



# AIDA2 FREEDIVER

## OPEN WATER FREEDIVER COURSE

# Your AIDA Instructor

**Name**

**Age**

**Background / Profession**

**AIDA Instructor since**

# Who are you?

**Please introduce yourself to your buddies and to your instructor!**

# Introduction to Freediving

**Freediving can be learned!**

**Recreational vs. extreme freediving**

**Freediving = Apnea**

**Very diverse activity**

**A way of life**

**A social activity**

# AIDA International

**A**ssociation **I**nternationale pour le  
**D**éveloppement de l'**A**pnée

**Non-profit Organization**

**Founded 1992**

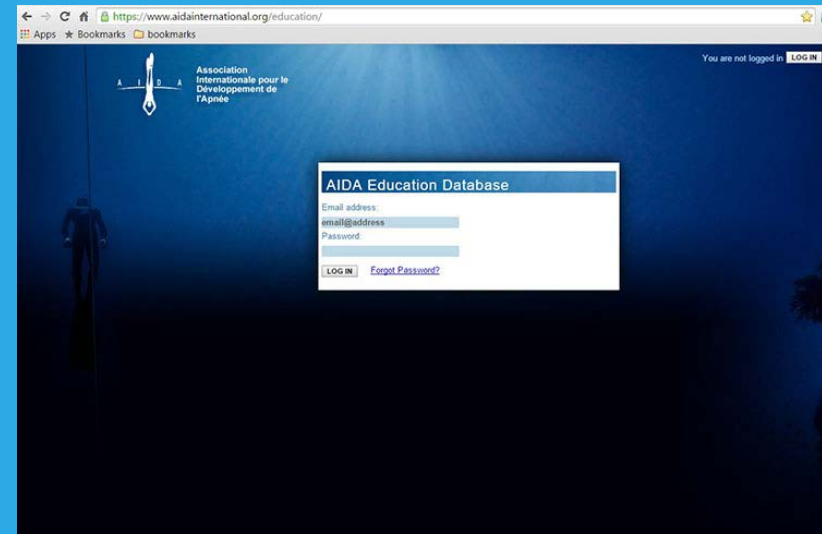
- Education Program
- Safety Standards
- Competitions and World Records

# Paperwork

Medical statement

Liability release (where applicable)

Registration with EOS







# THE BREATHING CYCLE

# Introduction

Oxygen saturation

96%-98% at all times

Hyperventilation does not  
store more Oxygen

Relaxation saves Oxygen



# Freedive Breathing Cycle

1. Relaxation Phase
2. One Full Breath
3. Breath Hold
4. Recovery Breathing

# Relaxation Phase

**Reducing physical activity**

**Mental focus**

**Belly Breathing**

**Relaxation Exercise**

- Body Scan
- Or any other exercise you know



# One Full Breath

**Comfortable, focus on relaxation**

**Inhale slowly**

**Two stage full breath (yogic breath)**

- First belly
- Then chest

**There can be only one!**

# Breath Hold

**Relaxation**

**CO<sub>2</sub> build up**

**Contractions**

**Mind game**

Video: "Urge to Breathe"

# Recovery Breathing

Safety concept

Relaxed passive exhalations

Quick full inhalations

Repeat 3 times (or more)

Make it a habit!

