

**Friday Night
Scuba Refresher
With
Larry “Harris” Taylor, Ph.D.**

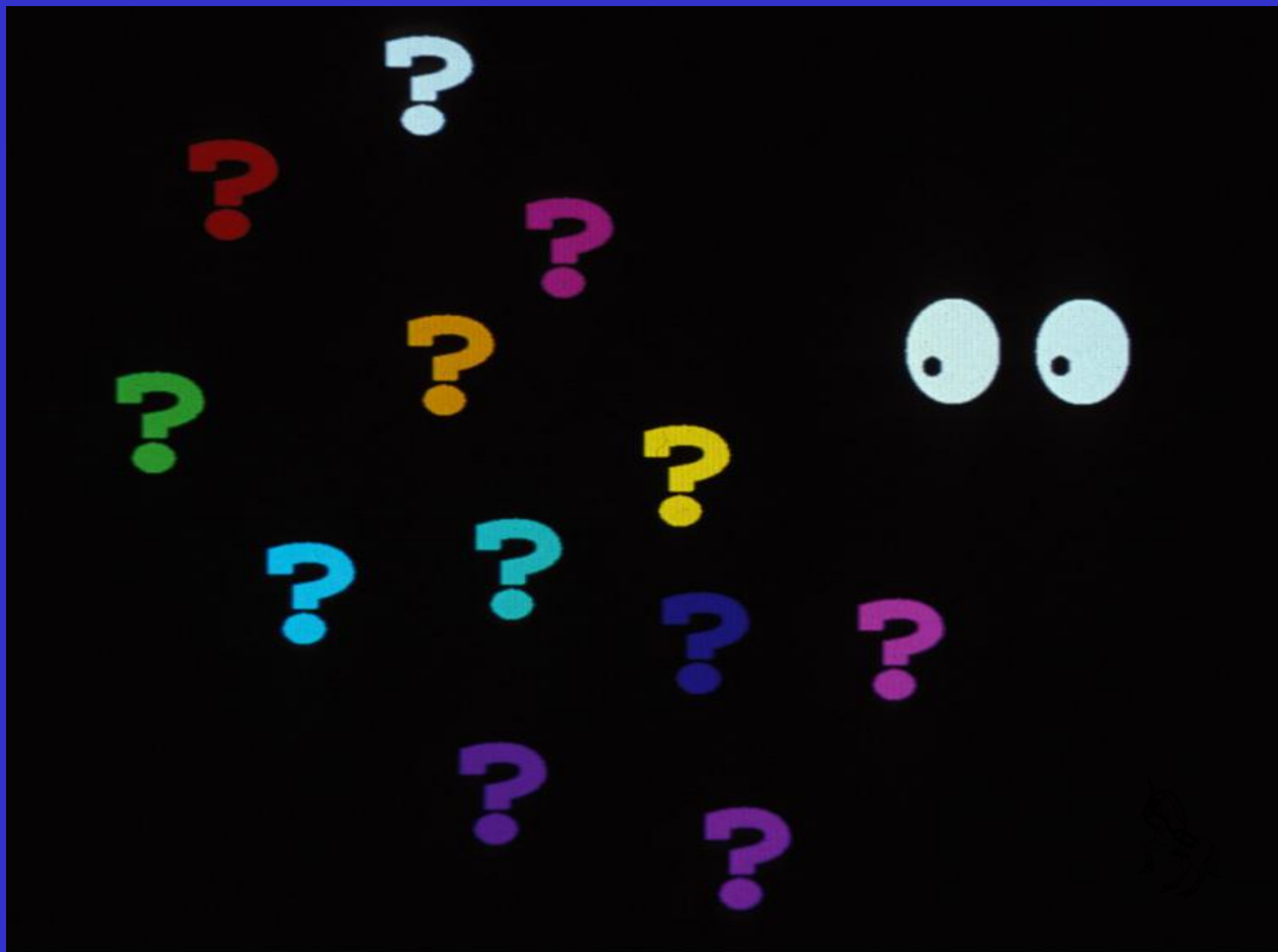


The Lecture Is A Democracy



The Water-Work Is A Dictatorship!





