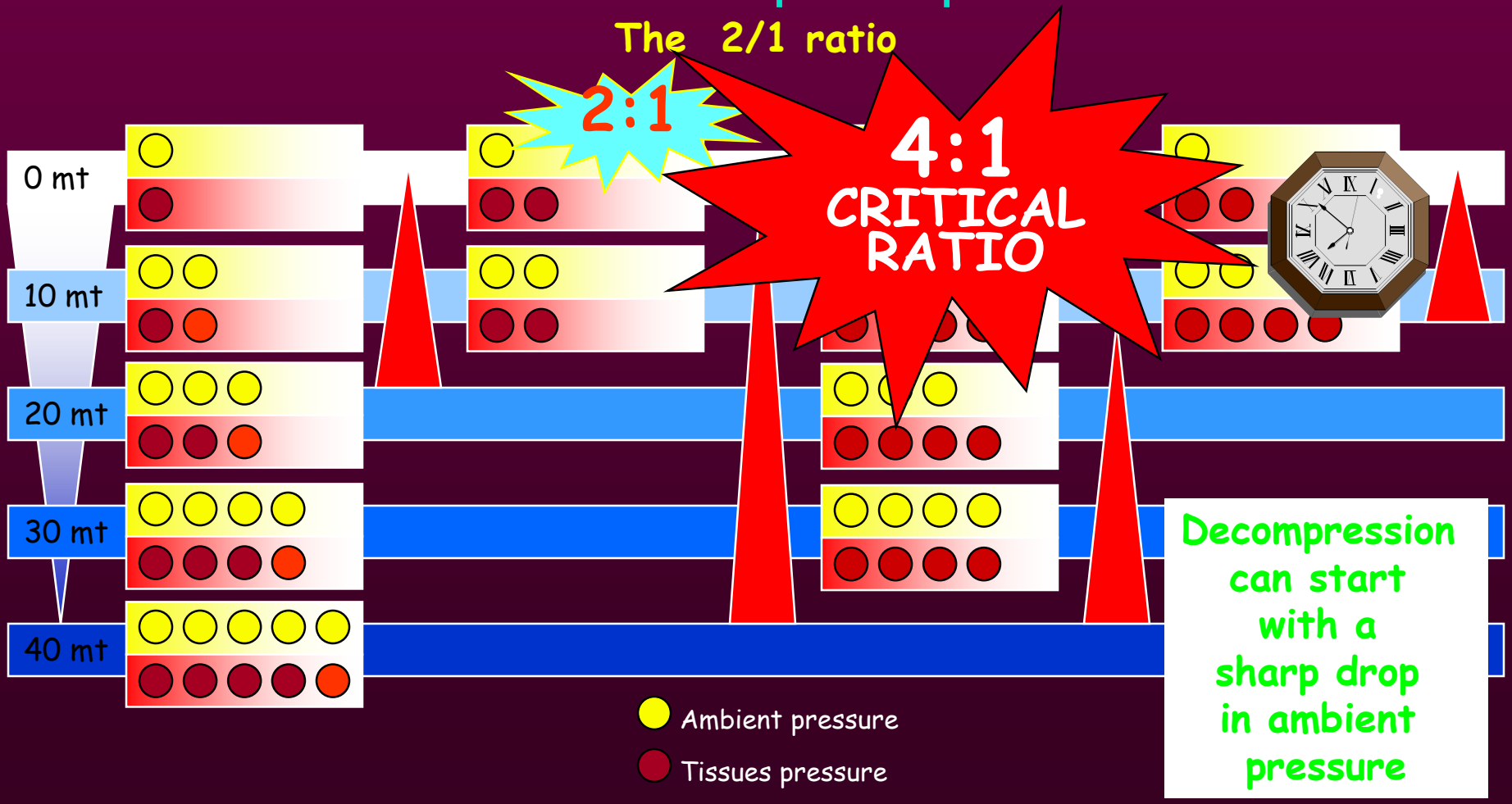


Lesson II

World Underwater Federation

P

Haldane's principles



Adaptations of haldane's model

Adaptations of haldane's model

AN INCREASE IN THE NUMBER OF THEORETICAL COMPARTMENTS

Haldane	5
USNavy	6
Buhlmann	16
Computer	8-10

Adaptations of haldane's model

THE CRITICAL OVERPRESSURE RATIO

HALDANE	2:1
FAST TISSUES	3:1
SLOW TISSUES	1,5:1

"M VALUE"

DIVE TABLES

ALGORITHMS ON THE DIVE COMPUTER

Adaptations of haldane's model

NITROGEN ABSOPTION AND RELEASE TIMES

In contrast to Haldane's findings, tissues have different nitrogen absorption and release times. It has been seen that these times are influenced by many factors that can result in substantial differences

Adaptations of haldane's model

NITROGEN IN THE BODY

Haldane, with the means available to him at the time, did not have the possibility of verifying if there was nitrogen present in the body in the form of gassy micro-bubbles even after a dive that adhered to the tables. These micro-bubbles, being of a size that they could be handled without problems, and therefore without symptoms, they were not noted until the development of the Doppler system,
which is able to record their presence,
size and quantity in the body.

Adaptations of haldane's model

ASCENT SPEED

The maximum ascent speed is given by the maximum overpressure ratio. Therefore, this can vary with variations in the initial depth. In fact, the pressure differential is different between 30 and 20 m from that of 10m from the surface. However this calculation can only be worked out by the dive computer. Using the tables we must unquestionably follow the indicated maximum limit

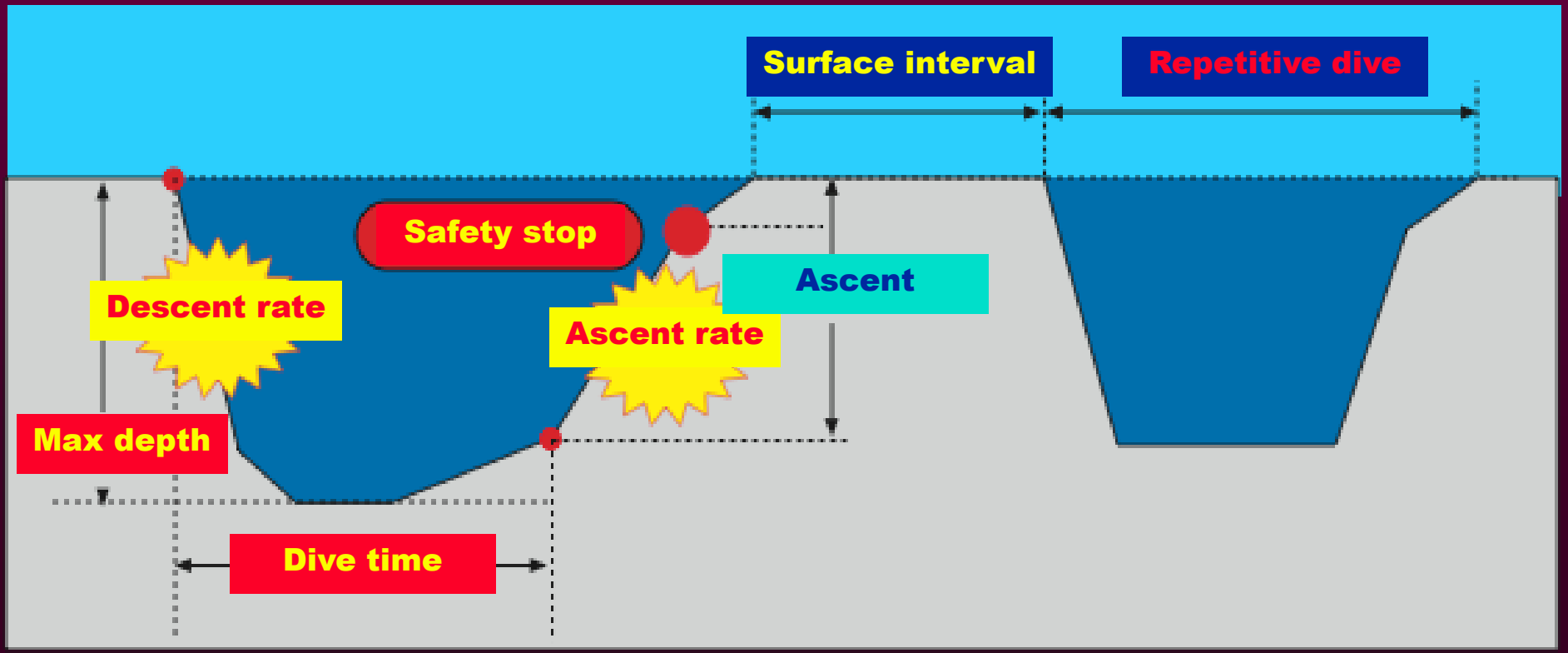
Dive tables

Lesson II

World Underwater Federation

Dive tables

Terminology



Lesson II

World Underwater Federation

Dive tables

Tables

DIVE LETTER GROUP	3		6		9		12		18		24		30		36		42		DEPTH (metres)
		4,5		7,5		10,5		15		21		27		33		39		45	
A	60	35	25	20	15	5	5												A
B	120	70	50	35	30	15	15	10	10	5	5	5	5						B
C	210	110	75	55	45	25	25	15	15	10	10	10	7	5	5	5	5	5	C
D	300	160	100	75	60	40	30	25	20	15	15	12	10	10	10	8	7		D
E		225	135	100	75	50	40	30	25	20	20	15	15	13	12	10	10	E	
F		350	180	125	95	60	50	40	30	30	25	20	20	15	15		F		
G			240	160	120	80	70	50	40	35	30	25	22	20		G			
H			325	195	145	100	80	60	50	40	35	30	25		H				
I				245	170	120	100	70	55	45	40			I					
J				315	205	140	110	80	60	50			J						
K					250	160	130	90				K							
L					310	190	150	100			L								
M						220	170			M									
N						270	200		N										
O						310		O											

NEW DIVE LETTER GROUP	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
12	241	213	187	161	138	116	101	87	73	61	49	37	25	17	7
15	160	142	124	111	99	87	76	66	56	47	38	29	21	13	6
18	117	107	97	88	79	70	61	52	44	36	30	24	17	11	5
21	96	87	80	72	64	57	50	43	37	31	26	20	15	9	4
24	80	73	68	61	54	48	43	38	32	28	23	18	13	8	4
27	70	64	58	53	47	43	38	33	29	24	20	16	11	7	3
30	62	57	52	48	43	38	34	30	26	22	18	14	10	7	3
33	55	51	47	42	38	34	31	27	24	20	16	13	10	6	3
36	50	46	43	39	35	32	28	25	21	18	15	12	9	6	3
39	44	40	38	35	31	28	25	22	19	16	13	11	8	6	3

REPETITIVE DIVE DEPTH (metres)

BASED ON
U.S. NAVY
DIVE TABLES

SAFETY STOP
3mt/3min

Examples

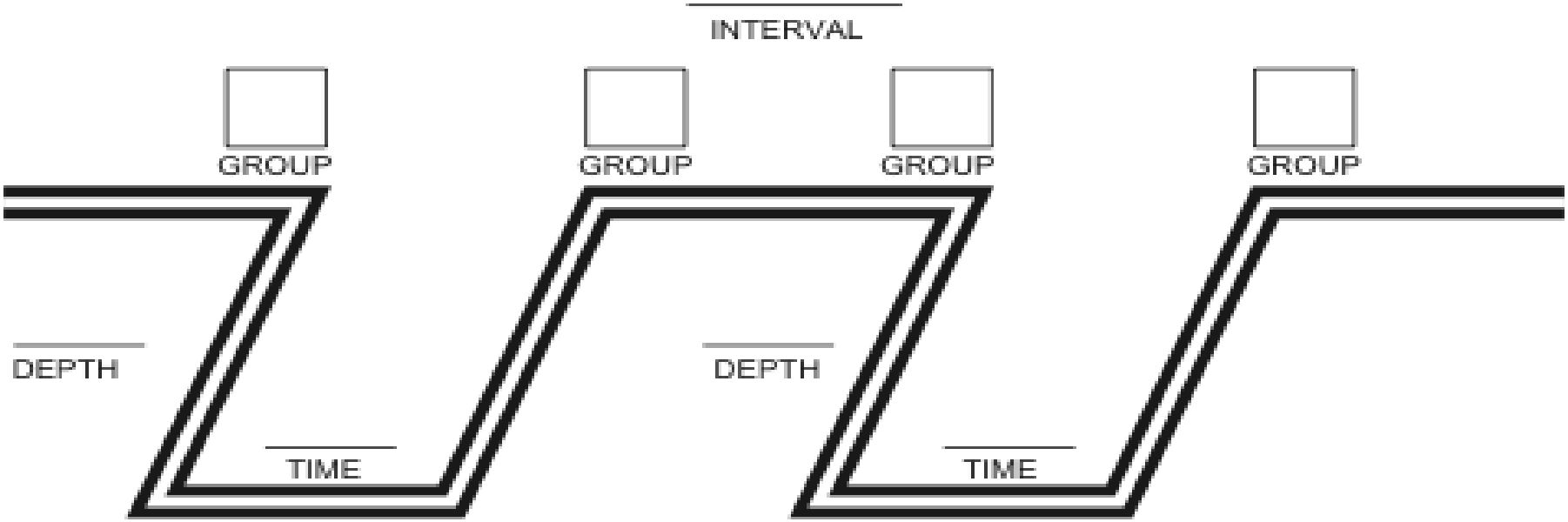
Examples

End of dive letter group

Lesson II

World Underwater Federation

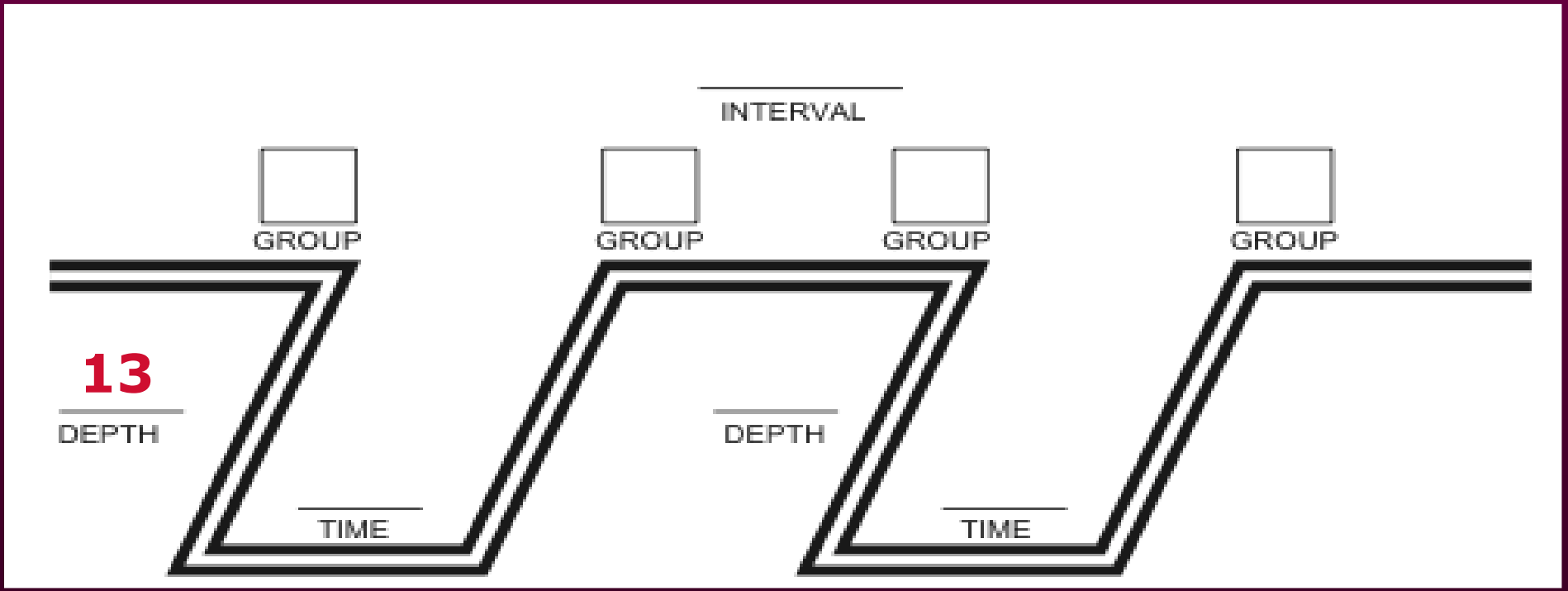
Examples



Lesson II

World Underwater Federation

Examples



Max depth 13 mt

Lesson II

World Underwater Federation

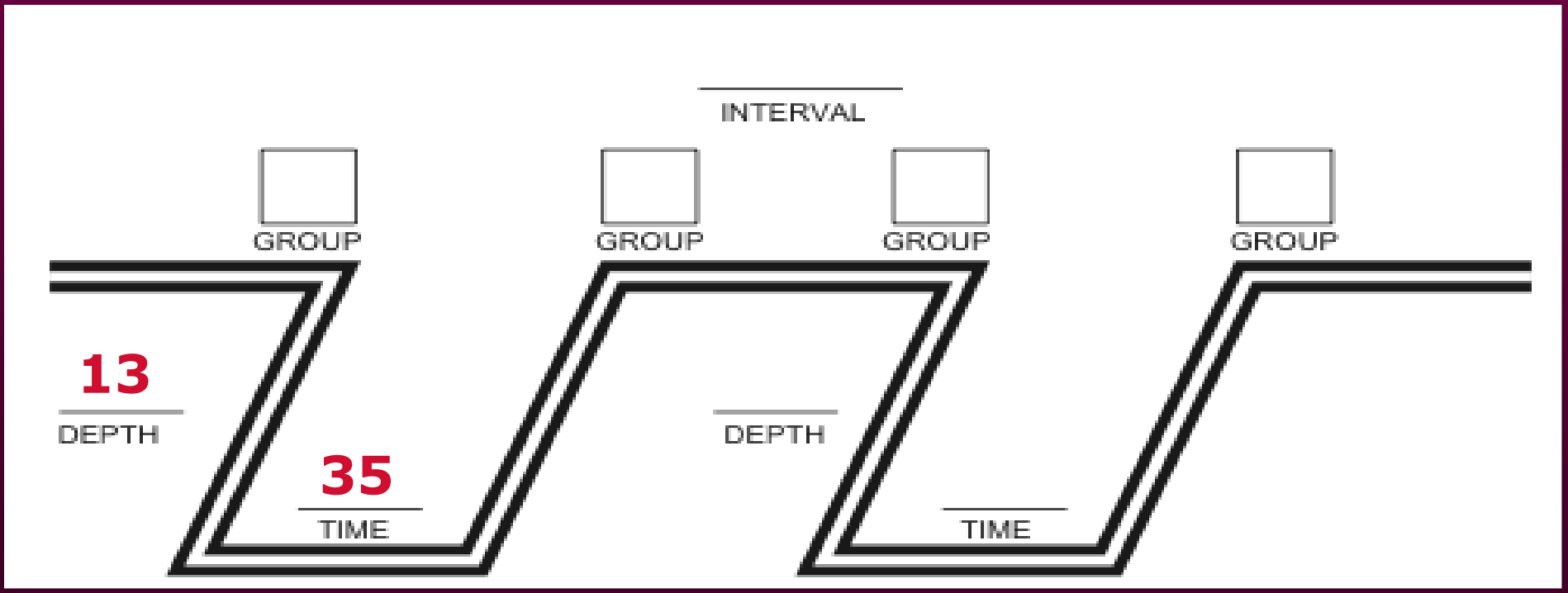
Examples

	12		18		24		30		36		42	
10,5	15			21		27		33		39		
5	5											
15	15	10	10	5	5	5	5					
25	25	15	15	10	10	10	7	5	5	5	5	
40	30	25	20	15	15	12	10	10	10	8	7	
50	40	30	25	20	20	15	15	13	12	10	10	
60	50	40	30	30	25	20	20	15	15		F	
80	70	50	40	35	30	25	22	20		G		