Exercise

# Freedive Breathing Cycle: Summary

**Relaxation Phase**

**One Full Breath**

**Breath Hold**

**Recover Breathing**



# BASIC PHYSIOLOGY



# Basic Physiology

**Respiratory System**

**Circulatory System**

**Mechanics of Breathing**

**Regulation of Breathing**

**Hyperventilation**

**Safely prolong Breath-Holds**

# Respiratory System

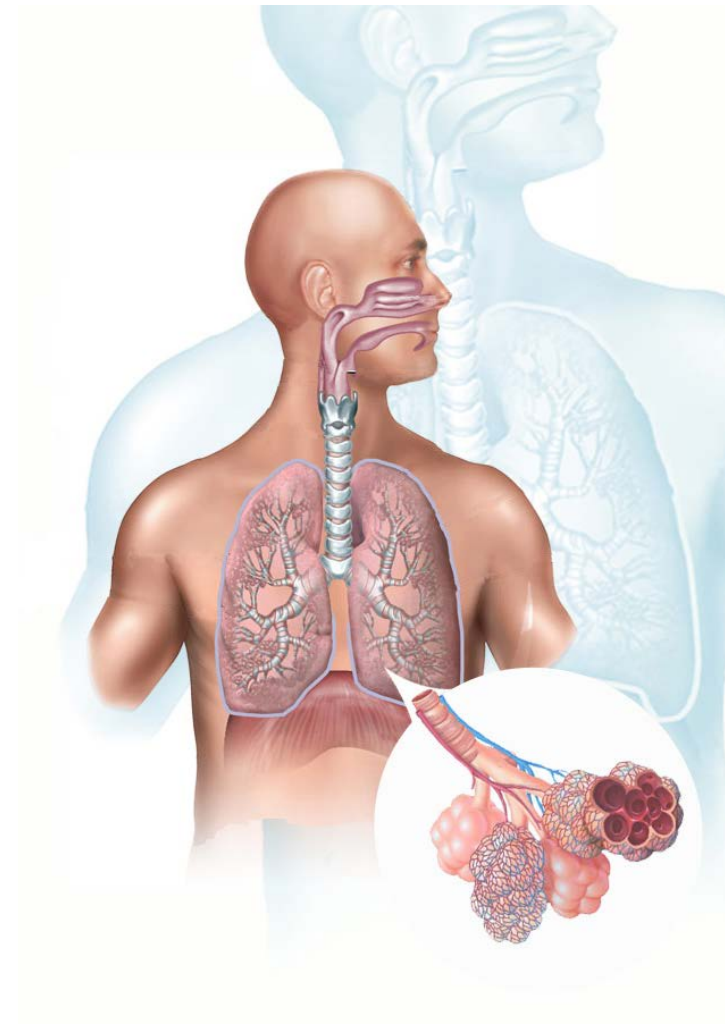
## Elements

- Nose/Mouth
- Trachea
- Bronchi
- Bronchioles
- Alveoli

## Gas Exchange in Alveoli

- O<sub>2</sub> (Oxygen)
- CO<sub>2</sub> (Carbon Dioxide)

## Video: "Respiratory System"



# Circulatory System

## Two cycles

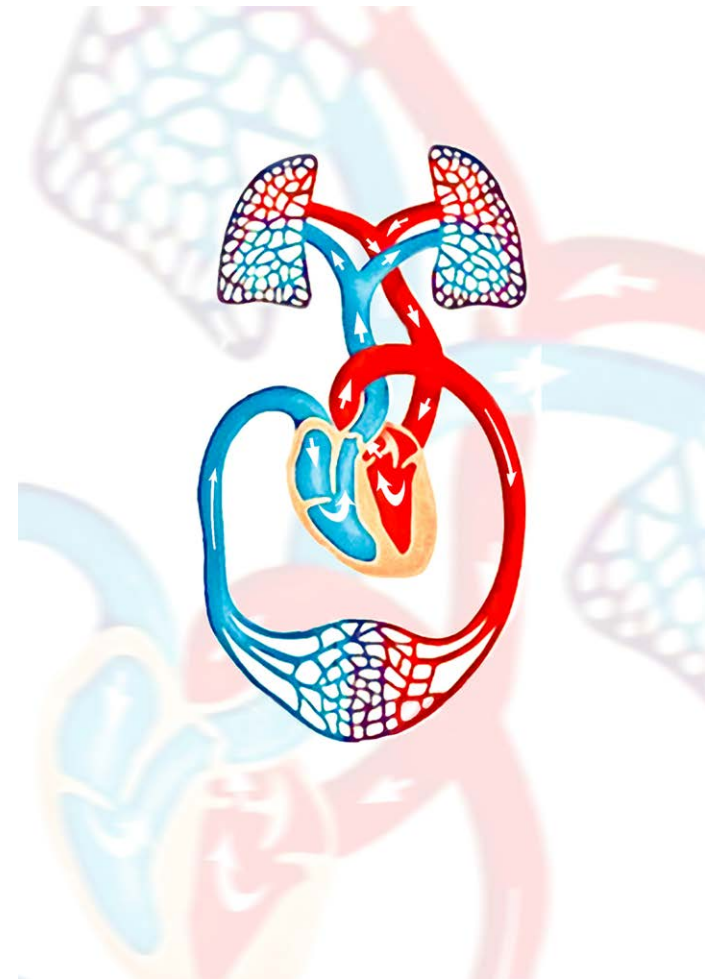
### **O<sub>2</sub> (Oxygen)**

- transported on red blood cells
- bonded with haemoglobin

### **CO<sub>2</sub> (Carbon Dioxide)**

- transported dissolved in blood plasma

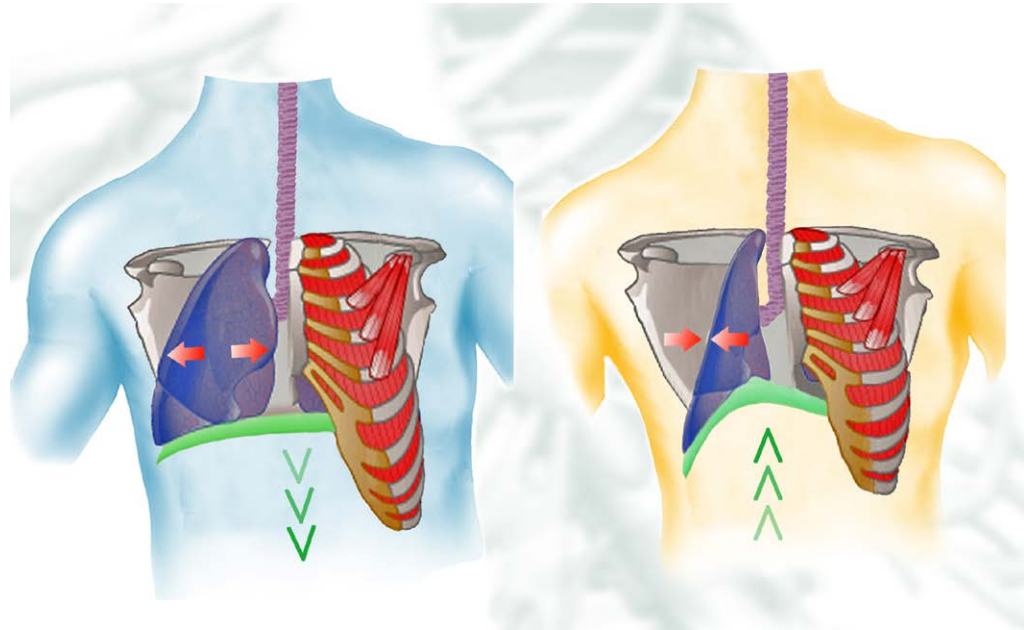
## Video: “Circulatory System”