Practice of Diving



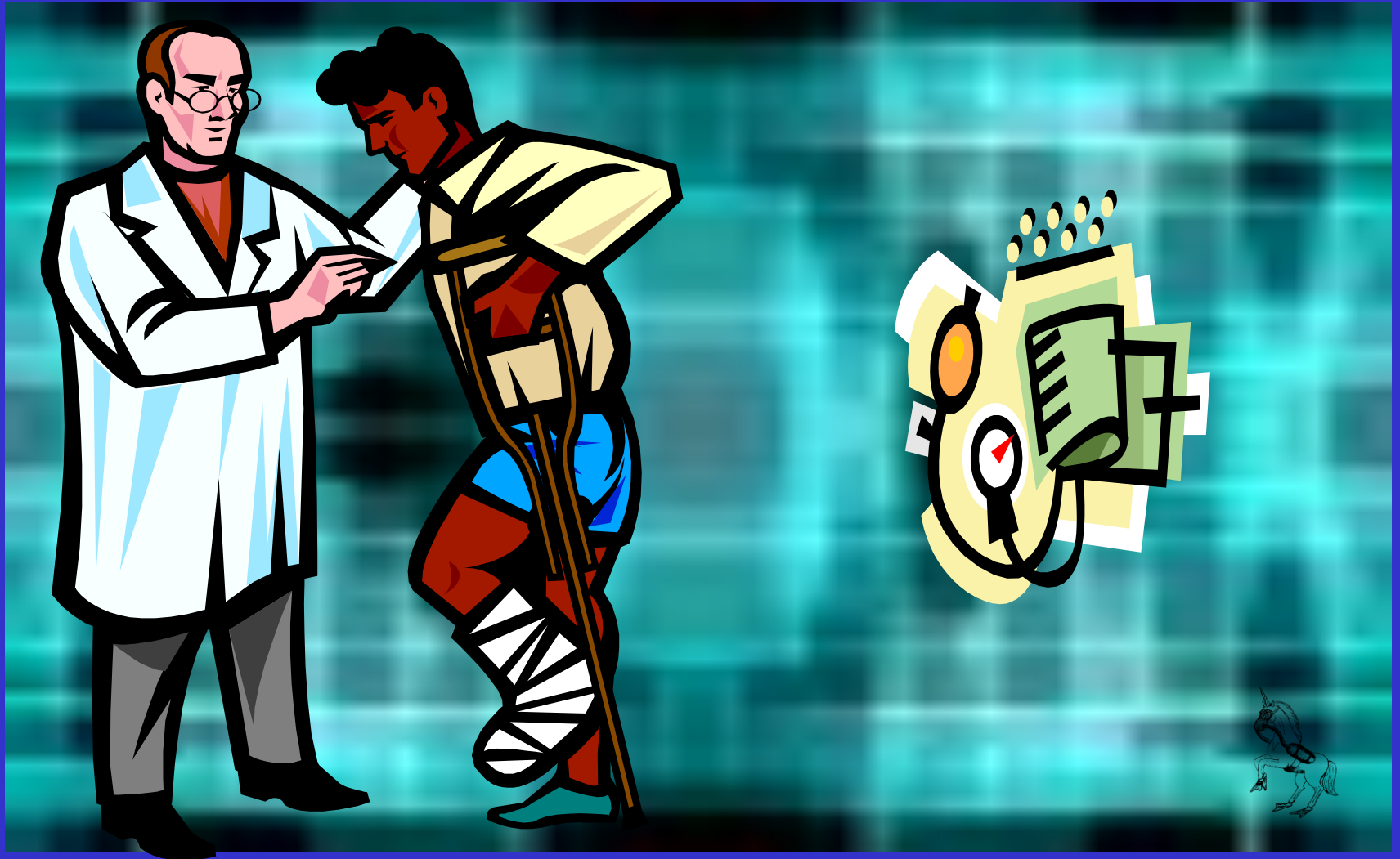
Need To Feel Good



Physically
Mentally
Emotionally



Need Medical Evaluation



Avoid Bad Pre-Dive Habits



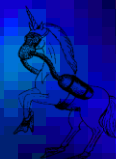
Alcohol



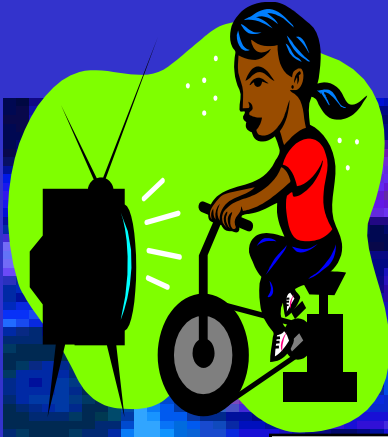
Changes viscosity of inner ear fluid

Inner ear: Last organ to clear

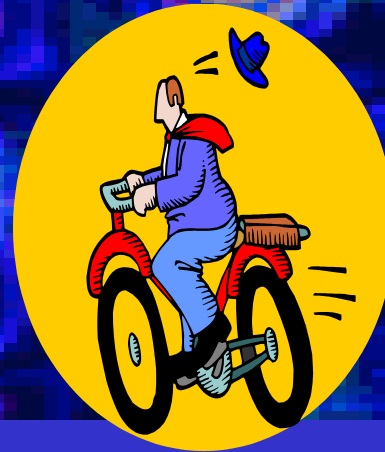
**Pre dive alcohol compromises
Ability to determine
Which way is up!**



