Lesson 1

The boat

Lesson I

World Underwater Federation

BOW
front or forward end of a boat

STERN
back end of a boat

PORT
the side of a boat that is on the left when one is facing forward

Starboard
the side of a boat that is on the right when one is facing forward

AFT
direction towards the stern of a boat

FORWARD
direction towards the bow of a boat

WINDWARD
the side the wind comes from

LEEWARD
the opposite side the wind comes from

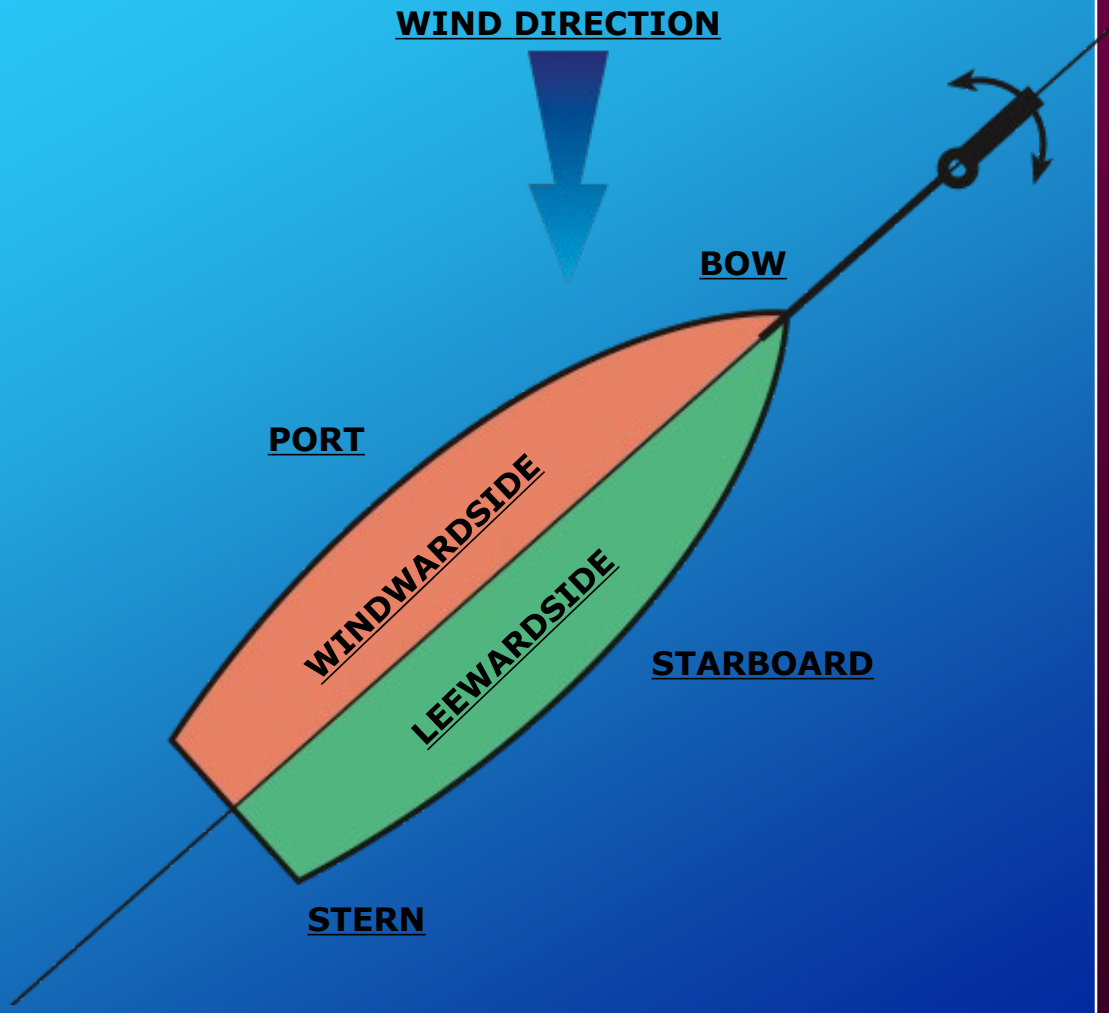
HELM
handle or wheel for moving the rudder of a boat