# Mechanics of Breathing

**Main Muscle: Diaphragm**

**Belly Breathing**



# Mechanics of Breathing

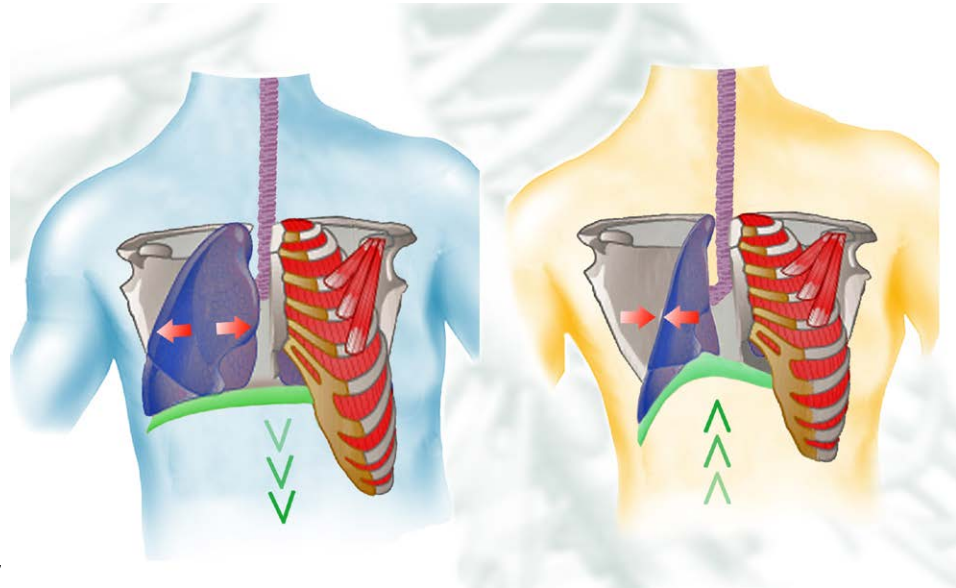
## Supporting breathing muscles:

- Intercostal muscles
- Accessory breathing muscles
- Chest Breathing

**Inhale: active**

**Exhale: passive**

**Video: “Mechanics of breathing”**



# Regulation of Breathing

**Neutral level of CO<sub>2</sub> is maintained by intensity of breathing**

**Breath hold: Rising CO<sub>2</sub> level**

**Mental aspects of breath holding**

**Physical aspects of rising CO<sub>2</sub>**

- Burning sensation / tightness in chest
- Contractions

# Hyperventilation (Hv)

**Moving more air than needed to maintain neutral level of CO<sub>2</sub>**

**Does not store more O<sub>2</sub>**

**Lowers the level of CO<sub>2</sub>**

**Delays signals of rising CO<sub>2</sub>**

**Raises heart rate**

**Reduces blood flow to the brain**



# Hyperventilation

## **Symptoms of Hyperventilation**

- Euphoria
- Tingling in the extremities
- Lightheadedness
- Dizziness
- Numbness around the mouth
- A metallic taste in the mouth
- Semi paralysis of the hands

# Safely Prolong Dives

**CO<sub>2</sub> Tolerance**

**Relaxation**

**Efficiency (Technique)**

# Basic Physiology: Summary

**Respiratory System**

**Circulatory System**

**Mechanics of Breathing**

**Regulation of Breathing**

**Hyperventilation**

**Safely prolong Breath-Holds**

A diver in a camouflage wetsuit is hanging from a blue and white rope underwater. The diver's head is at the bottom, and their arms are crossed. The background is a clear blue water. The word "EQUALISATION" is written in white capital letters across the center of the image.