Exercise Lifestyle

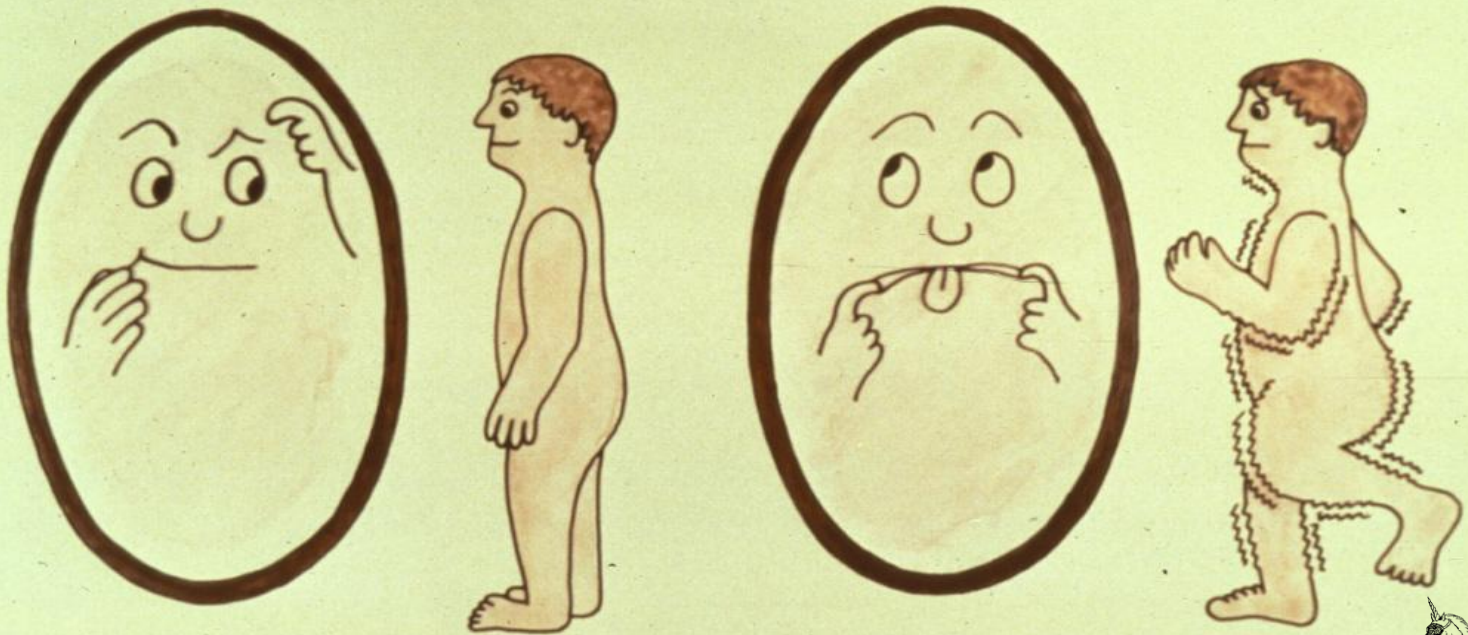


Aerobics for Stamina
Anaerobics for Strength



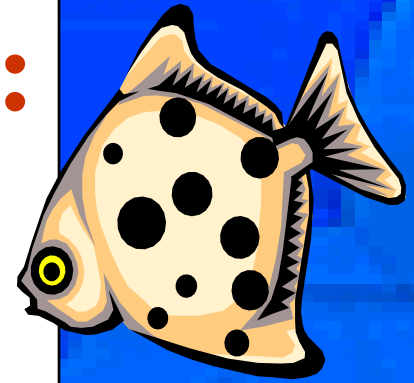
The Jiggle Test

The “jiggle” test:



Bottom Line

Avoid Diving with:
Alcohol
Drugs
Diseases
Injuries
Emotional Stress





**The “Gospel”
According to “Harris”
The knowledgeable,
“Physically Fit Diver
ALWAYS
Has More Fun!”**



**“Primitive Brain”
Does NOT like Immersion
So,
Apprehension is normal
Until acclimated**



Buddy Diving?

**In Michigan Waters
75 % of scuba fatalities
Alone at time of death
But
Only 25% entered alone**

Buddy Diving

Dive Together As a Team



Buddy Diving

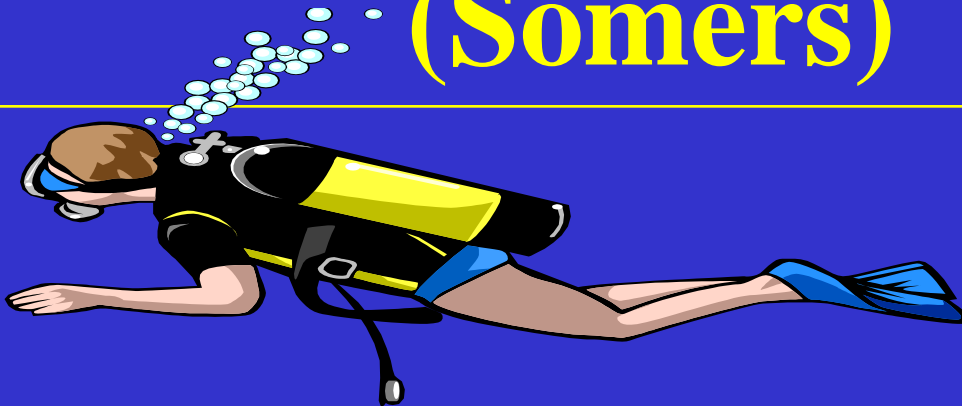
**EACH Diver
Needs to be responsible**

**Buddy diving
is NOT
a dependency system!**



Buddy Diving

**Diving With A Fool For A buddy
Makes a Pair!
(Somers)**



Buddy Diving

**Separated Diver Protocol
(at the Quarry)
Look around a bit
Surface
Stay On Surface**

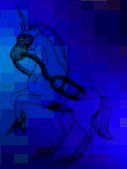


Varies with environment and mission



Buddy Diving

**Common Separation Point:
Descent
So,
Descend
Feet first,
Facing buddy**



Buddy Diving



Pre-Dive Check

S = Signals

E= Emergency Air Share

A = Activity of Dive

B = Buoyancy Devices

A = Air On

G = Go Diving!



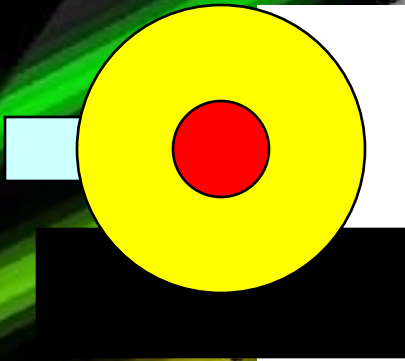
Equipment



**Before Trip
Know
Function & Comfort
Fit**



Equipment



**Regulator
(Primary and Secondary)
Should be
Top-of-the-Line
'cause You Are Worth The Best!**

**Buy the “best”
Service Annually**

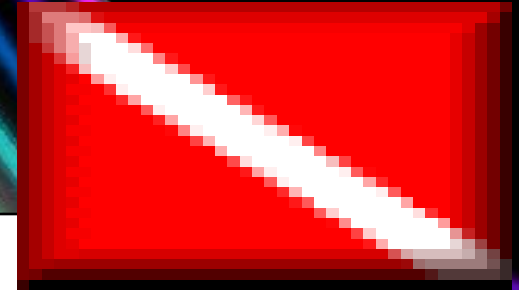
Equipment

**NEVER Compromise
On life-Support Equipment!**

**Source of Breathing Gas
Thermal Protection**



Equipment



Dive Flag
Required in most inland waters
Michigan:
Diver within 100' of flag
Boats outside 200' of flag