Lesson II

World Underwater Federation

Examples

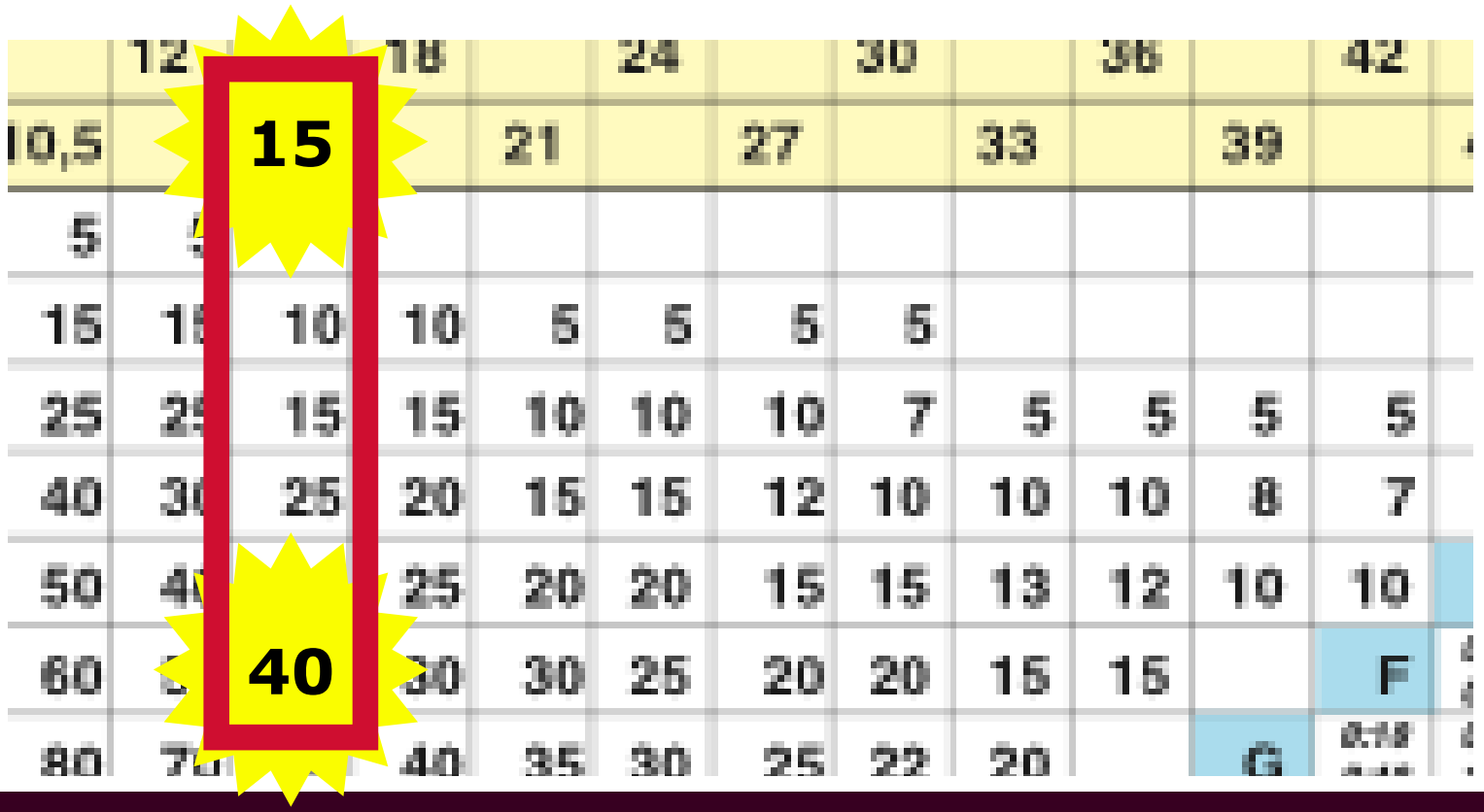


Max depth	13	mt
Dive time	35	Min

Lesson II

World Underwater Federation

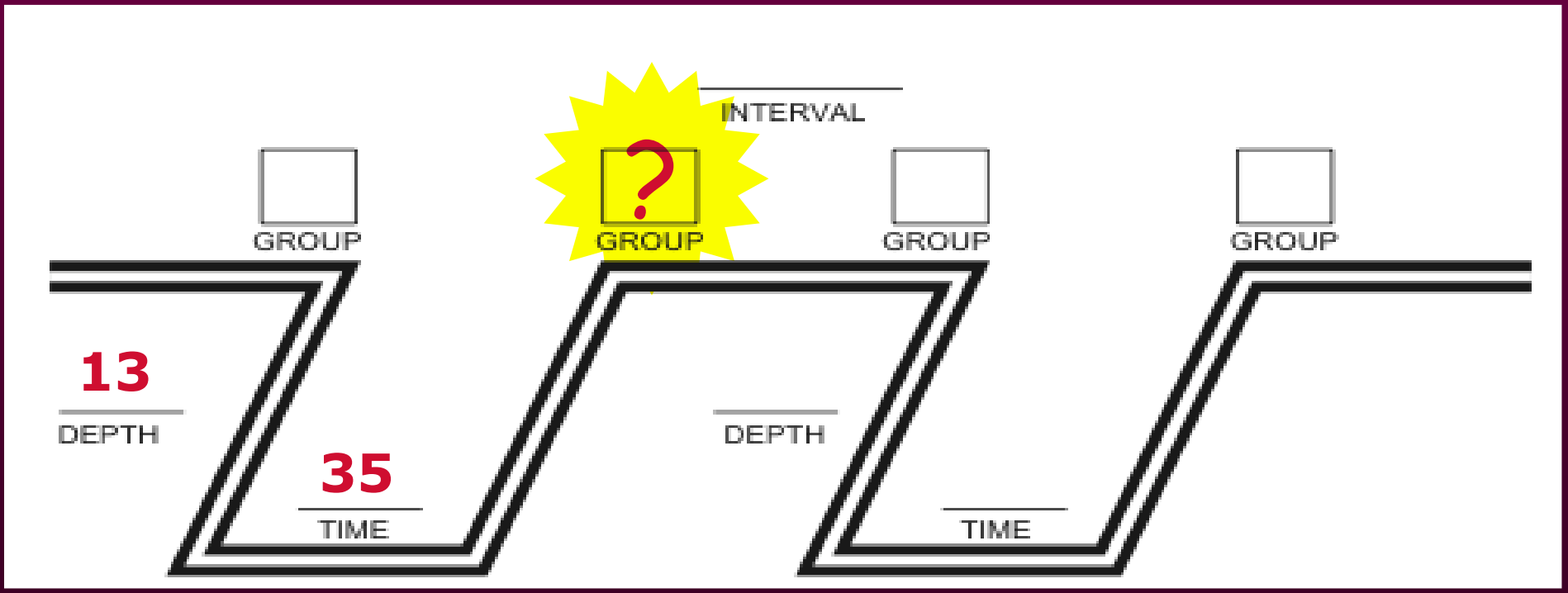
Examples



Lesson II

World Underwater Federation

Examples

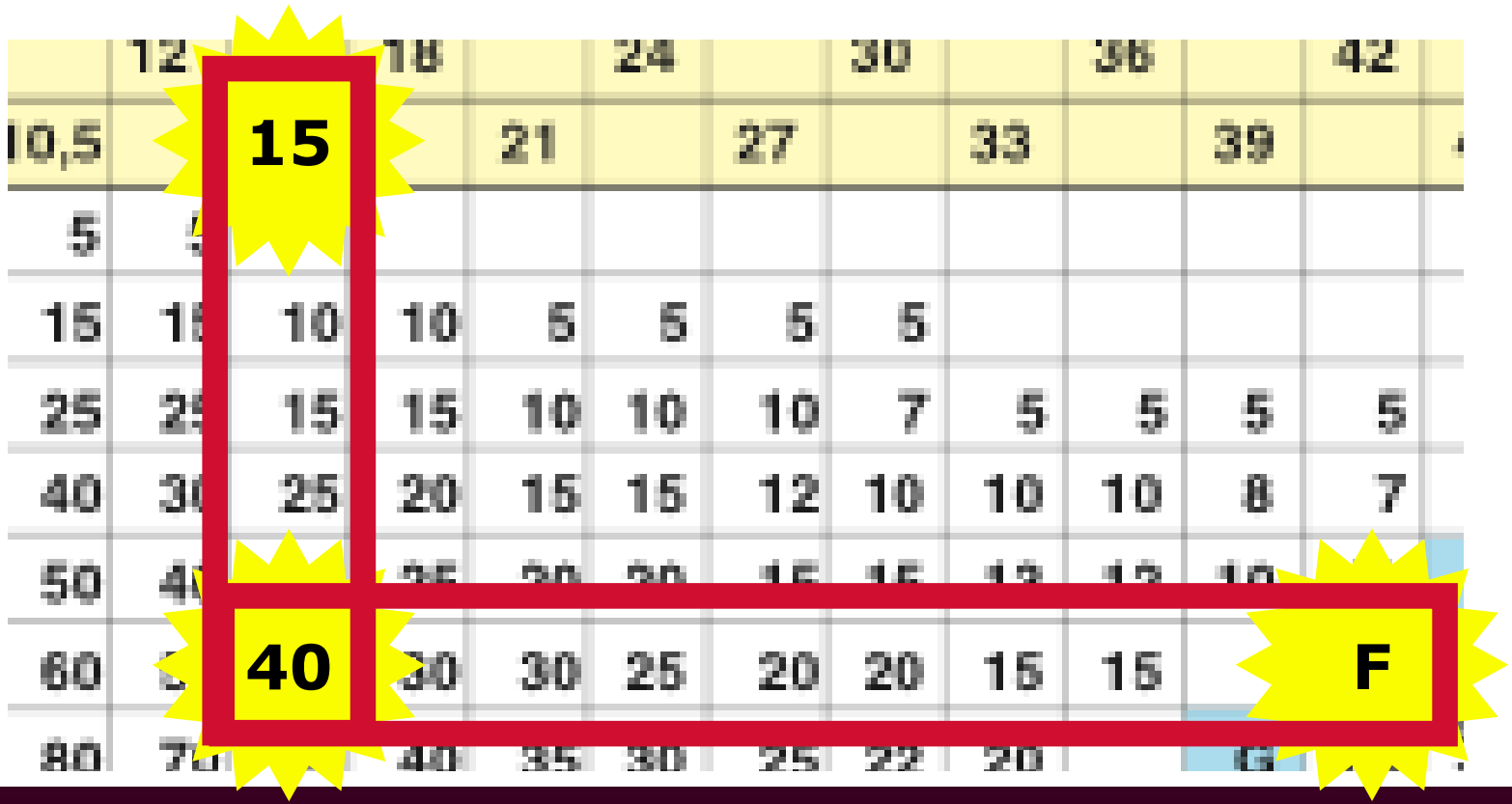


Max depth	13	mt
Dive time	35	Min

Lesson II

World Underwater Federation

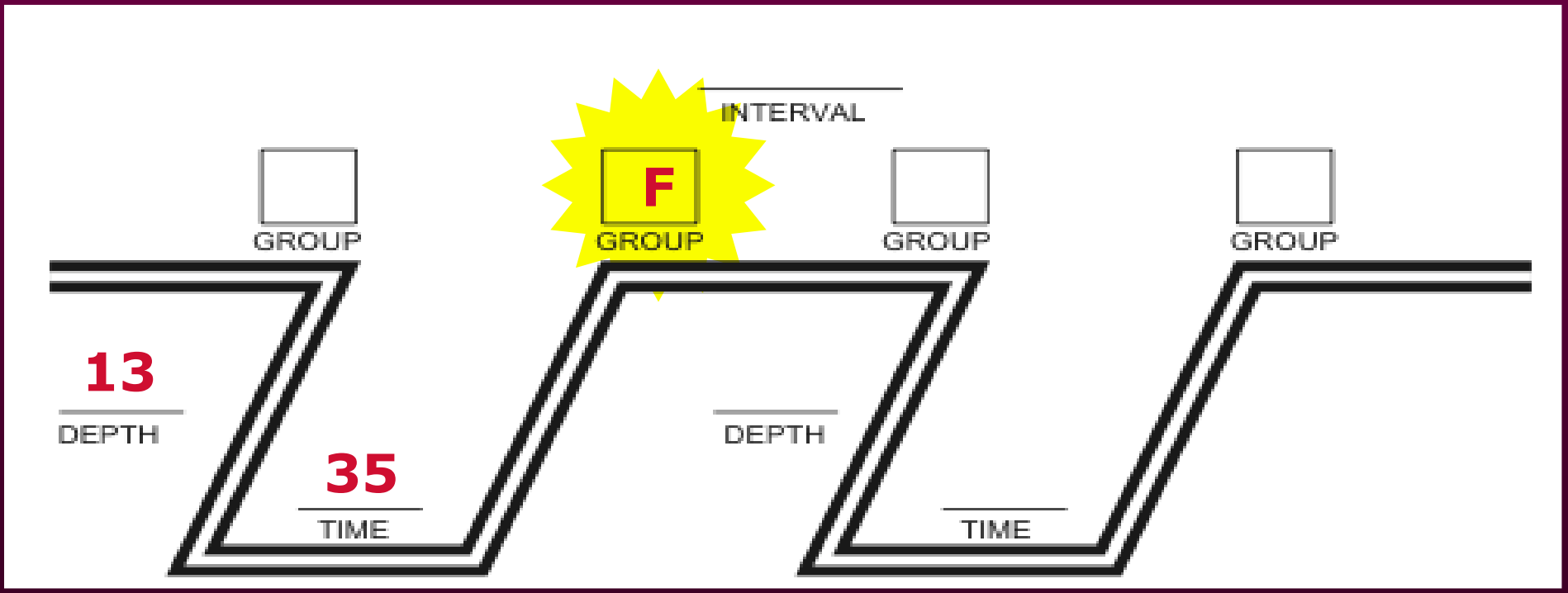
Examples



Lesson II

World Underwater Federation

Examples



Max depth	13	mt
Dive time	35	Min

Examples

Decompression stops

Lesson II

World Underwater Federation

Dive tables

Tables

Mt.	Min	9	6	3	Gr
12	210			2	N
	230			7	N
	250			11	O
15	110			3	L
	120			5	M
	140			10	M
	160			21	N
18	70			2	K
	80			7	L
	100			14	M
	120			26	N
21	60			8	K
	70			14	L
	80			18	M
	90			23	N
	100			33	N
24	50			10	K
	60			17	L
	70			23	M
	80		2	31	N
	90		7	39	N

Mt.	Min	9	6	3	Gr
27	40			7	J
	50			18	L
	60			25	M
	70		7	30	N
	80		13	40	N
30	30			3	I
	40			15	K
	50		2	24	L
	60		9	28	N
	70		17	39	O
	80		23	48	O
33	25			3	H
	30			7	J
	40		2	21	L
	50		8	26	M
	60		18	36	M
36	20			2	H
	25			6	I
	30			14	J
	40		5	25	L
	50		15	31	N

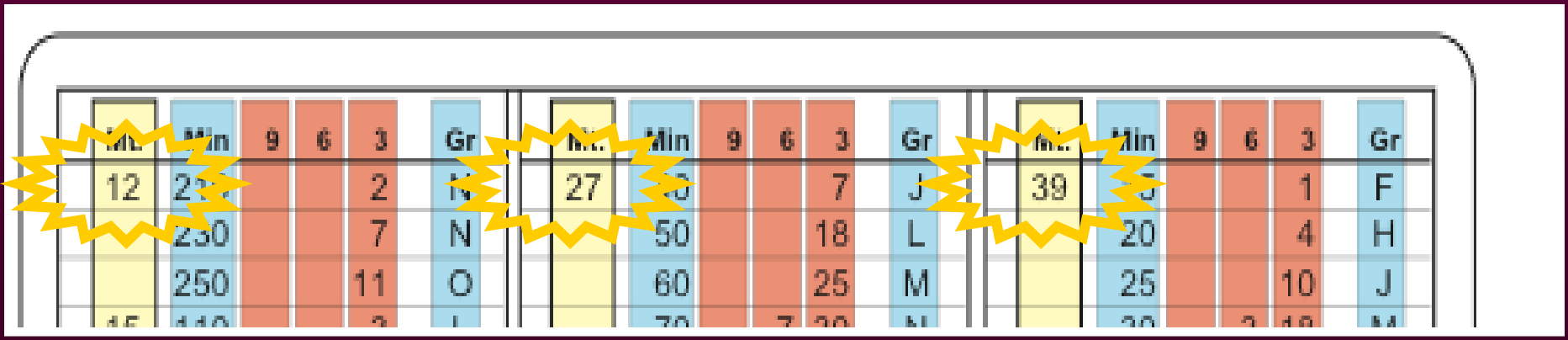
Mt.	Min	9	6	3	Gr
39	15			1	F
	20			4	H
	25			10	J
	30		3	18	M
	40		10	25	N
	50	3	21	37	O
42	15			2	G
	20			6	I
	25		2	14	J
	30		5	21	K
	40	2	16	26	N
45	10			1	E
	15			3	G
	20		2	7	H
	25		4	17	K
	30		8	24	L
	40	5	19	33	N