# EQUALISATION

# Equalisation

**Pressure: Boyle's Law**

**The Body's Air Spaces**

**Equalisation Technique**

**Facilitate Equalisation**

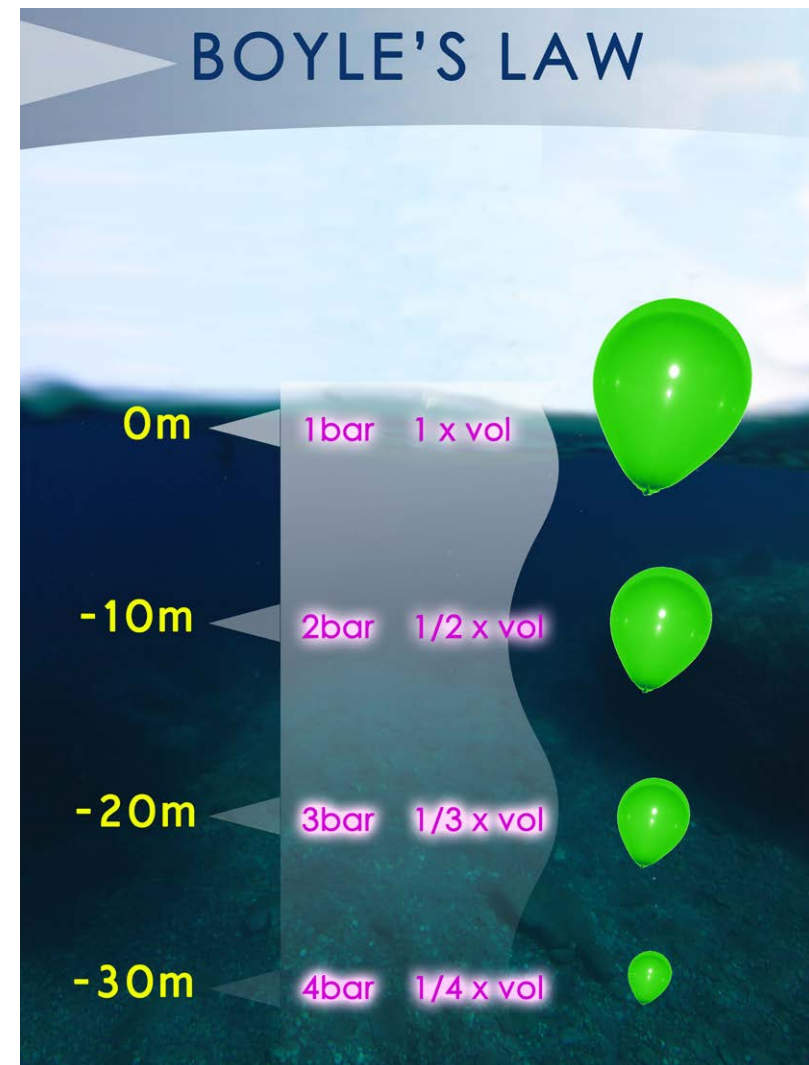
# Pressure

## Pressure builds by depth

1 bar per 10m

### Boyle's Law:

"If the temperature remains constant, the volume of a gas is inversely proportional to the absolute pressure."