Location

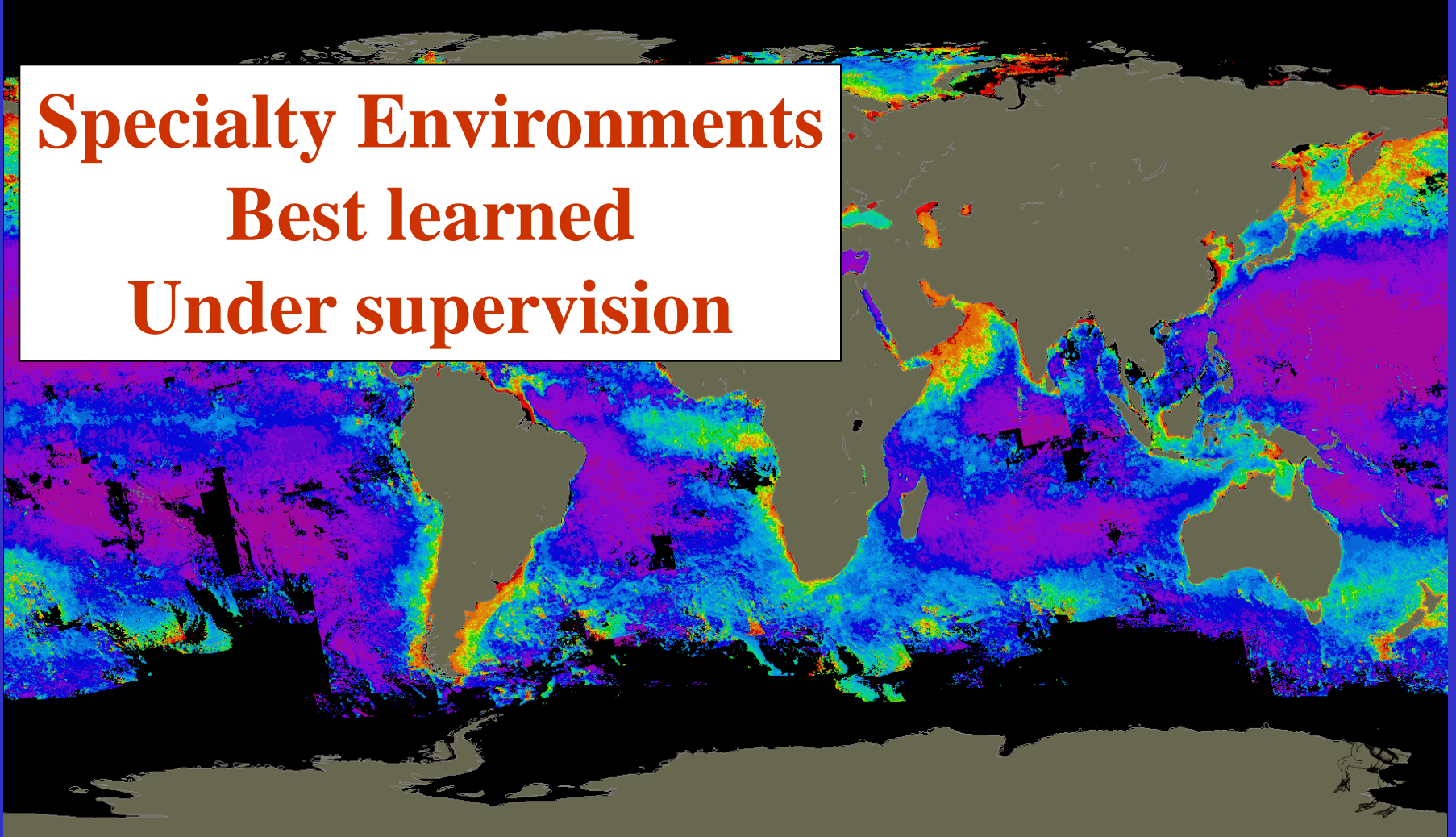


**Consistent With
Training
Experience
Finances**

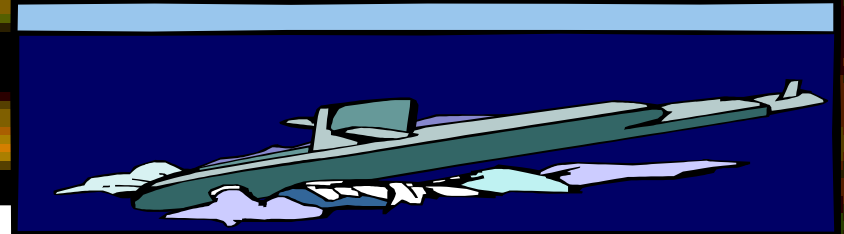


Location

Specialty Environments
Best learned
Under supervision



Depth



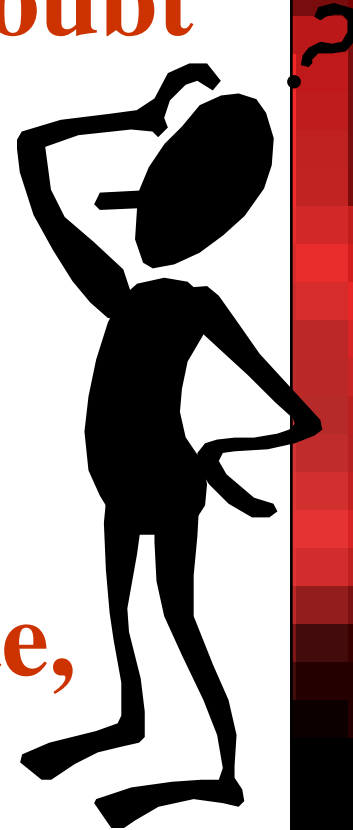
**Consistent With
Training
Experience
Equipment**