STEERING-GEAR
area of a boat where helm is

UPPER WORKS OR TOP SIDE
no underwater area of a boat

(SHIP'S) BOTTOM OR QUICKWORK
underwater area of a boat

KEEL
structure along the bottom of a ship where the framework is built up

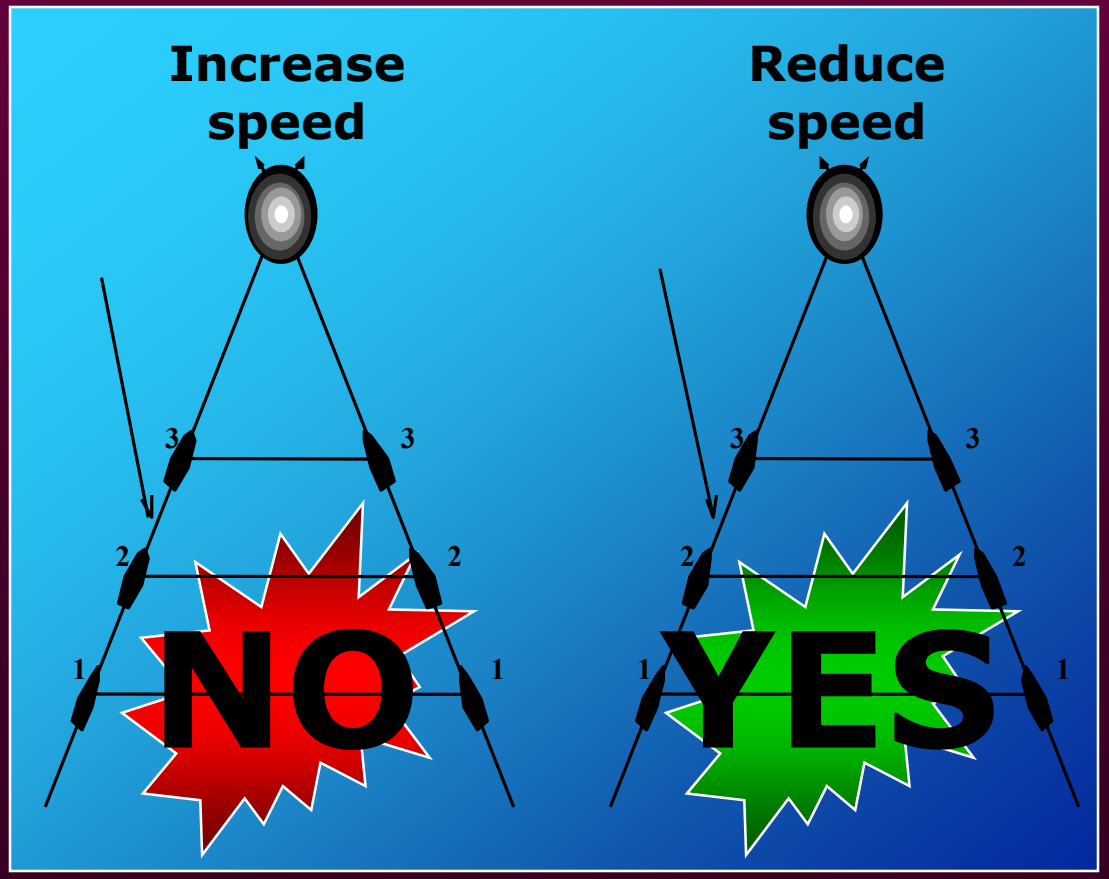


Lesson I

World Underwater Federation

Bearing process

COSTANT BEARING

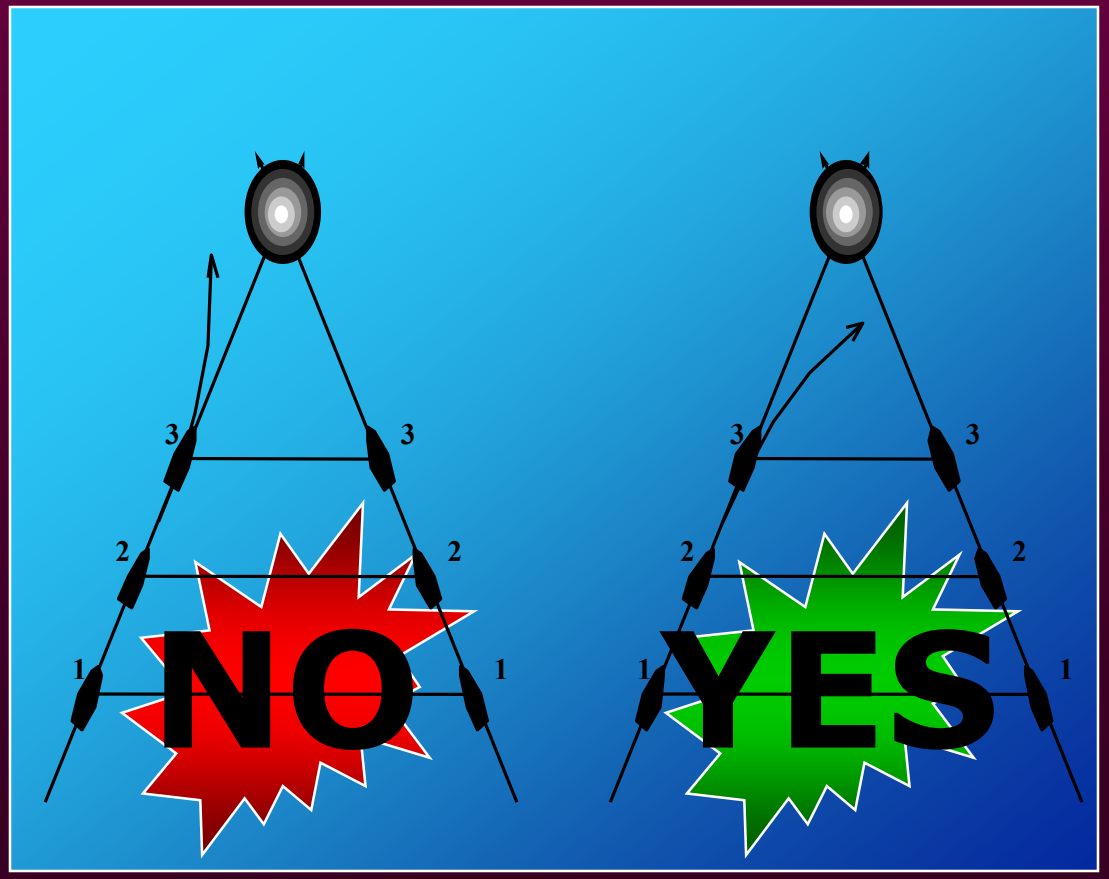


Lesson I

World Underwater Federation

Bearing process

COSTANT BEARING

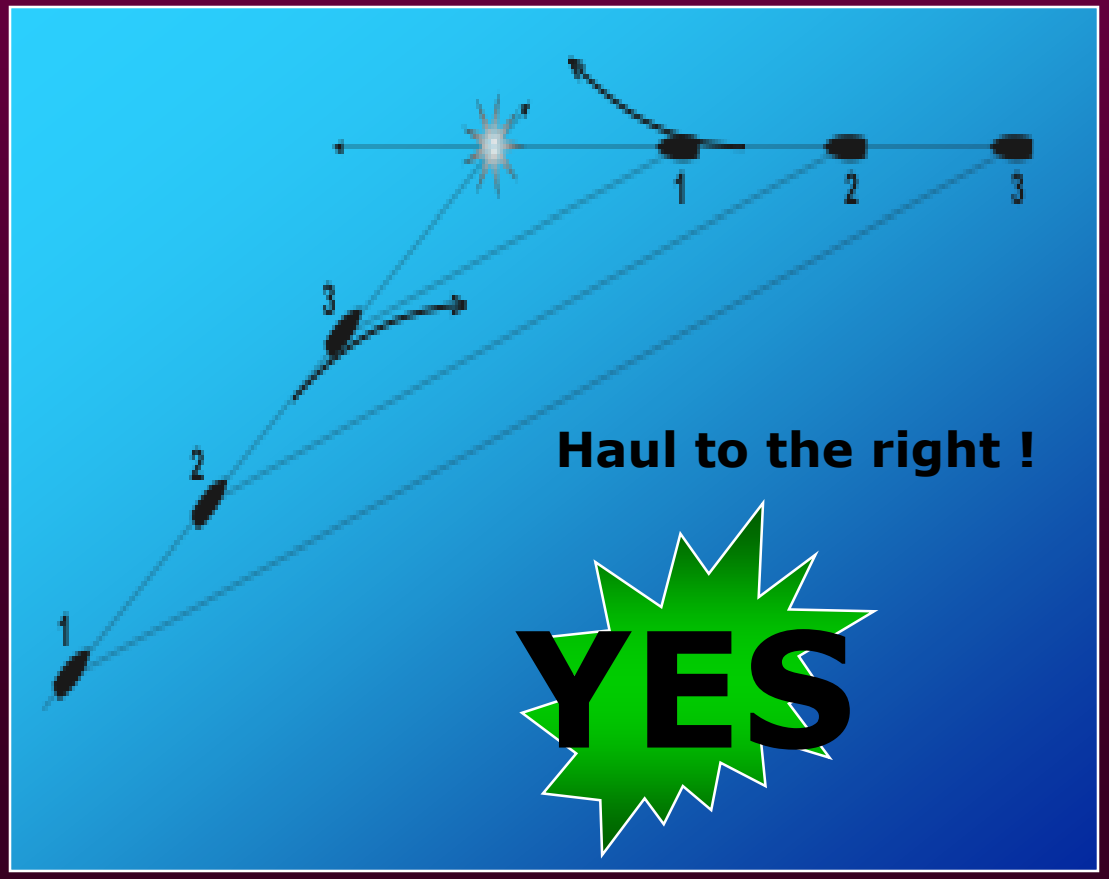


Lesson I

World Underwater Federation

Bearing process

COSTANT BEARING

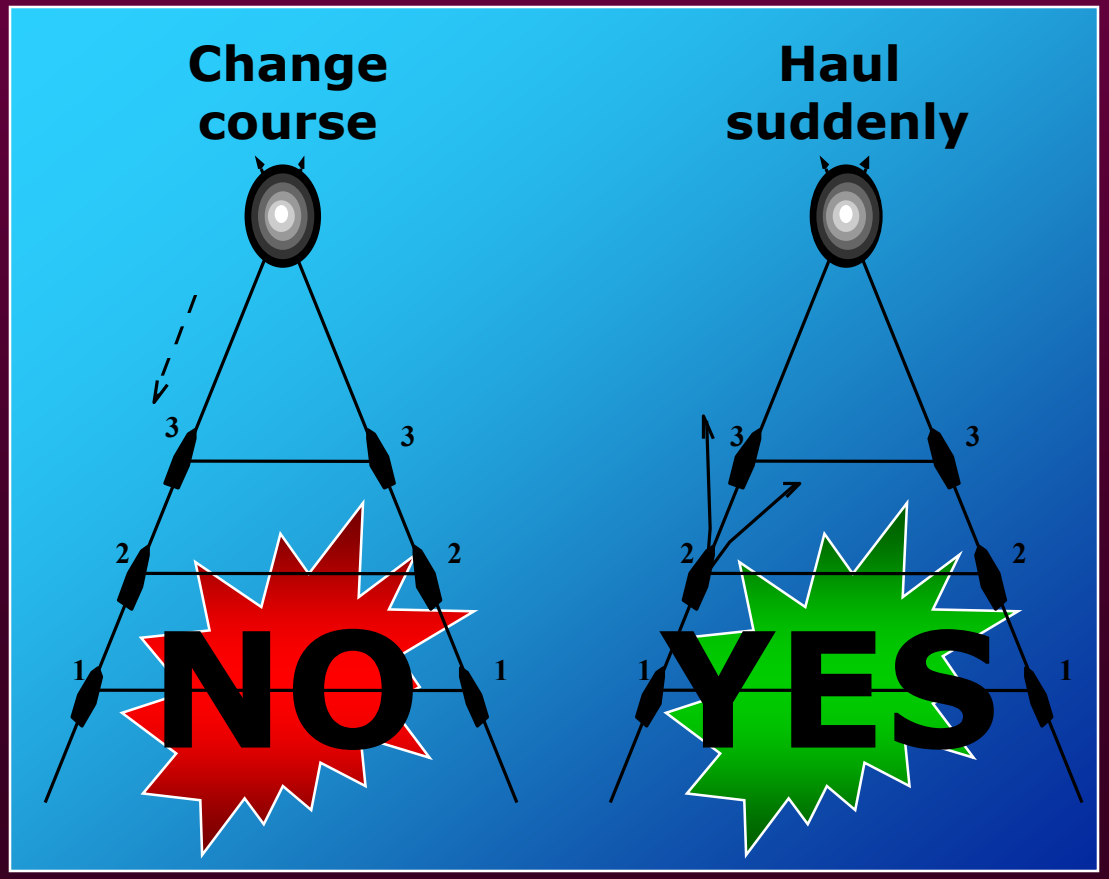


Lesson I

World Underwater Federation

Bearing process

COSTANT BEARING

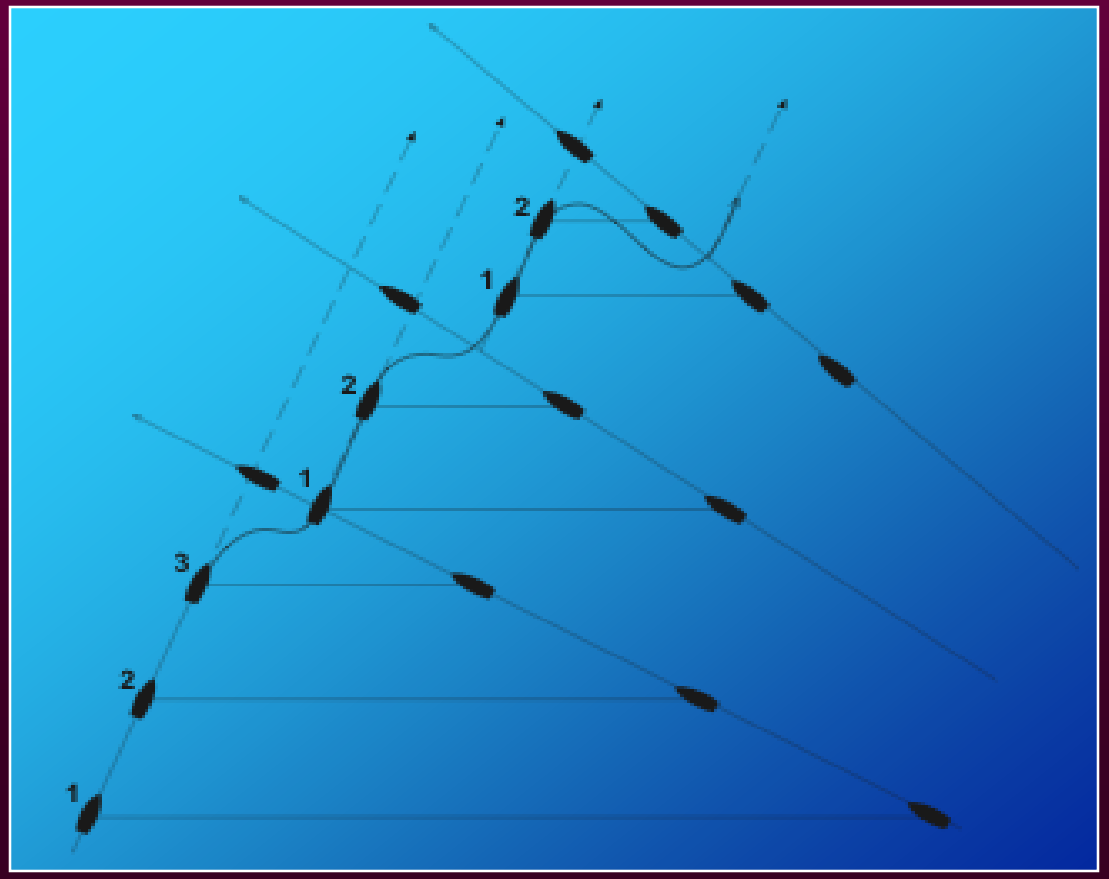


Lesson I

World Underwater Federation

Bearing process

COSTANT BEARING

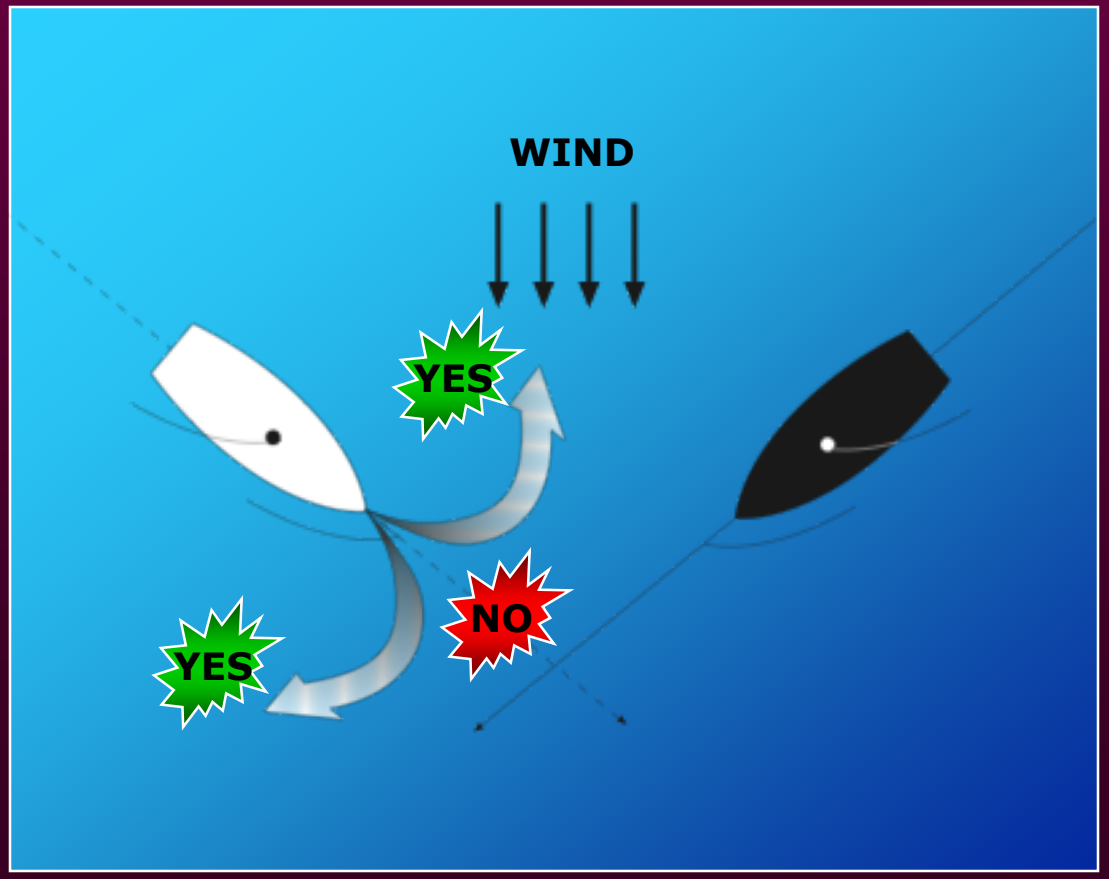


Lesson I

World Underwater Federation

To avoid collision

SAILING BOATS

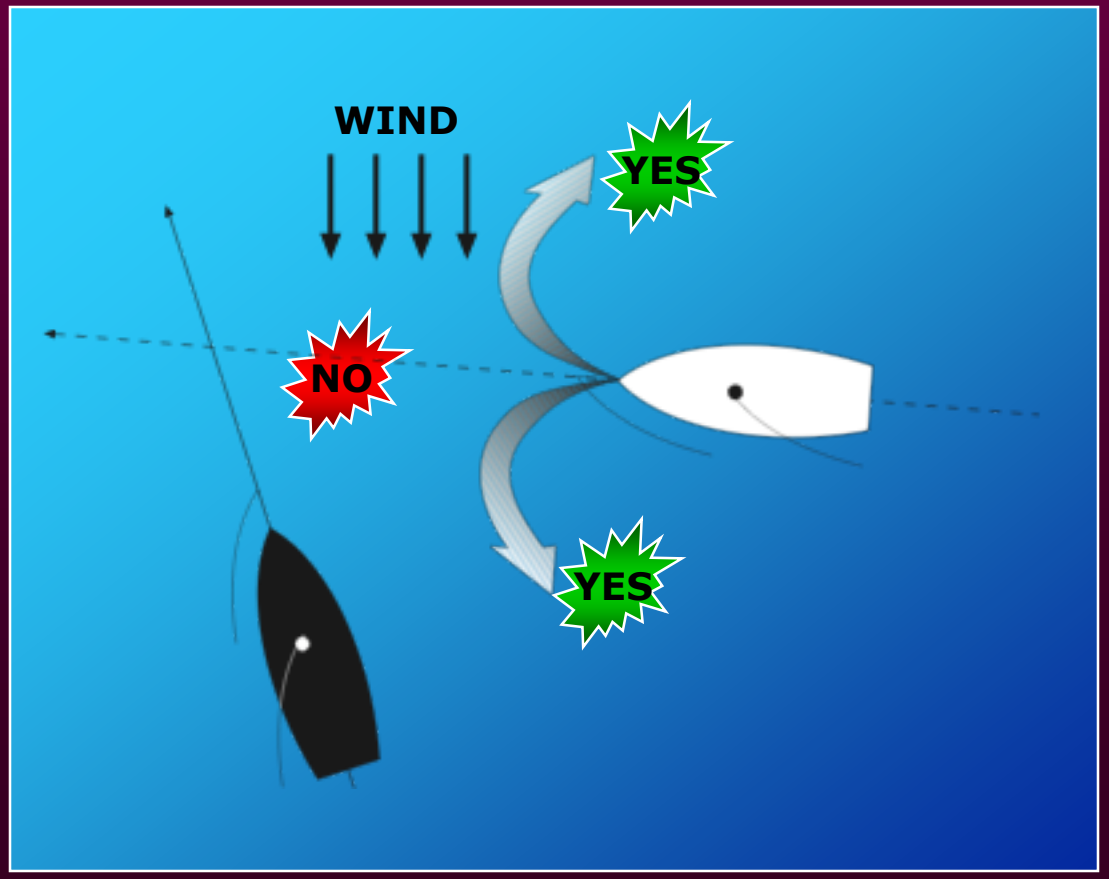


Lesson I

World Underwater Federation

To avoid collision

SAILING BOATS

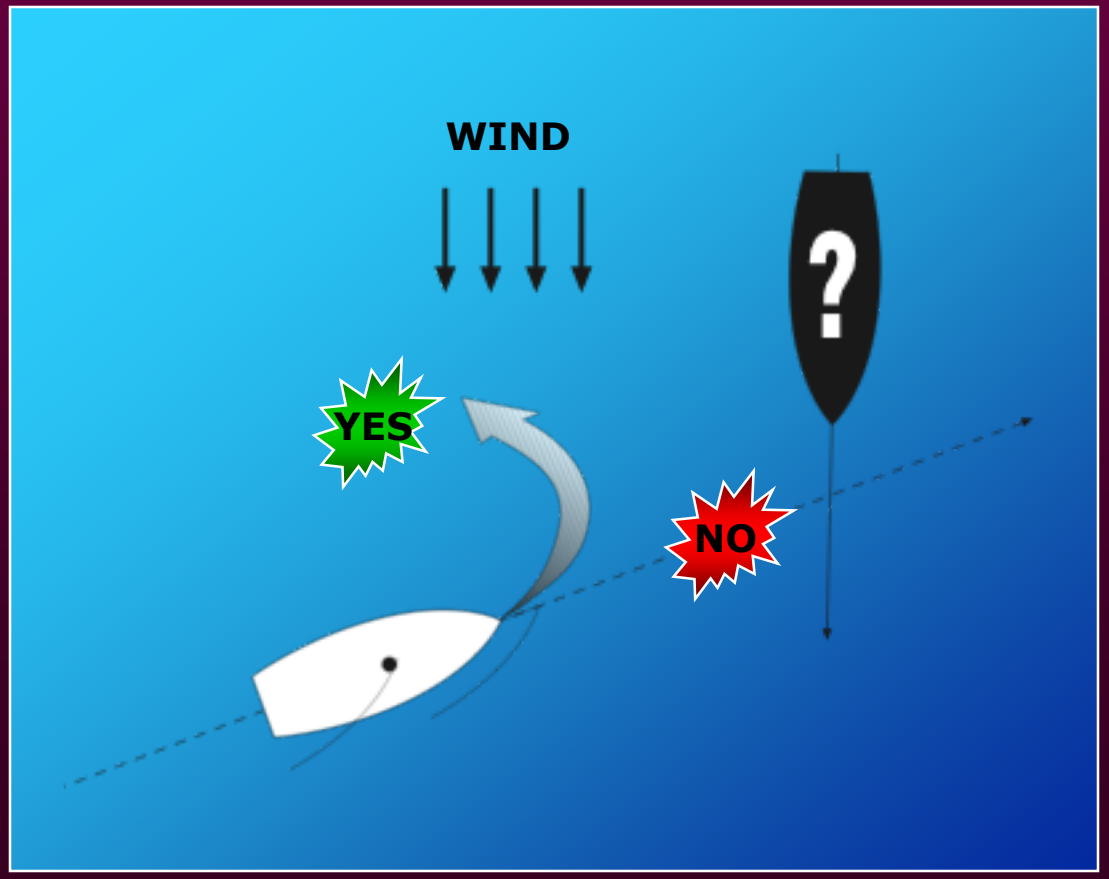


Lesson I

World Underwater Federation

To avoid collision

SAILING BOATS

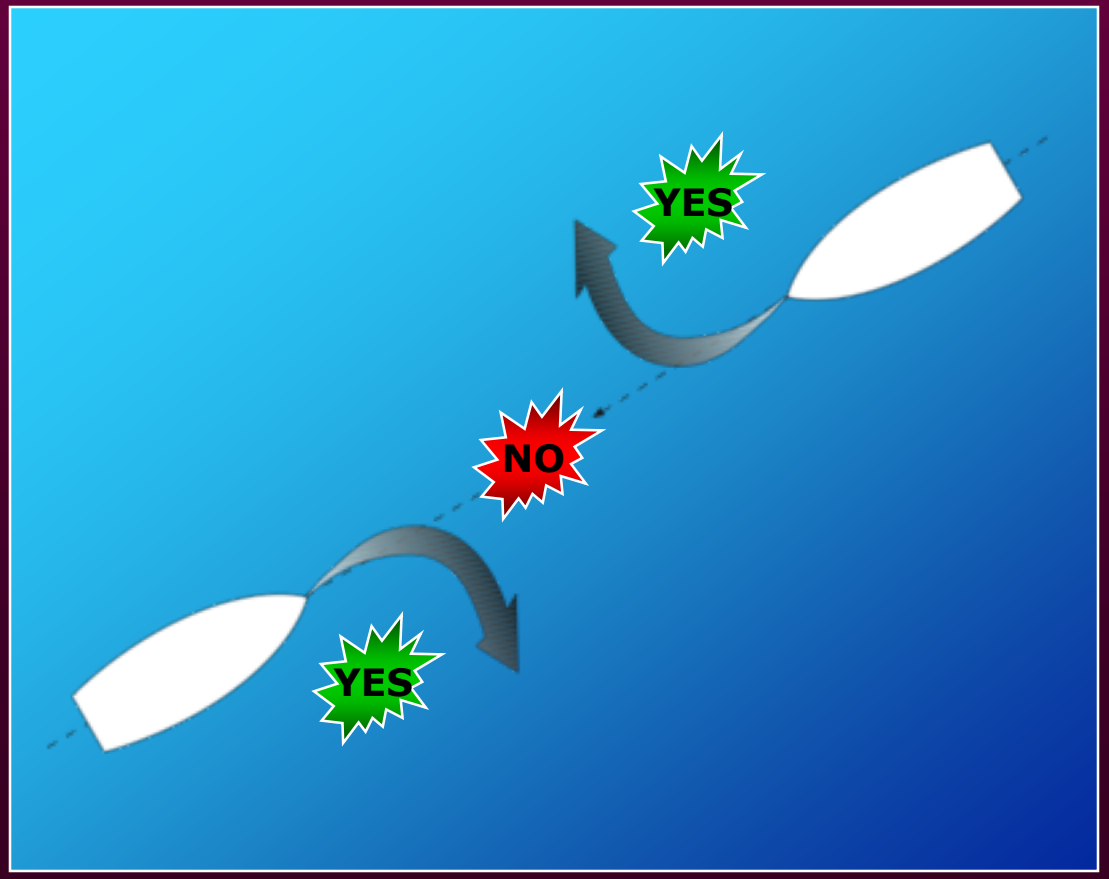


Lesson I

World Underwater Federation

To avoid collision

MOTOR BOATS

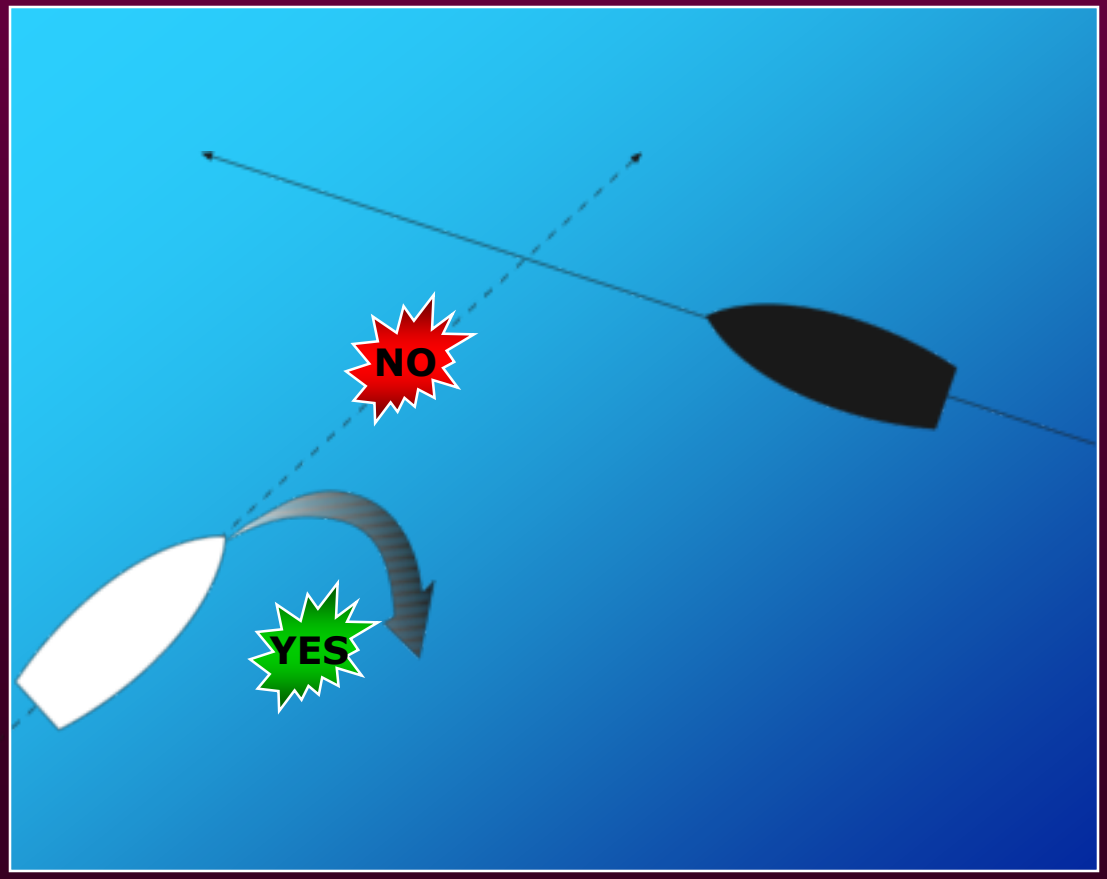


Lesson I

World Underwater Federation

To avoid collision

MOTOR BOATS

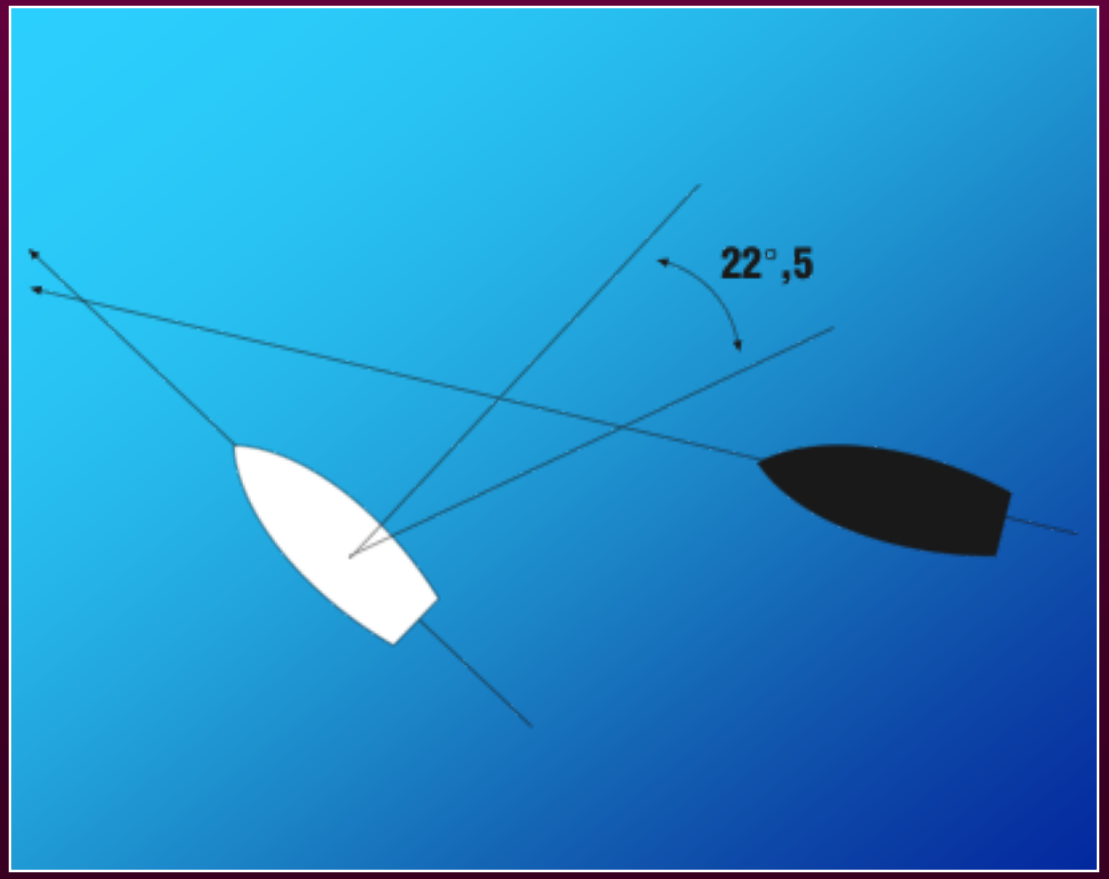


Lesson I

World Underwater Federation

To avoid collision

REACHING BOAT



Lesson I

World Underwater Federation

Anchors

1 SHANK

Straight and sleder part of the anchor

2 SQUILL

Ring placed at the end of SHANK

3 FLUKE

4 COUNTERSHAKE

5 PATTA

The end of fluke

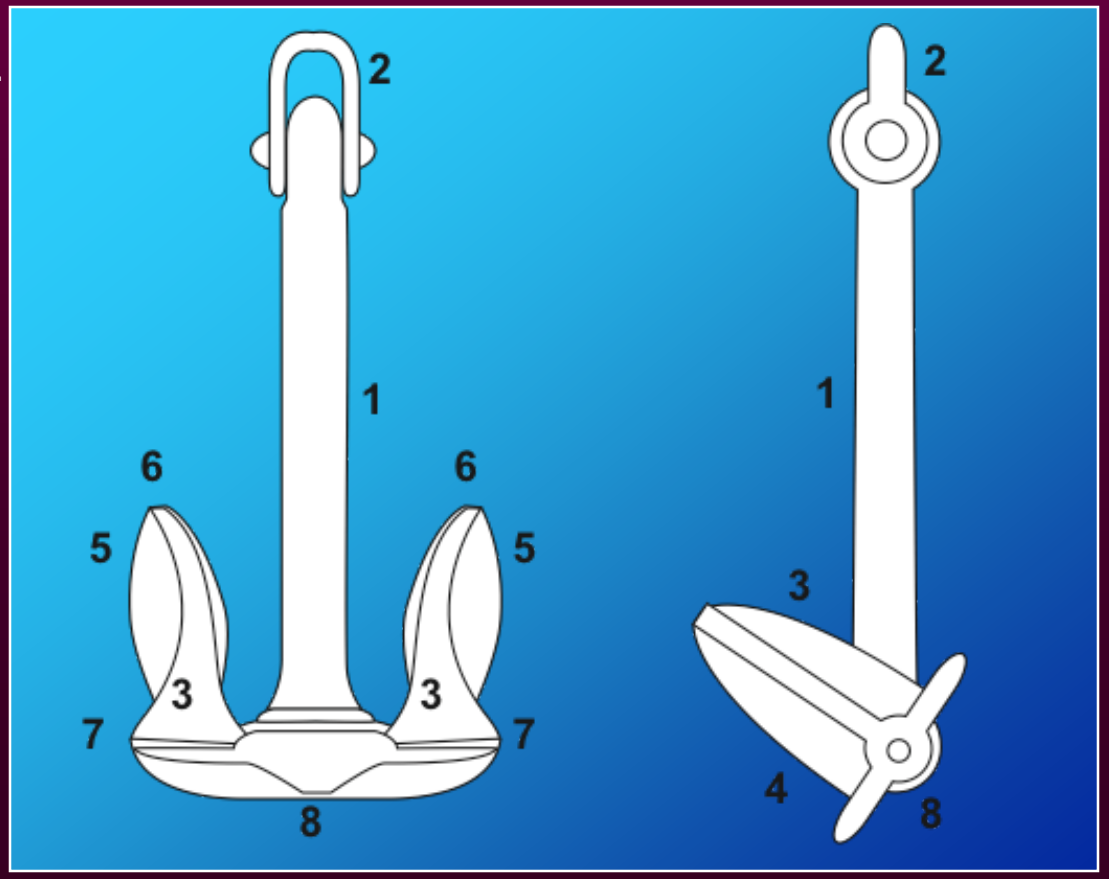
6 ANCHOR BILL

The end of palm

7 PIVOT

8 CROWN

Joint between flukes and shank



Lesson I

World Underwater Federation

Anchors

1 Hall
with articuled flanks,
it is used by average or big boats

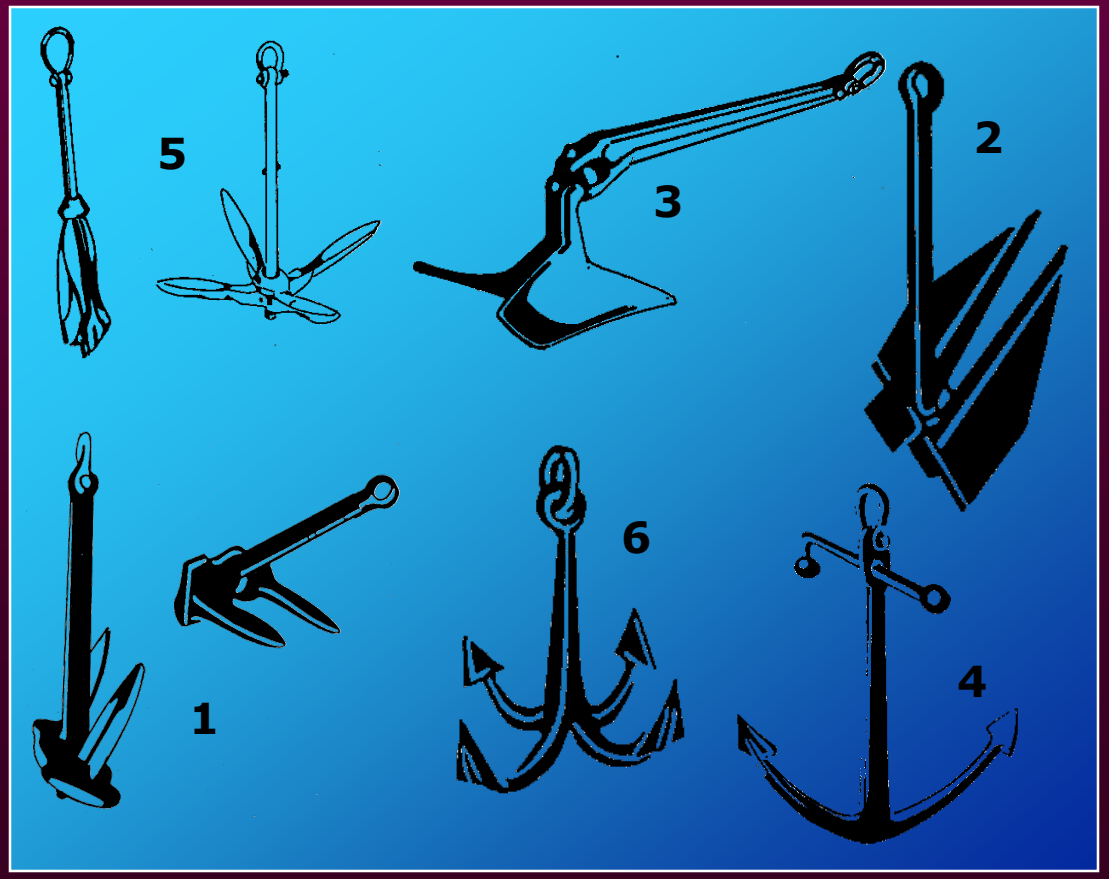
2 Danforth
It is used by small boats especially
on sandy or muddy bottoms

3 C.Q.R.
with transversal structure
that forces at least one fluke
to hold on the bottom

4 Ammiragliato
with three flexible flakes and fixable
to shank for a confortable stawage

5 Umbrella
with three flexible flakes and fixable
to shank for a confortable stawage

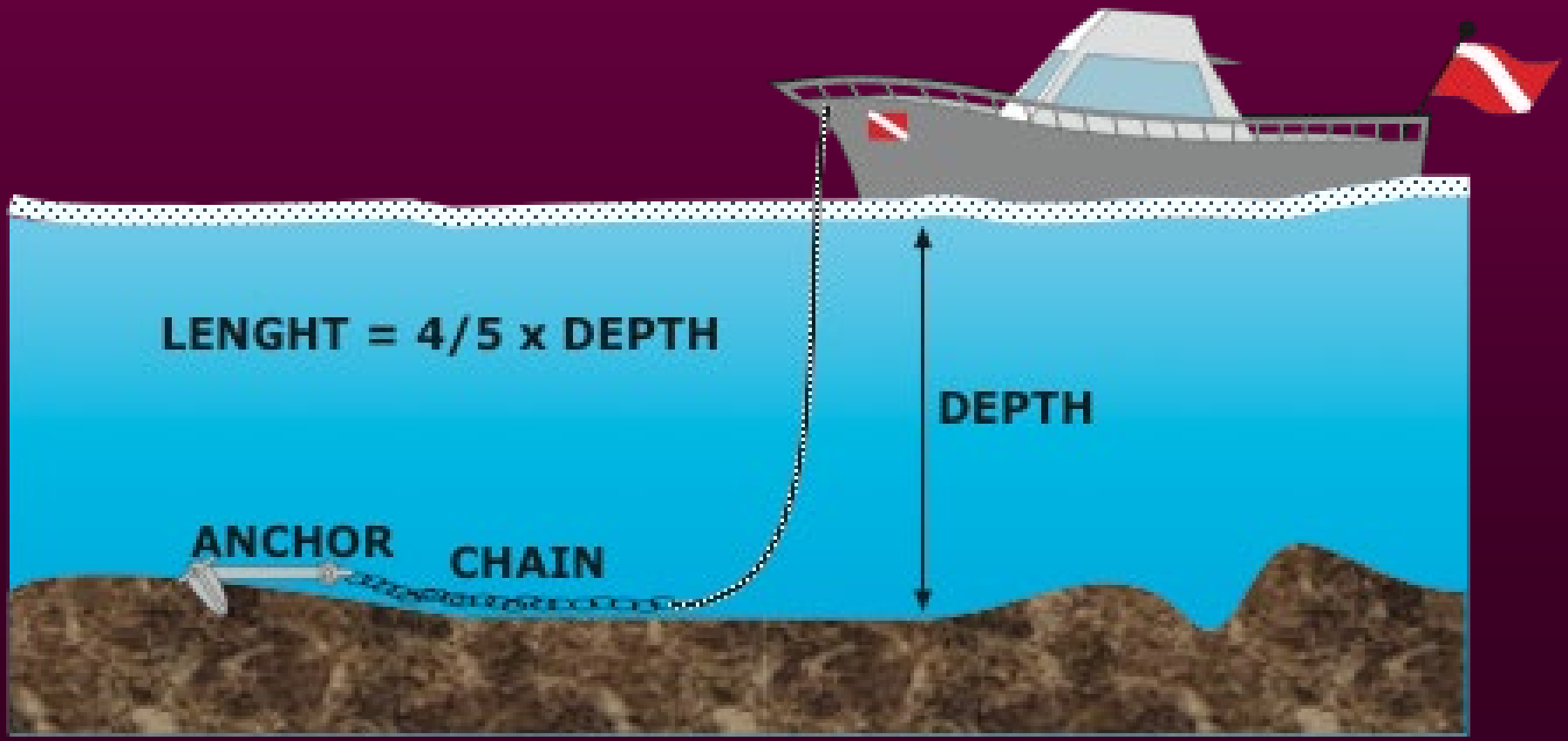
6 Grapnel
with fixed flukes, it is used
to rescue cables or objects