Lesson II

World Underwater Federation

Dive tables

Tables



Min	9	6	3	Gr
12			2	M
230			7	N
250			11	O

Min	9	6	3	Gr
27			7	J
50			18	L
60			25	M

Min	9	6	3	Gr
39			1	F
20			4	H
25			10	J

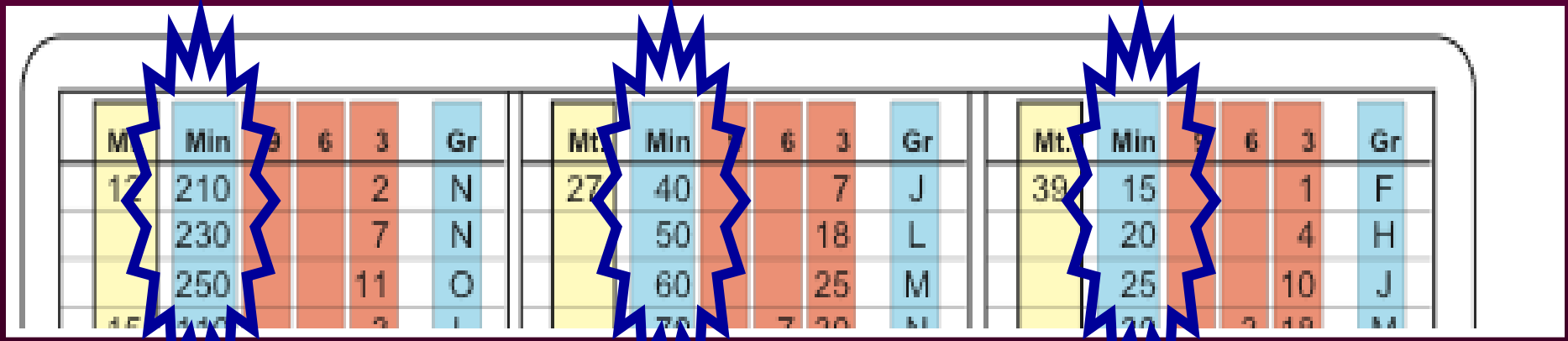
Depth

Lesson II

World Underwater Federation

Dive tables

Tables



Mt.	Min	9	6	3	Gr
12	210			2	N
	230			7	N
	250			11	O

Mt.	Min	9	6	3	Gr
27	40			7	J
	50			18	L
	60			25	M

Mt.	Min	9	6	3	Gr
39	15			1	F
	20			4	H
	25			10	J

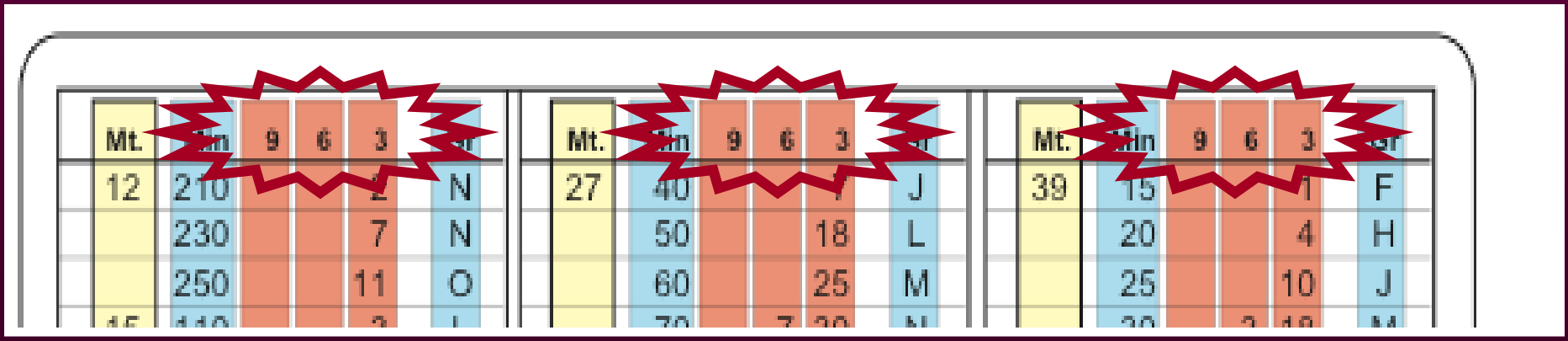
Dive time

Lesson II

World Underwater Federation

Dive tables

Tables



Mt.	Min	9	6	3	Gr
12	210				N
	230			7	N
	250			11	O

Mt.	Min	9	6	3	Gr
27	40				J
	50			18	L
	60			25	M

Mt.	Min	9	6	3	Gr
39	15				F
	20			4	H
	25			10	J

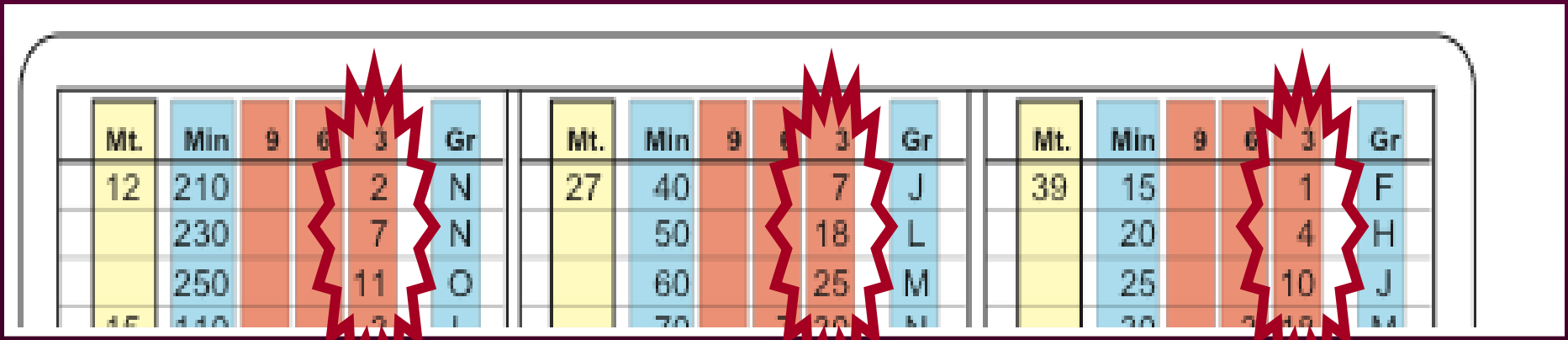
Stop depth

Lesson II

World Underwater Federation

Dive tables

Tables



Mt.	Min	9	6	3	Gr
12	210			2	N
	230			7	N
	250			11	O

Mt.	Min	9	6	3	Gr
27	40			7	J
	50			18	L
	60			25	M

Mt.	Min	9	6	3	Gr
39	15			1	F
	20			4	H
	25			10	J

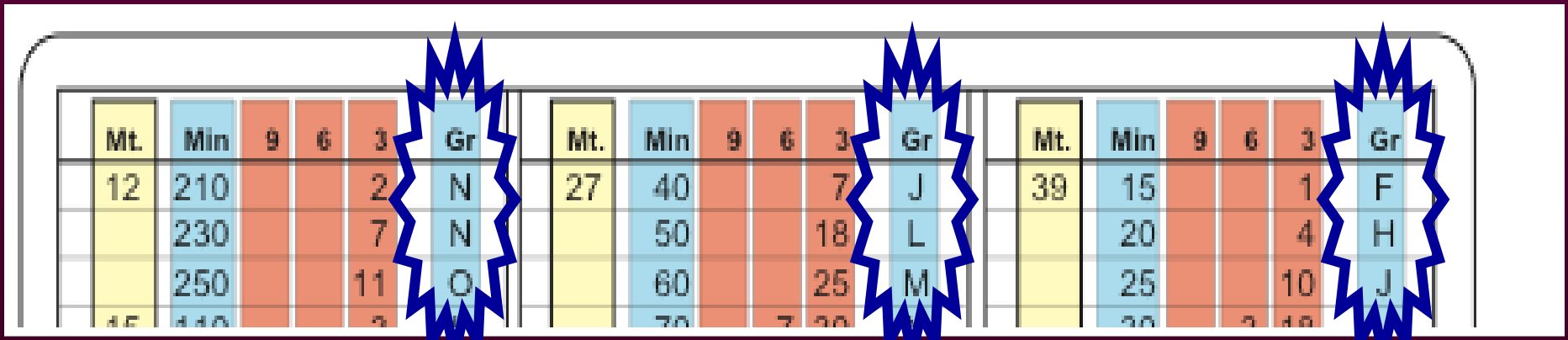
Stop time

Lesson II

World Underwater Federation

Dive tables

Tables



Mt.	Min	9	6	3	Gr
12	210			2	N
	230			7	N
	250			11	O

Mt.	Min	9	6	3	Gr
27	40			7	J
	50			18	L
	60			25	M

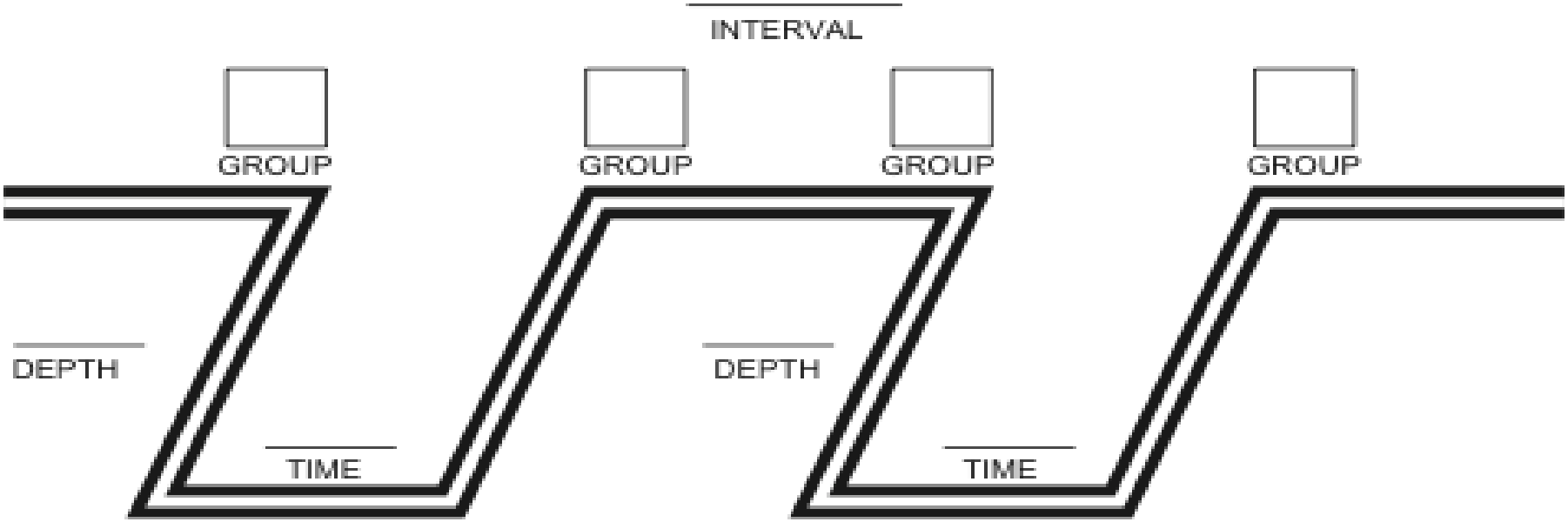
Mt.	Min	9	6	3	Gr
39	15			1	F
	20			4	H
	25			10	J

Dive letter group

Lesson II

World Underwater Federation

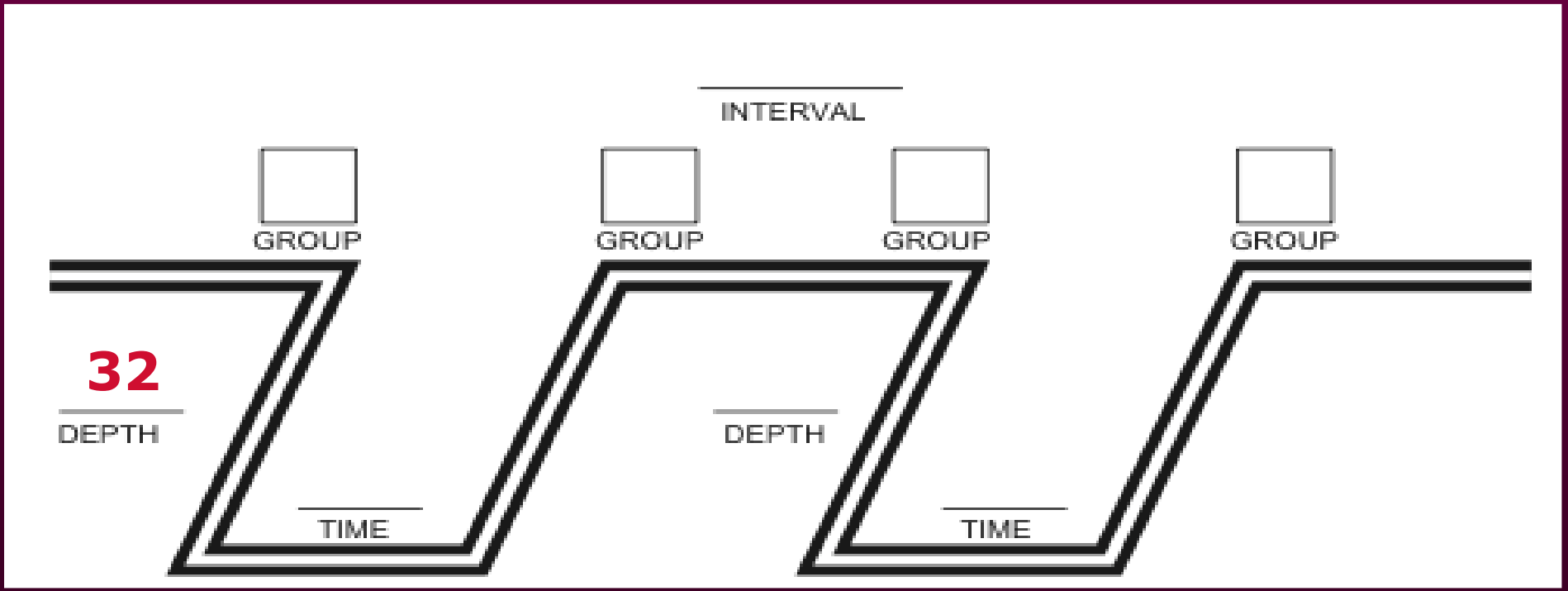
Examples



Lesson II

World Underwater Federation

Examples



Max depth 32 mt

Lesson II

World Underwater Federation

Examples

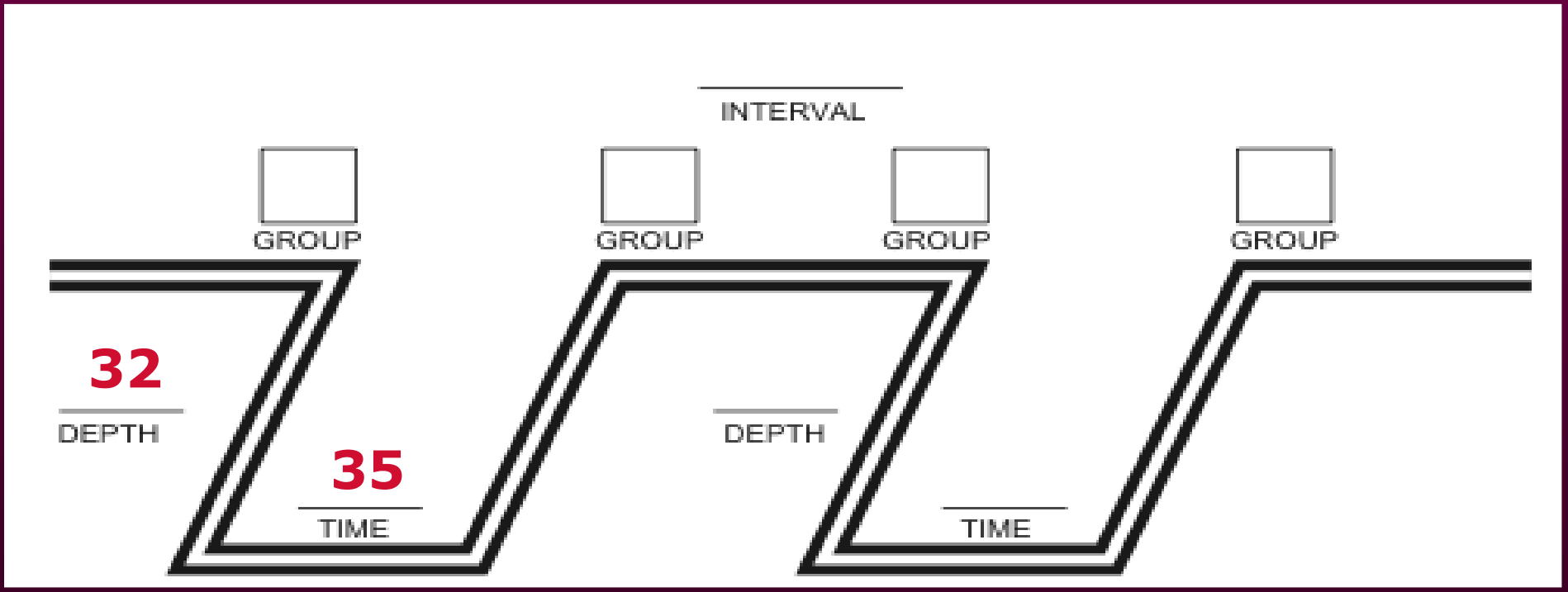
	12		18		24		30		36		42	
10,5		15		21		27				39		
5	5											
15	15	10	10	5	5	5	5					
25	25	15	15	10	10	10	7	5	5	5	5	
40	30	25	20	15	15	12	10	10	10	8	7	
50	40	30	25	20	20	15	15	13	12	10	10	
60	50	40	30	30	25	20	20	15	15		F	
80	70	50	40	35	30	25	22	20		G		