**There is
No Hurry
To go deep!**



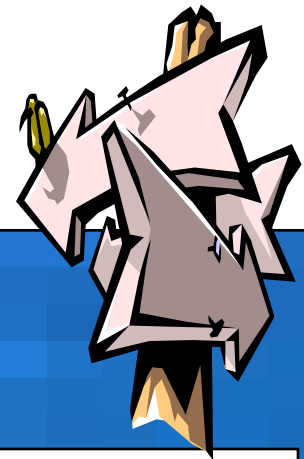
**If there is Any doubt
About
Self
Dive site
Equipment
People On-Site,
Abort Dive**





Peer Pressure Can Be Extreme Ego Saving “Coping Style”

“Can’t Clear”



**The Decision NOT TO DIVE
Is always Correct!**



Potential Problems



Photo by Australia's Severe Weather Page

<http://australiansevereweather.simplenet.com>



Mask On Forehead

Problems For Divers:

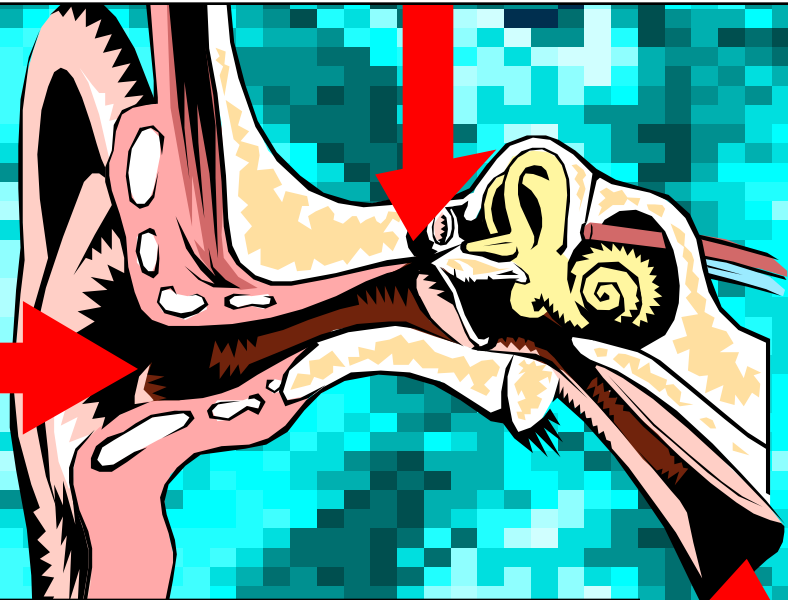
Loss of Mask To Waves
SOME Interpret As Stress
Natural Oils Transfer To Mask
& Increase Tendency To “Fog”



“Clearing” Ears

Tympanic Membrane

**On descent:
Ambient Pressure
Moves “ear drum”
inward**



**Balancing pressure
Restores “ear drum” position
Removes pain**



“Clearing” Ears



Techniques:

Valsalva: “Pinch & Blow”

Toynbee: “Pinch & Swallow”

Move Jaw

Tilt Head to Stretch Eustachian Tube

Descend Feet First



Frenzel



“Clearing” Ears



Frenzel

Safest & Most Effective Technique

**Place tongue on roof of mouth,
Hold it there**

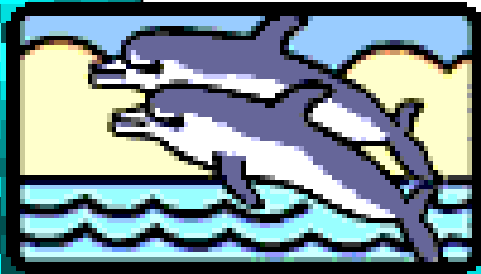
**Imagine driving back of tongue
Through top of the head**



“Clearing” Ears



**Techniques:
Clear Before Dive
And
Frequently During Descent**



**STOP
If pain felt**



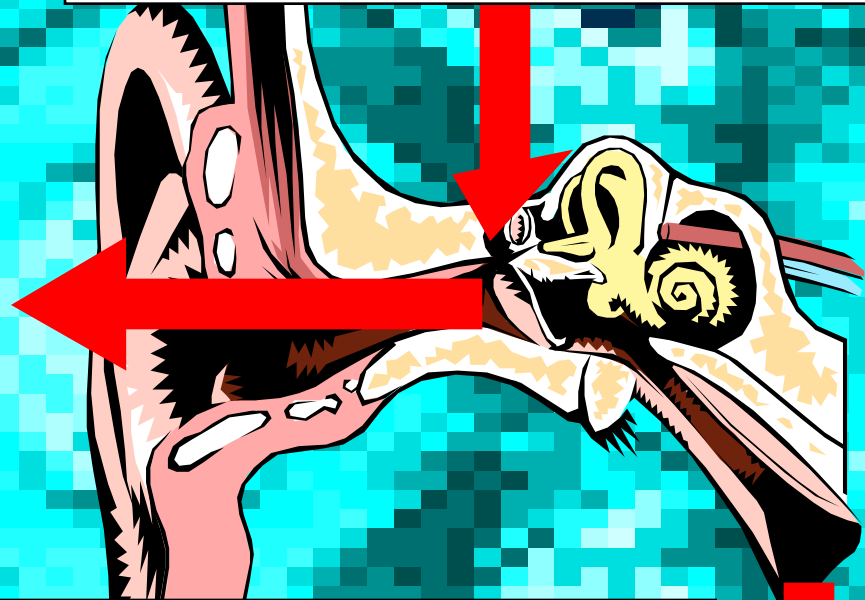
**“Clearing” Ears
Must be Done GENTLY
(like driving in Maryland!)**