Lesson I

World Underwater Federation

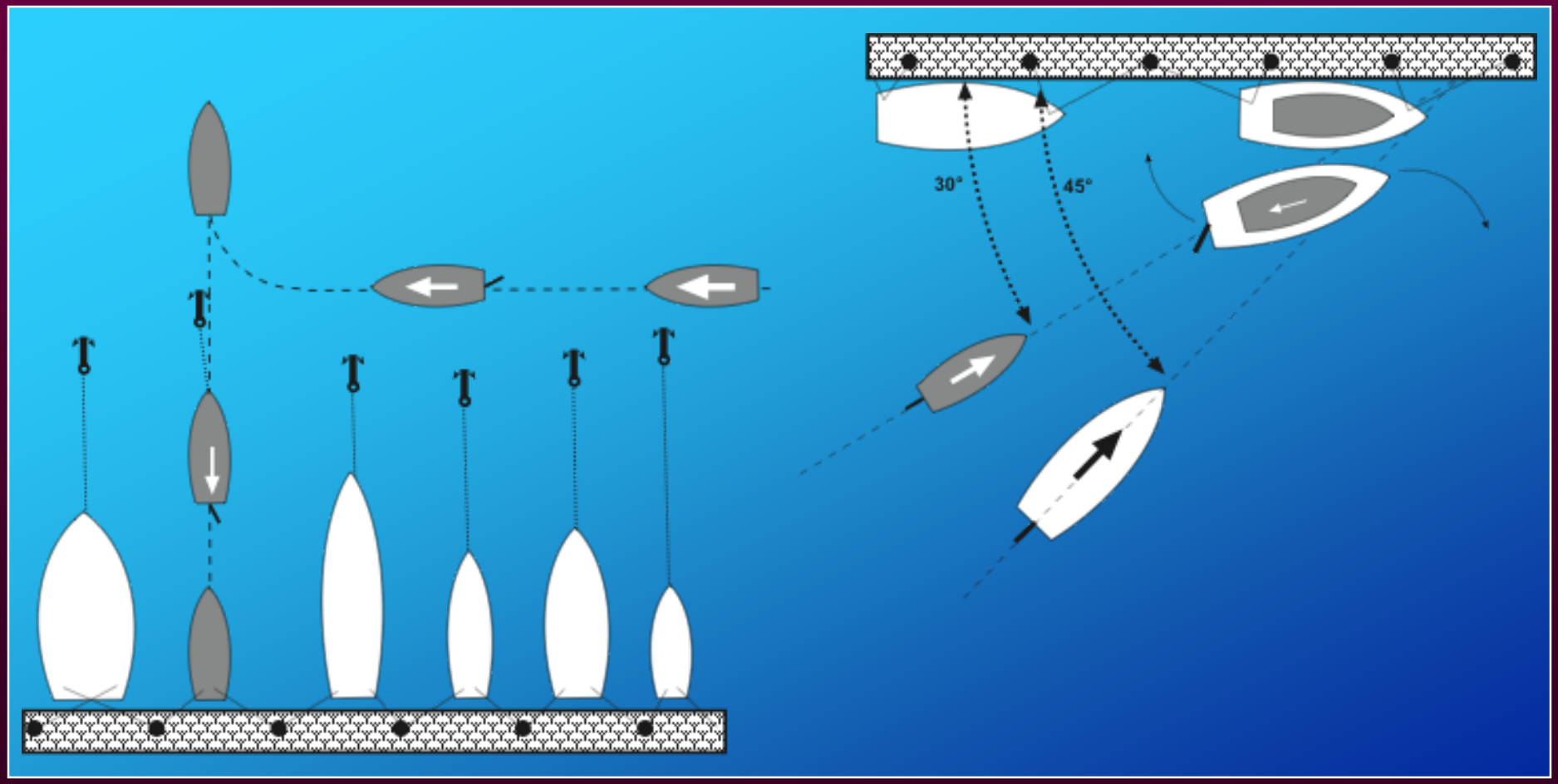
Anchor manoevre



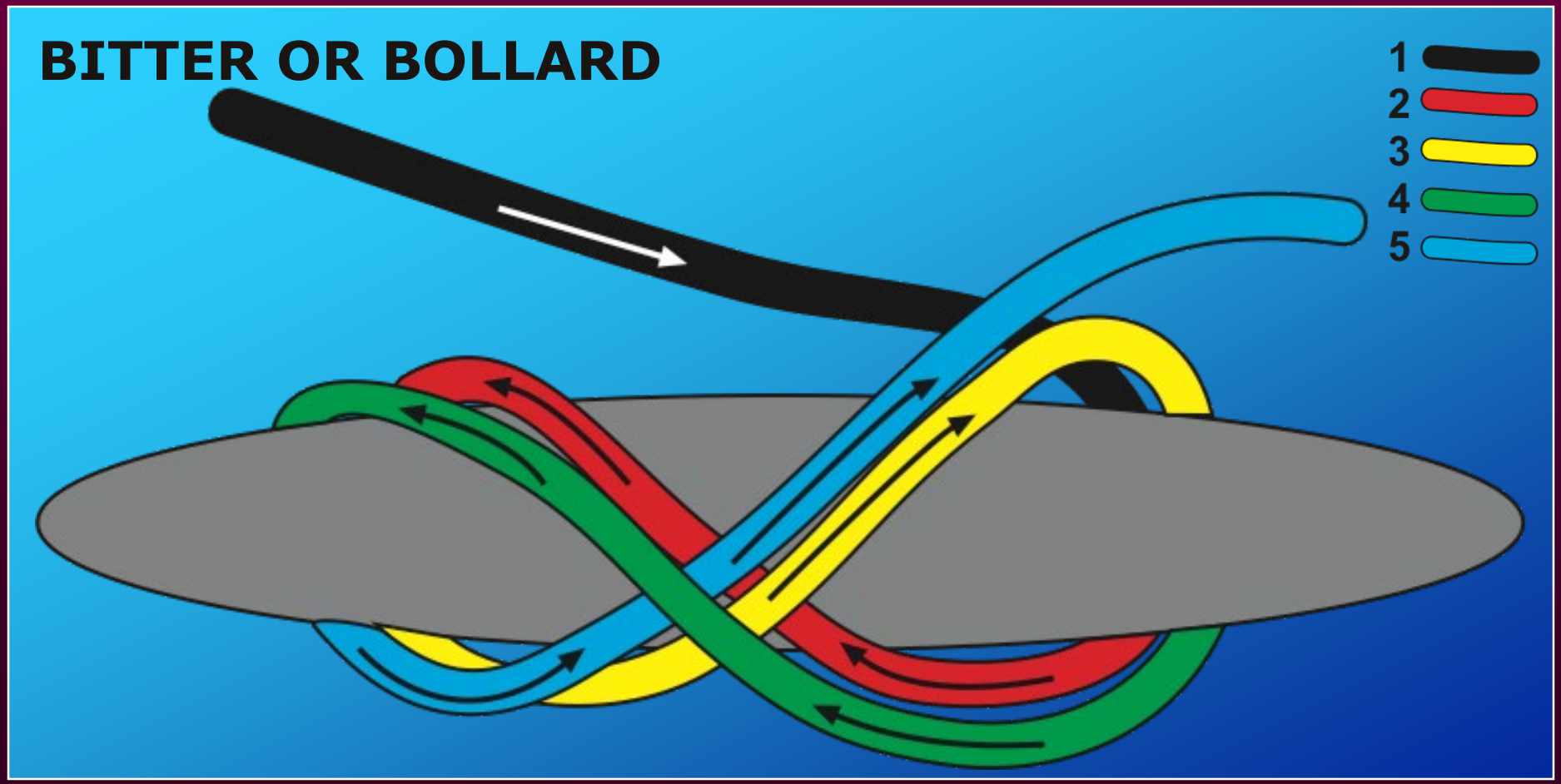
Lesson I

World Underwater Federation

Anchor manoevre



Knots



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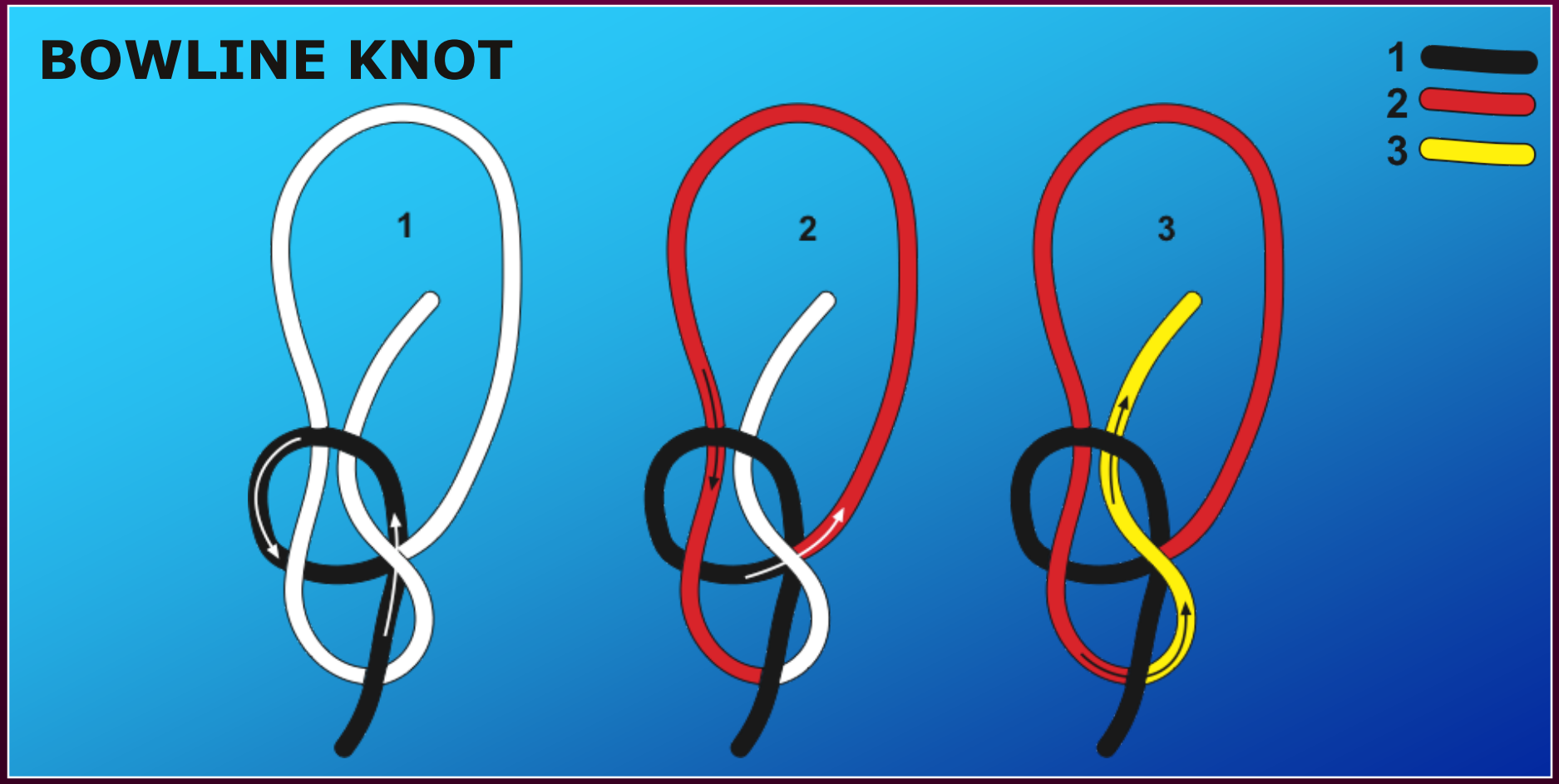
World Underwater Federation

Knots



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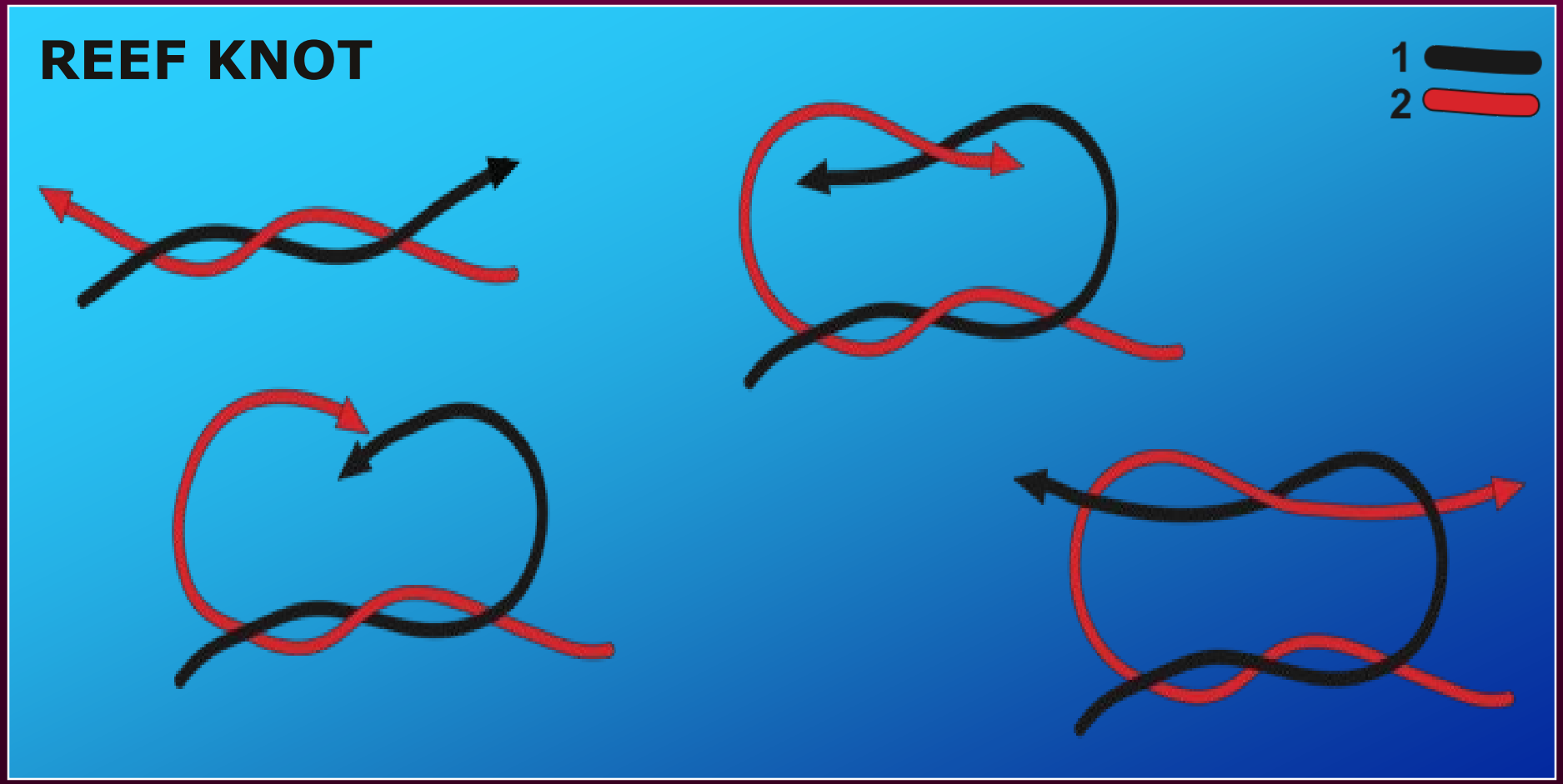
World Underwater Federation

Knots



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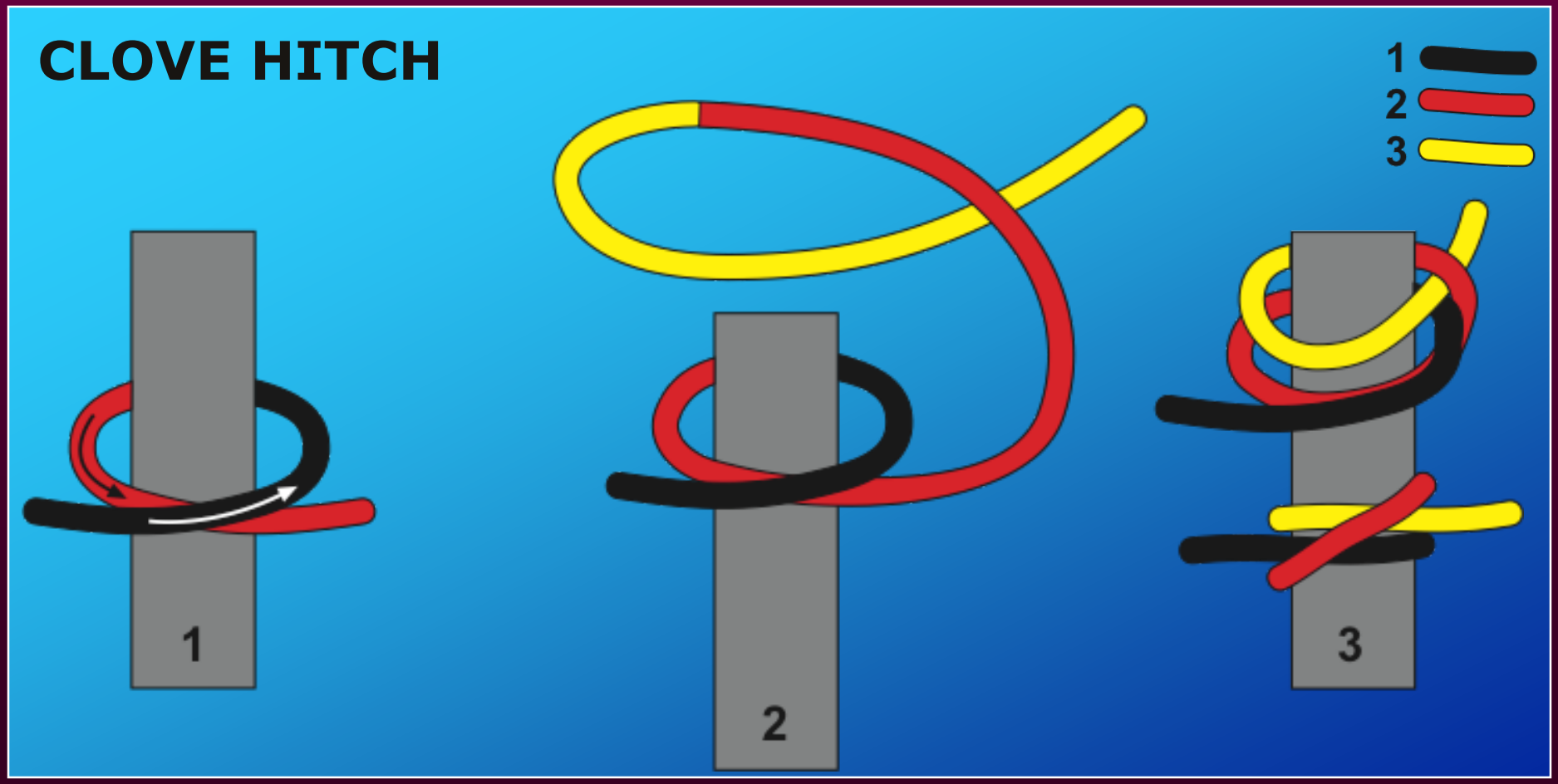
World Underwater Federation