33

Lesson II

World Underwater Federation

Examples

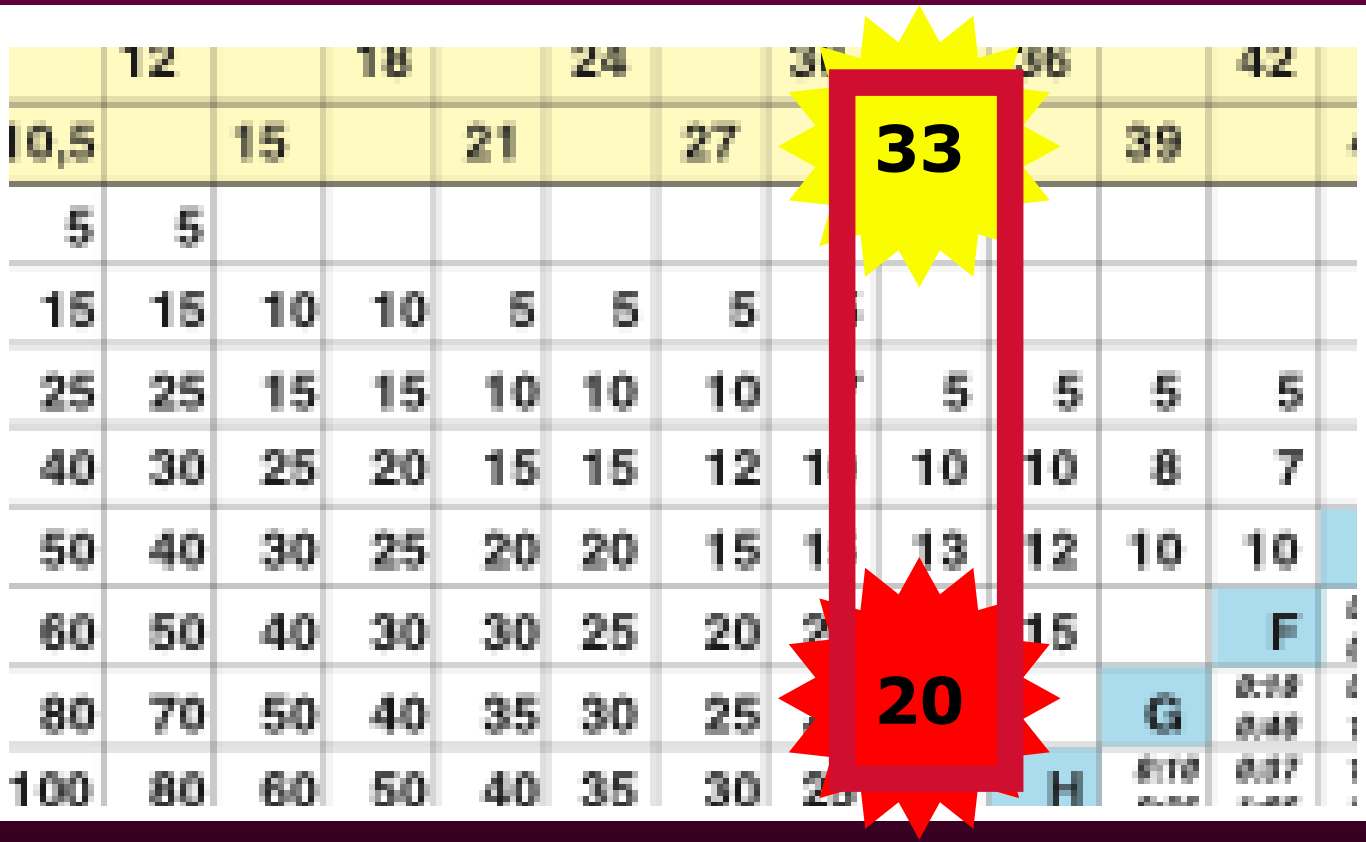


Max depth	32	mt
Dive time	35	min

Lesson II

World Underwater Federation

Examples

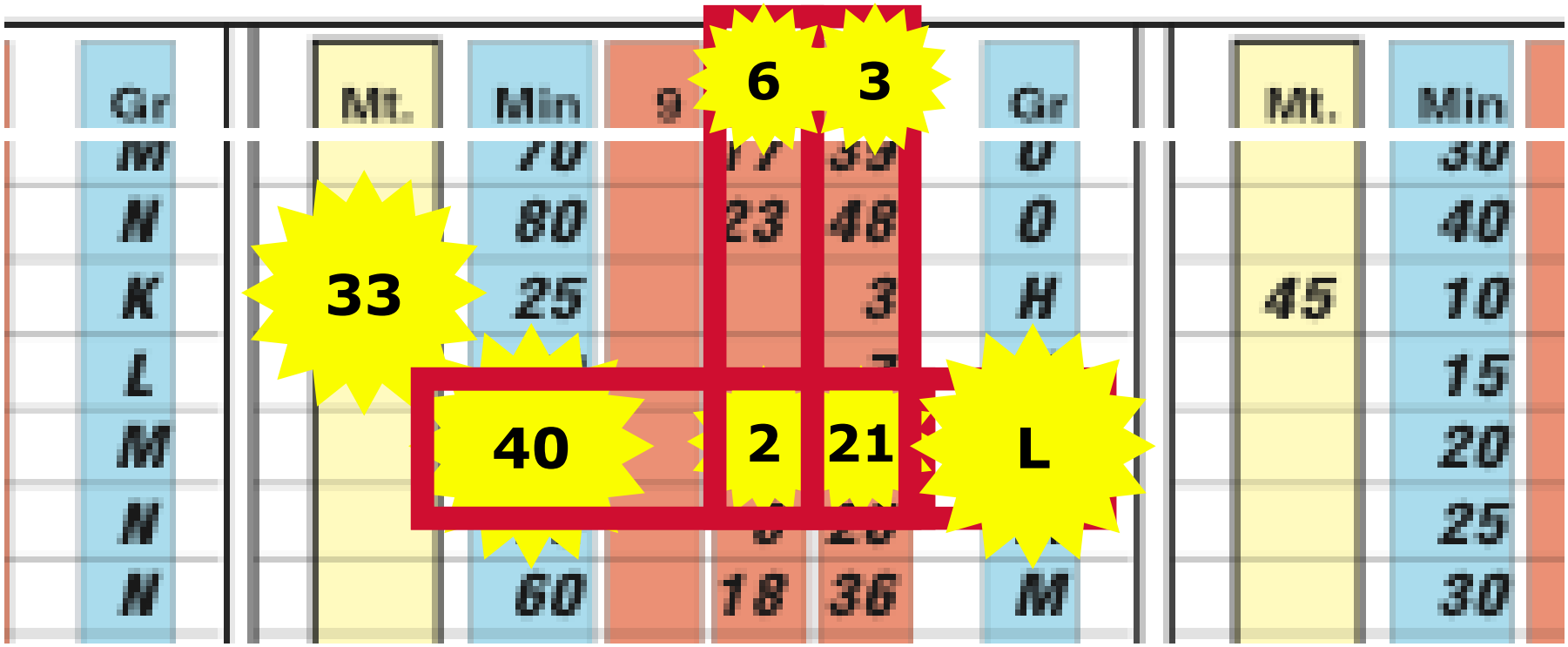


OUT OF SAFETY LIMITS

Lesson II

World Underwater Federation

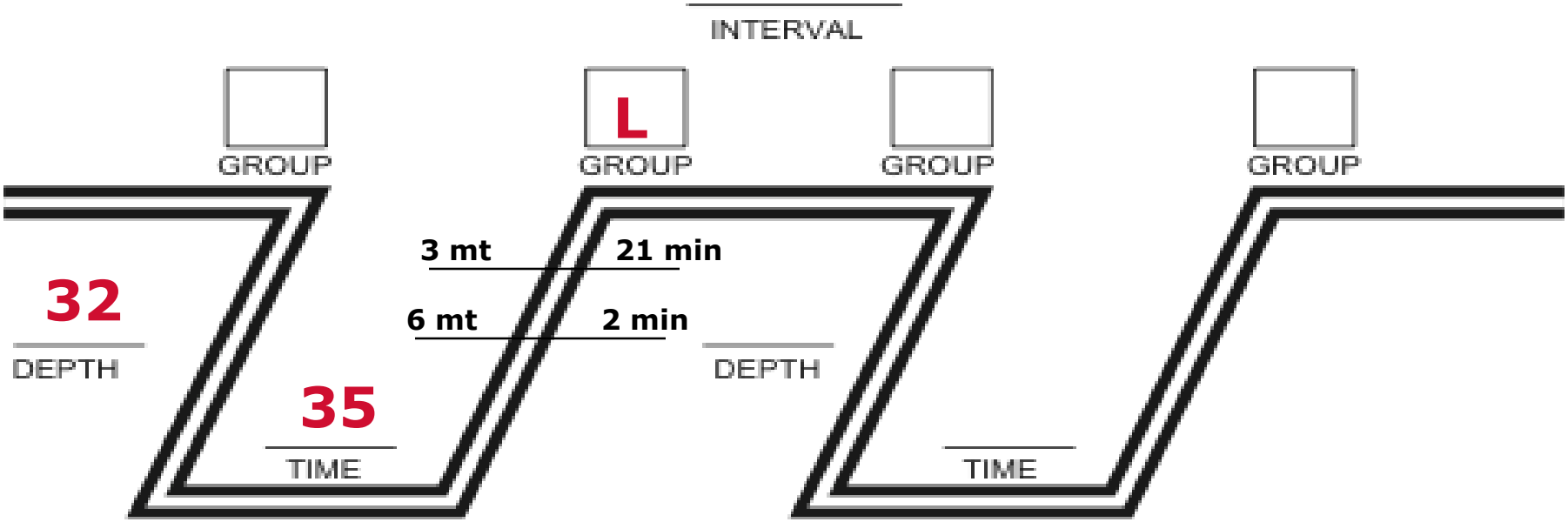
Examples



Lesson II

World Underwater Federation

Examples



Max depth	32	mt
Dive time	35	min

Examples

Stops time	23	+
Ascent time	2	=
Total ascent time	25	

Deep dive

Lesson II

World Underwater Federation

Deep dive

Deep dive

PLANNING A DEEP DIVE

CONTROL

EQUIPMENT

INSTRUMENTATION

PLANNING

SUPPORT BOAT

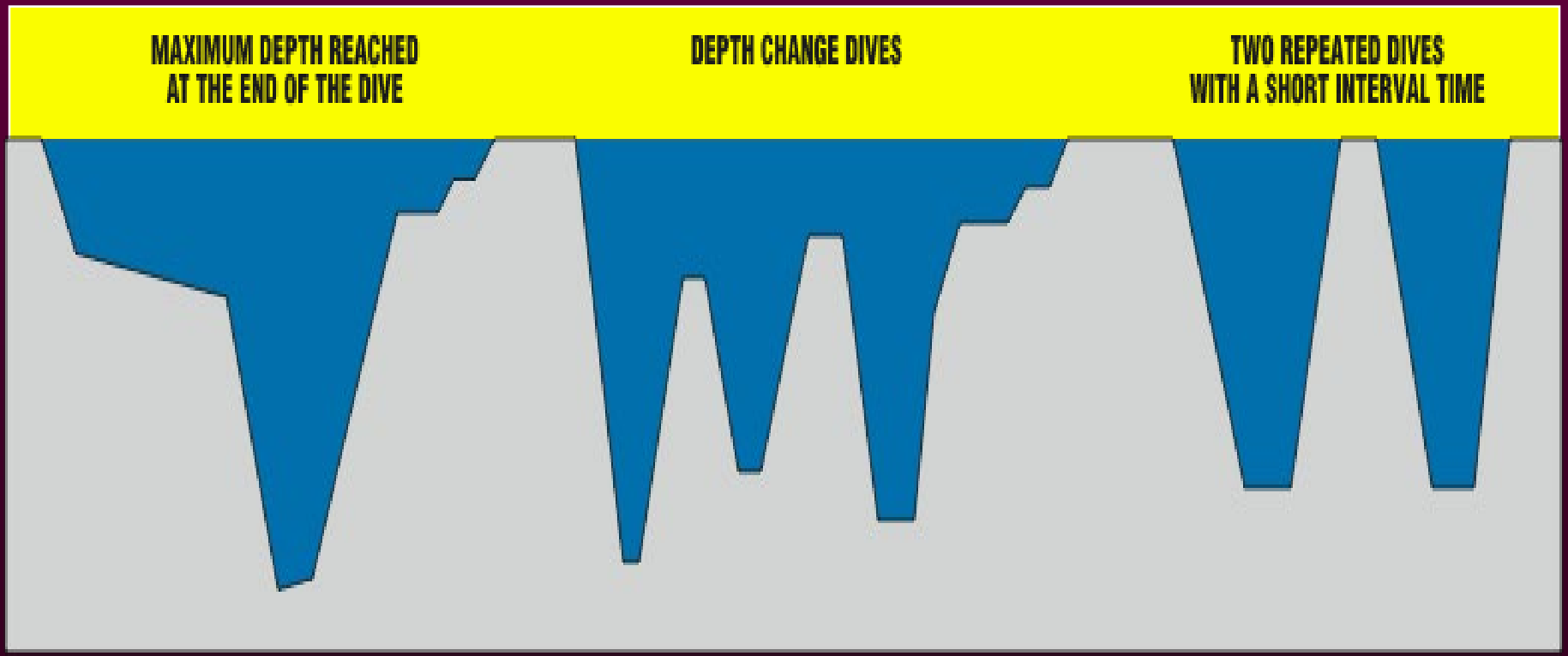
WEIGHT BELT

Lesson II

World Underwater Federation

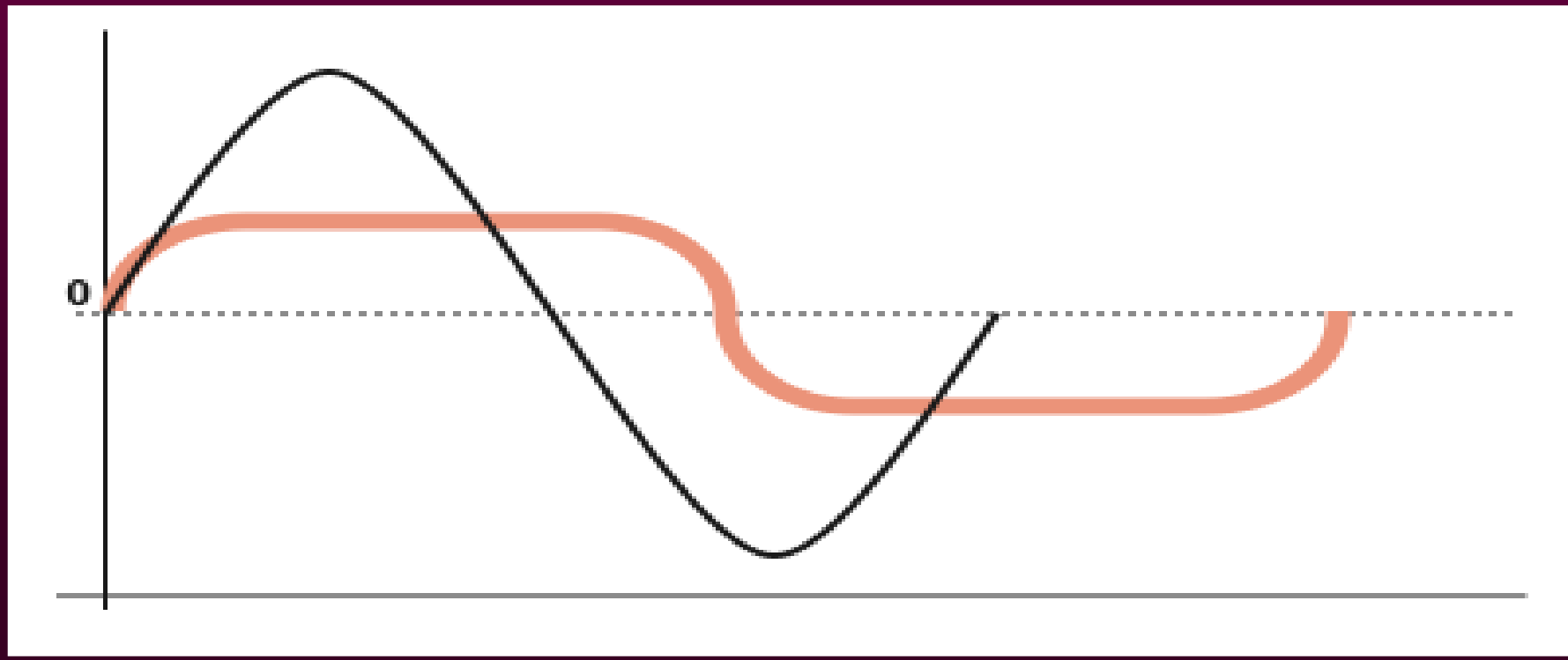
Deep dive

DIVE TO AVOID



Deep dive

BREATHING RYTHM



Air consumption

Air consumption

TO BE CONSIDERED

Quantity of air in the cylinder

TO BE PLANNING

Dive time

Dive depth

Air consumption

The quantity of air in a cylinder

Cilinder capacity x Loading pressure

Consumption in litres

20 x Ambient pressure x Dive time

Autonomy time in minutes

$$\frac{\text{Volume of the air in the cilinder}}{20 \times \text{Ambient pressure}}$$

Dive computer

Lesson II

World Underwater Federation

Dive computer

Lesson II

World Underwater Federation

Dive computer

Max depth

Time

Tables

Gruppo di appartenenza	3	4,5	6	7,5	9	10,5	12	15	18	21	24	27	30	33	36	39	42	45	Profondità in metri
A	60	35	25	20	15	5	5												A
B	120	70	50	35	30	15	15	10	10	5	5	5	5						B
C	210	110	75	55	45	25	25	15	15	10	10	10	7	5	5	5	5	5	C
D	300	160	100	75	60	40	30	25	20	15	15	12	10	10	10	8	7		D
E		225	135	100	75	50	40	30	25	20	20	15	15	13	12	10	10	E	
F		360	180	125	95	60	50	40	30	30	25	20	20	15	15		F		
G			240	160	120	80	70	50	40	35	30	25	22	20		G			
H			325	195	145	100	80	60	50	40	35	30	25		H				
I				245	170	120	100	70	55	45	40			I					
J				315	205	140	110	80	60	50			J						
K					250	160	130	90				K							
L					310	190	150	100			L								
M						220	170			M									
N						270	200		N										
O						310		O											
Nuovo gruppo	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A				

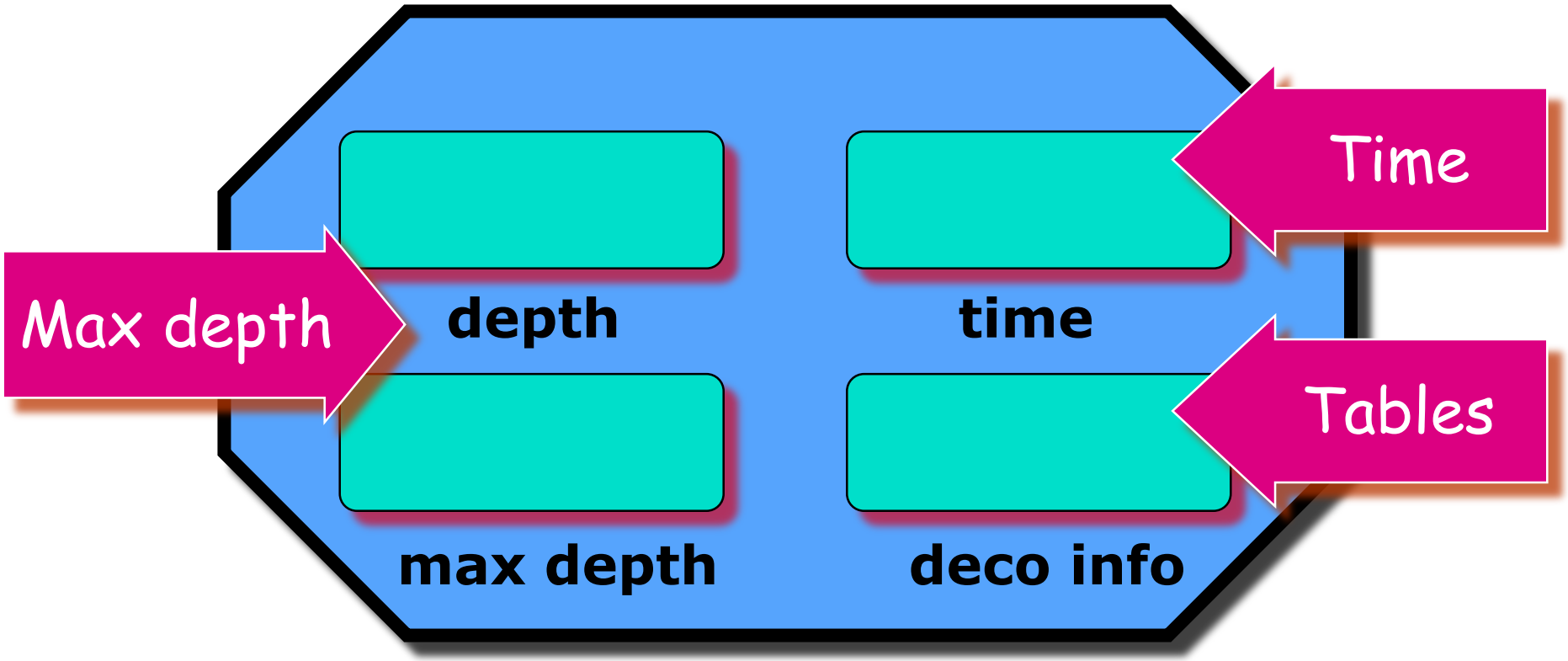
TABELLE PER IMMERSIONI SENZA DECOMPRESSIONE

Velocità di risalita NON SUPERARE 10mt/min

STOP DI SICUREZZA 3mt/3min

Profondità in metri intervallo ripetitivo

Dive computer



Lesson II

World Underwater Federation

Dive computer

CALCULATING A MULTILEVEL DIVE

HOW THE COMPUTER WORKS

THE THEORETICAL COMPARTMENTS AND THE HALF-SATURATION TIMES

Tables vs COMPUTER

Dive computer

Always refer to the handbook of instructions before using the instrument

EVERY COMPUTER HAS ITS OWN CHARACTERISTICS

Dive computer

Every diver must have his own computer

TWO DIVERS HAVE ALWAYS
A DIFFERENT DIVE PROFILE

Dive computer

Always respect the ascent rate

ONE OF THE MOST IMPORTANT PARAMETER IS THE ASCENT RATE

Dive computer

The maximum depth must be reached at the beginning of the dive

AVOID A YO-YO DIVE

Dive computer

Never make a comparison with the tables

OR USE THE TABLES
OR THE COMPUTER

NEVER MIX THEM

Dive computer

FLYING AFTER ADIVE

Wait at least 12 hours
if safe dives have been carried out in the last 2 days
for a total time of less than 120 minutes

Wait at least 24 hours
after repeated dives

Wait between 24 and 48 hours
after dives outside the safety limit

Lesson II

World Underwater Federation

Lesson 3

Lesson II

World Underwater Federation

In collaboration with

BLS - Basic Life Support

First Aid principles

Lesson II

World Underwater Federation

BLS

BLS

CALL
FOR HELP

ALLERT
EMERGENCY SERVICES

Lesson II

World Underwater Federation

BLS

BLS

ASSIST

THE VICTIM

ALLERT

EMERGENCY SERVICES

Lesson II

World Underwater Federation

BLS

BLS

ALLERT
EMERGENCY SERVICES

LATERAL SAFETY POSITION

HEAD HYPEREXTENSION

ORAL CAVITY INSPECTION

BLS

BLS

REMOVE IT !

OK

Lesson II

World Underwater Federation

BLS

LOOK - LISTEN - FEEL

YES

BREATHING ?

NO

BLS

ASSIST

THE VICTIM UNTIL EMERGENCY SERVICES ARRIVE

BLS

REPEAT 5 TIMES

30
COMPRESSIONS
2
VENTILATIONS

OK

BLS

LOOK - LISTEN - FEEL

YES

BREATHING ?

NO

OR

BLS

Someone capable of practising CPR, relieve you ?

STOP

STOP

A Doctor tells you to interrrupt CPR ?

You are replaced by someone Able to use an AED ?

AED

STOP

You are too tired to continue ?