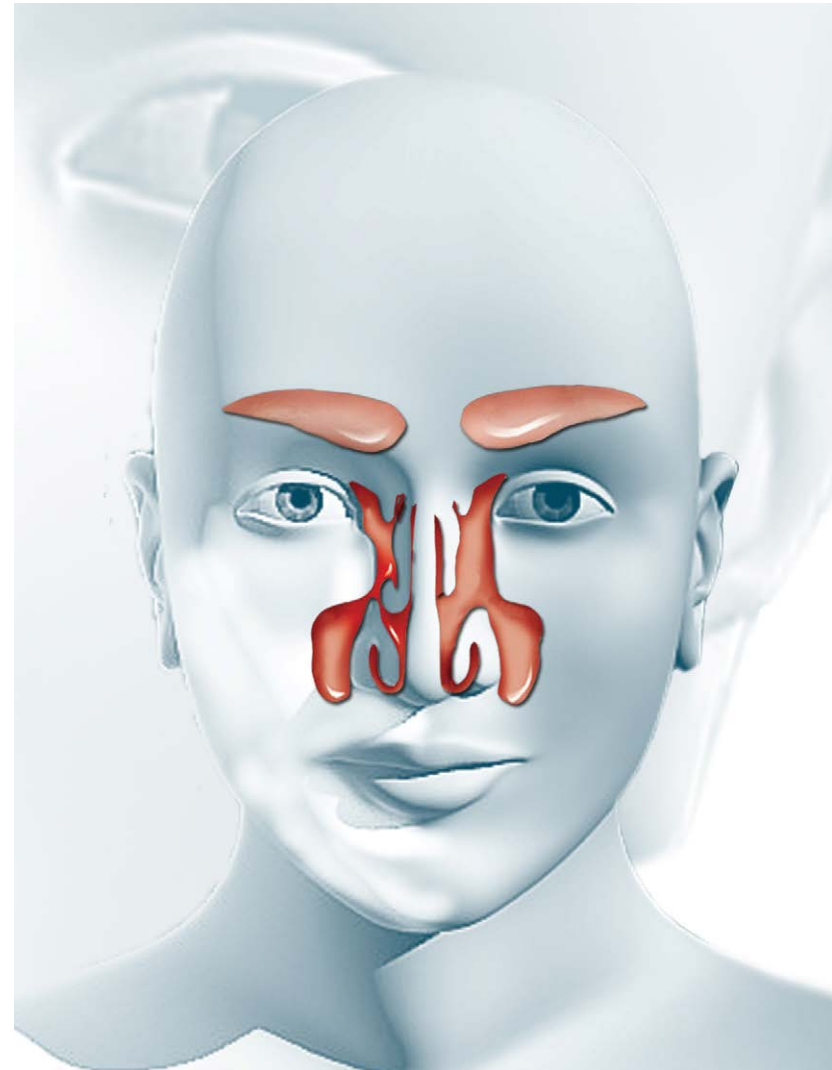
# Air Spaces

## **Need to equalize:**

- Ears
- Sinuses
- Mask

## **No need to equalize**

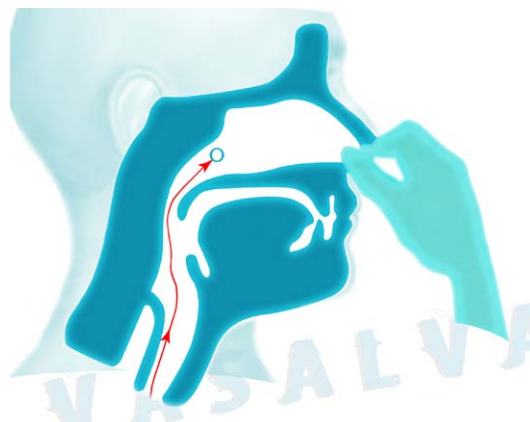
- Lungs



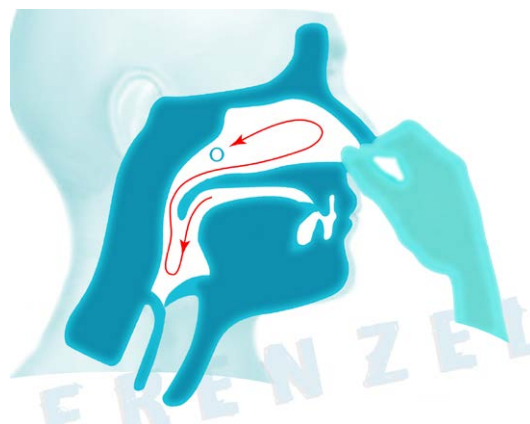


# Equalisation Technique

**Valsalva Manoeuvre**



**Frenzel Technique**



# Facilitate Equalisation

**Good technique**

**Equalise frequently enough**

**Slow down your descent if necessary**

**Dive healthy**

**Stretching before diving (neck, jaw, full body)**

**Outer ear filled with water (if wearing a hood)**

**Avoid decongestant medication**

**Avoid air condition**

# Equalisation: Summary

**Pressure: Boyle's Law**

**The Body's Air Spaces**

**Equalisation Technique**

**Facilitate Equalisation**



# FREEDIVE TECHNIQUE

# Freedive Technique

## **Technique is key to safe freediving**

- Preparation
- Duck Dive
- Descent & Equalisation
- Turn
- Ascent
- Surface and Recovery

# Preparation

Relaxation Phase

One Full Breath

Take snorkel out

Pre-equalise

... Duck Dive!

# Duck Dive

**Most effective start of a freedive**  
**Pre-equalise**

## **3-Step Duck Dive**

1. Stretch out on surface
2. Bend from hips
3. Pull arms back





# Descent

Minimum effort

Equalise when needed

Stay relaxed



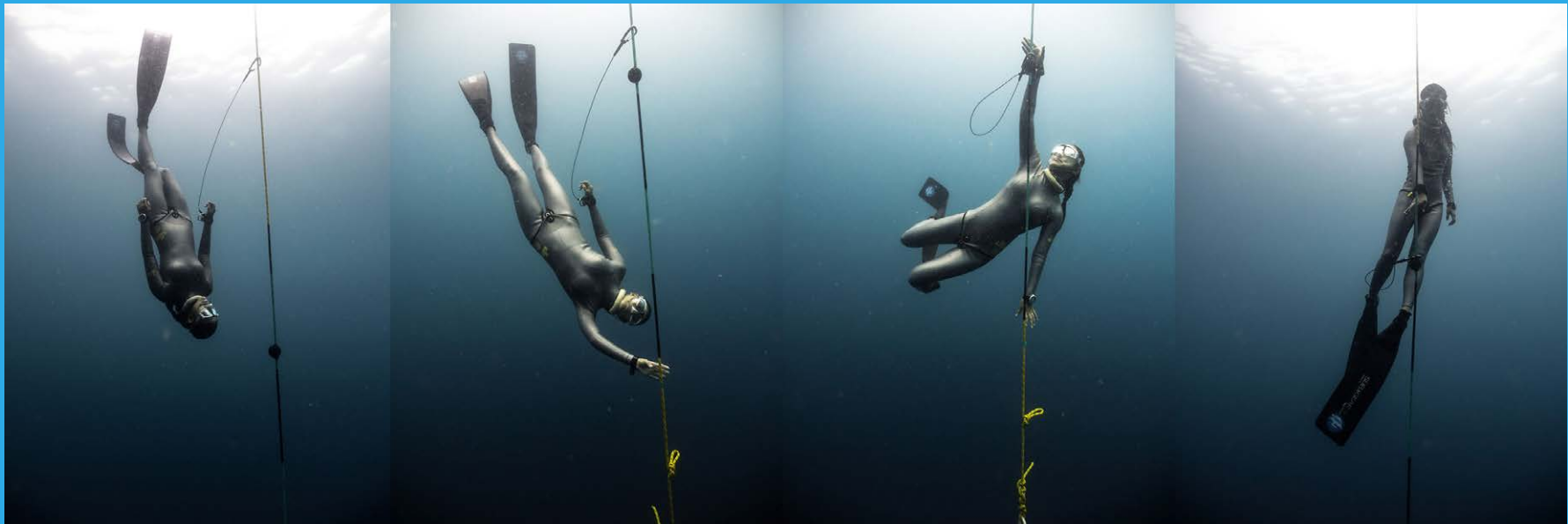
# Turn

1. Extend one arm (glide)

2. Grab the line to stop

3. Forward tumble turn

4. Pull line to start ascent



# Ascent

Looks like descent  
(minus equalisation)

Focus: Finning technique  
& streamlining

Use of buoyancy



# Surfacing & Recovery

1. Keep your air in
2. Grab the buoy
3. Recovery Breathing
4. Buddy communication

# Freedive Technique: Summary

Preparation

Duck Dive

Descent & Equalisation

Turn

Ascent

Surface and Recovery

A photograph of two freedivers underwater. The diver on the right is a man wearing a black wetsuit, a silver belt, and a red helmet. He is holding a yellow rope with his left hand and has his right hand near his face. The diver on the left is a woman wearing a black wetsuit, a silver belt, and a black mask. She is looking towards the man. The background is a deep blue ocean with some bubbles. The text "SAFETY IN FREEDIVING" is overlaid in white capital letters.