“Clearing” Ears

On ascent:
Internal Pressure
Moves “ear drum”
outward

Tympanic Membrane



Balancing pressure
Restores “ear drum” position
Removes pain



“Clearing” Ears



Since pressure
Greatest in middle ear

Pressure relieved with
GENTLE
“pinch and suck”



“Clearing” Ears



**Post Dive
ANY
“Fullness” in ears
Ringing
Hearing problems**

Require ENT Exam



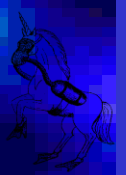


**Buoyancy Control
Is THE Key To Having Fun
In Underwater Realm!**



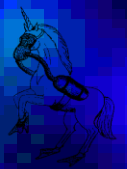


**Loud Fead (Easy Diver)
Said
“Dive With Your Brain,
NOT your Back!”**



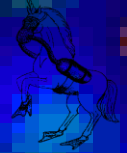


NOT
Understanding Buoyancy
Leads to
Fatigue, Over-exertion &
General Discomfort





**Buoyancy:
Best to
Forget
+ and -**

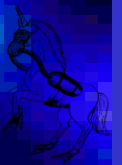


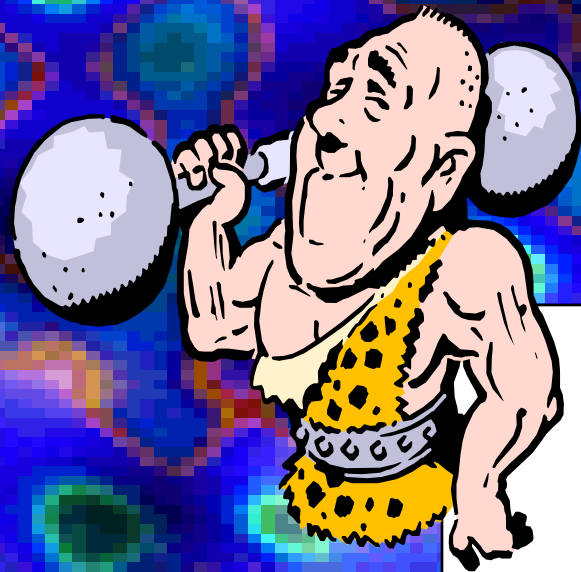


**Buoyancy
Is A Force
Directed Towards
The Surface**

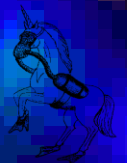


**Buoyancy
Is An “UPWARD” Force
Equal To:
Weight Of
Displaced Water**



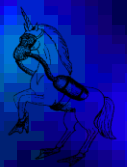


**Weight
Is A Force
Directed Towards
The Bottom**

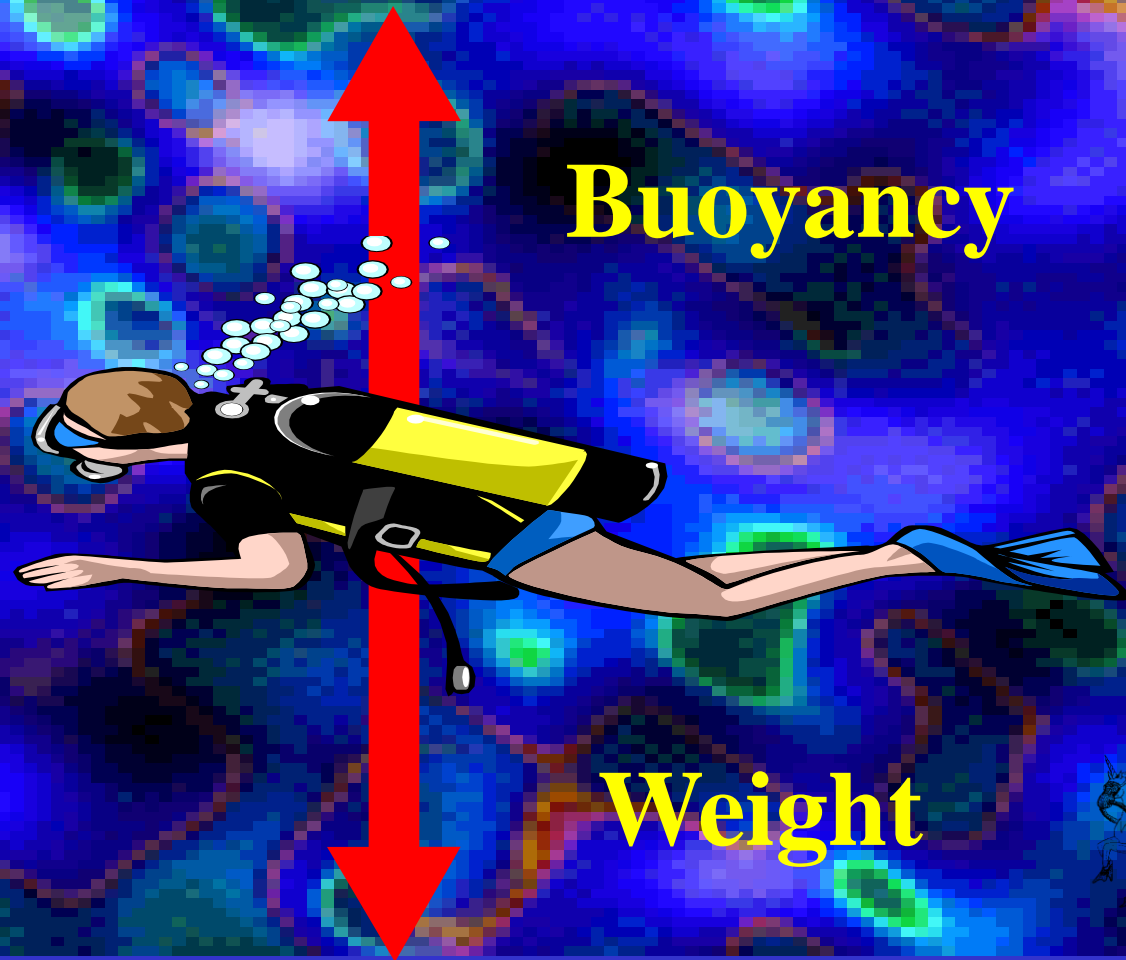




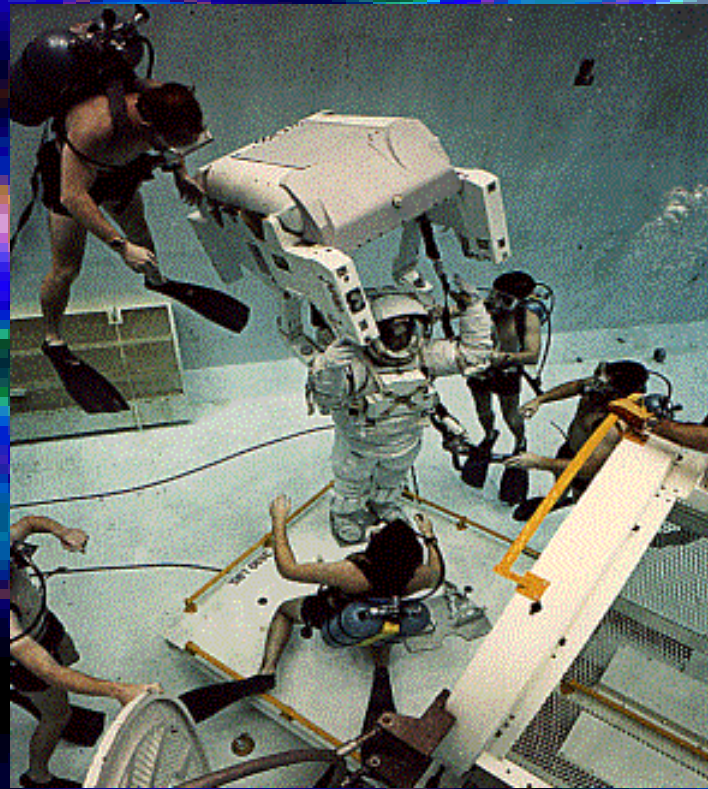
**Weight
Is A “DOWNWARD” Force
Equal To:
Weight of
Diver & Everything Worn**



Position of Diver In The Water Column



Desired “Weightless” State



Buoyancy

Forces Equal

Weight



Buoyancy: Descent



Gas Volume:



Displaced Water:



So

Diver Heavy;

Add Air To BC

To Compensate Buoyancy



Buoyancy: Ascent



Gas Volume:



Displaced Water:



So

Diver Buoyant;

Dump Air From BC

To Compensate Buoyancy



Buoyancy: Temperature Effects

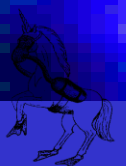


**Temperature:
Gas Volume:
Displaced Water:**



So

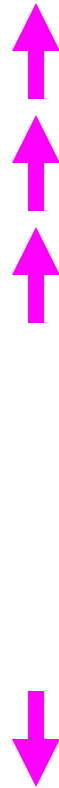
**Diver Heavy;
Add Air To BC
To Compensate Buoyancy**



Buoyancy: Temperature Effects



Temperature:
Gas Volume:
Displaced Water:
So
Diver Heavy;
Dumps Air From BC
To Compensate Buoyancy