OK

First aid principles

Lesson II

World Underwater Federation

First aid

A TRAUMA CAN AFFECT

SKIN

MUSCLES

ARTICULATION

BONES

BLOOD VESSELS

Lesson II

World Underwater Federation

First aid

SKIN

Burns

Bruise

Scratching

Lesson II

World Underwater Federation

First aid

MUSCLES

Strain

Contusion

Lesson II

World Underwater Federation

First aid

ARTICOLATION

Sprain

Dislocation

Lesson II

World Underwater Federation

First aid

BONES

Fracture

Lesson II

World Underwater Federation

First aid

BLOOD VESSELS

Haemorrage

venous

arterial

Lesson II

World Underwater Federation

Lesson 4

Natural orientation

Lesson VI

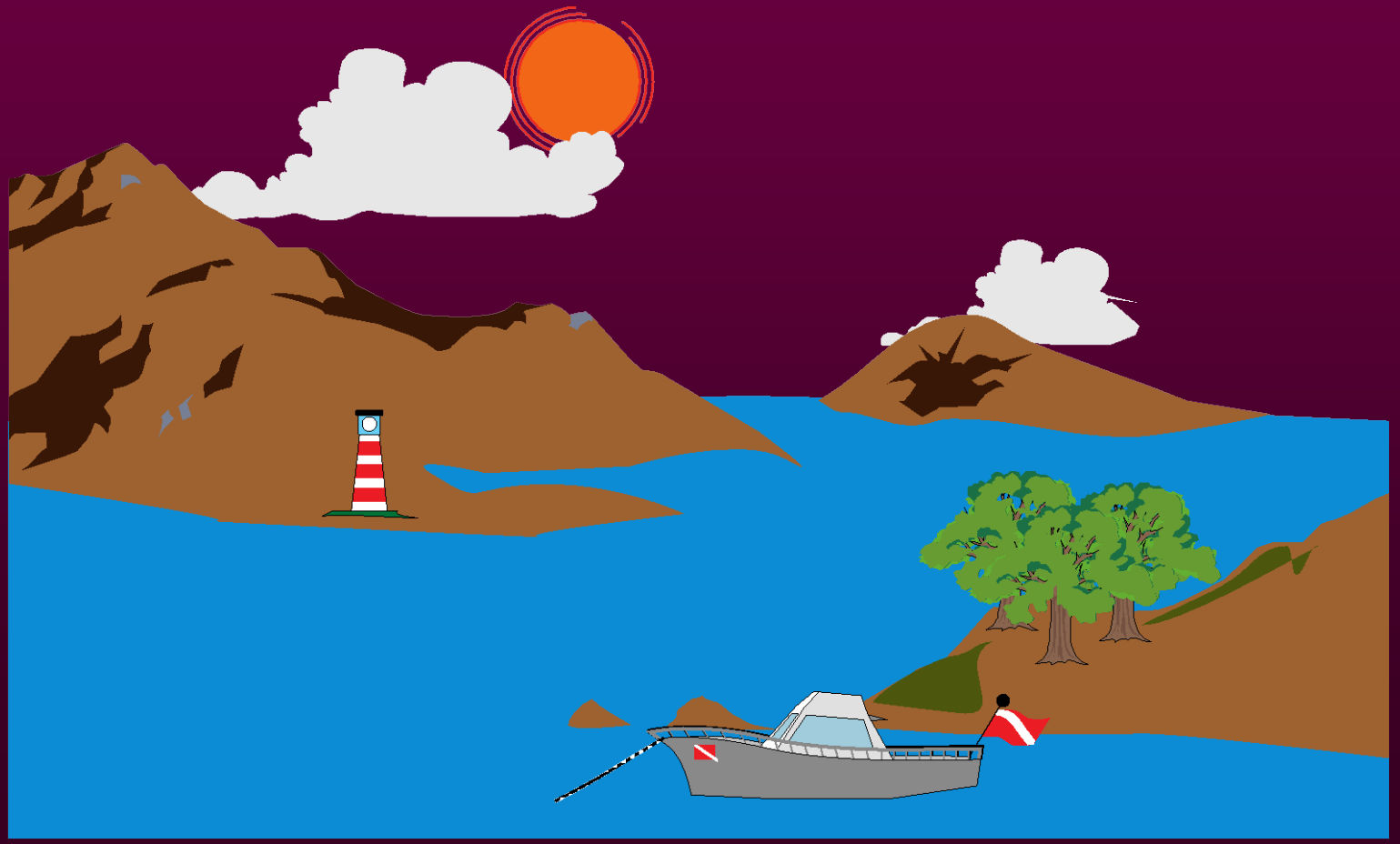
World Underwater Federation

Pay attention to main features

Lesson VI

World Underwater Federation

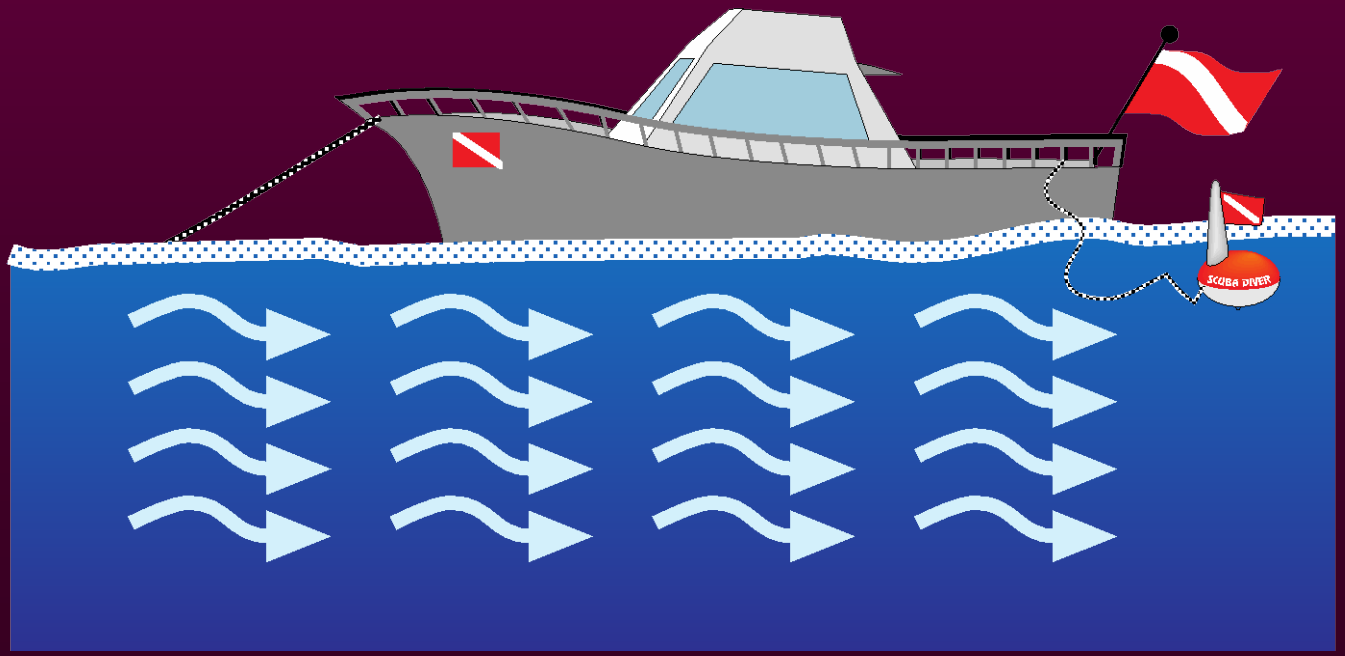
Location of the boat



Lesson VI

World Underwater Federation

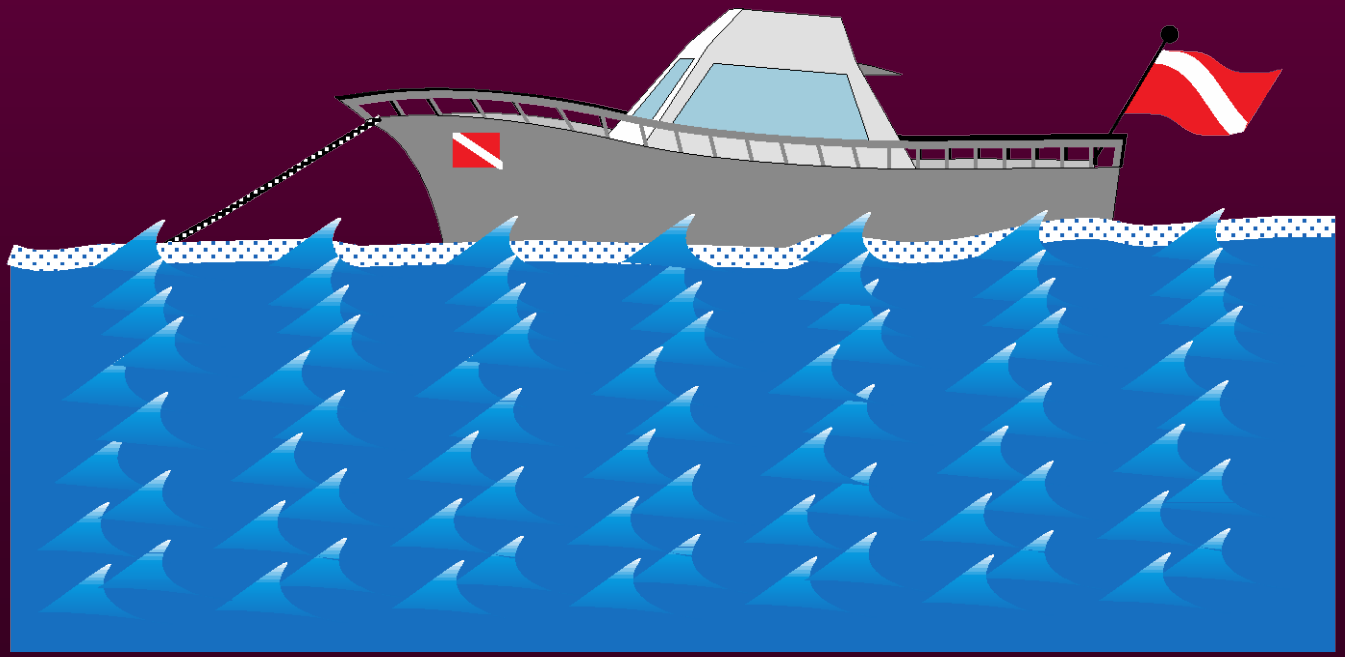
Current direction



Lesson VI

World Underwater Federation

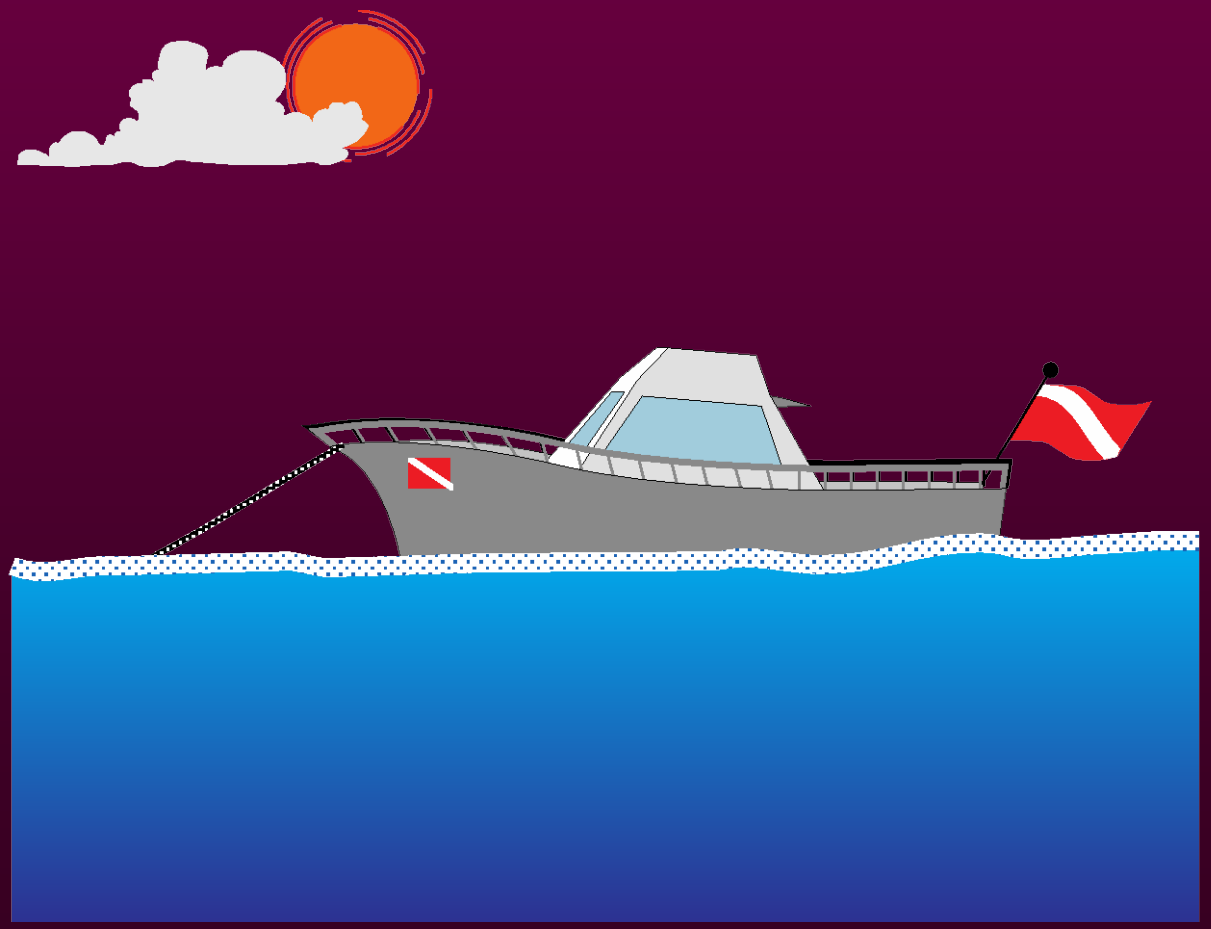
Waves direction



Lesson VI

World Underwater Federation

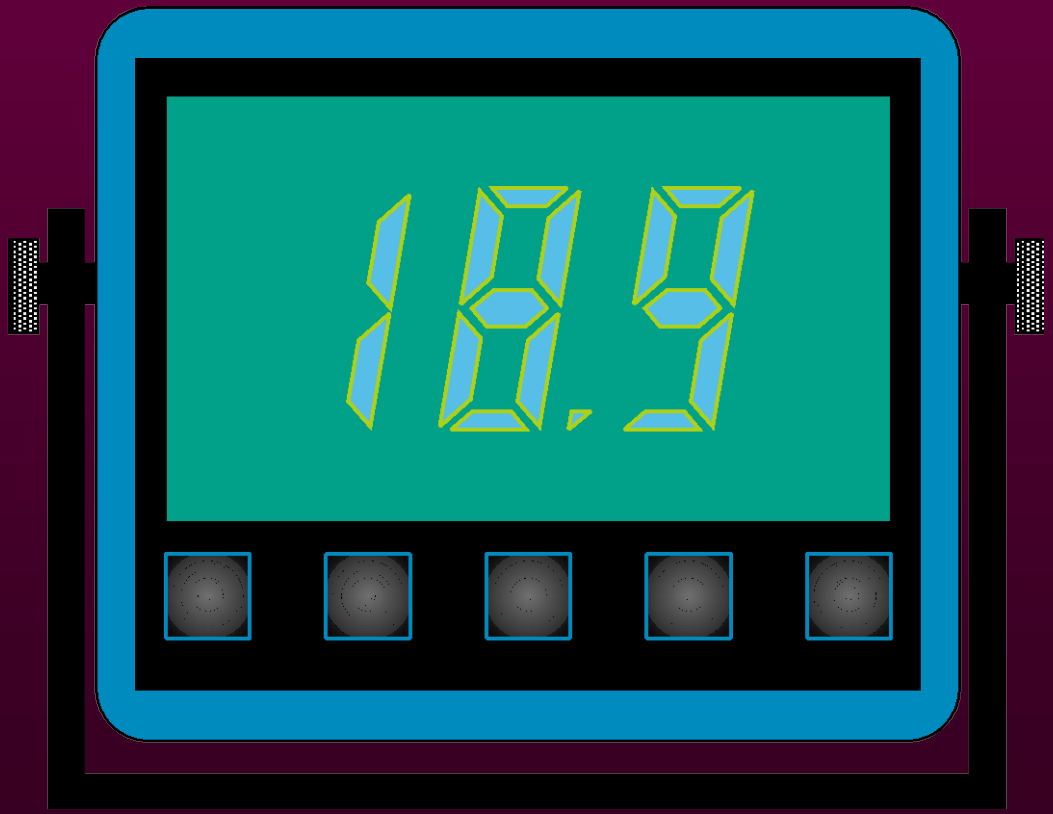
Location of the boat,referring to the sun