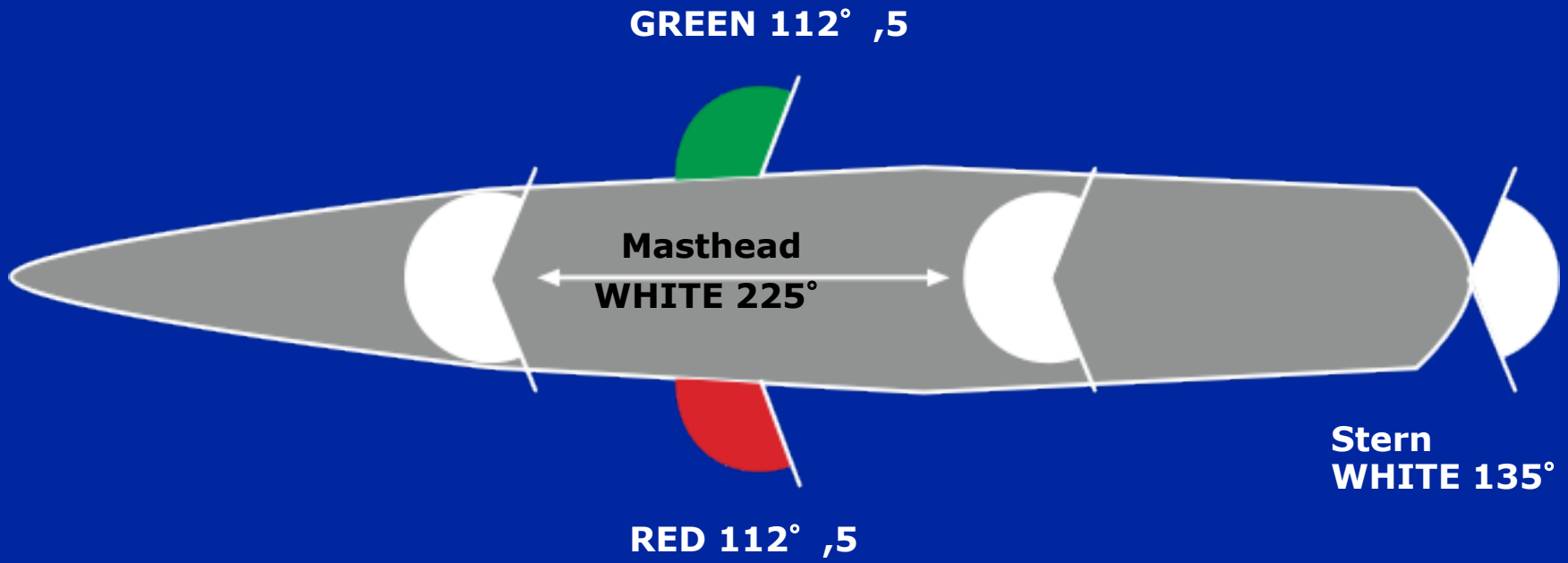
Knots



Lesson I

World Underwater Federation

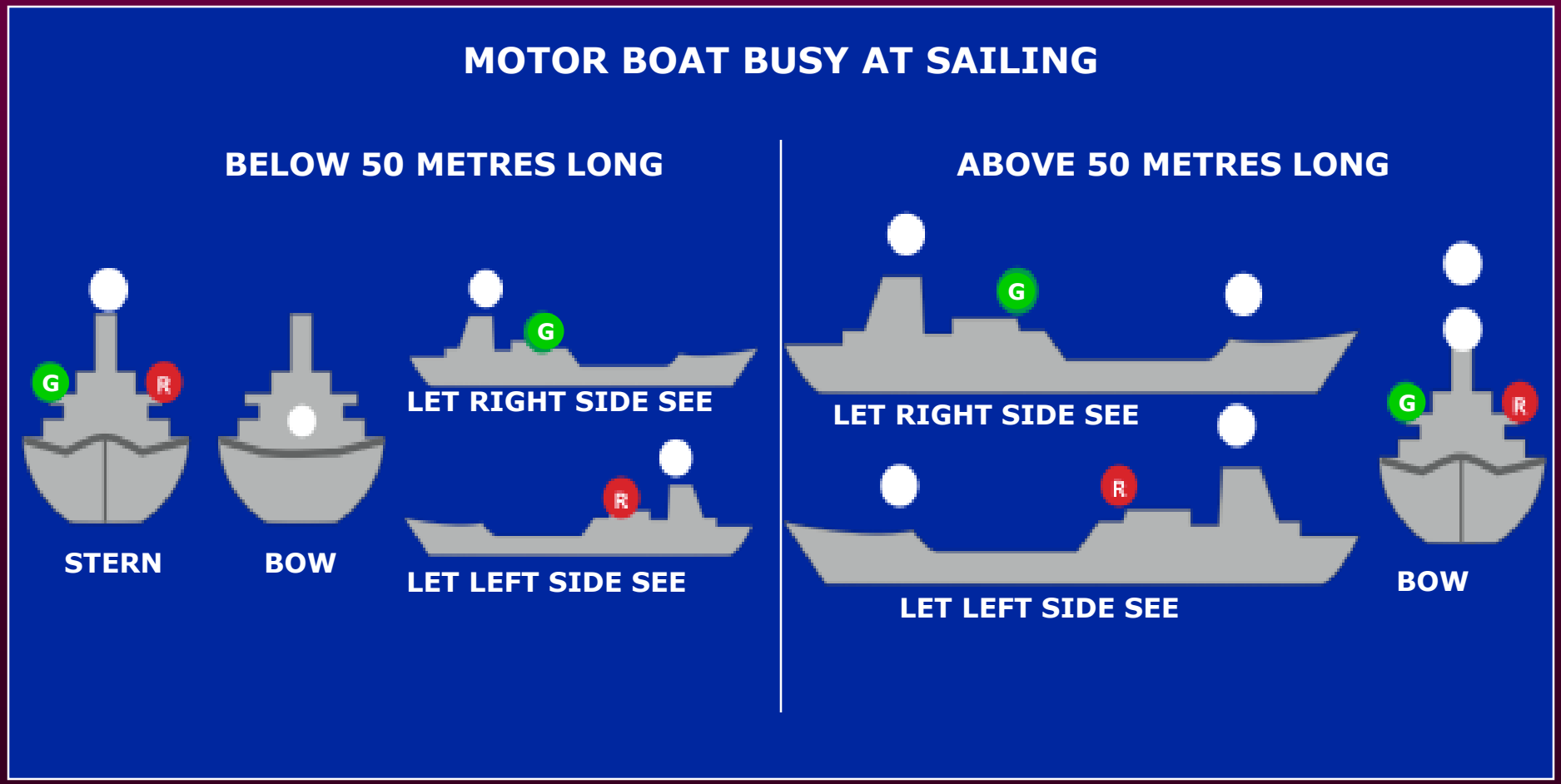
Lamps and mark signals



Lesson I

World Underwater Federation

Lamps and mark signals

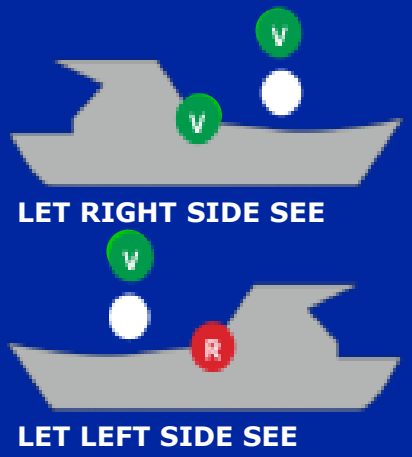


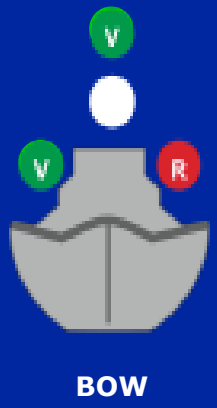
Lesson I

World Underwater Federation

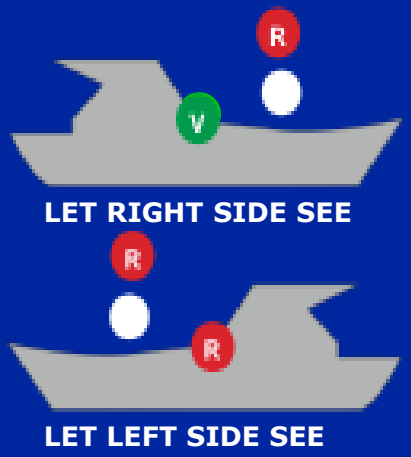
Lamps and mark signals

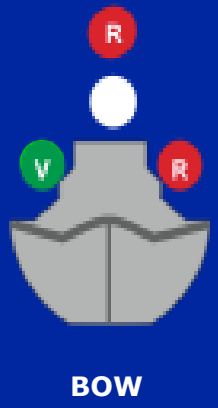
BOAT BUSY AT TRAWLING WITH WAY





BOAT BUSY AT FISC□HING WITH WAY





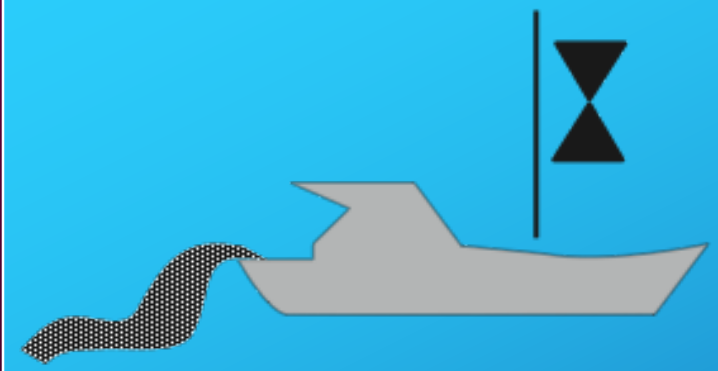
Lesson I

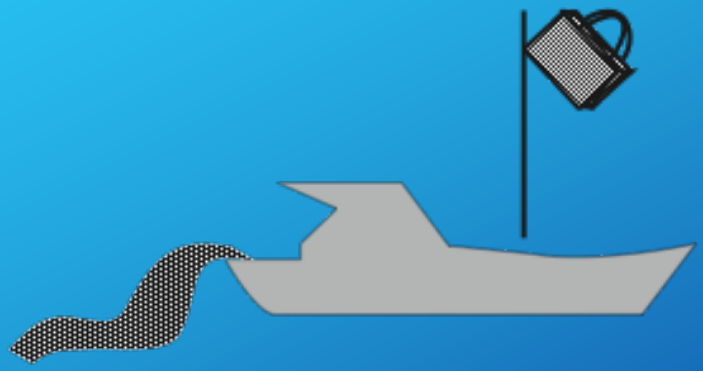
World Underwater Federation

Lamps and mark signals

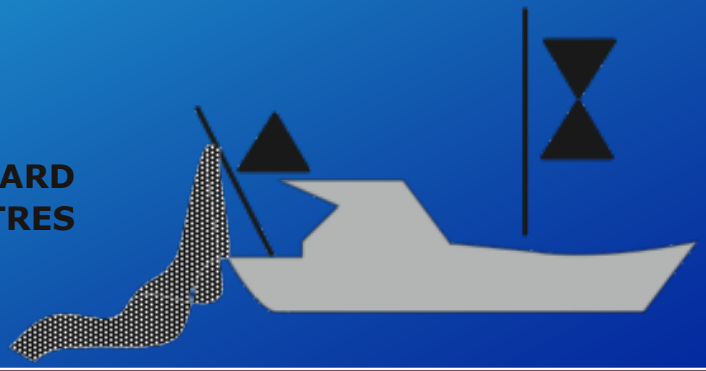
BOAT BUSY AT TRAWLING

OR FISHING WITH WAY IN THE MORNING





WITH TOOL WHICH EXTENDS OUTBOARD HORIZZONTALLY MORE THN 150 METRES



Lesson I

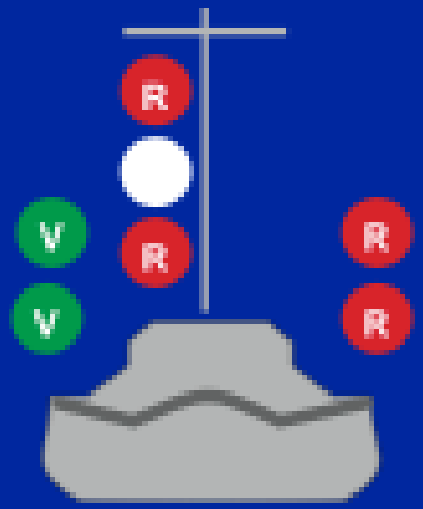
World Underwater Federation

Lamps and mark signals

BOAT BUSY AT DREDGING OR UNDERWATER OPERATIONS

TWO RED LIGHTS IN VERTICAL LINE

MARK THE SIDE WHERE THE OBSTRUCTION IS



TWO GREEN LIGHTS THE SIDE WHERE IT IS POSSIBLE TO GO BY

TWO BLACK BALLS

IN VERTICAL LINE

MARK THE SIDE WHERE THE OBSTRUCTION IS

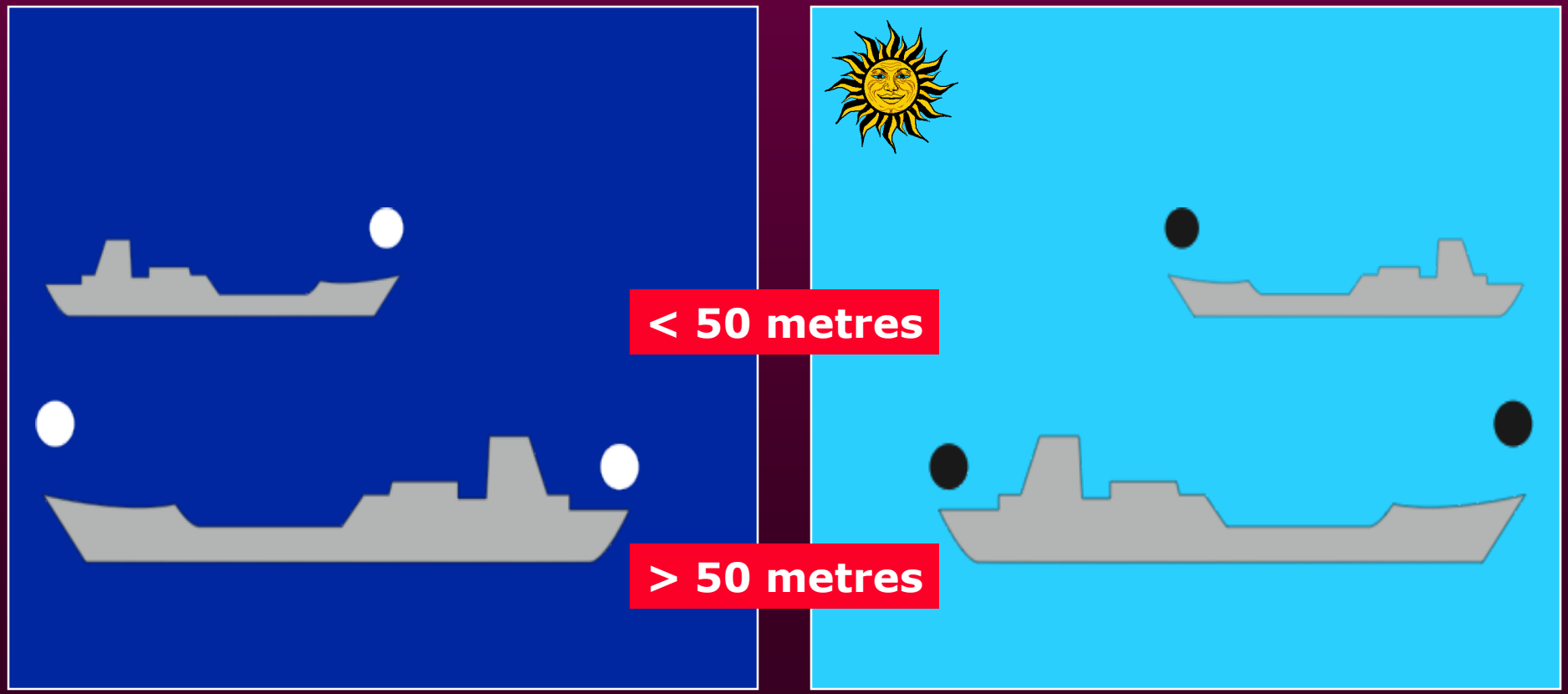
TWO BICONES THE SIDE WHERE IT IS POSSIBLE TO GO BY

Lesson I

World Underwater Federation

Lamps and mark signals

ANCHORED BOATS



Lesson I

World Underwater Federation

Rescue manoeuvres

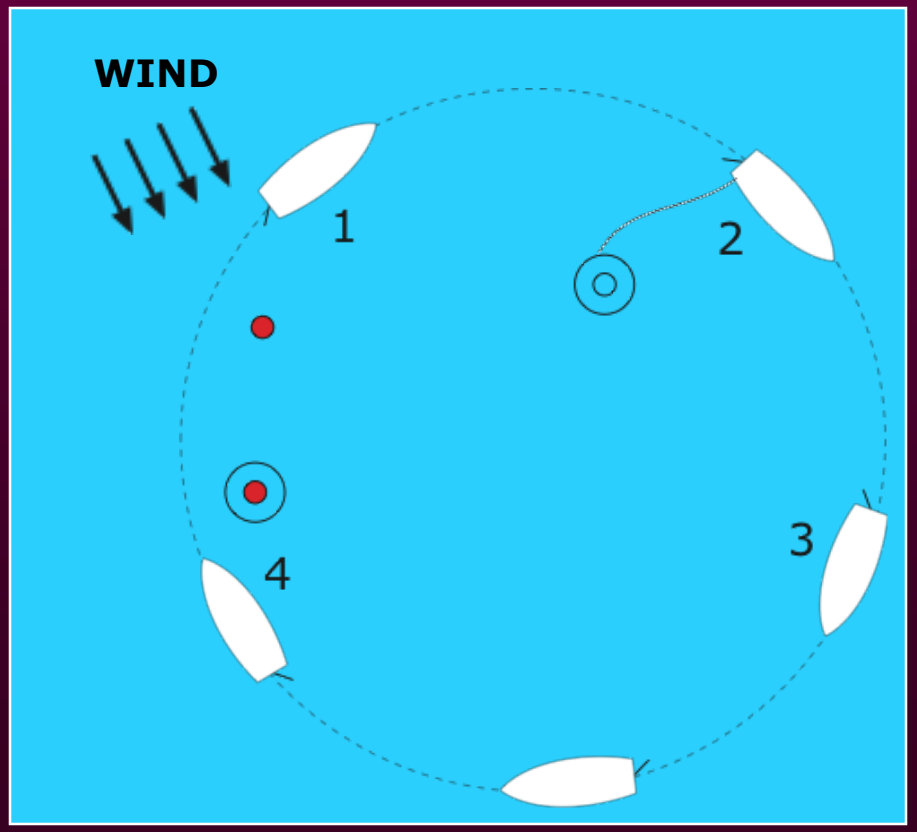
IF YOU WITNESS A SURVIVOR'S FALL OVERBOARD

1 **SURVIVOR OVERBOARD**
COME ALONGSIDE
THE SURVIVOR'S SIDE

2 **LIFEBUOY OVERBOARD**

3 **FINISH THE TURN**

4 **GET CLOSER THE SURVIVOR**
WITH STILL PROPELLERS



Lesson I

World Underwater Federation

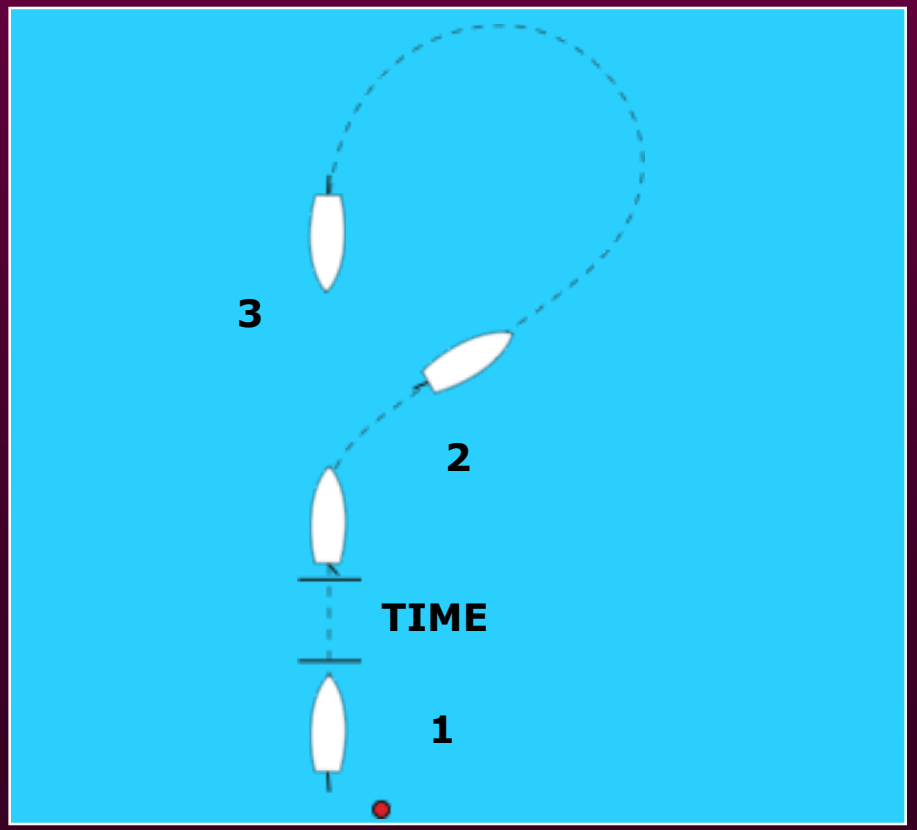
Rescue manoeuvres

IF YOU DO NOT WITNESS A SURVIVOR'S FALL OVERBOARD

1 **SURVIVOR OVERBOARD**

2 **BEGIN CHANGING COURSE**

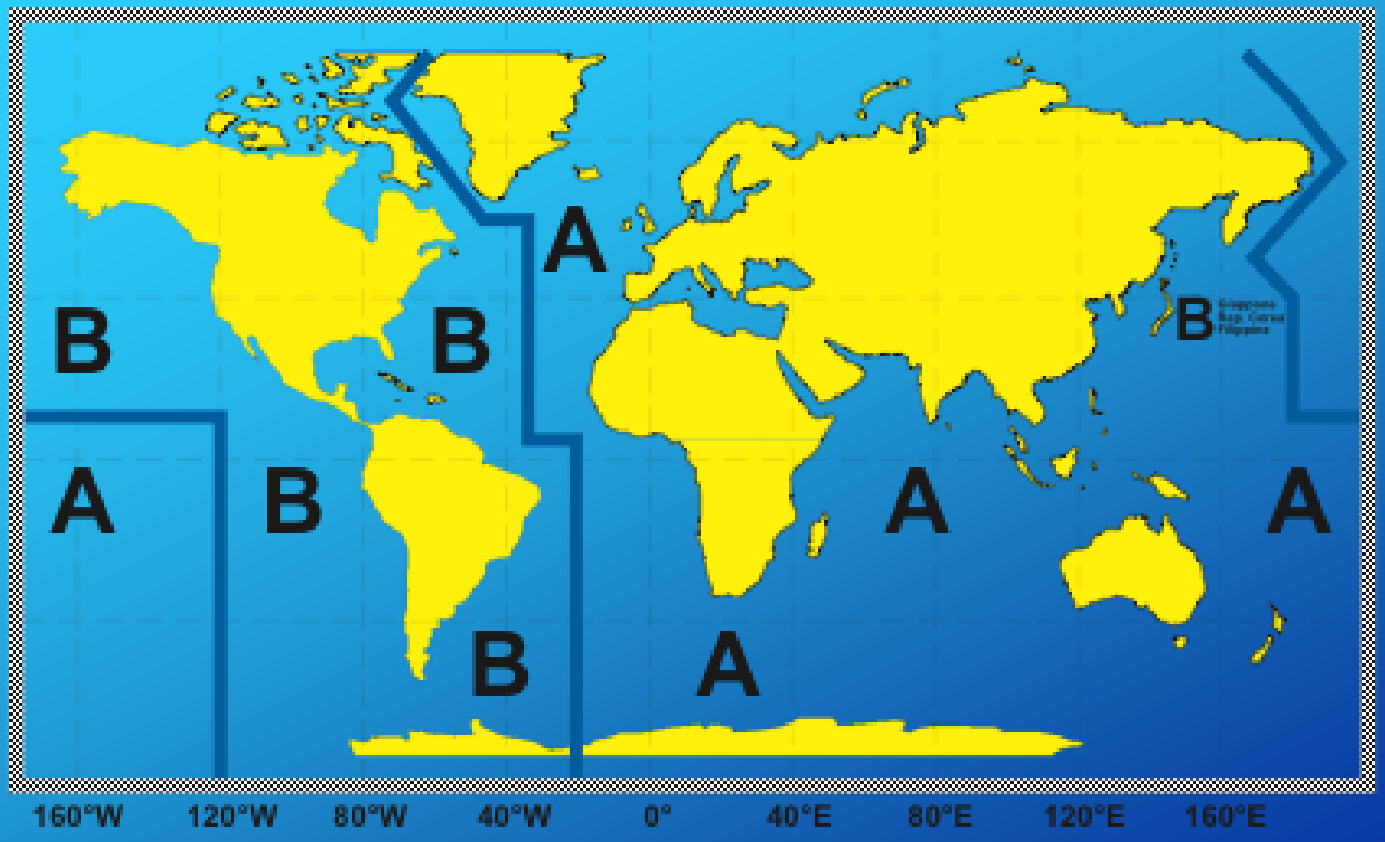
3 **BEGIN COVERING THE OPPOSITE COURSE**



Lesson I

World Underwater Federation

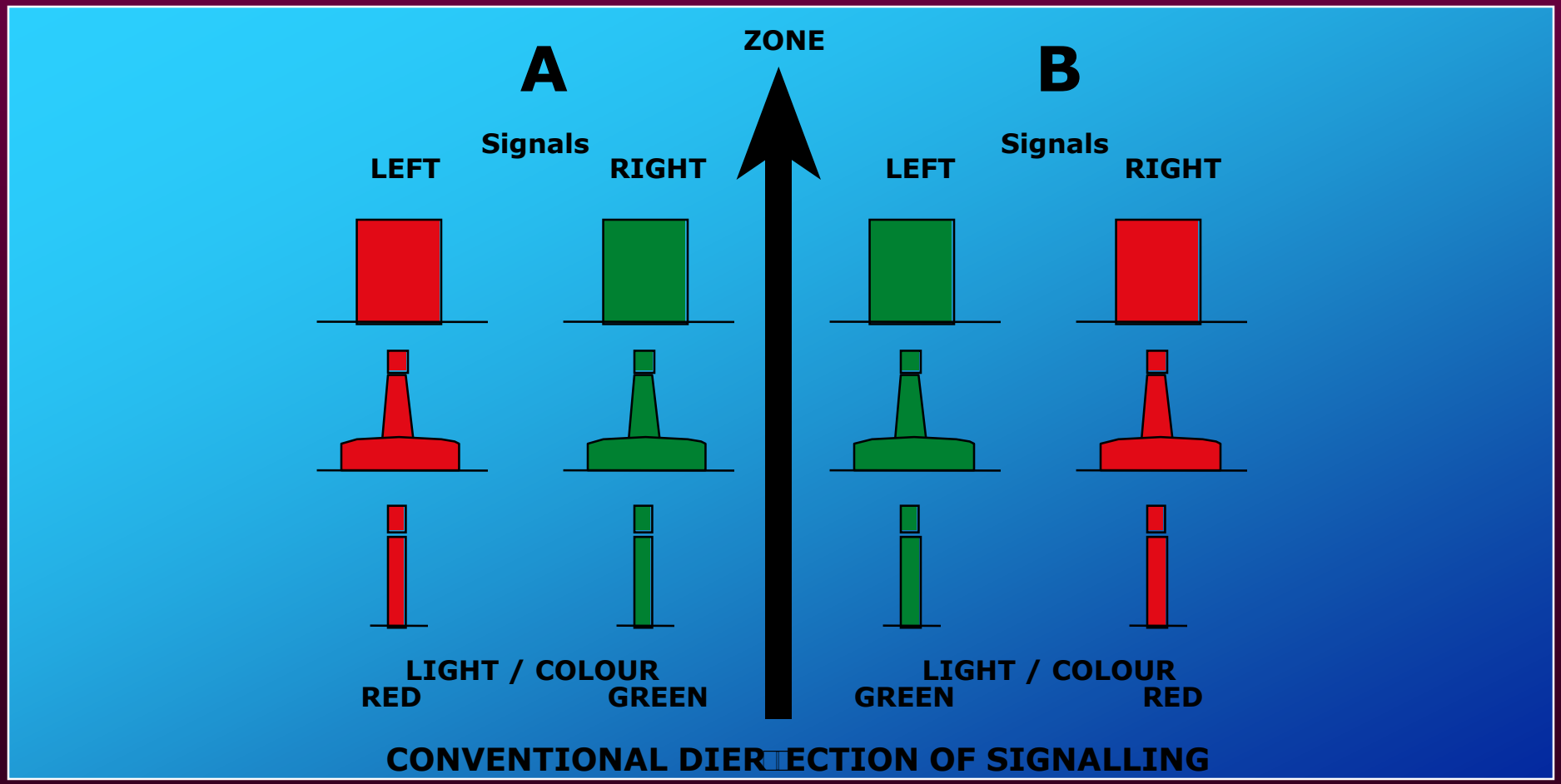
Systems of marine signalling



Lesson I

World Underwater Federation

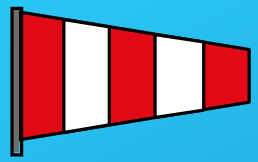
Systems of marine signalling



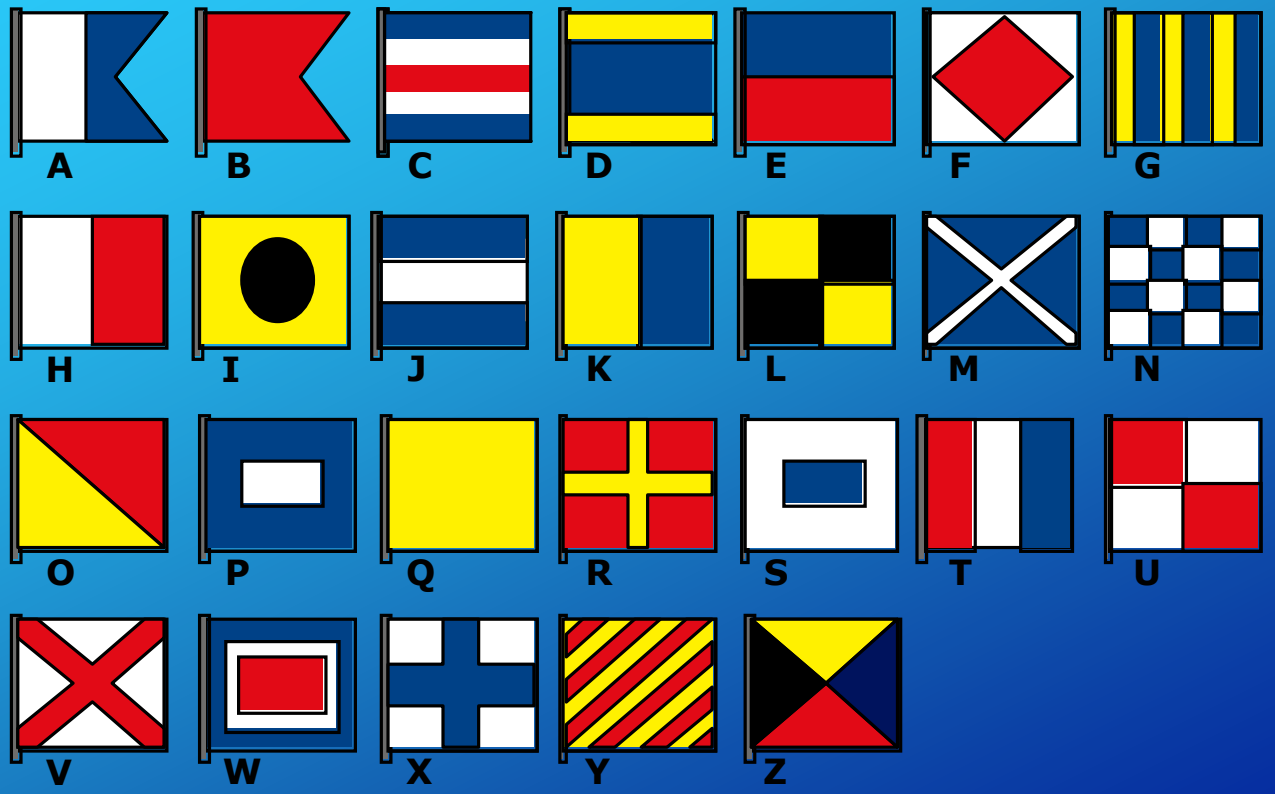
Lesson I

World Underwater Federation

Flags



ANSWERING PENNANT



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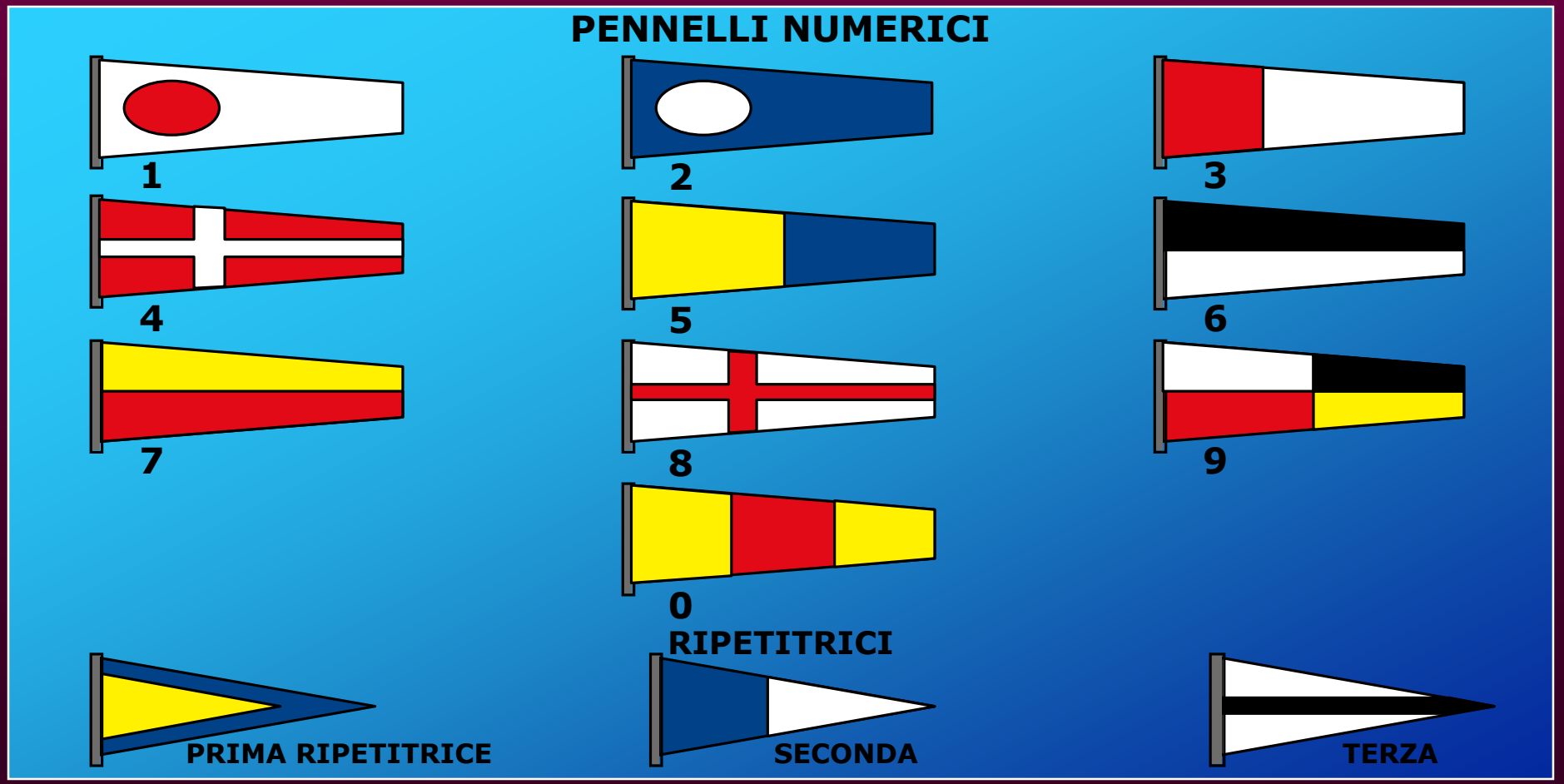
World Underwater Federation