# SAFETY IN FREEDIVING

# Safety in Freediving

The Buddy System

Loss of Motor Control (LMC)

Blackout (BO)

Signs of Trouble

Symptoms of Blackout

Rescue Procedures

Risk Reduction

Freediving and Scuba

# Buddy System

**First level of safety: You!**

**Second level of safety: The buddy team**

**Take buddying as seriously as diving**

## **Buddy communication**

- Session briefing
- Keep communicating
- Refuse if uncomfortable

## **Forms of buddying**





# Static Buddying

## **Safety check**

- Verbal
- Non-verbal

## **Buddy team plan**

## **Maximum reliability**

# Dynamic Buddying

Follow on surface

Head-to-head

Use snorkel

No weights

Upon surfacing:  
Be there, but not touch.

# Deep Buddying

Meet at depth: minimum -10m

Keep the rope between the diver and yourself

Synchronize ascent

Surface together

Watch the diver for >30s

# Loss of Motor Control (LMC)

**Hypoxic fit after surfacing**

**Jerky movements of eyes, limbs or head**

**Strong warning signal**

**Stop diving for the day**

**Find out why it happened**

# Support a Victim of LMC

Gently hold the freediver so his/her airways are out of the water

Reassure and coach through recovery breathing

Remove facial equipment if needed

Remind to stop diving

Check for injuries (mainly in pool)

# Blackout (BO)

**Loss of consciousness**

**Hypoxia**

- $\text{SatO}_2 < 50\%$

**Brain damage: Question of doses!**

**Stop diving for the rest of the day**

**Find out why it happened. Change your diving!**

# Signs of Trouble

## **You can see:**

- Change of finning style
- Unfocused eyes
- Grabbing the rope
- Speeding up
- Escaping air
- Inability to keep head above water
- Anything abnormal

**If you think you should act – act!**

# Symptoms of BO

## **You can feel:**

- Ear ringing
- Feeling of warmth
- The dive starts to feel easier
- Tunnel vision
- Fuzzy thoughts
- Tingling sensation

**Surface immediately or indicate to your buddy!**



# Rescue

## **SAFE-Rule**

**S**urface

**A**irways

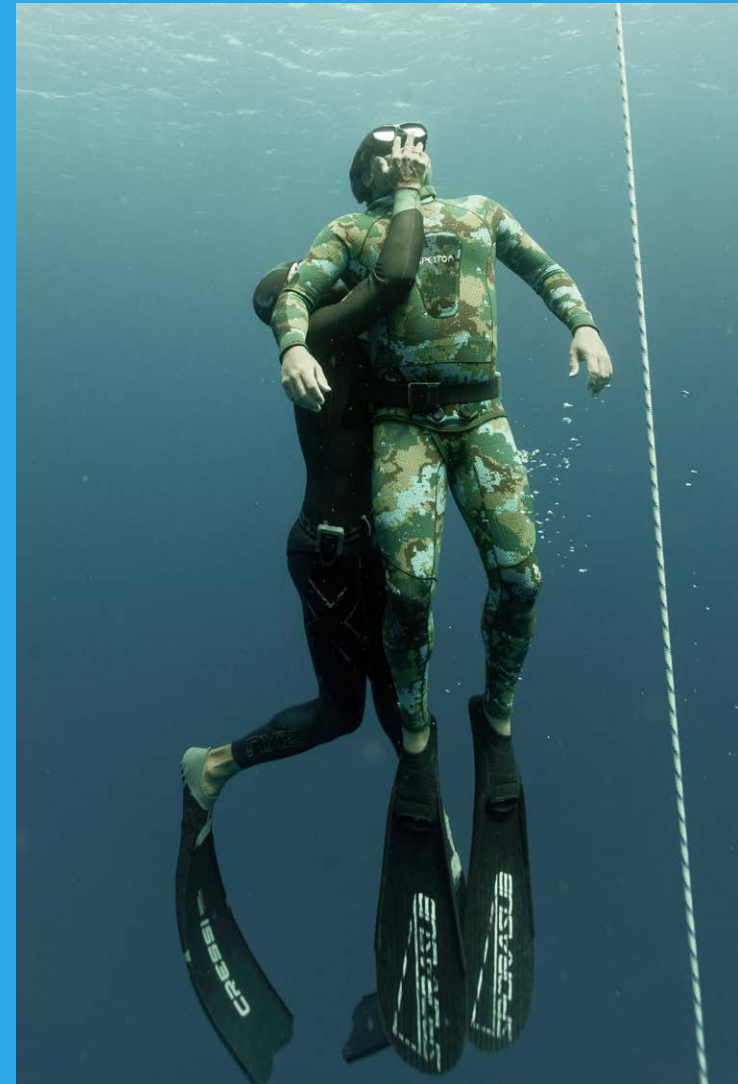
**F**acial **E**quipment

## **Blow - Tap – Talk**

- Until regaining consciousness
- Max. 10-15 seconds

## **Rescue breaths**

- Up to 5 rescue breaths
- Open airways: Tilt-back the head



# Rescue

## **If the victim does not resume breathing:**

- Call for help
- Start CPR (Cardiopulmonary Resuscitation)
- Evacuate to nearest medical facility

**AIDA advises you to consider attending a first aid course!**

# Risk Reduction

**Always freedive with a trained buddy**

- Regular rescue training!