Lesson VI

World Underwater Federation

Boat's econometer

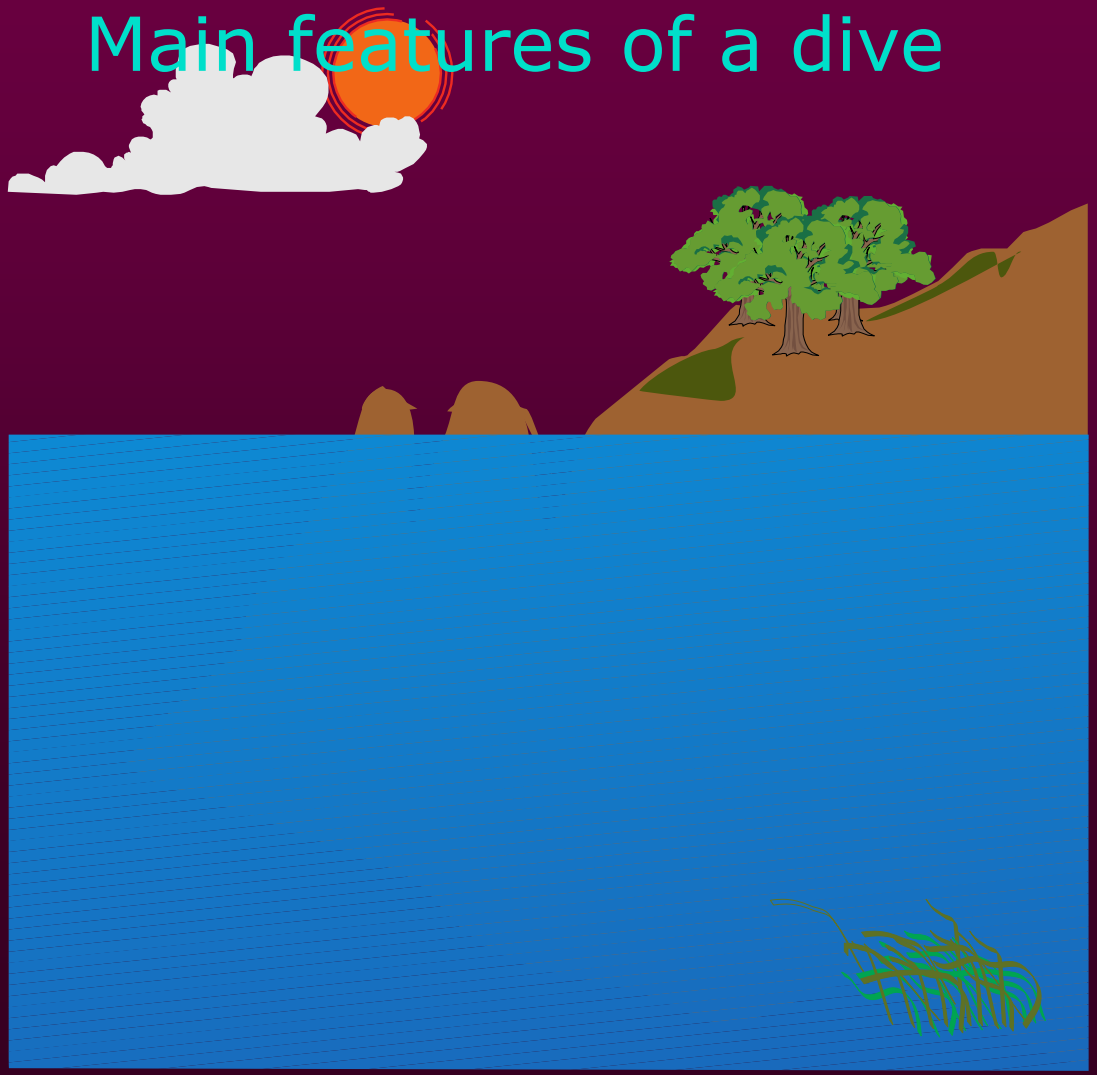


Effective use of environmental features

Lesson VI

World Underwater Federation

Main features of a dive

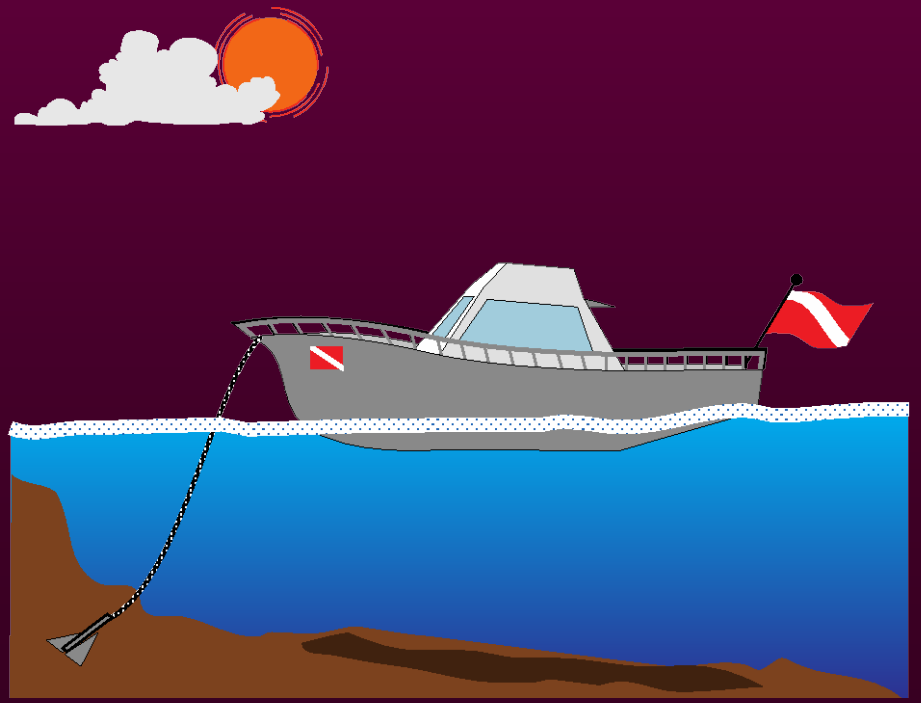


Lesson VI

World Underwater Federation

Current direction

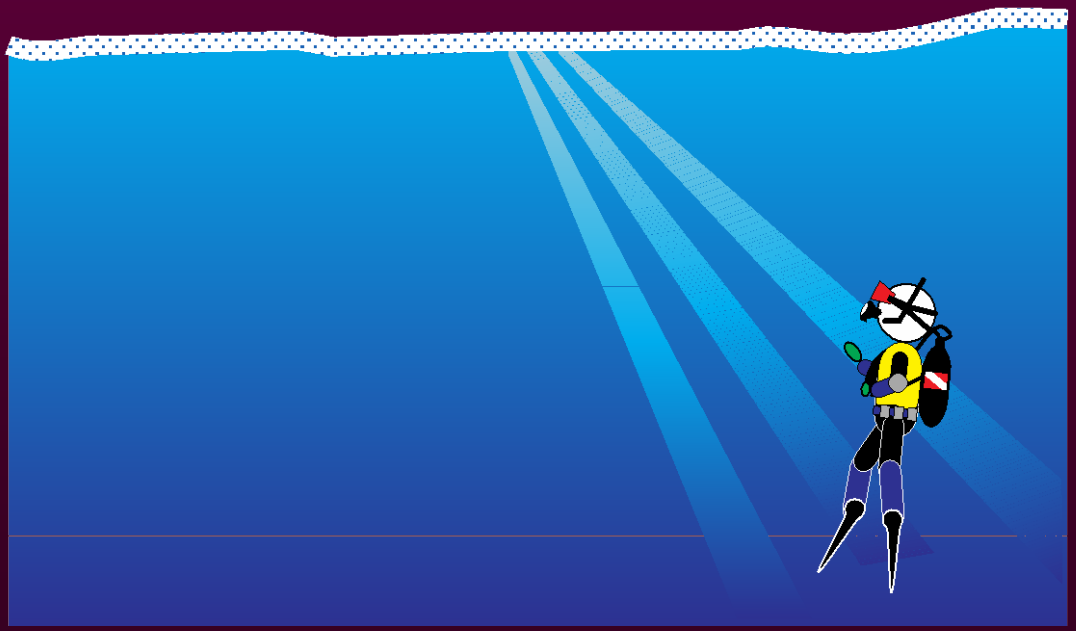
Boat shadow



Lesson VI

World Underwater Federation

Orientation referring to the sun and the waves



Lesson VI

World Underwater Federation

Sand ripples

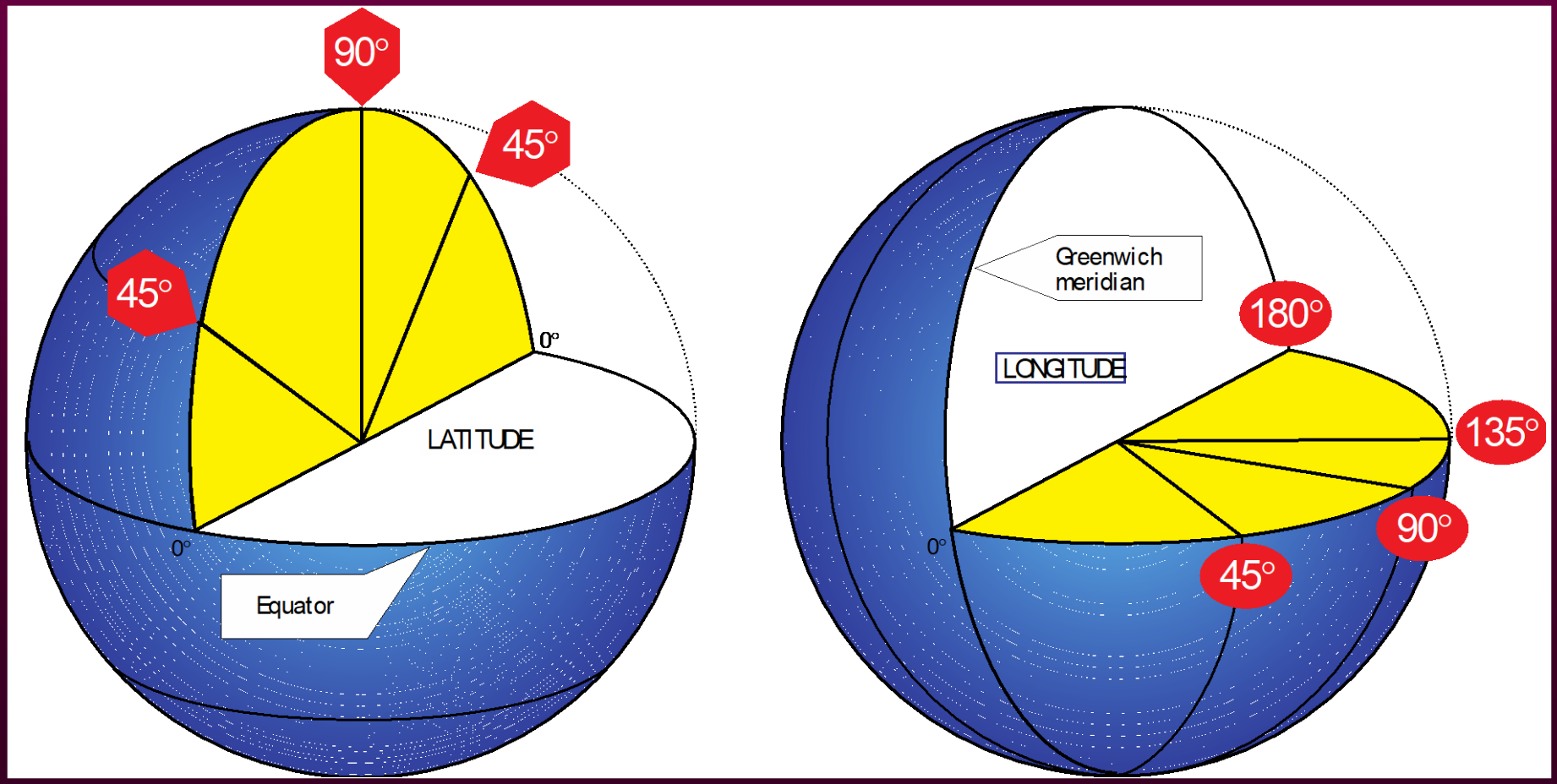
Depth

Instrumental orientation

Lesson VI

World Underwater Federation

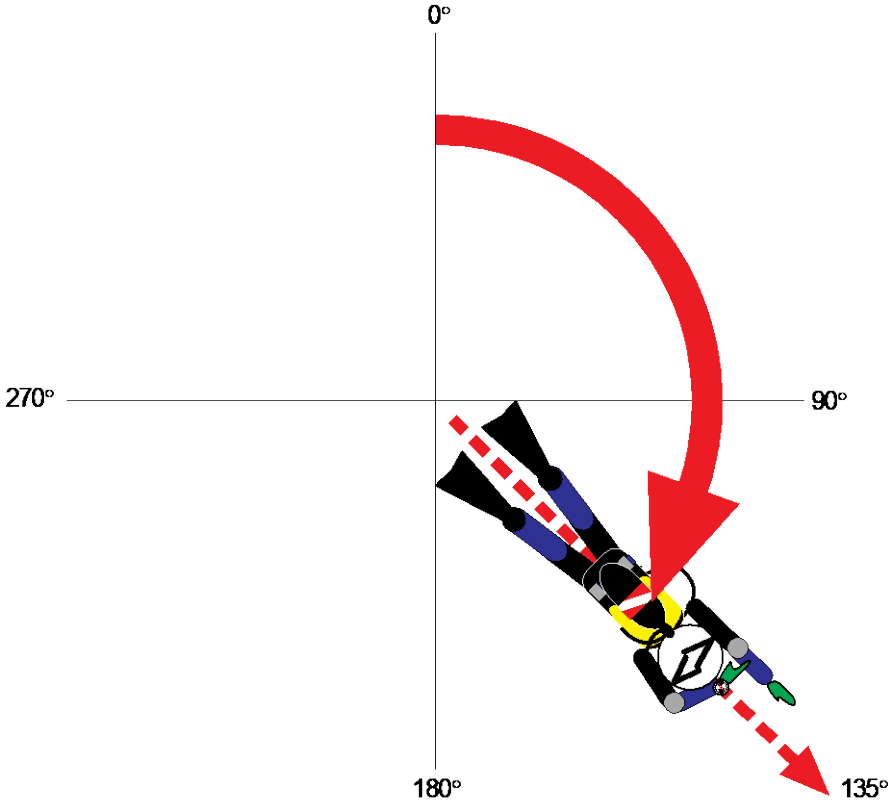
The compass

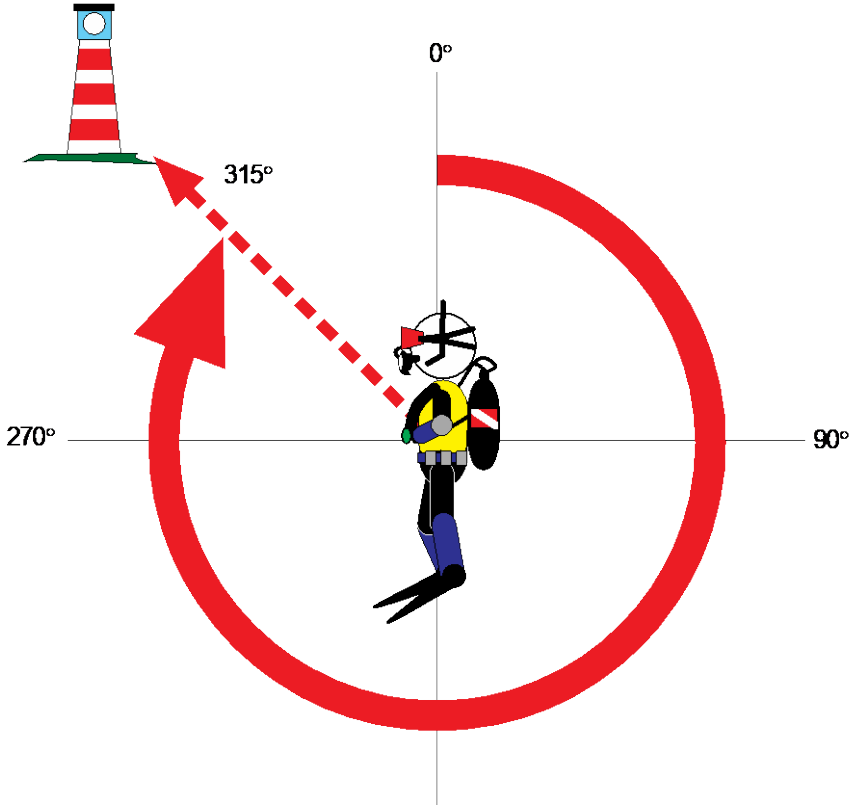


Lesson VI

World Underwater Federation

The compass

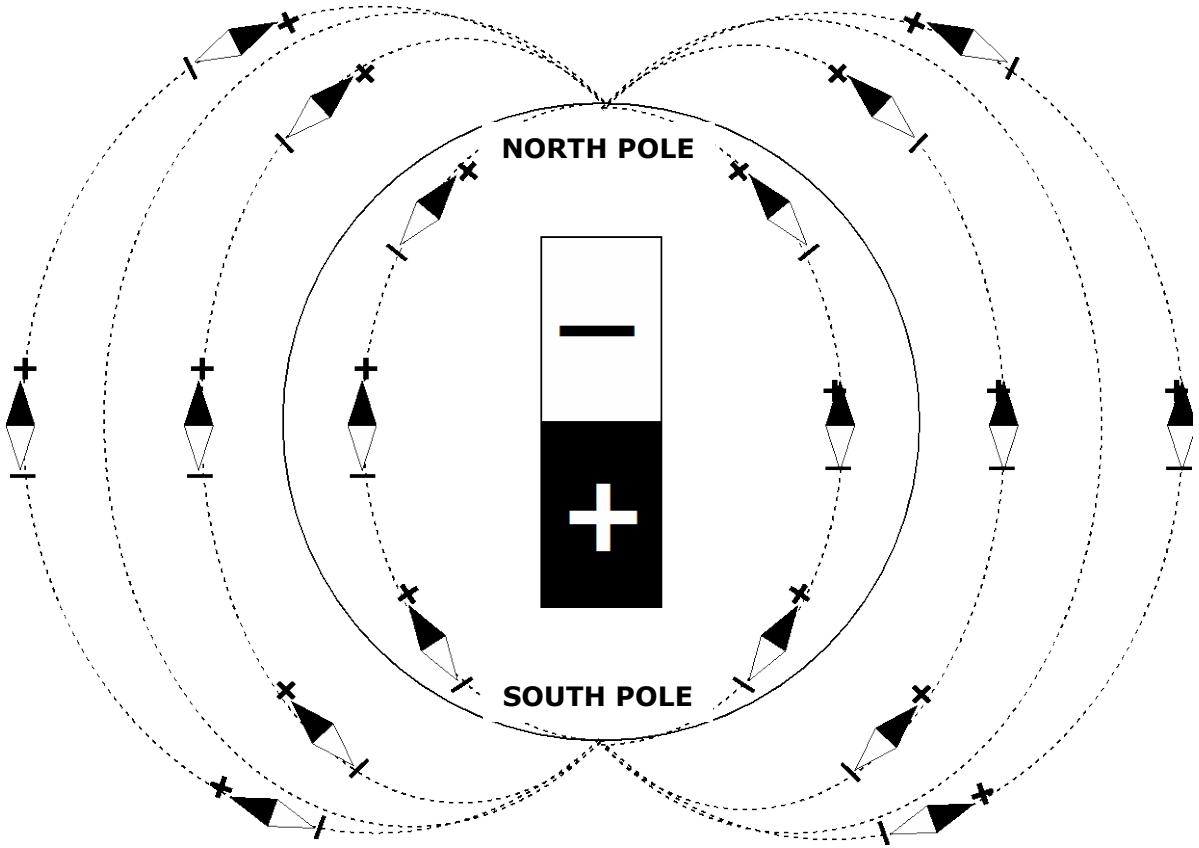




Lesson VI

World Underwater Federation

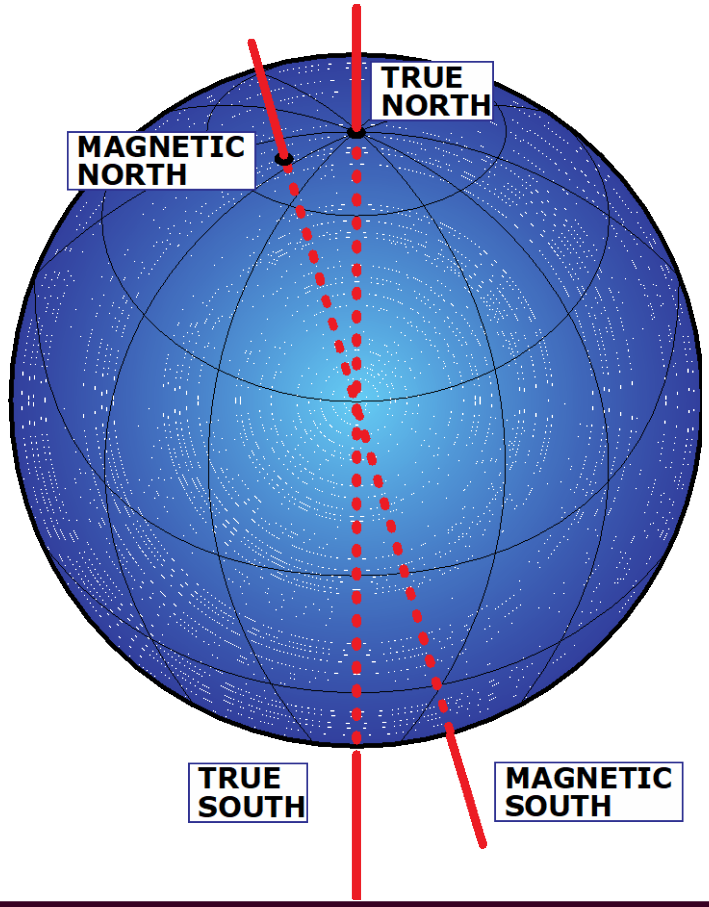
The compass

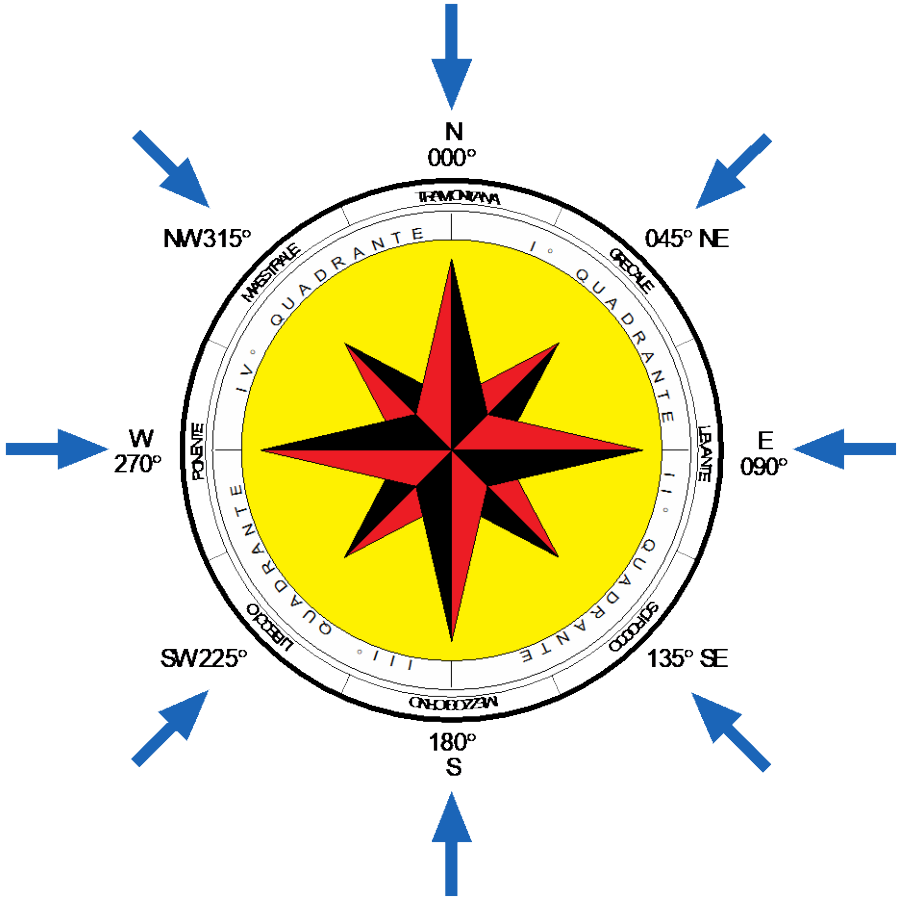


Lesson VI

World Underwater Federation

The compass

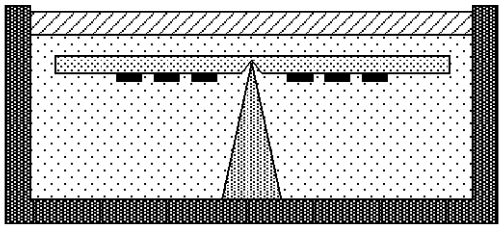


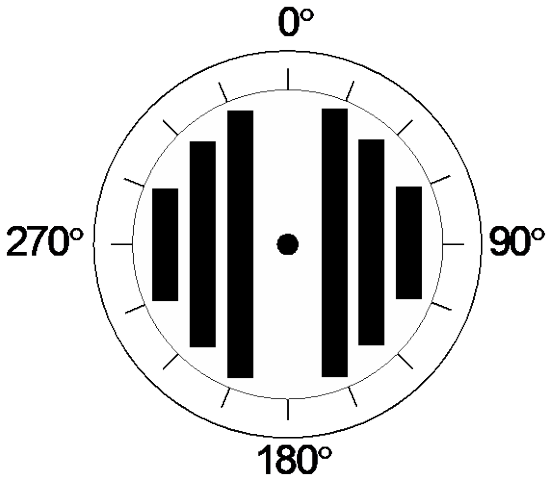


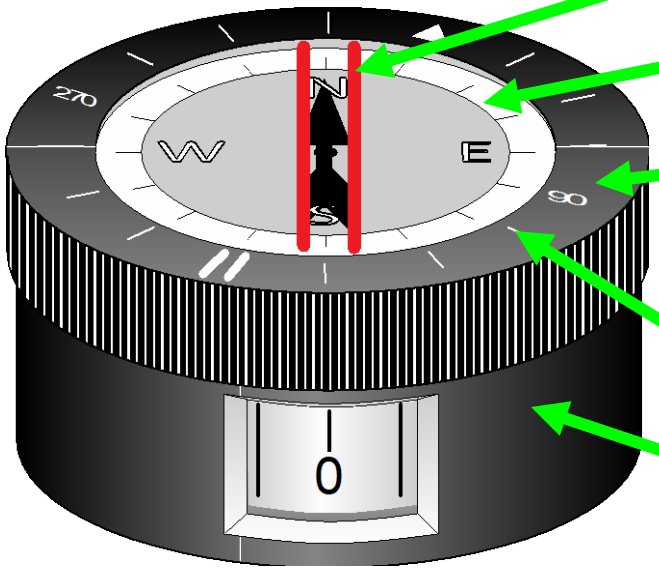
Lesson VI

World Underwater Federation

The compass







Lubber's line

Compass rose

Degree bezel

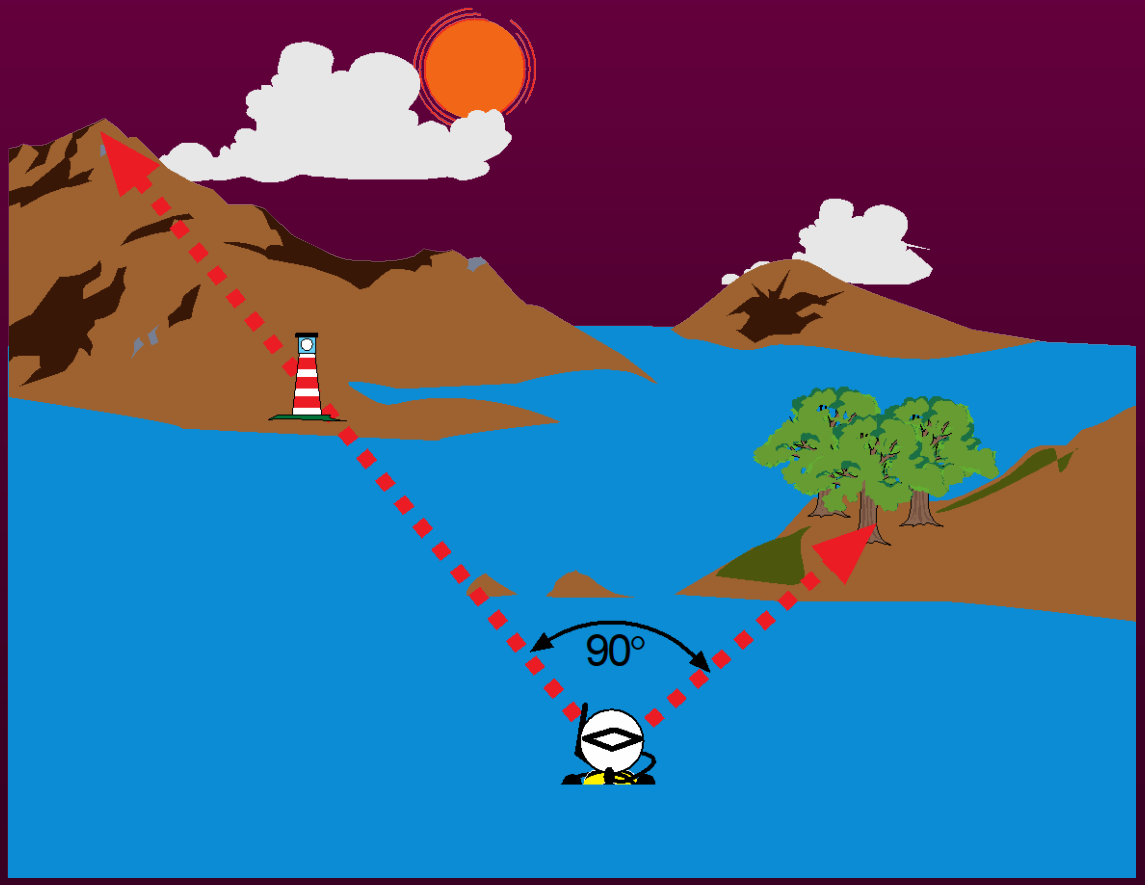
Bowl

Degree bezel

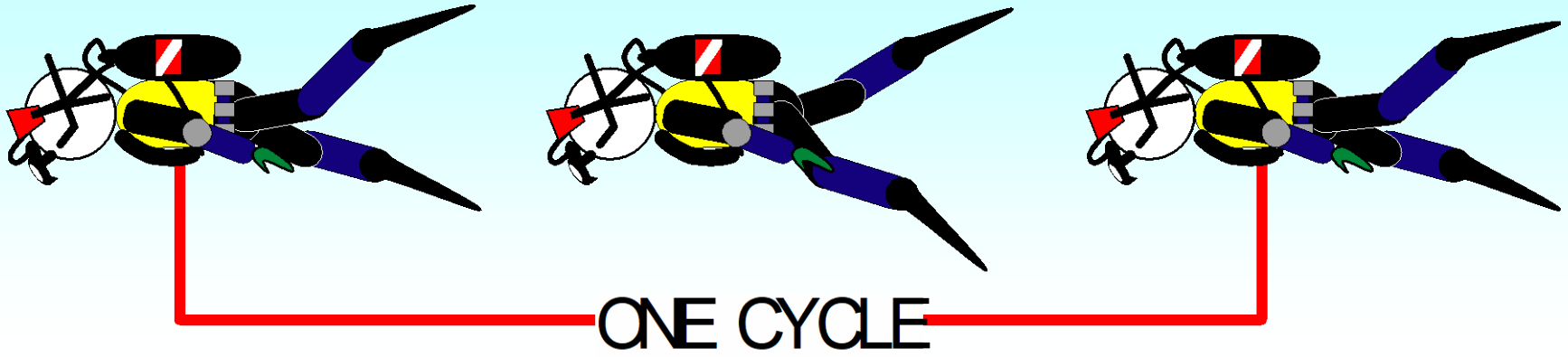
Lesson VI

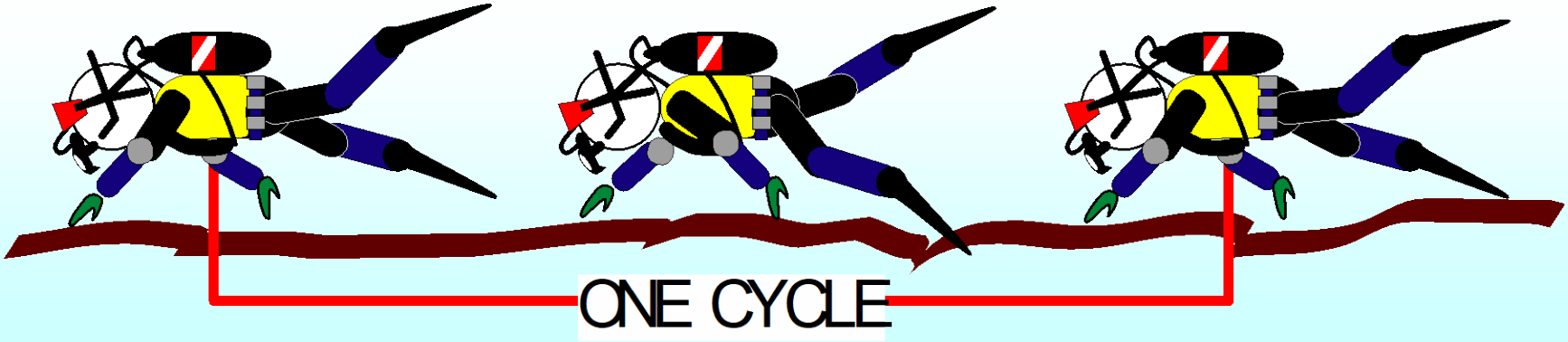
World Underwater Federation

Position fix



How calculate distances





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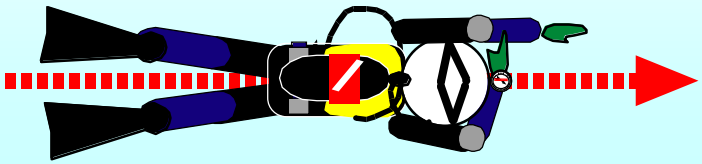
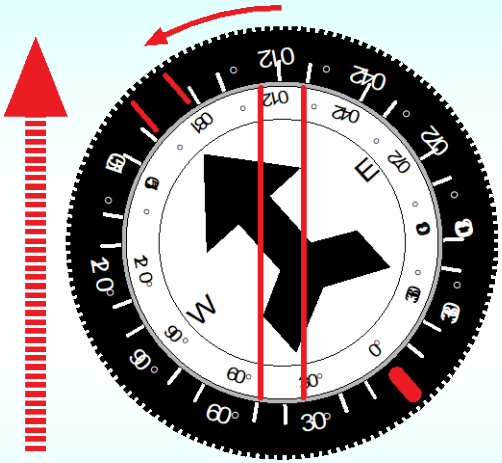
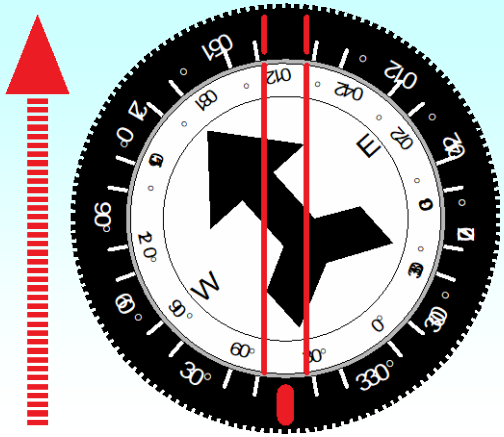
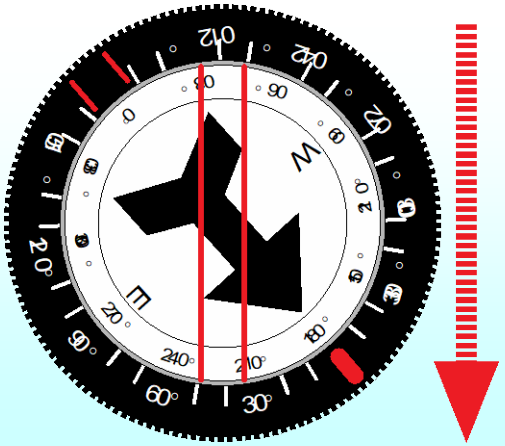
World Underwater Federation