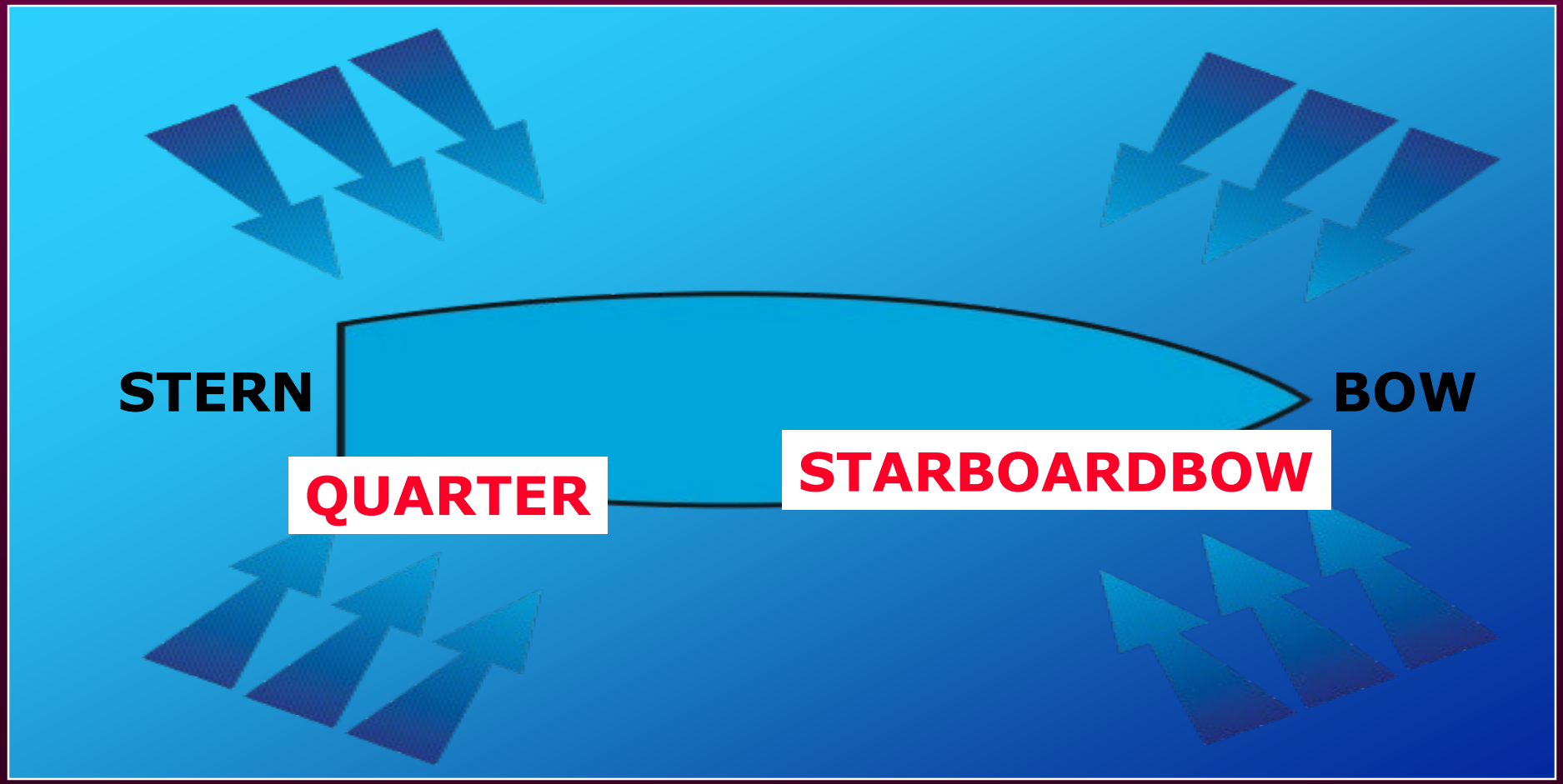
Flags



Lesson I

World Underwater Federation

Steering a boat



Meteorology

Lesson I

World Underwater Federation

Meteorology

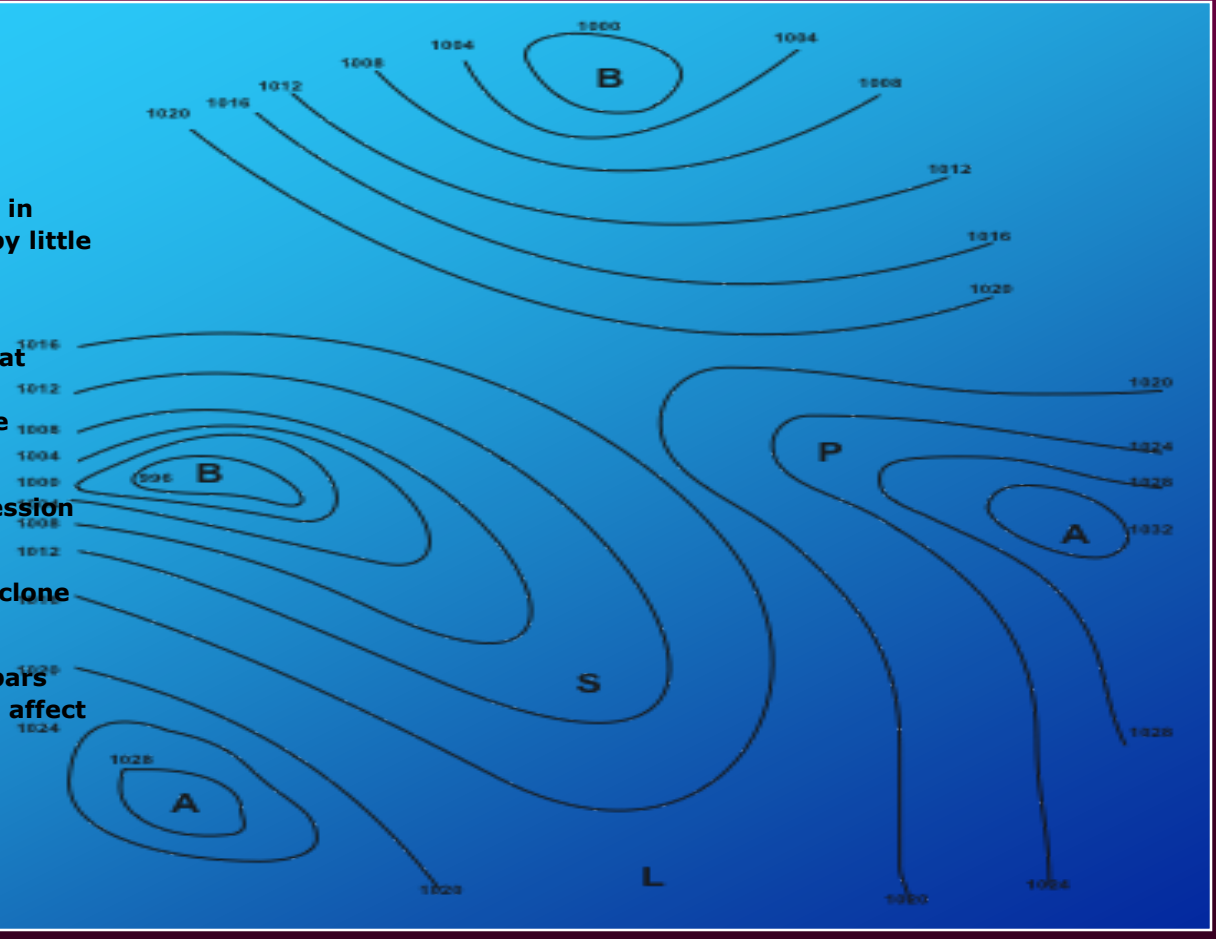
A Anticyclone
Complex of closed isobars that affect an area in which atmospheric pressure increases little by little one goes towards the middle of the picture

B Depression
or cyclonic area Complex of closed isobars that affect an area in which atmospheric pressure decreases little by little one goes towards the middle of the picture

C Trough Cuneiform expansion of a depression that is between two anticyclones

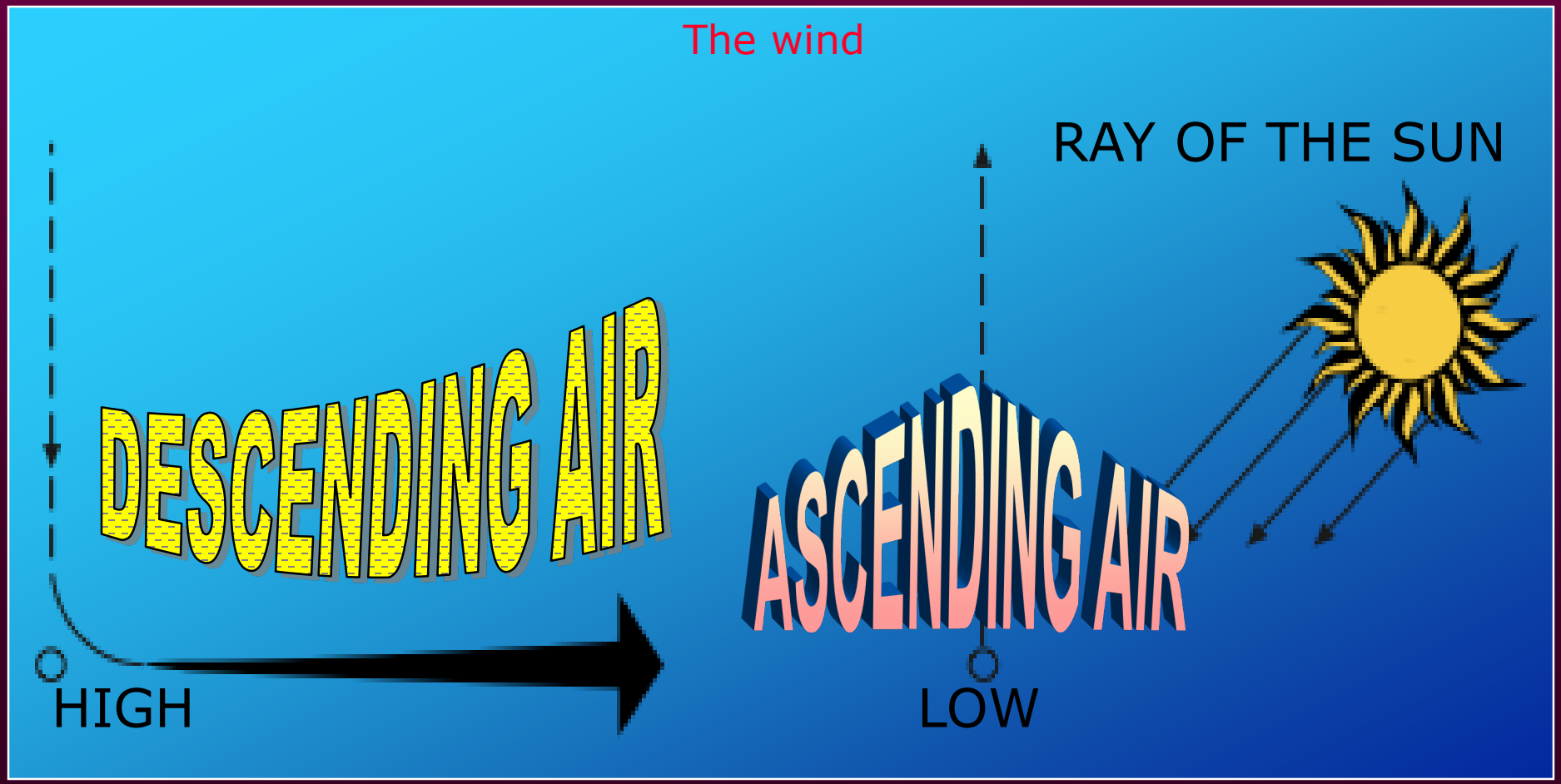
P RidgeCuneiform expansion of an anticyclone that is between two depressions

L Levelled pressure area Complex of isobars that are at some distance among them which affect a large area where pressure is uniform



Meteorology

The wind

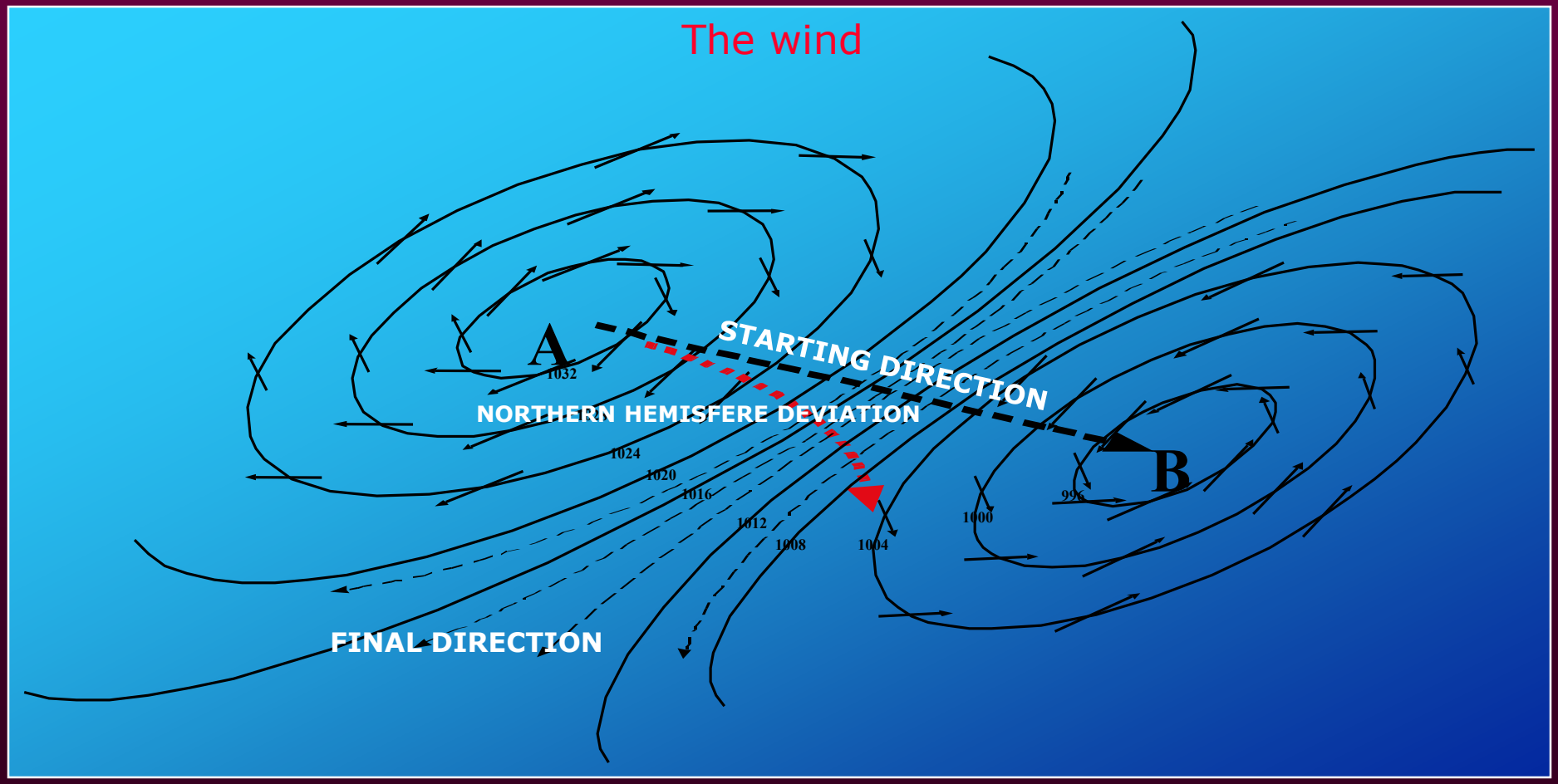


Lesson I

World Underwater Federation

Meteorology

The wind

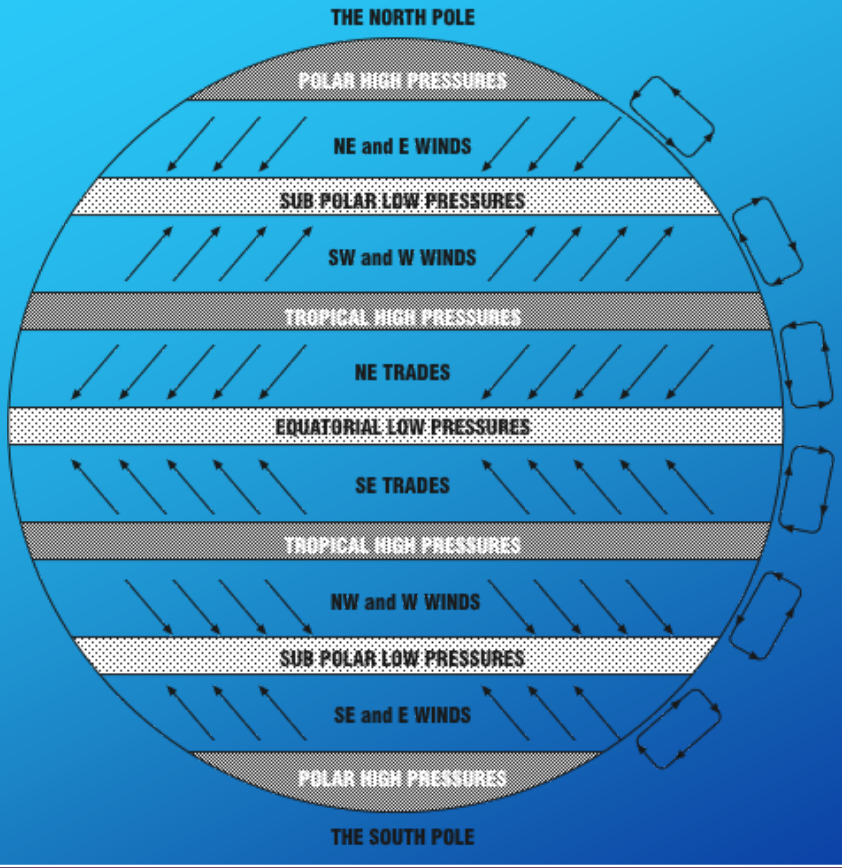


Lesson I

World Underwater Federation

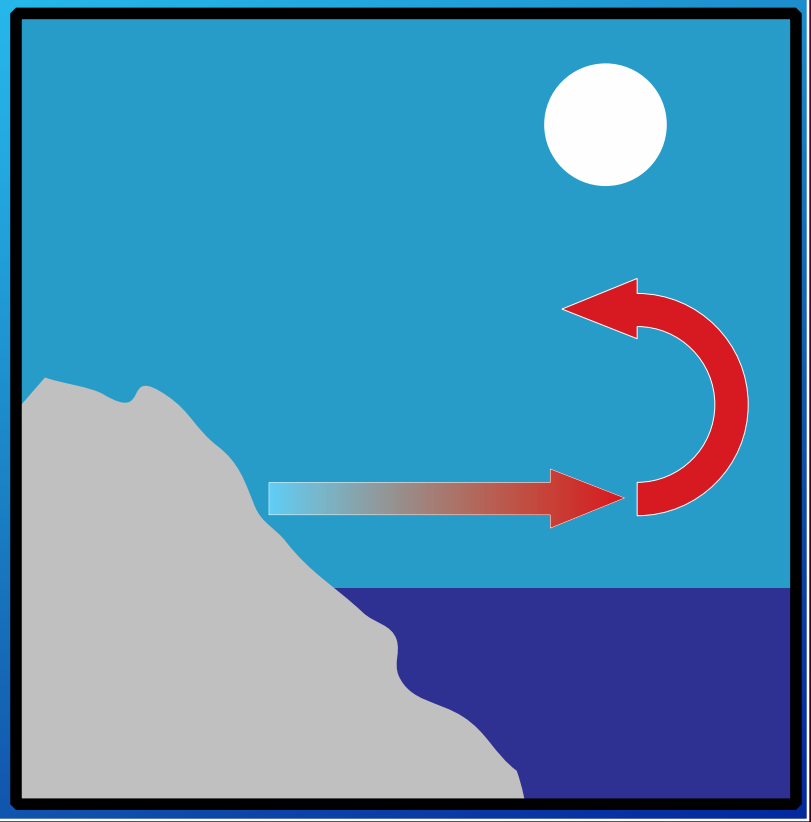
Meteorology

The wind

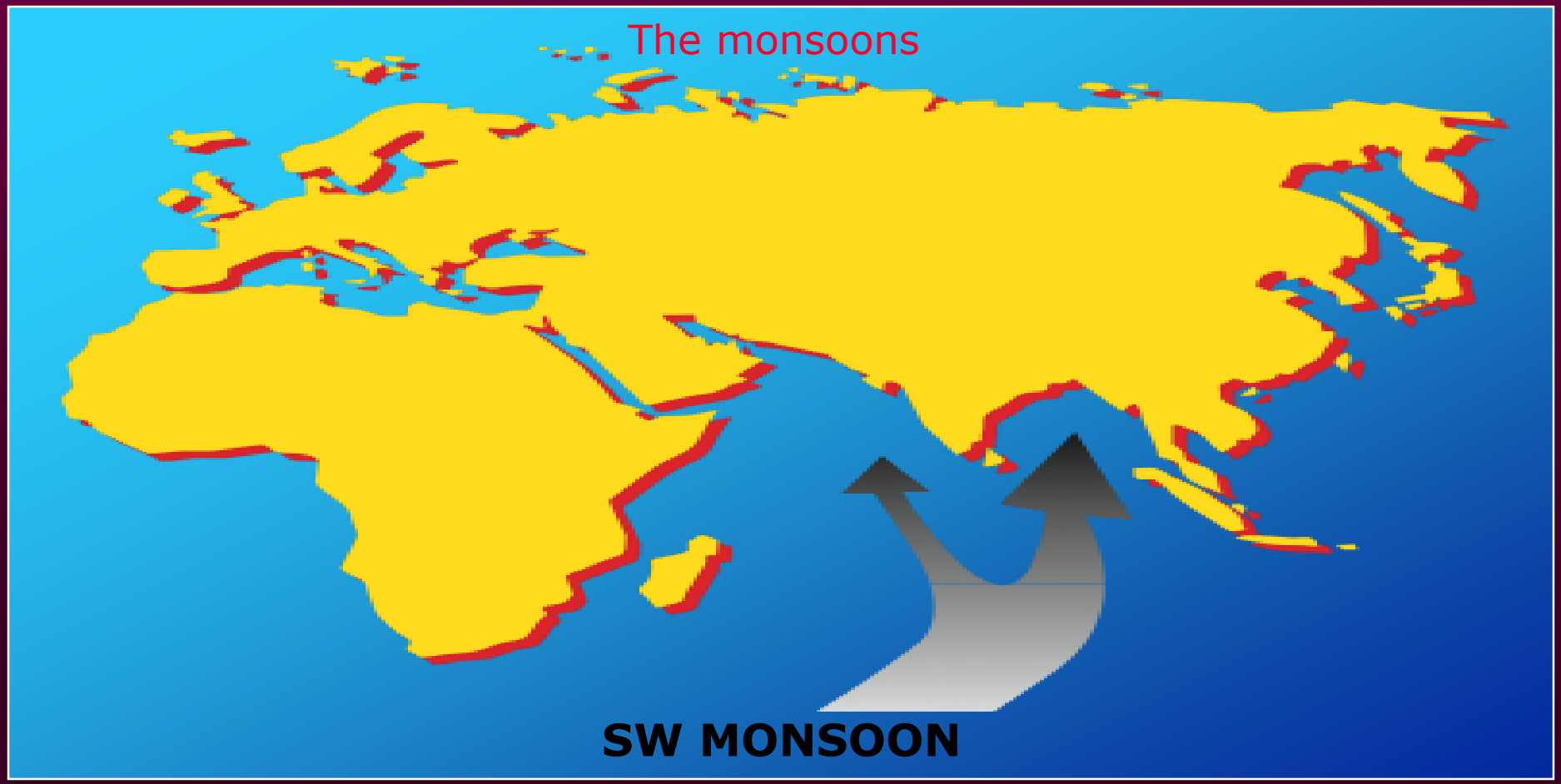


Meteorology

The breeze



Meteorology

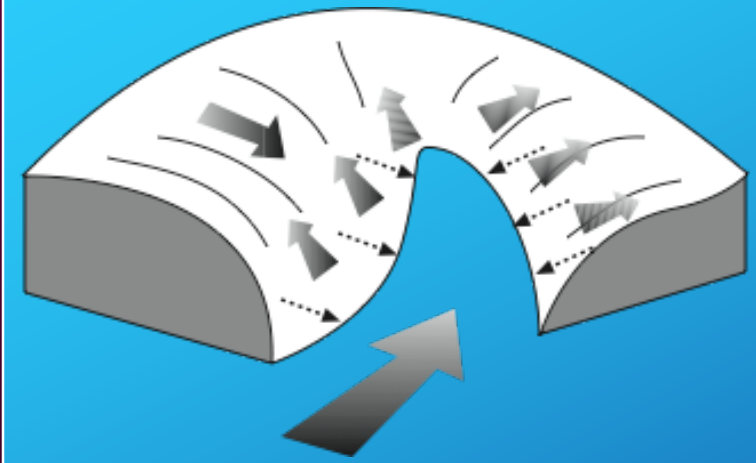


Lesson I

World Underwater Federation

Meteorology

Atmospheric disturbances



STATIONARY FRONT
if it does not move

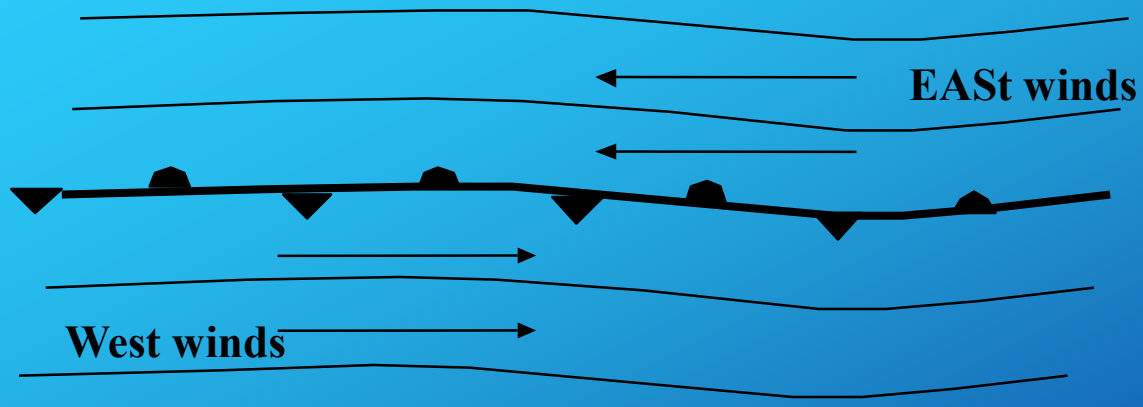
WARM FRONT
if warm air advances driving cold air

COLD FRONT
if cold air advances driving warm air

OCCLUDED FRONT
when a cold front is supeirmposed upon a warm front because the warm front is lesse fast