**Correct weighting**

**Snorkel out!**

**Bring a buoy or float!**

**Wear a lanyard in <10m visibility**

**Always Recovery Breathing**

# Risk Reduction

Relaxation

Good technique

Conservative freediving

Hydration

Slow progression approach

Avoid smoking

Low blood sugar vs. Eating

Stay warm

# Freediving & Scuba

## **With scuba computer:**

- Wait for No Fly Sign!

## **Rule of thumb:**

- After one scuba dive: Wait 12h
- After several scuba dives: Wait 24h

## **Do not accept air from Scuba divers!**

## **Scuba after Freediving:**

- Wait 12h!

# Safety in Freediving: Summary

The Buddy System

Loss of Motor Control (LMC)

Blackout (BO)

Signs of Trouble

Symptoms of Blackout

Rescue Procedures

Risk Reduction

Freediving and Scuba



# Freedive Equipment

**Masks**

**Fins & Monofins**

**Snorkels**

**Weight belts & Weights**

**Wetsuits**

**Lanyards**

**Buoys & Floats**



# Mask

**Enclose nose**

**Assure good fit**

**Low volume**

**Clear lenses**

**Flexible skirt**



# Freedive Fins

**Full foot pocket**

**Length = Power (with good technique)**

**Plastic / fibre glass / carbon**

**Blades in var. stiffness**



# Monofin

**More powerful**

**Different technique**

**Competition tool**



# Snorkel

**Safety tool**

**Moderately rigid**

**Without purge valve**

**Remove before diving**

**Attached to mask?**



# Weight belt

**Flexible**

**Worn on hips**

**Small weights**

**Seals suit**

**Quick release**

**Worn on hips**

**Small weights**

**Seals suit**



# Wetsuit

**Protection from cold and sun**

**Varying thickness**

**Tailor made / close fit**

**Full body**

**No zipper**

**Mobility**

**Fragile**



# Lanyard

**Attaching to the dive line**

**To keep the bearings**

**For rescue purposes with a  
counterweight system**

**Quick release**





# Freedive Buoy

**Flat for resting**

**Dive line firmly attached**

**Tethering line**

**Carabineers**

**Handles to hold on to**

**Light bottom weight**

**Tennis ball to stop lanyard**

**Bottom plate**





# Gear maintenance

**Rinse in fresh water**

**Dry in the shade – protect from direct sun**

**Store in dry place**

# Freedive Equipment: Summary

**Masks**

**Fins & Monofins**

**Snorkels**

**Weightbelts & Weights**

**Wetsuits**

**Lanyards**

**Buoys & Floats**

# FREEDIVE DISCIPLINES



# Introduction

**Recreational and Competitive Freediving**

**In AIDA: 8 disciplines**

**In AIDA2 Course: 4 disciplines**

# Static Apnea (STA)

**Breath hold face down in water**

**Pool or confined water**

**Mind game**

**Contractions**

**Most accessible form of training**

**In the dry: Solo training possible**

**In water: Always with a buddy!**

World Records

Video: Static Apnea



# Dynamic Apnea (DYN, DNF)

**Horizontal distance covered  
on one breath**

**Pool or confined water**

**Dynamic with Fins  
or Monofin: DYN**

World Records



# Dynamic Apnea

**Horizontal distance  
covered on one breath**

**Dynamic no Fins: DNF**

**Lifeguard is NOT a buddy!**

World Records

Video: Dynamic Apnea



# Free Immersion

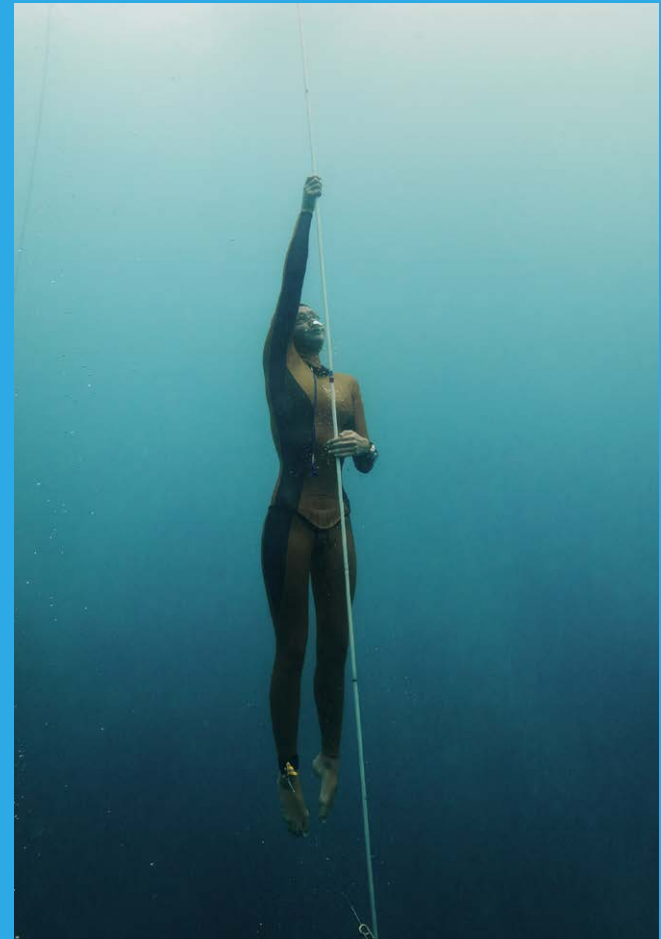
**Pulling yourself down and back up a line: FIM**