Course









Limited visibility dive

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World Underwater Federation

Limited visibility dive

EQUIPMENT

CHOOSE A DIVE SITE

DIVE PLANNING

PREPARE THE EQUIPMENT

SAFETY PROCEDURES

DIVE SIGNALS

EQUIPMENT MAINTENANCE

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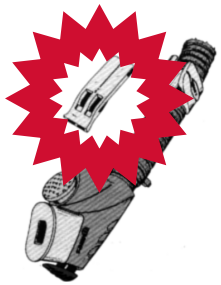
World Underwater Federation

Limited visibility dive

EQUIPMENT



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World Underwater Federation

Limited visibility dive

CHOOSE A DIVE SITE

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World Underwater Federation

Limited visibility dive

DIVE PLANNING

DIVE LETTER GROUP	3		6		9		12		18		24		30		36		42		DEPTH (metres)
		4,5		7,5		10,5		15		21		27		33		39		45	
A	60	35	25	20	15	5	5												A
B	120	70	50	35	30	15	15	10	10	5	5	5	5						B
C	210	110	75	55	45	25	25	15	15	10	10	10	7	5	5	5	5	5	C
D	300	160	100	75	60	40	30	25	20	15	15	12	10	10	10	8	7		D
E		225	135	100	75	50	40	30	25	20	20	15	15	13	12	10	10	E	
F		350	180	125	95	60	50	40	30	30	25	20	20	15	15		F		
G			240	160	120	80	70	50	40	35	30	25	22	20		G			
H			325	195	145	100	80	60	50	40	35	30	25		H				
I				245	170	120	100	70	55	45	40			I					
J				315	205	140	110	80	60	50			J						
K					250	160	130	90				K							
L					310	190	150	100			L								
M						220	170			M									
N						270	200		N										
O						310		O											

NEW DIVE LETTER GROUP	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
12	241	213	187	161	138	116	101	87	73	61	49	37	25	17	7
15	160	142	124	111	99	87	76	66	56	47	38	29	21	13	6
18	117	107	97	88	79	70	61	52	44	36	30	24	17	11	5
21	96	87	80	72	64	57	50	43	37	31	26	20	15	9	4
24	80	73	68	61	54	48	43	38	32	28	23	18	13	8	4
27	70	64	58	53	47	43	38	33	29	24	20	16	11	7	3
30	62	57	52	48	43	38	34	30	26	22	18	14	10	7	3
33	55	51	47	42	38	34	31	27	24	20	16	13	10	6	3
36	50	46	43	39	35	32	28	25	21	18	15	12	9	6	3
39	44	40	38	35	31	28	25	22	19	16	13	11	8	6	3

REPETITIVE DIVE DEPTH (metres)

BASED ON
U.S. NAVY
DIVE TABLES

SAFETY STOP
3mt/3min

Limited visibility dive

PREPARE THE EQUIPMENT

DRESSING ORDER

BUDDY CHECK

EQUIPMENT POSITIONING

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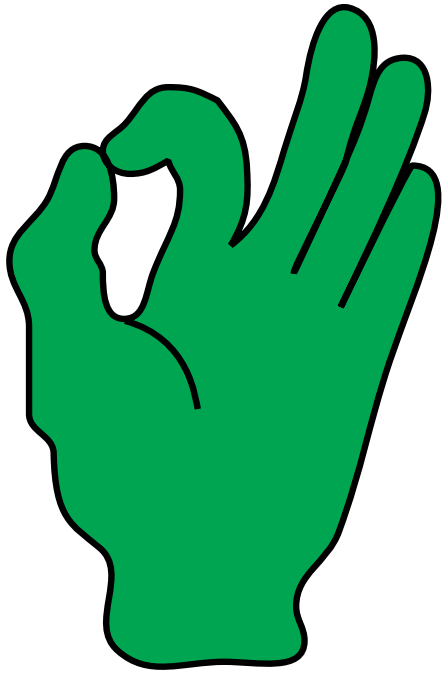
World Underwater Federation

Limited visibility dive

SAFETY PROCEDURES



Ascent speed

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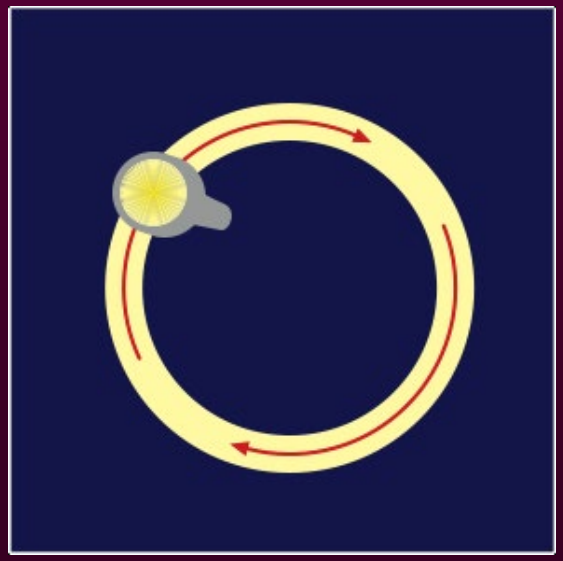
World Underwater Federation

Limited visibility dive

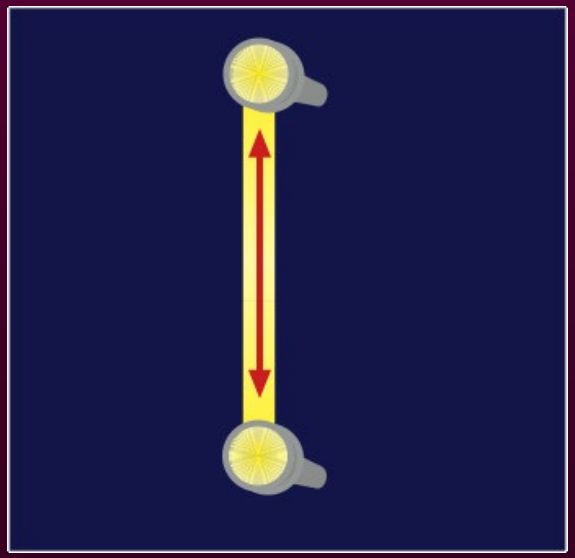
DIVE SIGNALS

OK

OK



Something wrong



Dry suits

Dry suits

MATERIALS

SEALS

VALVES

UNDERSUIT

Dry suits

MATERIALS

NEOPRENE

CRASHED NEOPRENE

VULCANIZED RUBBER ON FABRIC

TRILAMINATE

POLYURETHANE

Dry suits

SEALS

WRISTS AND NECK IN NEOPRENE OR LATEX

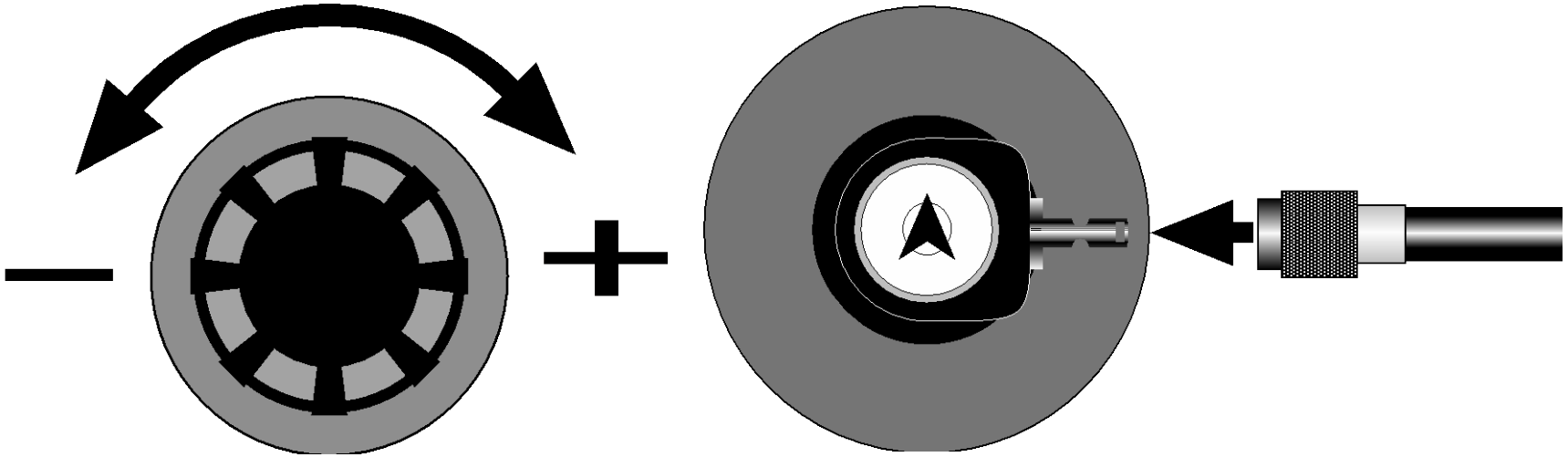
WATER TIGHT BRONZE ZIP

RUBBER BOOTS

HOOD

Dry suits

VALVES



OUTLET VALVE

INLET VALVE

QUICK DISCONNET HOSE

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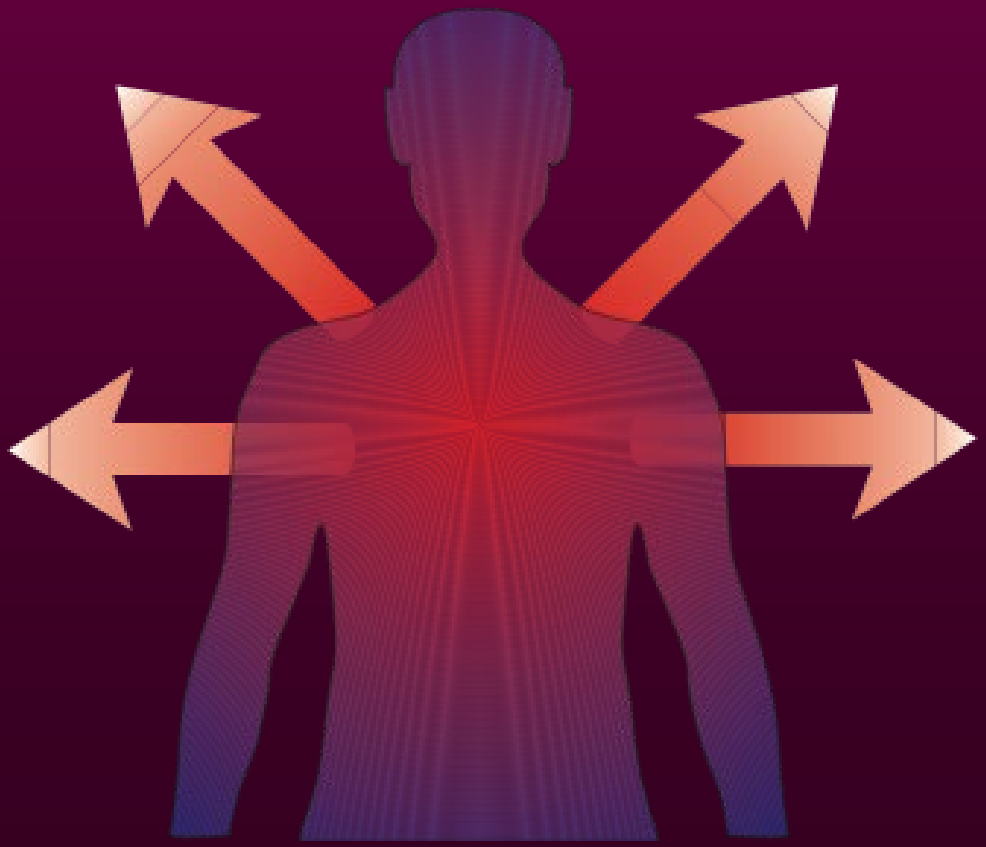
Dry suits

UNDERSUIT



Dry suits

PUTTING ON DRY SUIT
ENTERING THE WATER
BUOYANCY CONTROL
ASCENT RATE
MAINTENANCE

Dry suits

EMERGENCY PROCEDURES

INVERTED POSITION

INTLET VALVE

OUTLET VALVE

DRY SUIT FLOODS

Diving at altitude

Diving at altitude

TO BE CONSIDERED

DIVING SITE ALTITUDE

TO BE PLANNING

TIME SPENT AT THE ALTITUDE
OF THE DIVE SITE BEFORE DIVING

PLANNED DIVE TIME

PLANNED DIVE DEPTH

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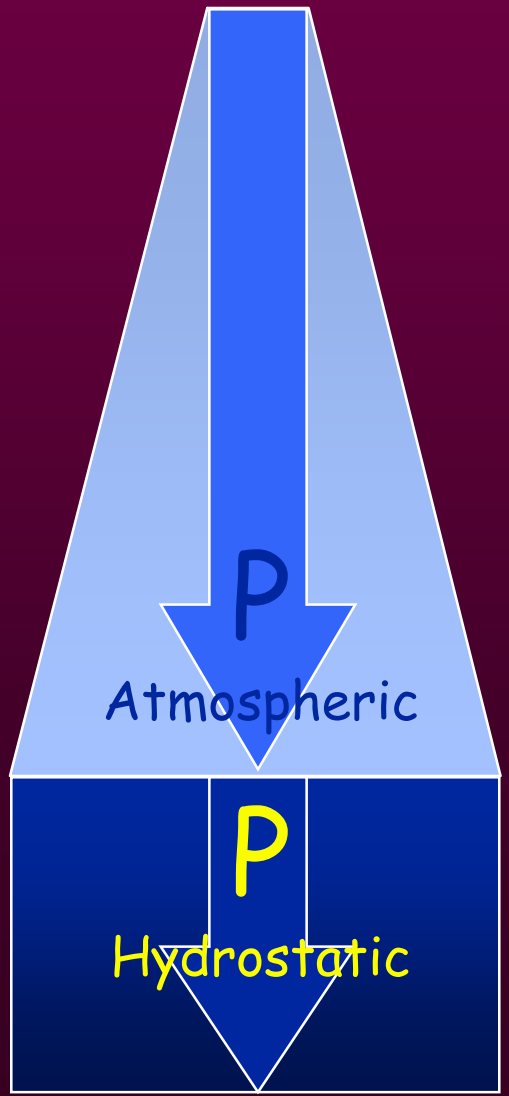
World Underwater Federation

Diving at altitude



2.500 mt - 0,75 Atm

2.000 mt - 0,78 Atm

1.500 mt - 0,83 Atm

1.000 mt - 0,88 Atm

0 mt - 1 Atm

10 mt - 2 Atm

20 mt - 3 Atm

30 mt - 4 Atm

40 mt - 5 Atm

mt S.L.M.	P Atm	Coeff.
0	1,000	1,0
100	0,988	1,0
200	0,976	1,0
300	0,964	1,0
400	0,952	1,0
500	0,940	1,0
600	0,928	1,0
700	0,918	1,1
800	0,907	1,1
900	0,897	1,1
1000	0,886	1,1
1100	0,877	1,1
1200	0,865	1,1
1300	0,855	1,1

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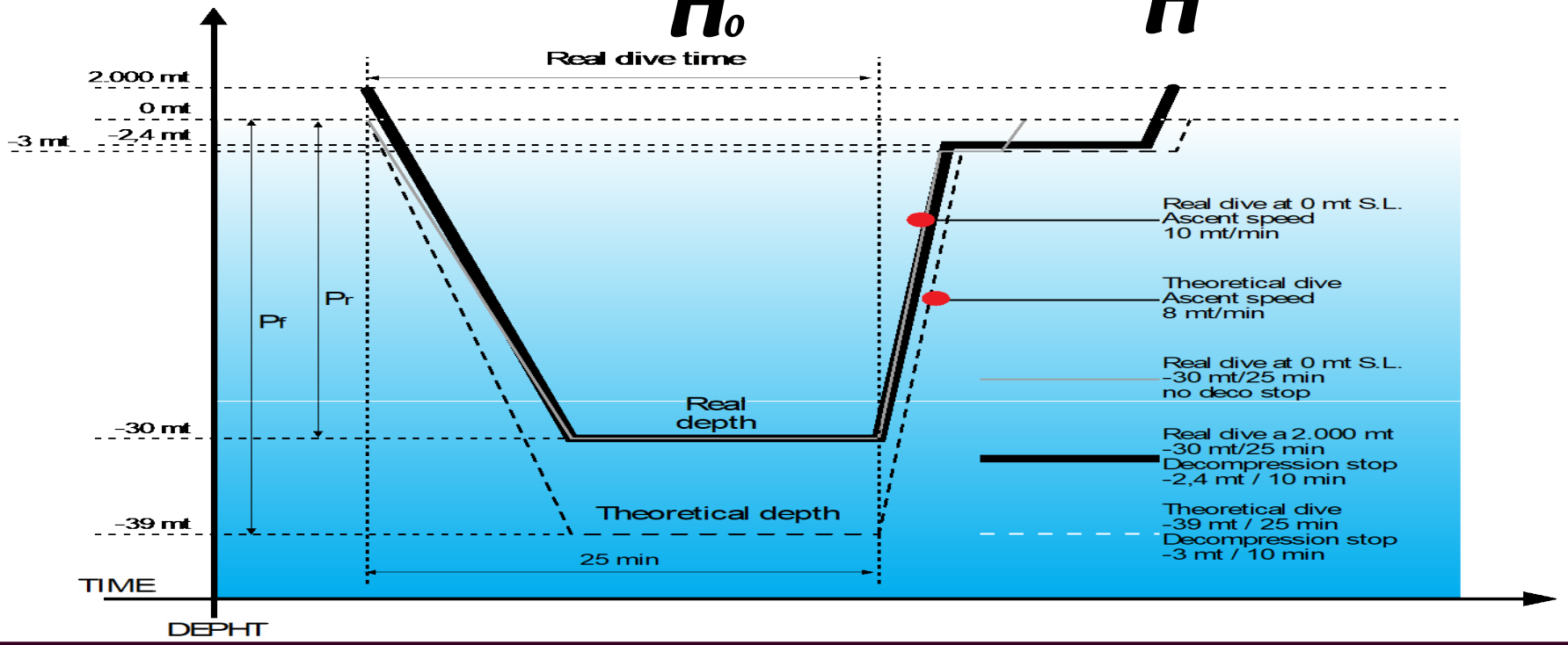
Diving at altitude planning

$$CFA = \frac{H}{H_0} \qquad CDP = \frac{H_0}{H}$$



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Diving at altitude planning

MT	ADJUSTEMENT COEFFICIENT								
	1,9	1,8	1,7	1,6	1,5	1,4	1,3	1,2	1,1
12	213	161	138	101	87	61	49	25	17
15	142	111	99	76	66	47	38	21	13
18	107	88	79	61	52	36	30	17	11
21	87	72	64	50	43	31	26	15	9
24	73	61	54	43	38	28	23	13	8
27	64	53	47	38	33	24	20	11	7
30	57	48	43	34	30	22	18	10	7
33	51	42	38	31	27	20	16	10	6
36	46	39	35	28	25	18	15	9	6
39	40	35	31	25	22	16	13	8	6
	MINUTES OF PENALIZATION								