Meteorology

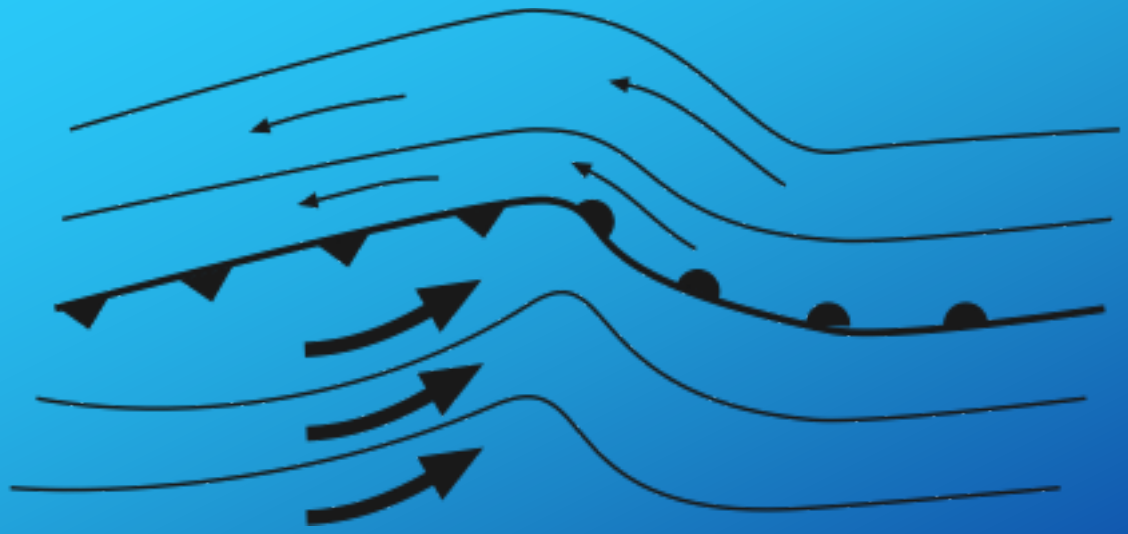
Atmospheric disturbances



STATIONARY FRONT
Parallel to isobars

Meteorology

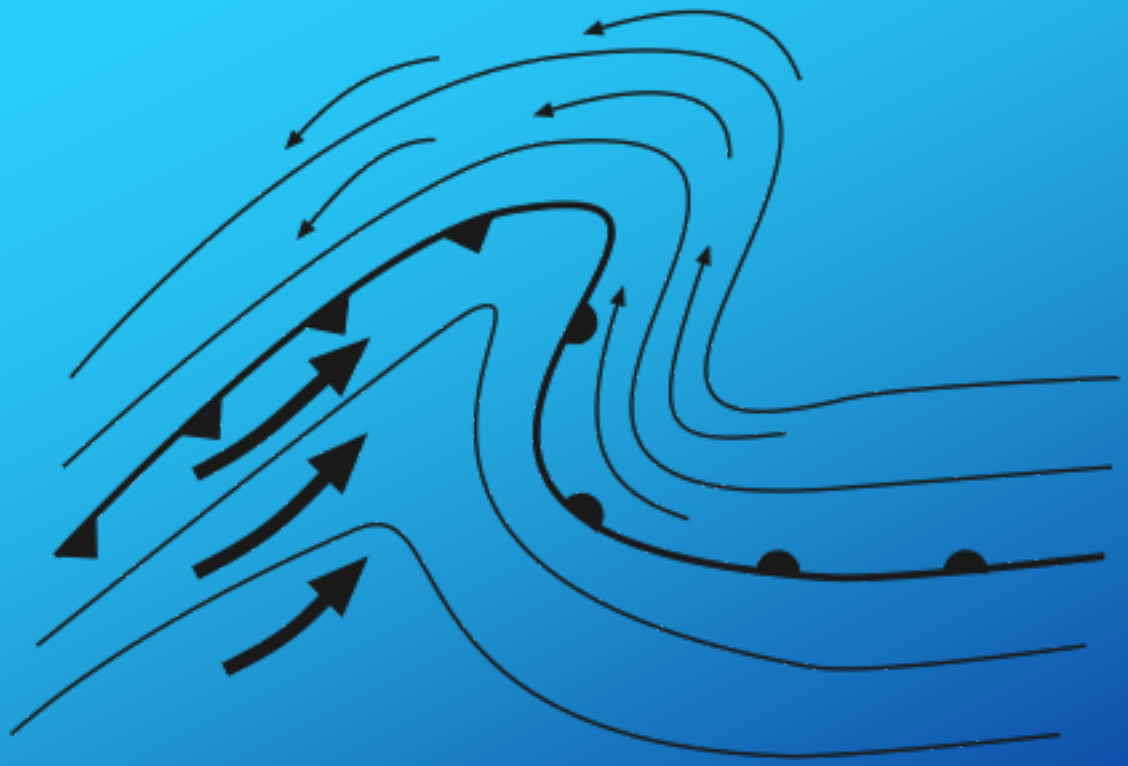
Atmospheric disturbances



FIRST STAGE

Meteorology

Atmospheric disturbances



ADVANCED STAGE

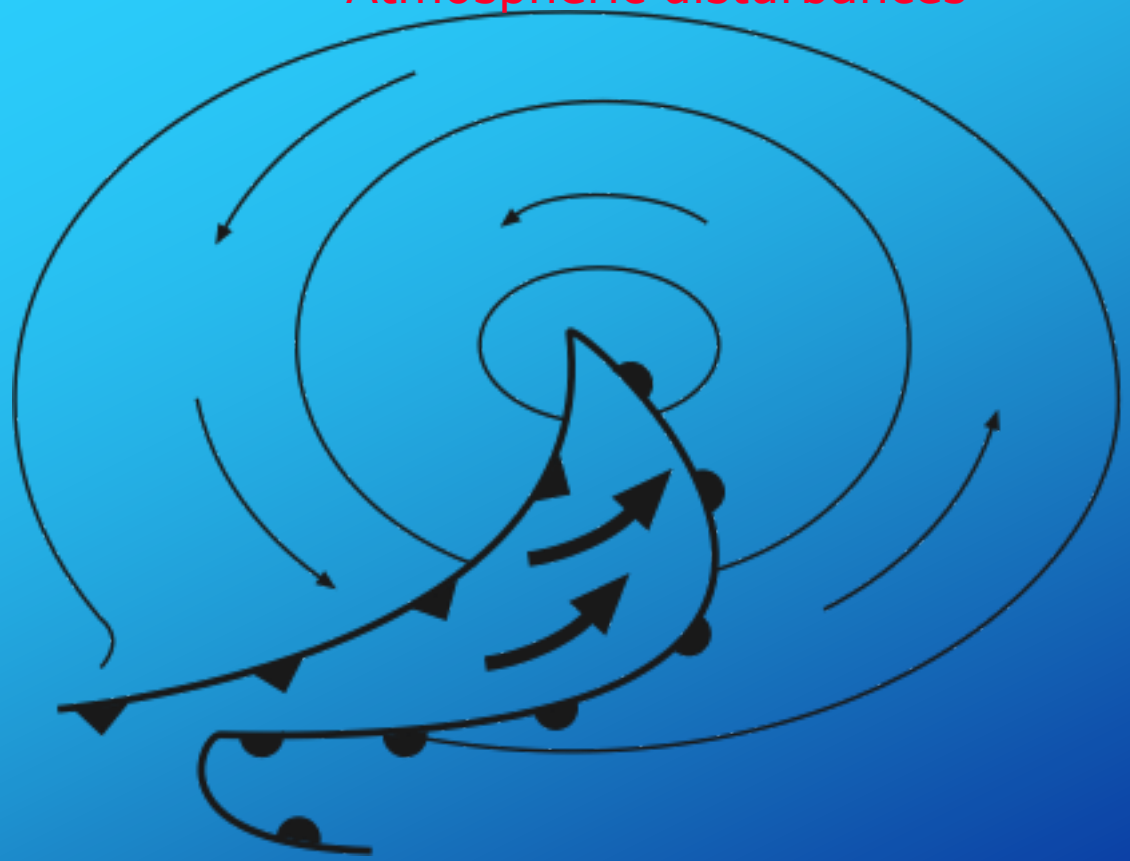
Meteorology

Atmospheric disturbances

DEPRESSION

Meteorology

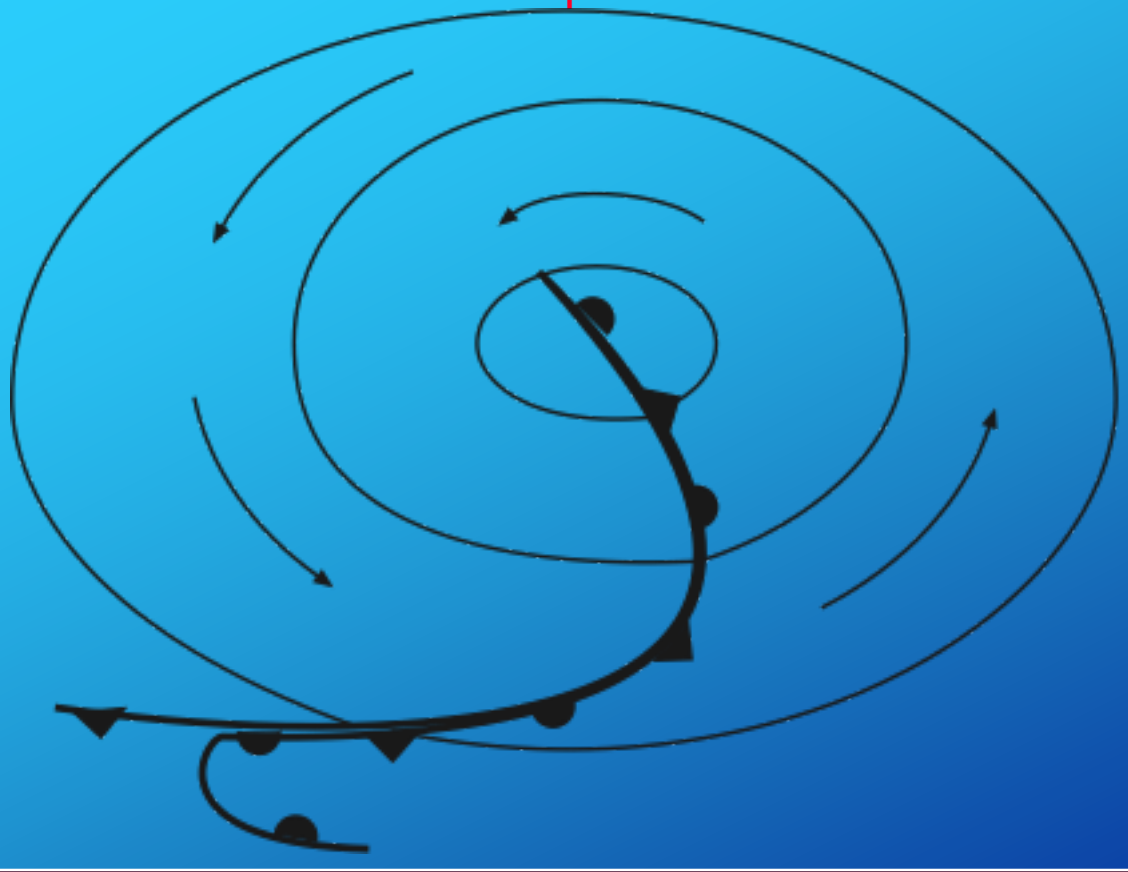
Atmospheric disturbances



TROUGH

Meteorology

Atmospheric disturbances



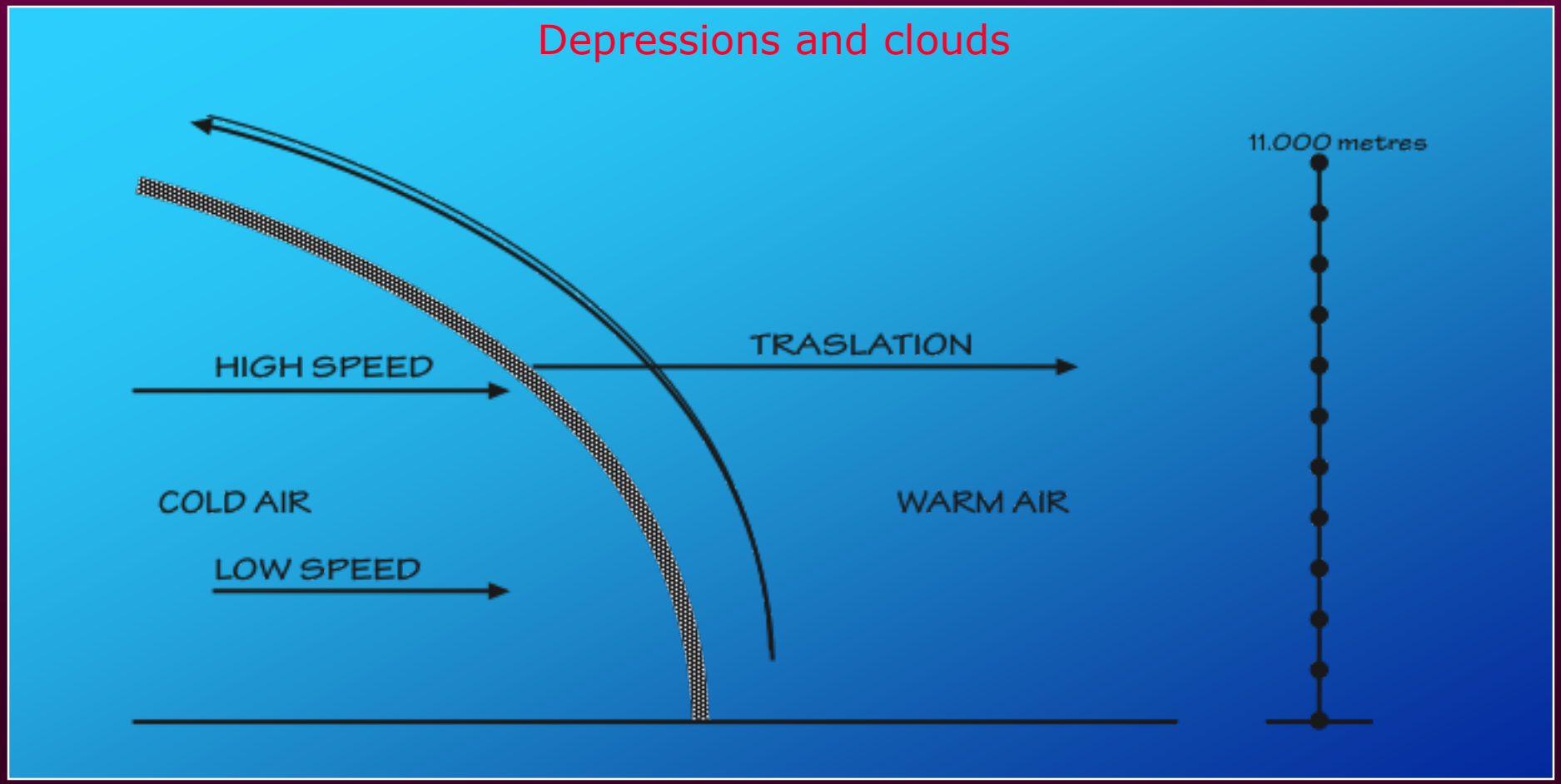
OCCLUSION

Lesson I

World Underwater Federation

Meteorology

Depressions and clouds

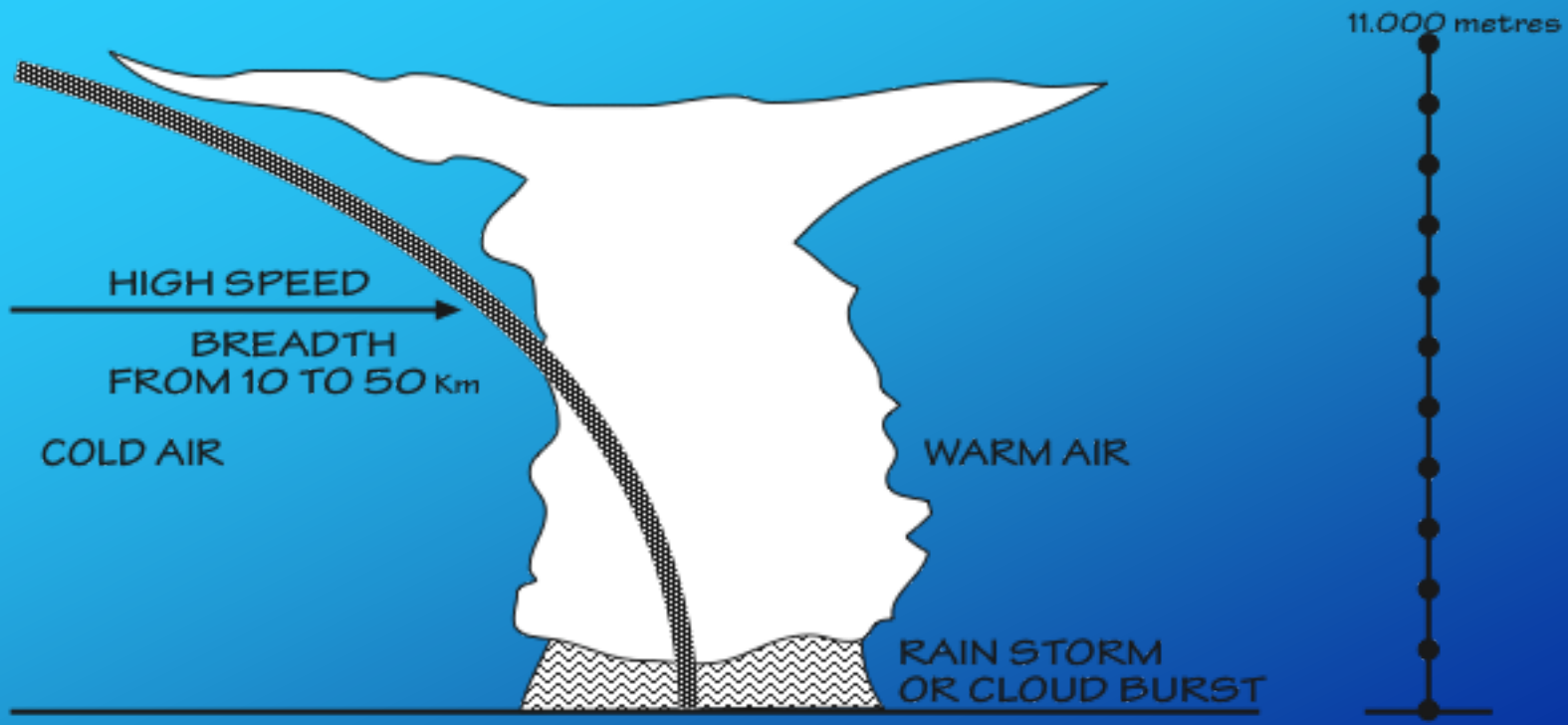


Lesson I

World Underwater Federation

Meteorology

Depressions and clouds



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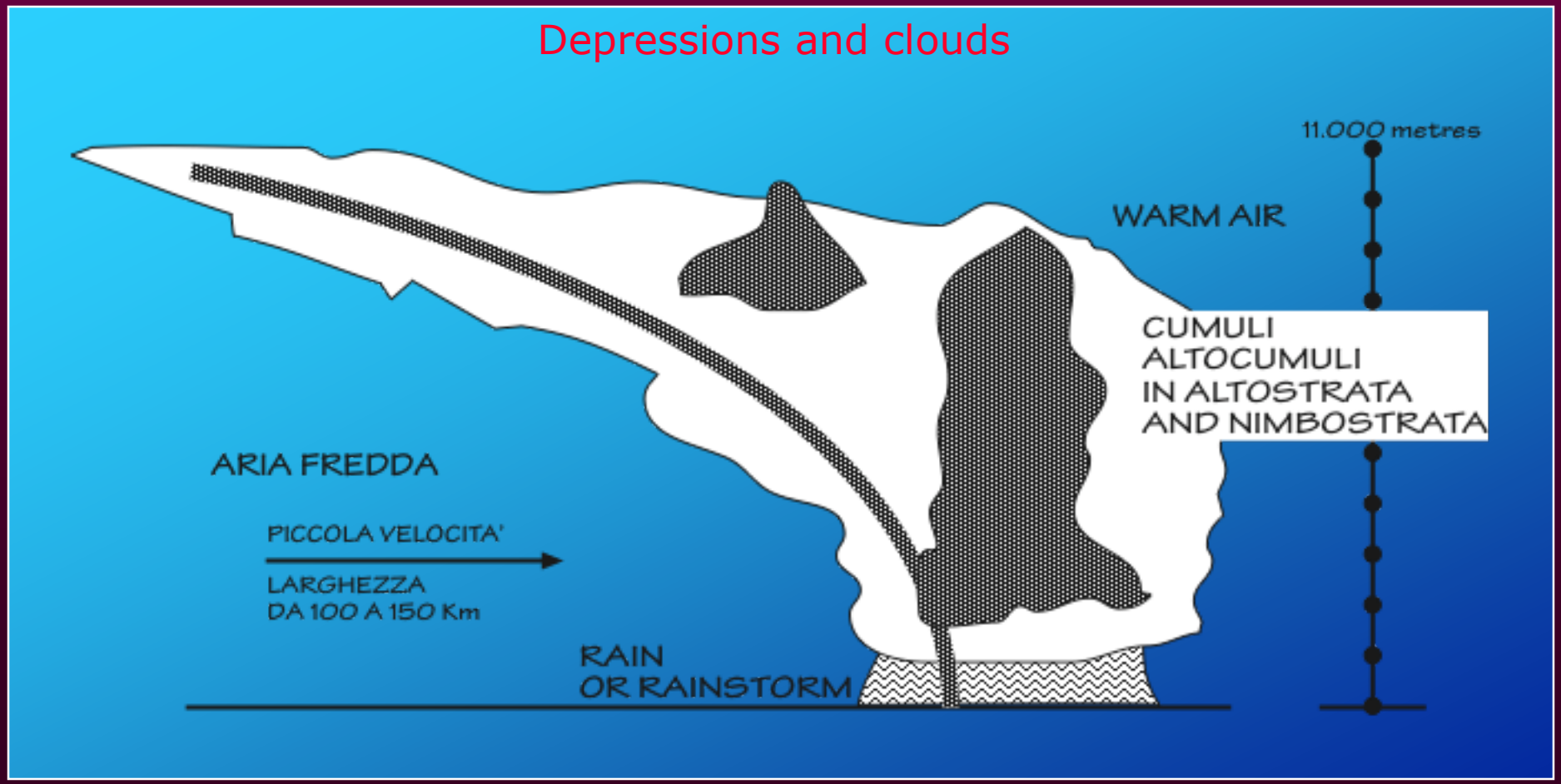
World Underwater Federation

Meteorology

Depressions and clouds



Lesson I

World Underwater Federation

Meteorology

Wind force

Wind velocity Km/h	BEAUTORT DEGREE AND EFFECTS OBSERVED OFFSHORE		Name
1	0	Smooth sea	Calm
1-5	1	Light ripples form but without foam	Ligth air (breath of wind)
6-11	2	Short and visible waves with glassy crests that do not break	Light breeze
12-28	3	Small waves with glassy foam in which the crest begins breaking	Gentle breeze
29-38	4	Moderate waves lenghthened in shape	Moderate wind
39-49	5	Waves with crests of white foam and sea sprays form	Fresh breeze (fresh wind)
50-51	6	Waves with white foam that break facing the direction of wind; tha sea swells	Strong breeze
52-74	7	Very lengthened waves, medium in height, sea sprays begin coming off from crests of waves; visible foam facing the direction of the wind	Near gale
75-88	8	Big waves whose crests begin tottering and breaking with foam and strong sprays that shoul reduce visibility	Gale
89-102	9	Very big waves with long crests and very large agglomerates of foam facing the direction of the wind; very strong breakers and reduced visibility	Strong gale
103-117	10	Very high waves, sea covered with foam facing the direction of wind; reduced visibility	Storm
118 >	11-12	White sea, air full of sea sprays and foam, very reduced visibility	Hurricane

Lesson I

World Underwater Federation

Meteorology

Wind force

SCALA BEAUFORT	FRANCESE	INGLESE	SPAGNOLO
0	Calme	Calm	Calma
1	Très légère brise	Light air	Ventolina
2	Légère brise	Light breeze	Brisa muy débil
3	Petit brise	Gentle breeze	Flojo, Brisa débil
4	Jolle brise	Moderate breeze	Brisa moderata
5	Bonne brise	Fresh breeze	Brisa fresca
6	Vent frais	Strong breeze	Brisa fuerte
7	Grand frais	Near gale	Viento fuerte
8	Coup de vent	Gale	Viento duro
9	Fort coup de vent	Strong gale	Viento muy duro
10	Tempête	Storm	Temporal
11	Violent tempête	Violent storm	Burrasca
12	Ouragan	Hurricane	Huracan

Lesson I

Confederazione Mondiale Attività Subacquee

Lesson 2

Lesson II

World Underwater Federation

Laerdal Italia S.r.l.
Via dei Lapidari 13 • I-40129 BOLOGNA • ITALY
Tel: +39-51-320087 • Fax: +39-51-320137 • Email: gbaravel@tin.it

WLS
Water Life Support

Water Life Support

WLS KEYWORDS

Emergency

Extraordinary and unexpected situation ordangerous circumstance which arises suddenly and which requires a quick action

Safety

Condition or state of being safe from harm or danger

Help/Rescue

Actions to get someone out of an unpleasant or dangerous situation

Danger

Combination of circumstances or situations from which a damage could come from.