**Warm-up**

**Streamlining**

**Equalisation training**

World Records





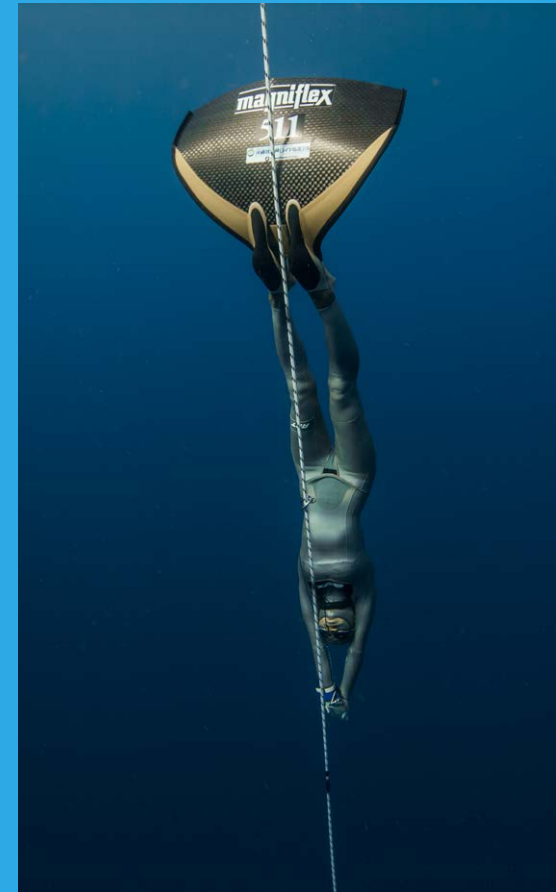
# Constant Weight

Swim down and back up using the same amount of weight

Grab the rope only to turn

Constant Weight with Fins or monofin: CWT

World Records



# Constant Weight

**Constant Weight No Fins: CNF**

World Records



# Variable Weight (VWT)

**Descend with weight or sled**

**Ascend without weights**

**Ascend swimming and/or pulling**

**Not a competition discipline**

World Records



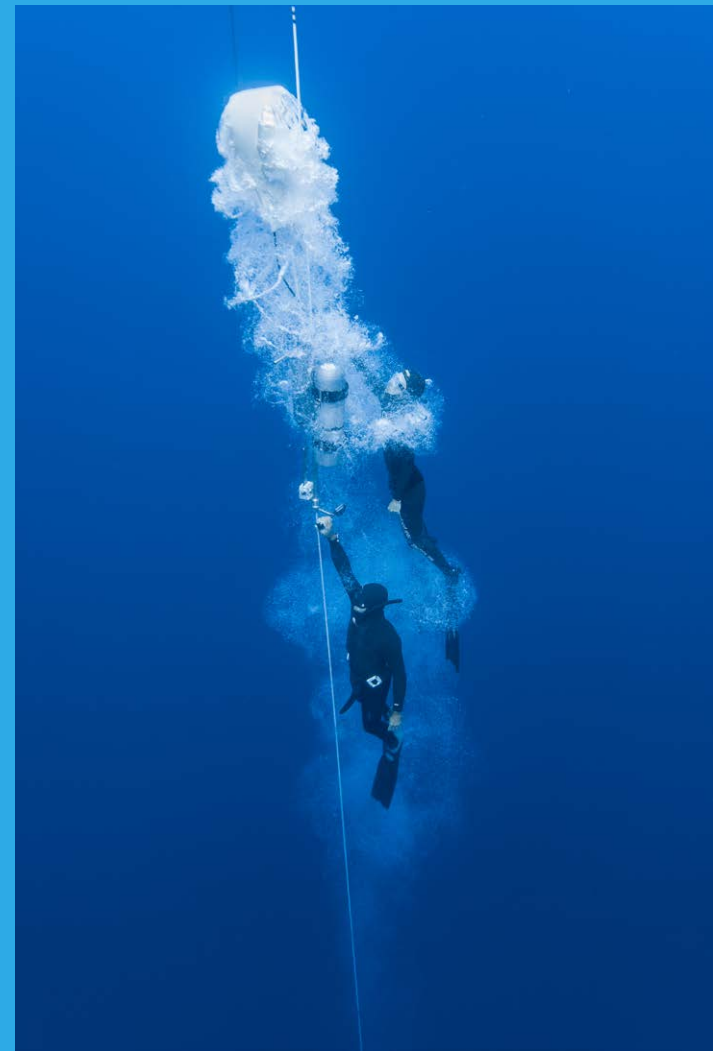
# No Limits (NLT)

**Descend with weights or sled**

**Ascend using lifting device**

**Not a competition discipline**

World Records



# Disciplines: Summary

<b>Static Apnea</b>	STA
<b>Dynamic Apnea</b>	DYN / DNF
<b>Free Immersion</b>	FIM
<b>Constant Weight</b>	CWT / CNF
<b>Variable Weight</b>	VWT
<b>No Limits</b>	NLT

# Freedive Code of Conduct

Mind your surroundings

Mind your long fins

Mind marine life

Do not remove anything from the sea

Do not leave anything in the sea

Mind the dive site

Be a role model



# Thank you for your attention

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