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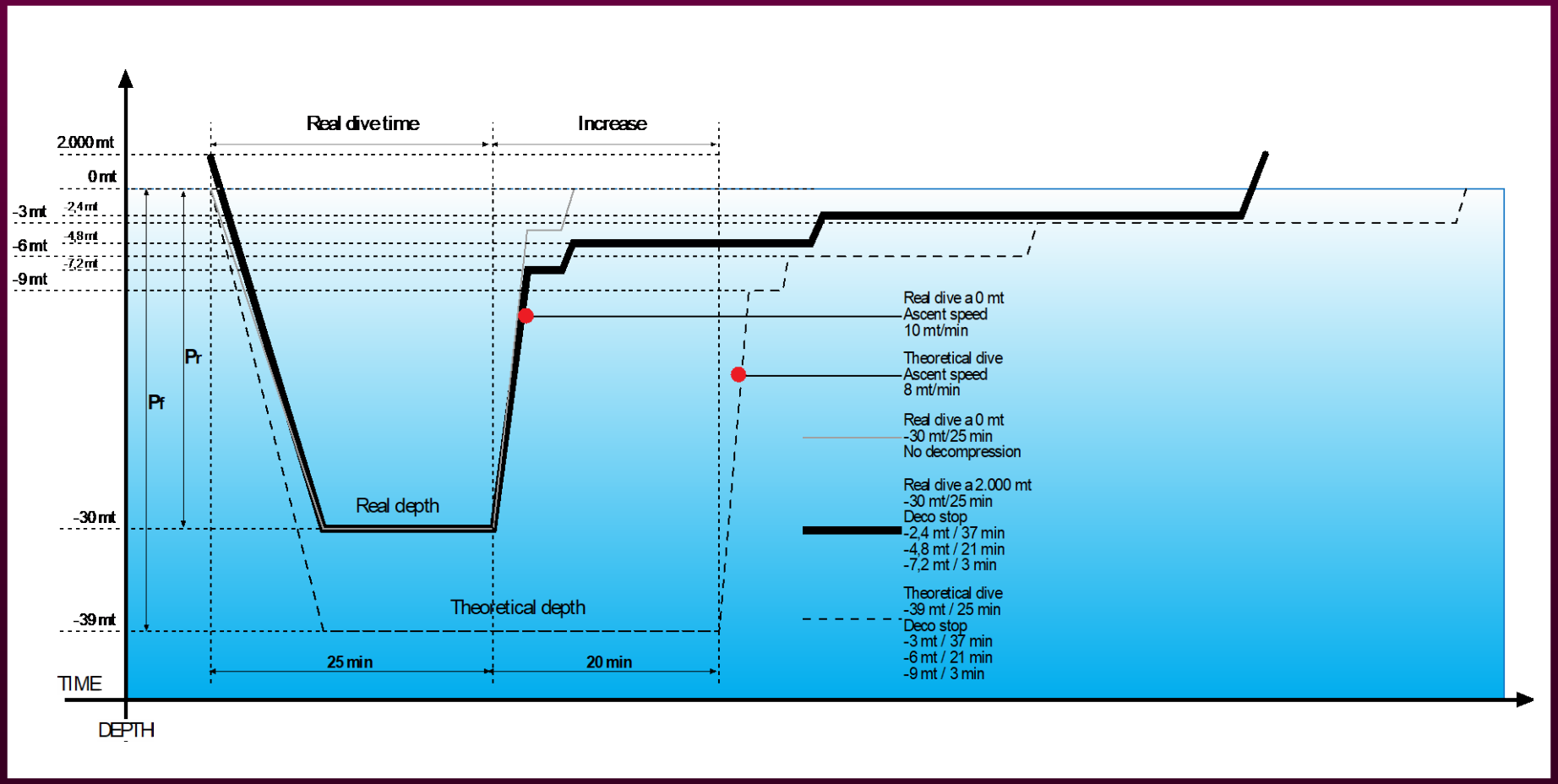
Diving at altitude planning



Diving in current

Diving in current

EQUIPMENT
CHOOSE A DIVE SITE
DIVE PLANNING
PREPARE THE EQUIPMENT
ENTER IN WATER
SAFETY PROCEDURES
DIVE SIGNALS
EQUIPMENT MAINTENANCE

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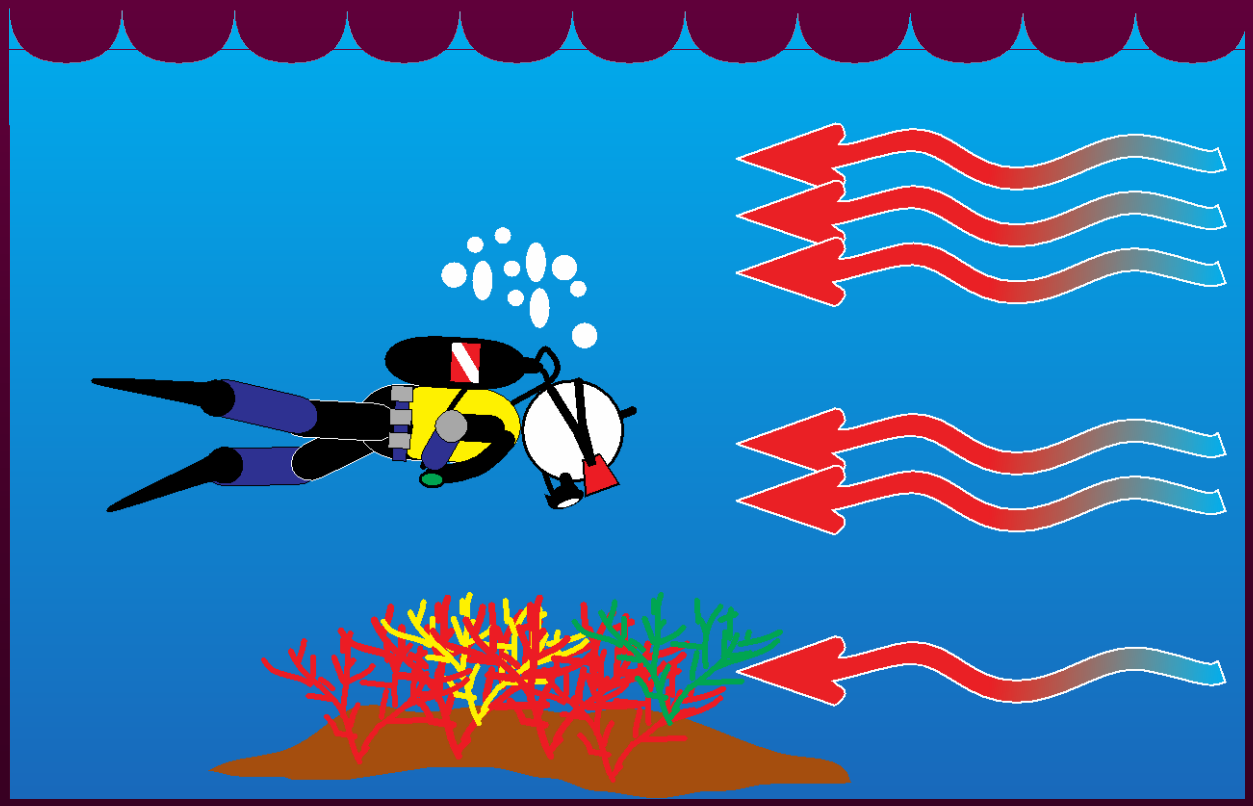
Diving in current



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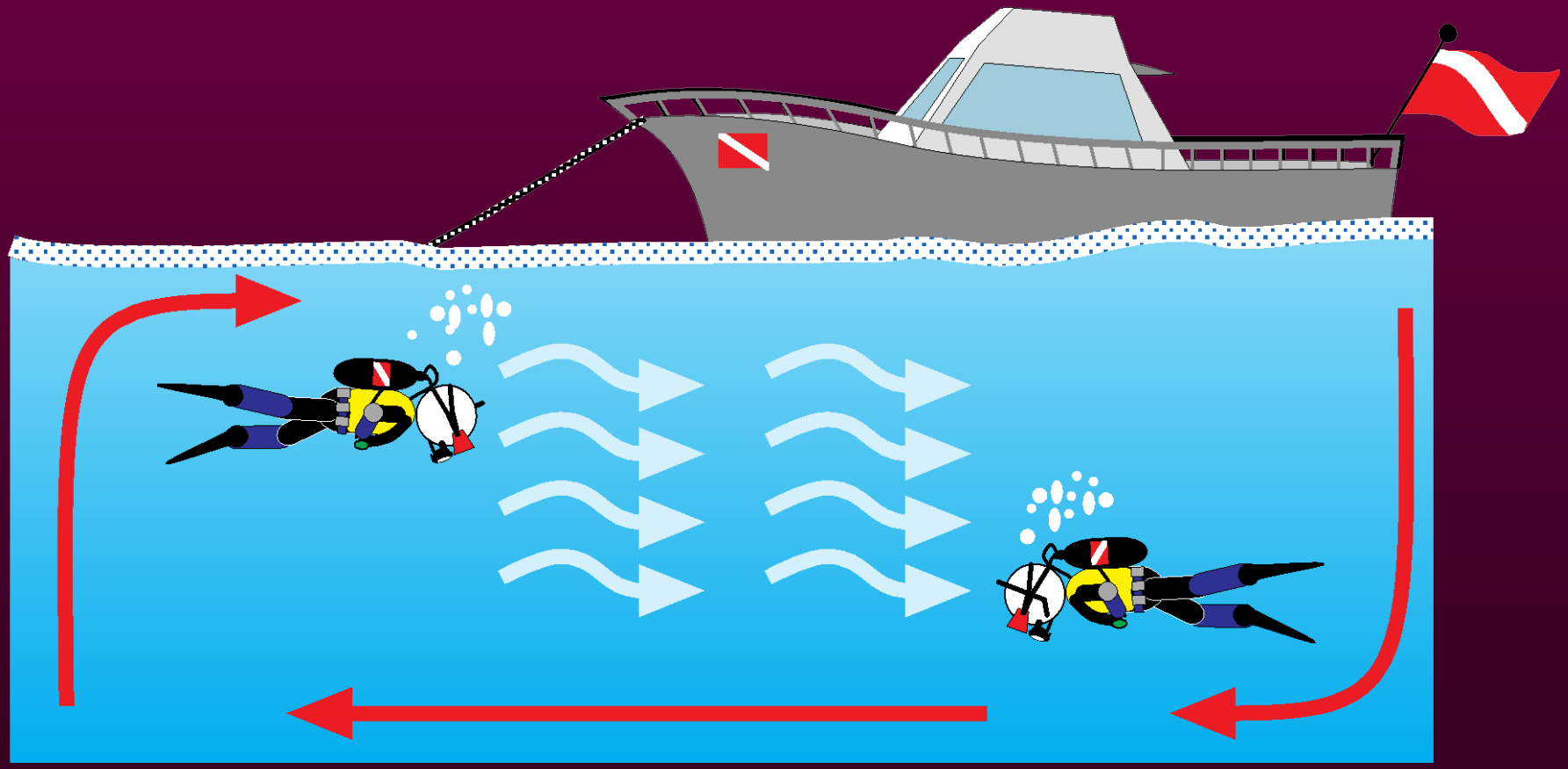
Diving in current



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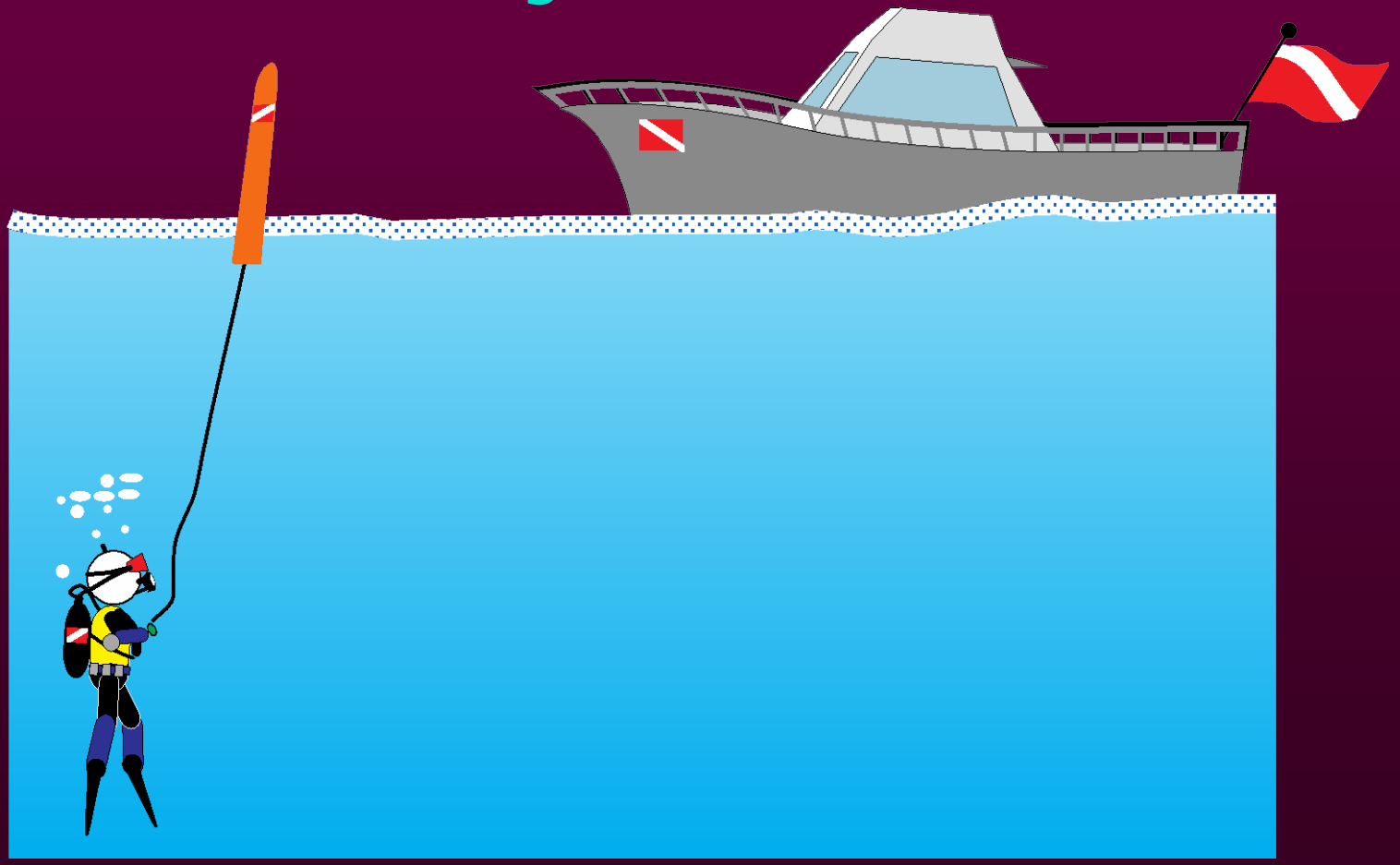
Diving in current



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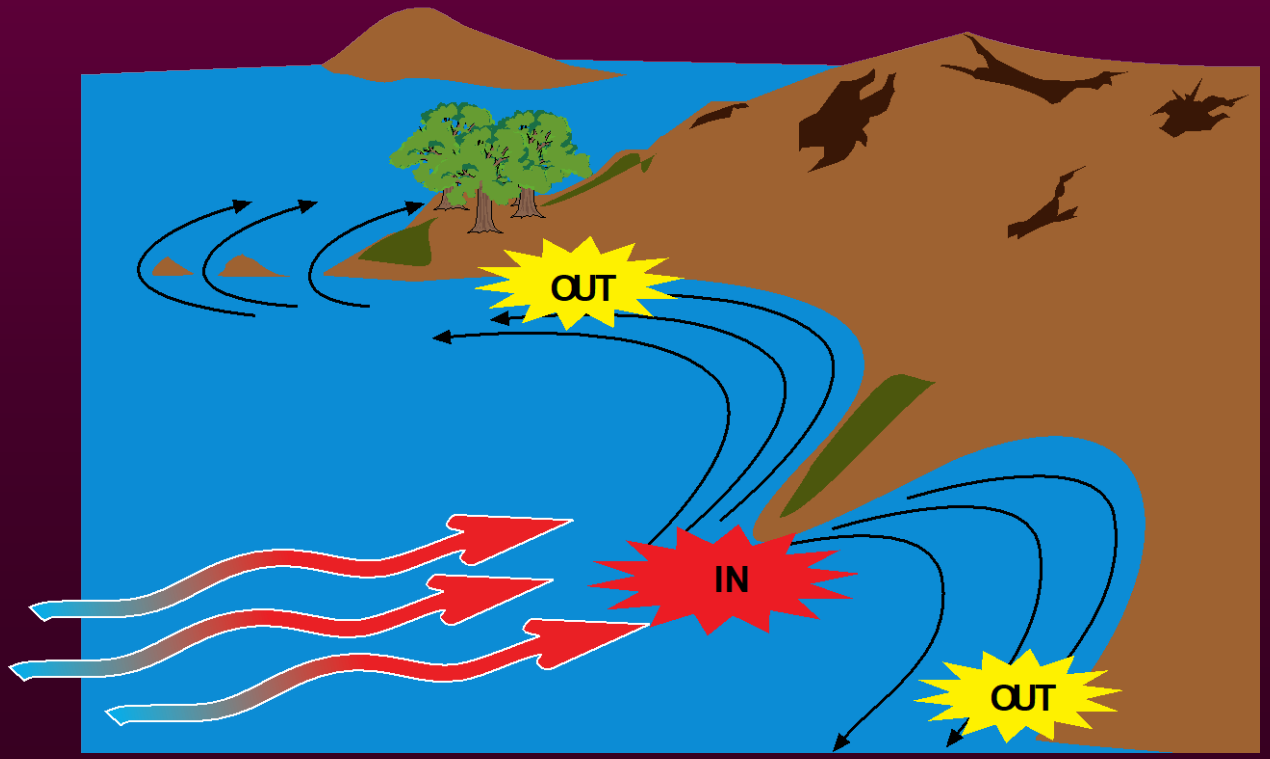
Diving in current



Dives in fresh water and /or very cold water

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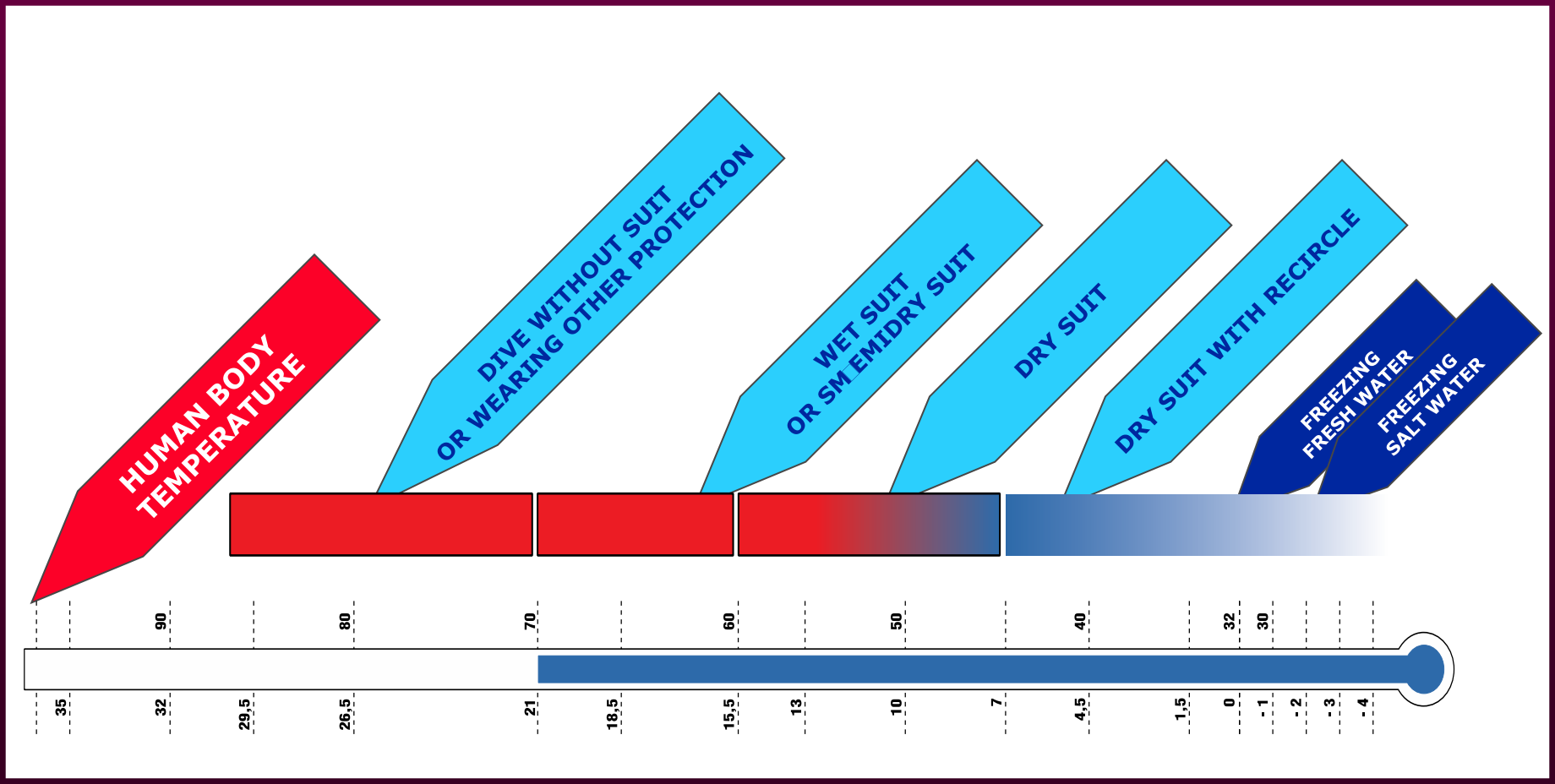
Dives in fresh water and /or very cold water



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