Water Life Support

SPECIFIC PREPARATION

CALM AND SELFCONTROL

QUICKNESS IN INTERVENING

ABILITY IN OBSERVING

INTUITION

Lesson II

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Water Life Support

RECOGNITION OF THE PROBLEM

"The diver in danger"

is a person, in our case is a diver

that is in a real or hypothetical dangerous situation

Water Life Support

RECOGNITION OF THE PROBLEM

Facing a danger "the diver in danger" can react according to his experience, gravity of situation or his nature in the following ways:

- rational and aware of the dangerous situation,
- unconscious and without breathing activity,
- passive and immovable,
- panic striken

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Water Life Support

SITUATION OF EMRGENCY

CAUSE OF ACCIDENT

STATE OF THE DIVER IN DANGER

RESCUE MANOEUVRE

Water Life Support

SITUATION OF EMRGENCY

- LOST DIVER
- REGULATOR FREE FLOW
- REGULATOR DOES NOT DELIVER AIR
- AIR IS DISCHARGED FROM B.C.D.
- B.C.D. is overfilled
- WEIGHT BELT RELEASES
- DRY SUIT PROBLEM
- LOSS OF MASK

Water Life Support

SITUATION OF EMRGENCY

- HYPOTHERMIA
- HYPERTERMIA
- BREATHLESSNESS
- HYPERVENTILATION
- CRAMPS

Lesson II

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Lesson 3

Rescue procedures

Water Life Support

CARRYNG THE DIVER IN DANGER

CHECK ON THE CONSCIOUSNESS OF THE DIVER IN DANGER

Reached the surface it is better to check on the consciousness of the diver in danger asking him some simple questions, shaking him and looking at him in the eyes, if he reacts well and he is self sufficient ask his help to reach the boat or the land , if he is unconscious release his weight belt

Lesson III

World Underwater Federation

Water Life Support

CARRYNG THE DIVER IN DANGER

CHECK ON
THE CONSCIOUSNESS
OF THE DIVER IN DANGER

Water Life Support

CARRYNG THE DIVER IN DANGER

ASKING FOR ASSISTENCE

After checking on the consciousness of the diver in danger it needs to ask for assistence: with proper aid signals attract attention of the boat so that someone can help you

Lesson III

World Underwater Federation

Water Life Support

CARRYNG THE DIVER IN DANGER

CHECK ON
THE CONSCIOUSNESS
OF THE DIVER IN DANGER

ASKING FOR ASSISTENCE

CHECK ON
RESPIRATORY ACTIVITY

MOUTH TO MOUTH
RESUSCITATION IN MOTION

Water Life Support

CARRYNG THE DIVER IN DANGER

CHECK ON RESPIRATORY ACTIVITY

While you are waiting for help, if the diver is unconscious check on his respiratory activity through the following assessments:

Observe if there is expansion of his chest or his abdomen
Listen to if there are sounds and noises coming from breathing
Listen to the expired air from nose and mouth

These operations are not easy, because of the uncomfortable situation and the state of anxiety. There are also other elements that can help to determine the absence of breathing:

The skin of the face is very flushed, cyanotic, because blood lacking in oxygen is circulating through the body

Lips and eyes will be swollen and congested

Lesson III

World Underwater Federation

Water Life Support

CARRYNG THE DIVER IN DANGER

CHECK ON
THE CONSCIOUSNESS
OF THE DIVER IN DANGER

ASKING FOR ASSISTENCE

CHECK ON
RESPIRATORY ACTIVITY

MOUTH TO MOUTH
RESUSCITATION IN
MOTION

Lesson III

World Underwater Federation

Water Life Support

CARRYNG THE DIVER IN DANGER

MOUTH TO MOUTH RESUSCITATION IN MOTION

If there is not respiratory activity, considering that it si very difficult that there is a heart failure instantly in these type of accidents, it needs to start quickly the artificial respiration "A.R." on the surface before and during the carrying of the diver in danger to the boat:

Inflate the diver' s B.C.D. so as to hold him without hampering the movements of the chest

If there is another diver, undress the diver in danger, the wet suit can maintain a buoyancy without B.C.D. , besides it is easier to make rescue operations without equipment

Put the palm of a hand on the forehead and block the nose with forefinger and inch, pout the other hand under the head to sustain the buoyancy of the head and consequently to keep airways out from the water,in the dry "A.R." the hand is on the chin because it is not indispensable to susstain the head

Now levering with hands in above mentioned position, the mouth emerges from the water and tends to open naturally, now some mouth-mouth insufflations start, one every 5 seconds, loosening the nose when the rescuer makes the inhalation

It is difficult to mark the rhytm of insufflations because we are in the water and we are carrying the diving in danger towards the boat , the effort will impede us either the artificial respiration and the carrying. We continue the "A.R." till the diver in danger begins breathing for example he coughs or breathes naturally, but if the diver in danger does not breathe we will carrying him to the boat or to the beach where we will make the BLS complete

Lesson III

World Underwater Federation

Water Life Support

CARRYNG THE DIVER IN DANGER

MOUTH TO MOUTH RESUSCITATION IN MOTION

Lesson III

World Underwater Federation

Water Life Support

CARRYNG THE DIVER IN DANGER TO THE SURFACE

CARRYING THE CONSCIOUS BUT NOT SELF SUFFICIENT DIVER IN DANGER

Without undressing him, we will grab him by tank valve and we will carry him on supine position while we will take fish-bone position looking at aid point, boat or land. We will sometimes stop and speak to the diver to know his state

CARRYING THE UNCONSCIOUS DIVER IN DANGER BUT WITH BREATHING ACTIVITY

In this case it is better to undress him so that his carrying is faster without equipment. As it needs to have the maximum contact with the diver in danger, the rescuer will put the diver on his side:

The rescuer puts himself fish-bone position under the diver in danger and grabs the diver with the hand passing above his shoulder and getting a grip under the armpit of the opposite arm. During this carrying the rescuer removes the mask to the diver in danger only if the sea is calm or if the diver has some breathing problems for which it needs that his nose is free

CARRYING THE UNCONSCIOUS DIVER IN DANGER BUT WITHOUT BREATHING ACTIVITY

This type of carrying will be difficult and tiring because in addition to carrying we must practice the moth-mouth resuscitation. the position is similar to the previous carrying:

From the fish-bone position we will pass our arm from up to down under the armpit of the diver in danger and we will put the hand on his nape, while we will block his nose with the other hand and will practice the mouth-mouth resuscitation; The arm which passes under the armpit provides us a firm grip so as to carry and practice the artificial resuscitation for a a long time

Lesson III

World Underwater Federation

Water Life Support

CARRYNG THE DIVER IN DANGER

CONSCIOUS
BUT NOT SELF SUFFICIENT

UNCONSCIOUS
BUT WITH BREATHING ACTIVITY

UNCONSCIOUS
BUT WITHOUT BREATHING ACTIVI

Lesson III

World Underwater Federation

Water Life Support

CARRYNG THE DIVER IN DANGER

CONSCIOUS
BUT NOT SELF SUFFICIENT

UNCONSCIOUS
BUT WITH BREATHING ACTIVITY

UNCONSCIOUS
BUT WITHOUT BREATHING ACTIVITY

Lesson III

World Underwater Federation

Water Life Support

CARRYNG THE DIVER IN DANGER

CONSCIOUS
BUT NOT SELF SUFFICIENT

UNCONSCIOUS
BUT WITH BREATHING ACTIVITY

UNCONSCIOUS
BUT WITHOUT BREATHING ACTIVITY

Water Life Support

HOISTING THE DIVER IN DANGER

HOISTING THE DIVER IN DANGER ON THE BOAT
THE DIVER IS IN CONFUSIONAL STATE BUT HE IS CONSCIOUS

We will help him to undress of his equipment and then with the assistence of other divers that are aboard we will help himto go on by the boarding ladder

The rescuer that is in water behind the diver in danger must stay some distance from him so as to help the diver in danger if he falls to the water , but at the same time he must be careful that the diver in danger does not fall on him

Divers that are aboard help the diver in danger to go on the boat when he is falling the boarding ladder and if necessary they lie him down on an sheltered place from the cold or from the sun so that they are ready to check his state

Water Life Support

HOISTING THE DIVER IN DANGER

THE DIVER IN DANGER IS UNCONSCIOUS BUT WITH BREATHING ACTIVITY

If during the carrying we have not undressed him it needs to do it aboard

Being careful to maintain dry respiratory tracts we will take off the equipment to the diver in danger as weight belt was released previously

The rescuer with a hand grabs the boarding ladder or the lowest side of the boat, with the other arm supports the diver by the waist, at this point he turns the diver with the back toward the boarding ladder or the side of the boat

The rescuer passes the diver's arms to other divers that are aboard and while the rescuer pushes the diver in danger upwards the assistants pull him up so that the diver in danger des not hit or hurt during hoisting

Lesson III

World Underwater Federation

Water Life Support

HOISTING THE DIVER IN DANGER

THE DIVER IN DANGER IS IN CONFUSIONAL STATE BUT HE IS CONSCIOUS

THE DIVER IN DANGER IS UNCONSCIOUS STATE BUT WITH BREATHING ACTIVI

Water Life Support

HOISTING THE DIVER IN DANGER

HOISTING THE DIVER IN DANGER ON THE LAND

The diver in danger is carried to the land only if it is impossible to reach the boat and the shore is near or if the diving is not from the boat

The rescuer will look for the beach or an enough easy point to hoist the diver in danger without causing other problems, but if the dive site is in a rocky zone he will look for a rock that degrades towards the sea so as to make a slide to lie on the diver in danger.

In shallow water the rescuer will undress the diver in danger ,(only if it has not been made it during carrying) then he will block the head putting a hand near the nape and with the other hand put under the armpit he will take him out from the water and will lie him on the beach

Water Life Support

SPECIFIC HOISTING

THE RESCUER IS ALONE

Holding the boarding ladder the rescuer turns the diver in danger so that his back leans against the boarding ladder, he puts the diver's arms around to own neck and the rescuer supports him holding with his legs during the climb

THIS PROCEDURE IS VERY DIFFICULT IF THE DIVER IN DANGER IS MORE HEAVILY BUILT THAN THE RESCUE

Lesson III

World Underwater Federation

Water Life Support

HOISTING THE DIVER IN DANGER

THE RESCUER IS ALONE

Water Life Support

SPECIAL HOISTING

THE BOAT IS AN INFLATABLE DINGHY

In this case as there is not a boarding ladder the diver in danger will be hoisted along the side of the inflatable dinghy

We will try to put the diver in danger from the back to the inflatable dinghy, holding him with a leg between his legs, , the assistents that are aboard will take his wrists and will pull him up on the side of the inflatable dinghy

THIS PROCEDURE IS IMPOSSIBLE
IF THE RESCUER IS NOT HELPED BY ASSISTENS

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Water Life Support

SPECIAL HOISTING

THE BOAT HAS EQUIPPED WITH A STERN GANGPLANK AT SEA LEVEL

We will hold the diver in danger with a leg between his legs and with our arms leaned against the the gang plank and under his armpit, we will bring his hand slowly and alternatively on the gangplank superimposing them, with a hand of ours we will block his hands and we will go up the gangplank levering on the other hand

Then we will turn the diver in danger holding it by the wrists so that he puts from the back to the gangplank and levering on the legs we will hoist him aboard

THIS OPERATION WILL BE EASIER IF WE WILL BE HELPED BY ASSISTENS ESPECIALLY DURING HOISTING WHEN THE DIVER IN DANGER WILL BE VERY HEAVY

Lesson III

World Underwater Federation

Water Life Support

HOISTING THE DIVER IN DANGER

THE BOAT HAS EQUIPPED WITH A STERN GANGPLANK AT SEA LEVEL

Lesson III

World Underwater Federation

Water Life Support

FIRST AID

Once reached the boat,hoisted the diver in danger aboard, it is necessary to practice a procedure that gets in connection to BLS (basic life support) operations

Location : put the diver in danger in a dry and protected place and if necessary lie him down on a sheltered zone

Call for help from land: consider the need to call the FIRST AID from land to send the divin in danger to hospital considering where we are, holding a telephonic contact to comuniate the diver's state

Monitoring: during the way back it is necessary to practice the BLS procedures starting from the check of consciousness and if necessary tha artificial respiration

Lesson III

World Underwater Federation

Water Life Support

FIRST AID

Lesson III

World Underwater Federation

Search & Rescue

Lesson III

World Underwater Federation

Search & rescue

A GOOD RESCUE PLAN MUST:

START FROM A KNOWN POINT

END IN A SETTLED POINT

IT ENABLES TO DETERMINE THE PRESENCE
OR NOT OF THE RESCUE OBJECT
IN THE CONSIDERED AREA

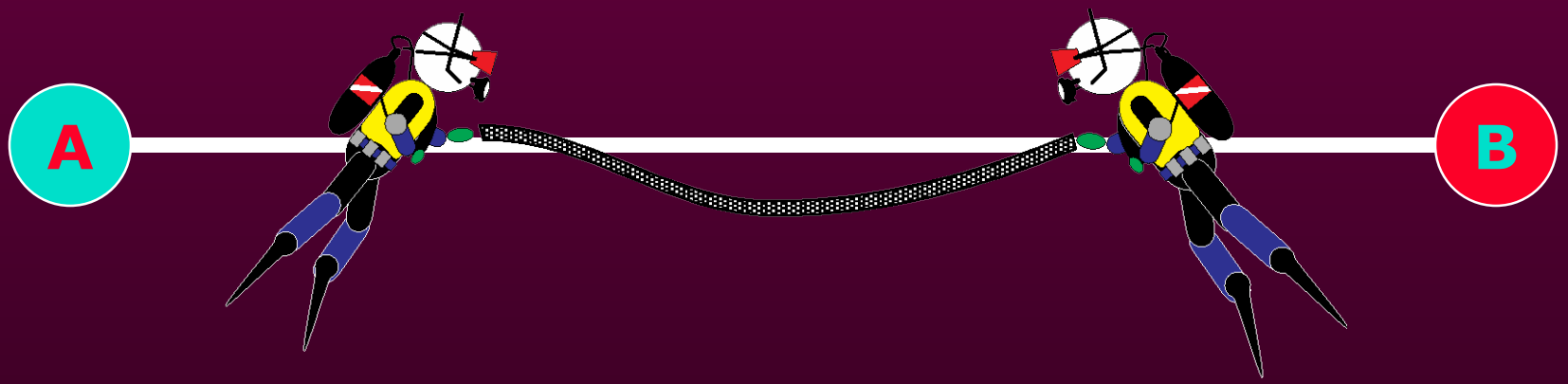
Lesson III

World Underwater Federation

Search & rescue

A GOOD RESCUE PLAN MUST:

USE A GOOD COMUNICATION SYSTEM



AMONG DIVERS THAT ARE UNDERWATER
AND DIVERS THAT ARE ON THE SURFACE

Lesson III

World Underwater Federation

Search & rescue

A GOOD RESCUE PLAN MUST:

USE THE BASIC EQUIPMENT IN CASE OF SCARCE VISIBILITY TOO EITHER FROM THE SHORE AND FROM THE BOAT

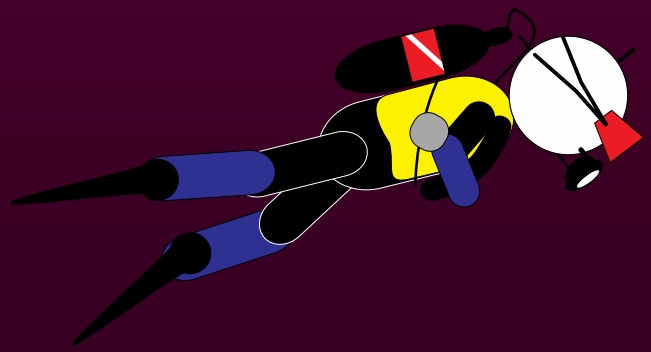
Lesson III

World Underwater Federation

Search & rescue

A GOOD RESCUE PLAN MUST:

ENABLE TO SIGNAL THE RECOVERY POINT EASILY



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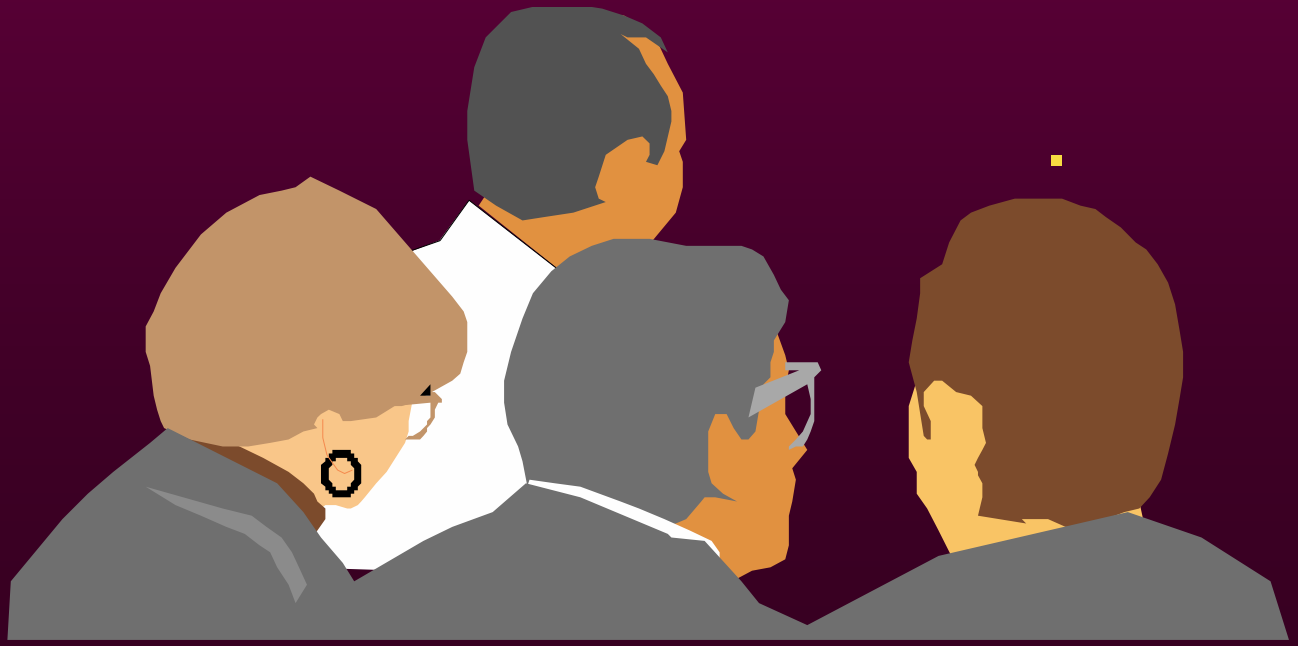
Search & rescue

A GOOD RESCUE PLAN MUST:

ENABLE PEOPLE THAT ARE NOT DIVERS
TO PARTECIPATE TO RESCUE OPERATIONS



Lesson III

World Underwater Federation

Search & rescue

A GOOD RESCUE PLAN MUST:

HAVE A DIVER AT SURFACE
THAT MUST BE READY FOR HELPING

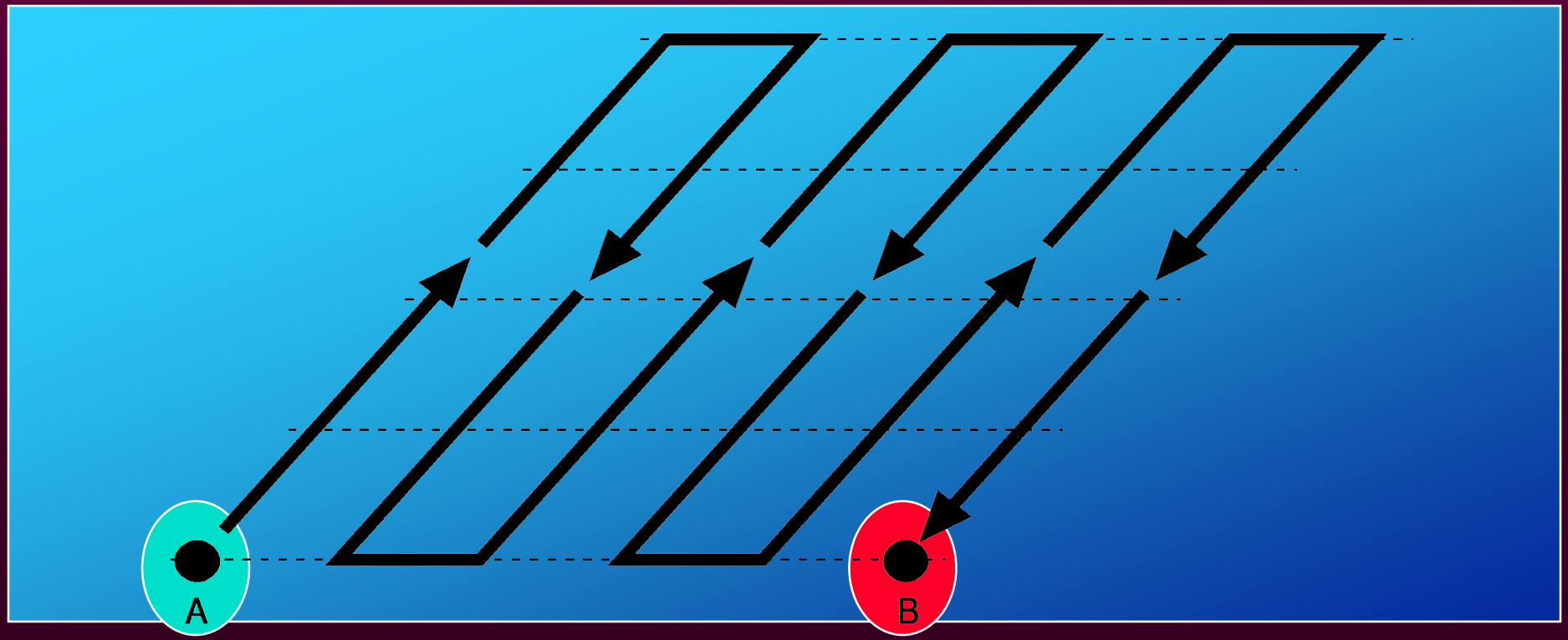
Lesson III

World Underwater Federation

Search & rescue

Search course

"U" COURSE



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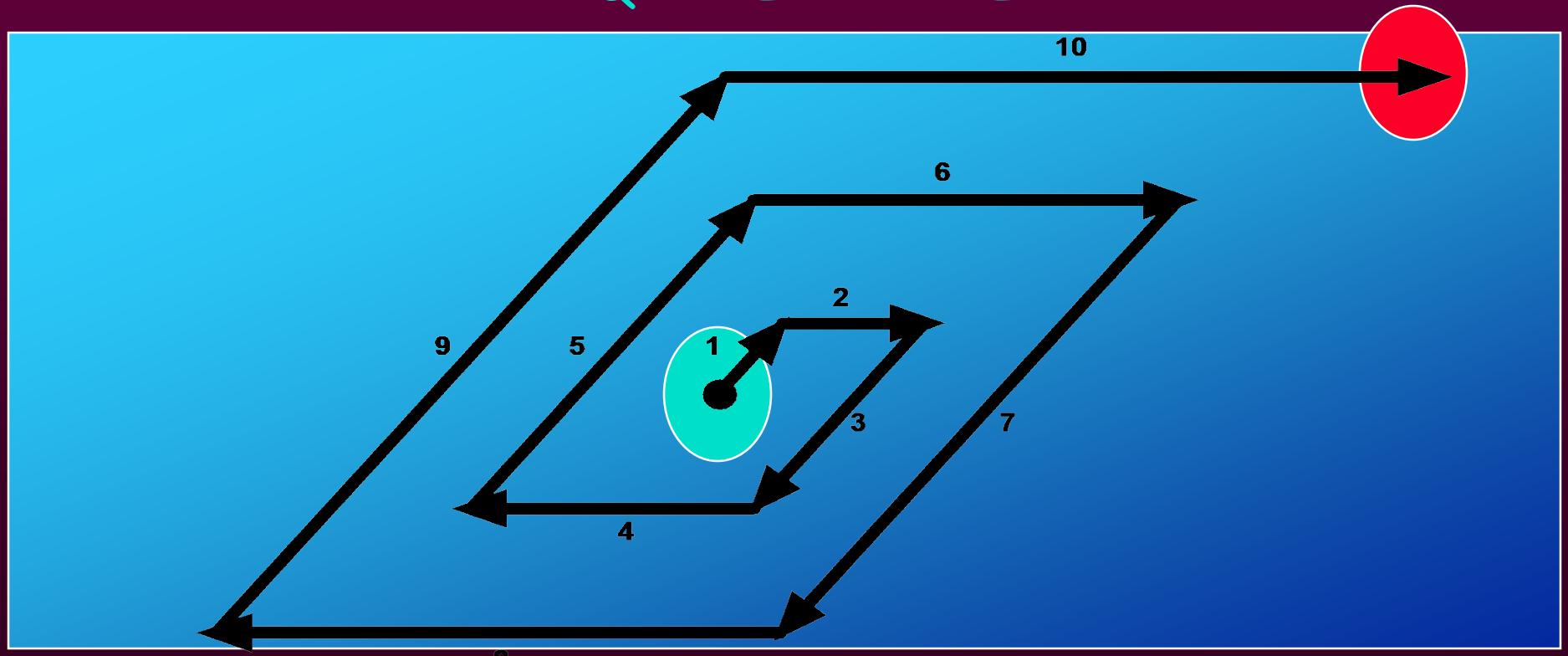
World Underwater Federation

Search & rescue

Search course

SQUARE COURSE



Lesson III

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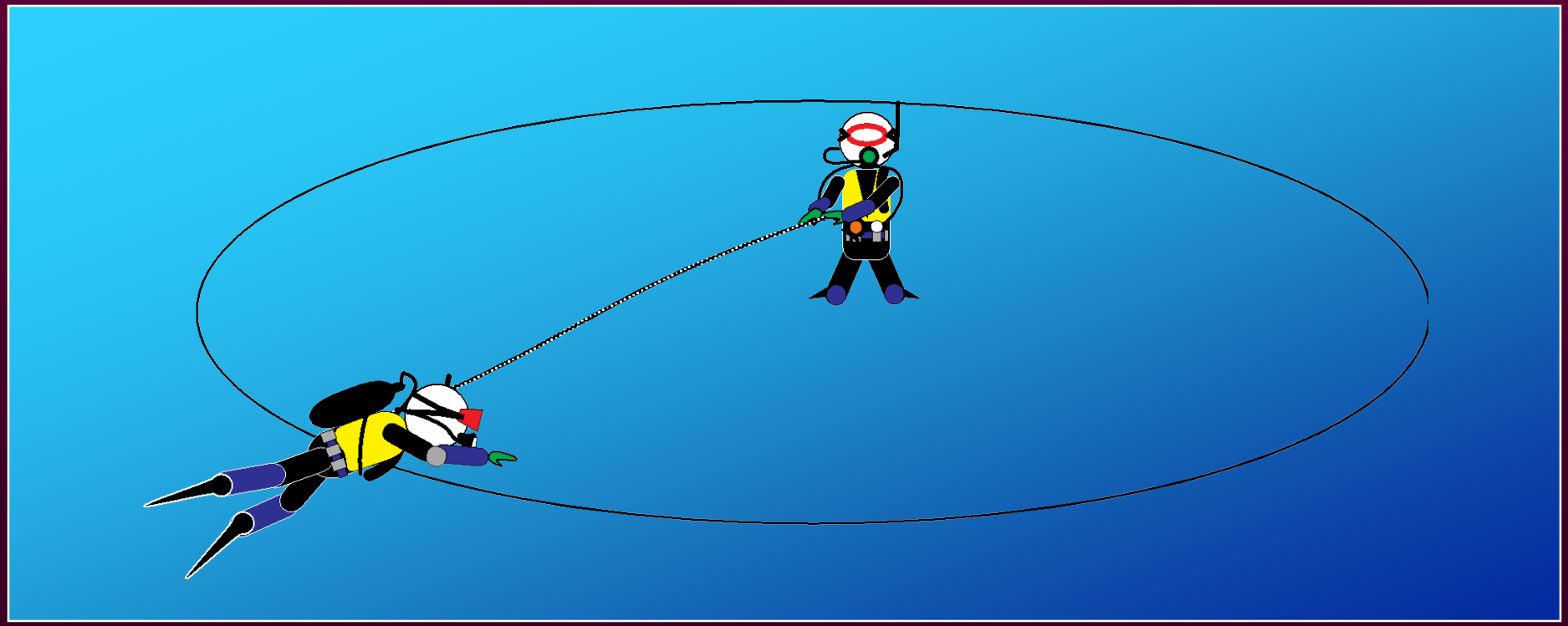
Search & rescue

Search course

ROUND COURSE



Lesson III

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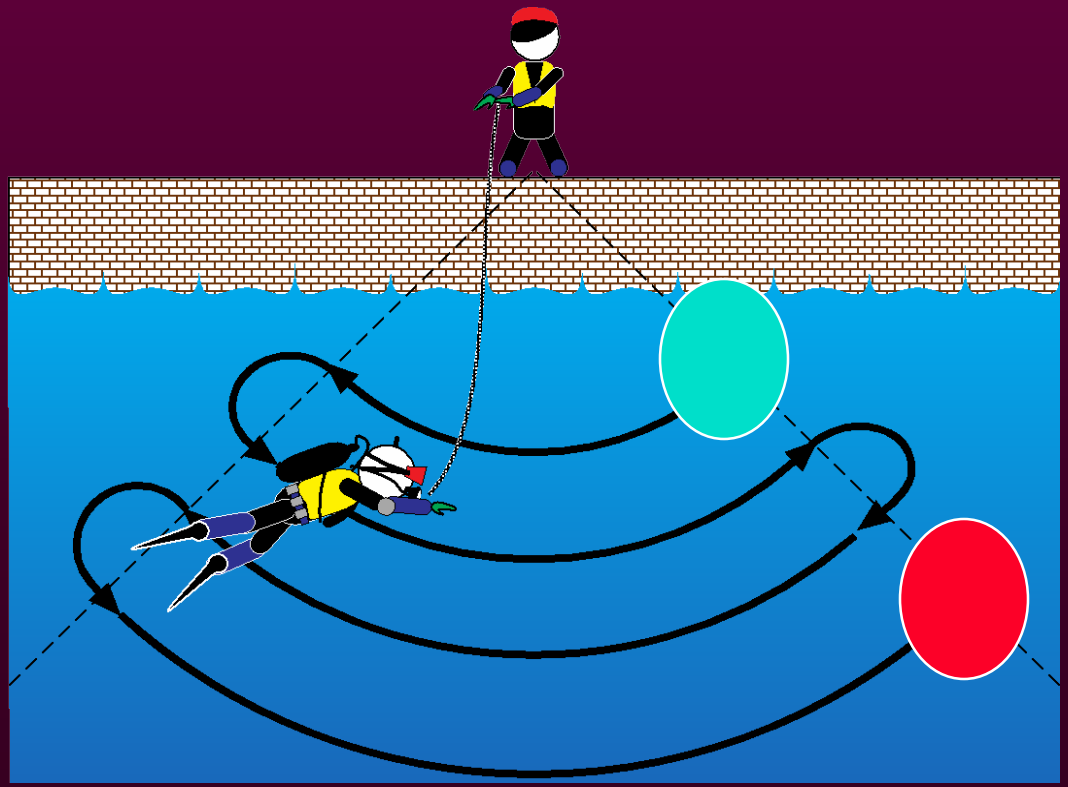
Search & rescue

Search course

CONTROLLED COURSE FROM THE SURFACE



Lesson III

World Underwater Federation

Search & rescue

RESCUE OF THE OBJECT

Lesson III

World Underwater Federation

Lesson 4

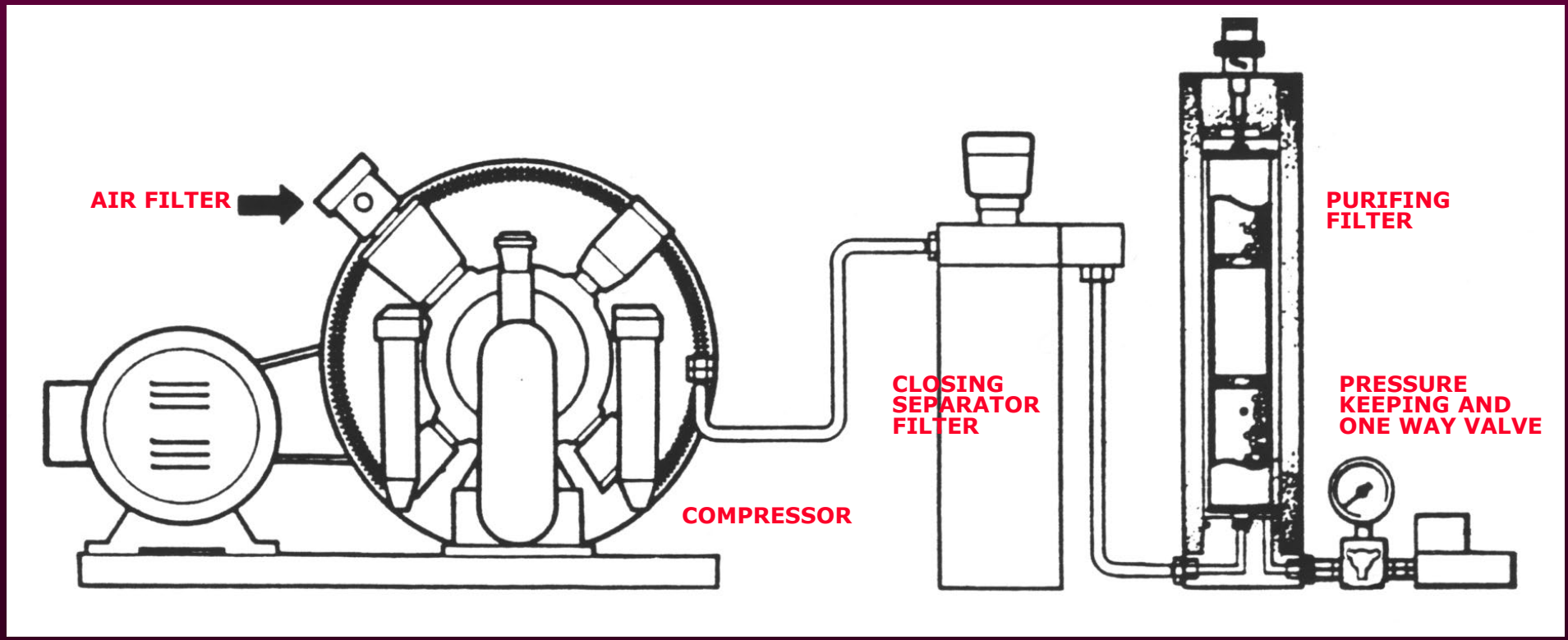
Equipment

Lesson IV

World Underwater Federation

Equipment

HIGH PRESSURE COMPRESSOR



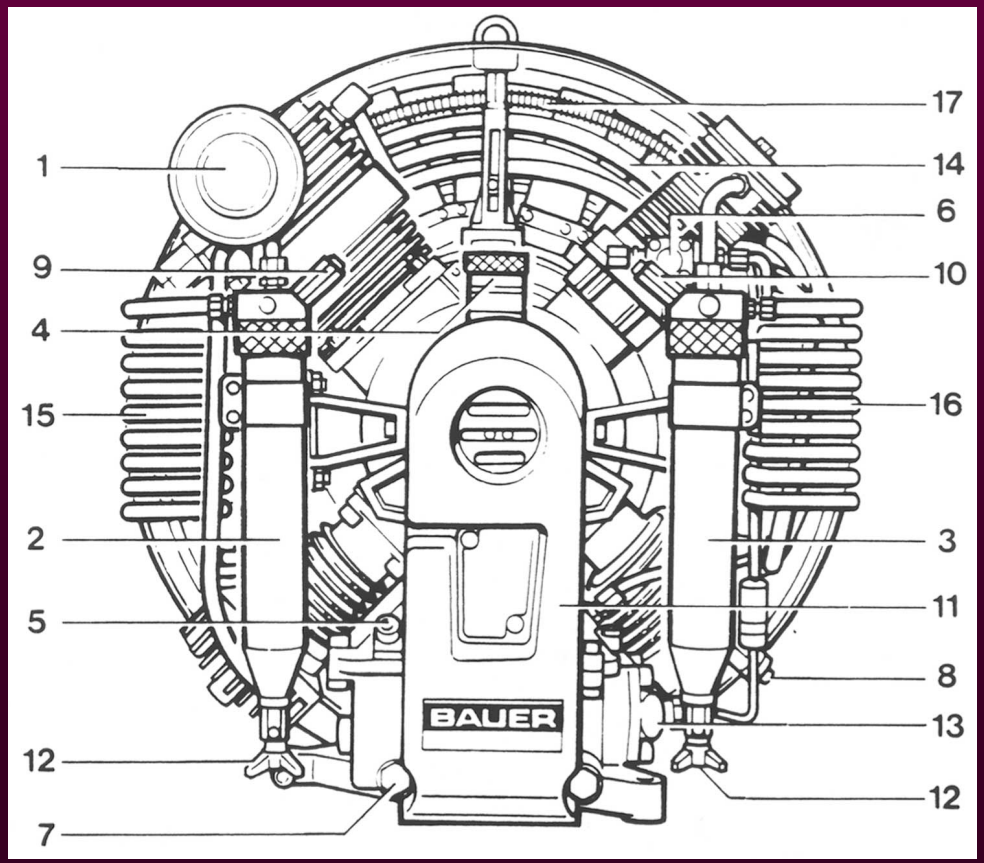
Lesson IV

World Underwater Federation

Equipment

HIGH PRESSURE COMPRESSOR

1. Suction filter
2. 2 stage separator filter
3. 3 stage separator filter
4. Lubricate filling nozzle
5. Level check bar
6. Lubricate pressure adjustment valve
7. Lubricate drainage cap
8. 1/2 stage safety valve



9. 2/3 stage safety valve
10. 3/4 stage safety valve
11. Protection belt
12. Condensation drainage valve
13. Oil pump
14. 1/2 inter-cooler
15. 2/3 inter-cooler
16. 3/4 inter-cooler
17. Final cooling circuit

Lesson IV

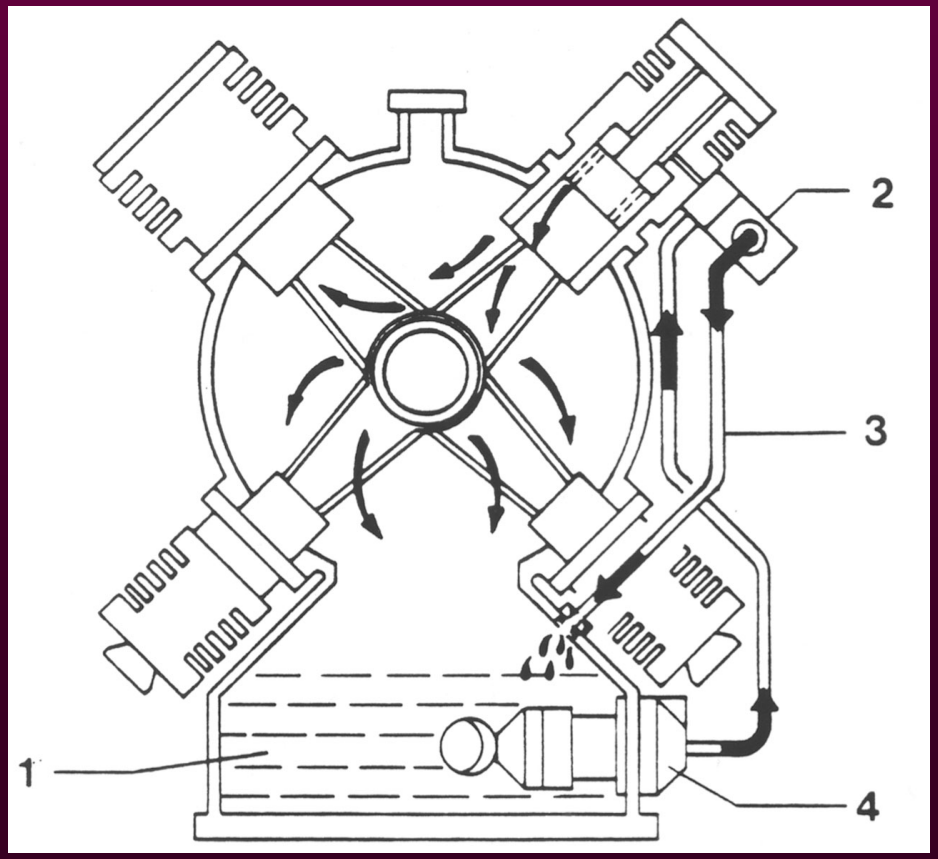
World Underwater Federation

Equipment

HIGH PRESSURE COMPRESSOR

1.
Cup

2.
Pressure regulator



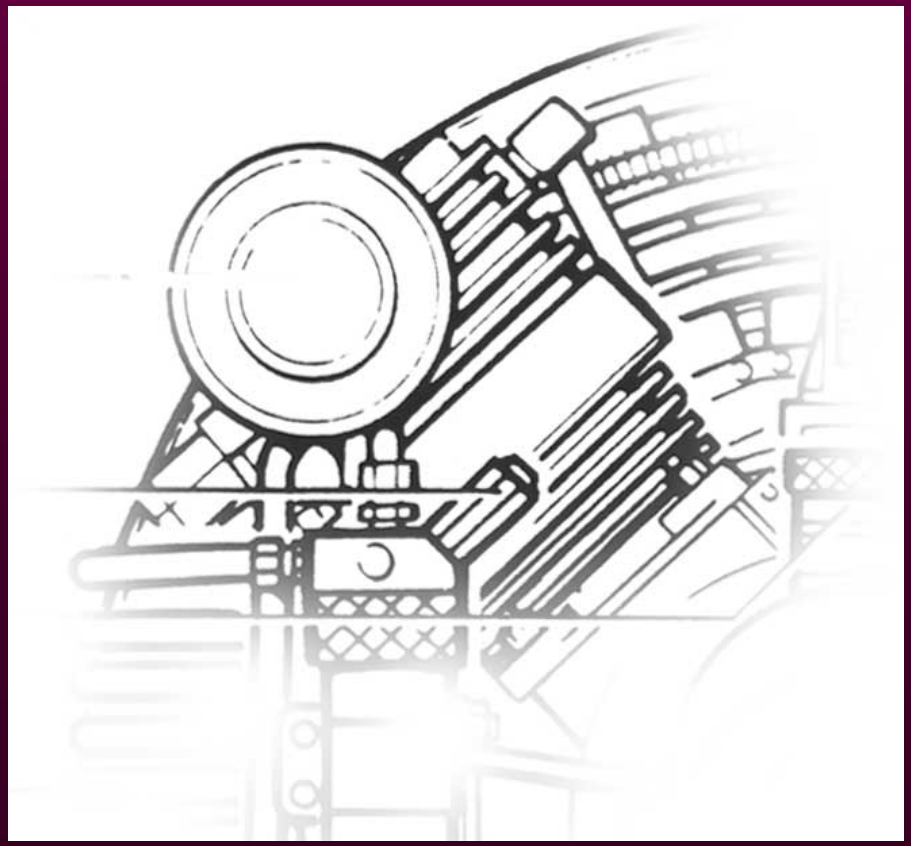
3.
Return circuit

4.
Injection pump

Equipment

HIGH PRESSURE COMPRESSOR

PURIFING FILTER



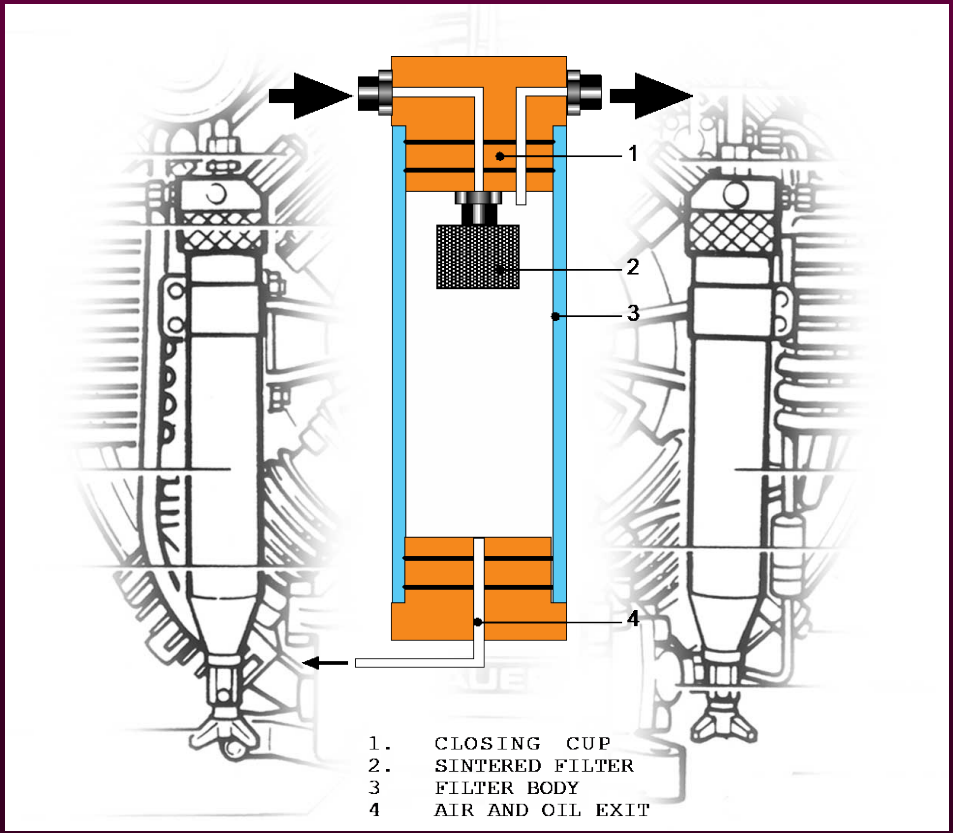
Lesson IV

World Underwater Federation

Equipment

HIGH PRESSURE COMPRESSOR

SEPARATOR FILTERS



Lesson IV

World Underwater Federation

Equipment

HIGH PRESSURE COMPRESSOR

SEPARATOR FILTERS

1 CLOSING CUP

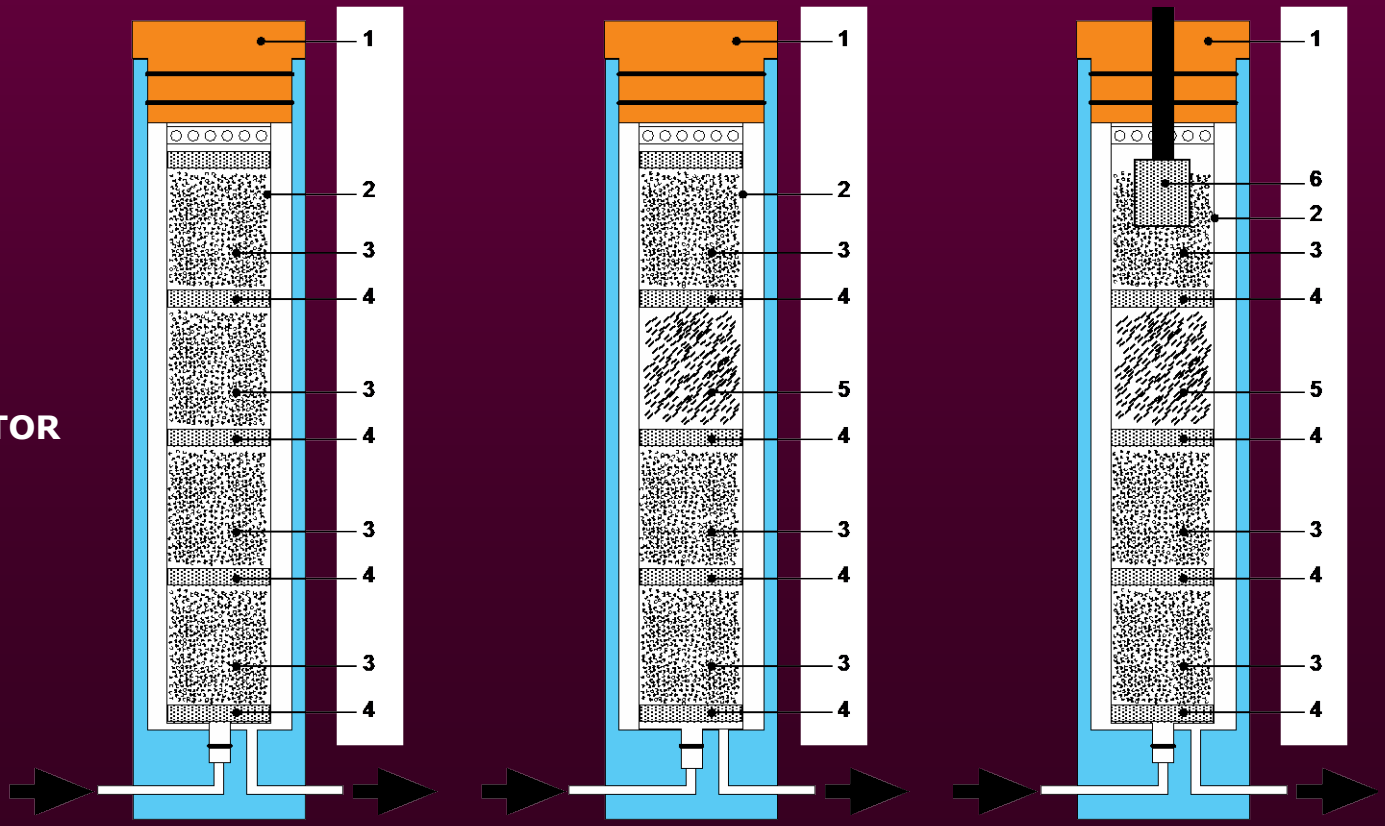
2 FILTER BODY

3 MOLECULAR SEPARATOR

4 SPONGY DISCS

5 ACTIVE COAL

6 TERMINAL SENSOR



Equipment

COMPRESSOR CHECKS

INLET AIR FILTER CHECK

A dry filter is usually used to filter air when it is entering, and this component of the compressor must suffer a strict maintenance and check too

- ***Before removing filter make a reference point by pen between filterand lodgement***
- ***Remove the filter and clean it blowing air from inside to outside***
- ***Clean with a cloth the lodgement of the filter, being careful that dust does not enter inside the aspiration pipe***
- ***Riplace the filter rotating it of 90° as regards the marked point, at the third rotation the filter will have to change***

The date of this maintenance changes according

to the environmental conditions where the device works

Equipment

COMPRESSOR CHECKS

SEPARATOR FILTERS CHECK

The intermediate filters are usually mechanical consequently their replacement must follow the manufacturer's advices
These filters are equipped with small tanks for condensation gathered that will be drained automatically or manually ar regular intervals

The duration of final purifying filter is given by:

- ***Environment temperature***
- ***Environmental humidity***
- ***Compressor temperature***

The filter has a variable duration and must be checked regularly, following the indication given by the manufacturer

Equipment

COMPRESSOR CHECKS

LUBRICANT LEVEL CHECK

- By a proper small stafe it is possible to check the lubricant level

- This test must be done every day before compressor turns on

- The oil level must respect the indicated measures as if the level is too high oil could pass trough the cylinders valves

Lesson IV

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Equipment

COMPRESSOR CHECKS

Change of the oil

Follow always manufacturer's instructions for the change of the oil either the procedures and the quantity . The manufacturer will indicate when to change the lubricate too , besides if the compressor is standing for a long time it is better to remove the lubricant inside the cup to avoid corrosion

- ***Turn on the compressor for some minutes***
- ***when the compressor is warm, make oil flow through draining nozzle***
- ***Open filling cap to favour oil discharge***
- ***After putting the new lubricant wait for 5 minutes before turnig up the device***
- ***Check that are not air bubbles in the circuit***

Equipment

COMPRESSOR CHECKS

SAFETY VALVE CHECK

All stages of the pumping unit are protected by safety valves that are tested and attested by the manufacturer

The most important valve is the final valve which regulates the refilled real pressure of tanks

This valve must be checked regularly to avoid leaks of circuit and especially to maintain the proper refilled pressure

Equipment

PROCEDURES

LOCATION OF COMPRESSOR

Compressor must be situated in a cool and dry place to avoid the formation of condensation but it is important to avoid dusty places too

The aspiration duct must be located far from exhaust emission exhalations

If the compressor is situated in a place with a cubature below 30 m2 a ventilation system will have to be installed

This rule must be respected too if there are other devices that develop heating in the same place

Equipment

PROCEDURES

REFILLED PROCEDURES

- ***Check the oil level***
- ***Test that the air intake are not obstructed***
- ***Check the tank to refilled testing the OR seal of the tank valves***
- ***Connect the on valve to tank valves***
- ***Put the tank in water to get a better cooling during refilling***
- ***Turn on the compressor***
- ***Wait for the filling of the intermediate stages***

The ticking that you listen to for few seconds when the compressor is on it is due to the piston of the last stage that is not in pressure yet

Equipment

PROCEDURES

REFILLED PROCEDURES

- **Open the on valve**
- **Open the valve of the tank valves**
- **Exhaust the condensation regularly**

In aparatus equipped with automatic condensation exhaust check that this operation happens at regular intervals

- **If the compressor is equipped with it, reached the rated pressure, a proper valve will turn off the compressor. Otherwise a set valve will exhaust the exceeding pressure**
- **Close the tank valves**
- **Exhaust the air through the on valve**
- **Disconnect the hose and replace the tank**
- **During refilling tanks warm up, even they are in water, consequently the inside pressure decreases because of the cooling. it is possible to restore the proper pressure reconnecting the tank to the compressor later**

Equipment

REFILLED PROCEDURES

USE OF STOWAGE AIR UNIT

If you need to refill tank in short time you could use the stowage unit.

These units include a set tank with a volume of about 90 lt, connected among them and, by by-pass unit, to the central refilled unit.

Through this by-pass unit the connected tanks will be refilled by pouring off, you can restore the pressure of stowage or refill them directly.

The main drawback of this refilled system is that the air could be stale because of a greater accumulation of condensation, mixed to oil, in the stowage tanks.

If it is not removed it creates a bad smell.

Lesson IV

World Underwater Federation