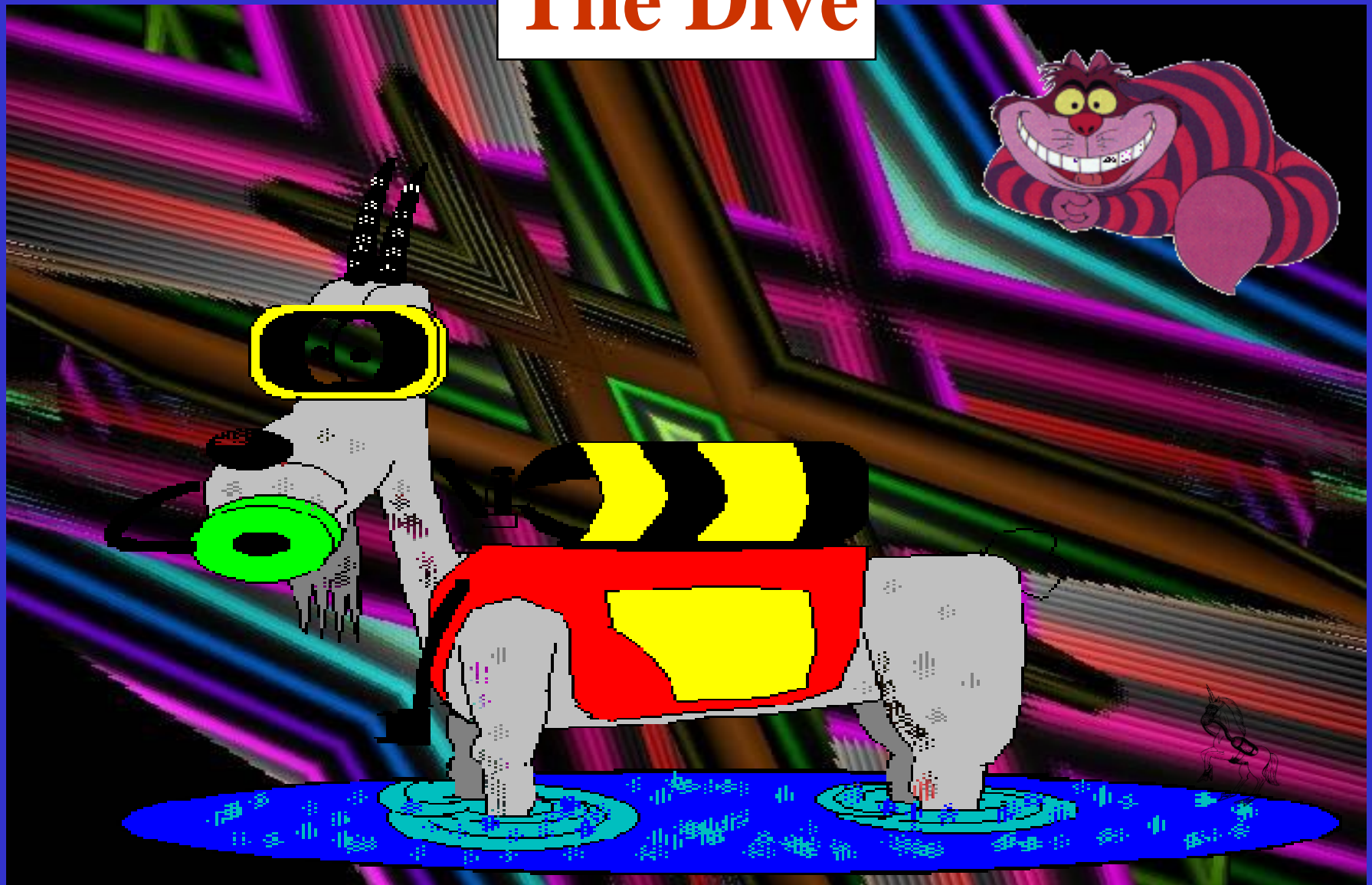


Setting Buoyancy:

**With ~ 500 psig In Cylinder
Breathing Through Snorkel:
Should Float Vertically
At Eye Level:
Inhale: Slight Rise
Exhale: Slight Descent**



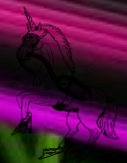
The Dive



The Dive: Descent

Vent B.C
Relax
Exhale.

Most Common Problem:
Deep Inhale As Descent Starts



The Dive: At Depth



Breathe
Slowly
Deeply
Continuously



The Dive: At Depth



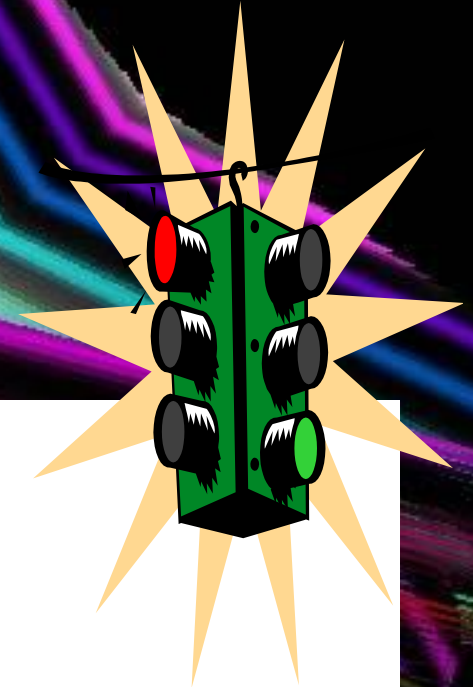
Pay Attention To Breathing
Any difficulty:
Stop
Breathe Slowly
Relax



Imagine A STOP Sign!



The Dive: Termination

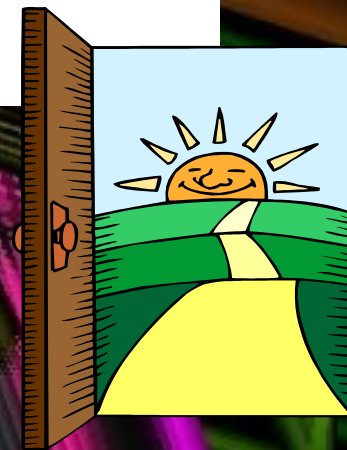


**500 psig
Cold
ANY Time
Everyone Has The Right (Duty)
To End Dive**



The Dive: Ascent

**Slooooooooooooooooooowly
Continuous Breathing
Safety Stop**



The Dive: Philosophy

All Dive Have
Benefit/Risk
Ratio





**Risk Is Never Zero
So,
Always
Evaluate
Self
Environment
Buddy**

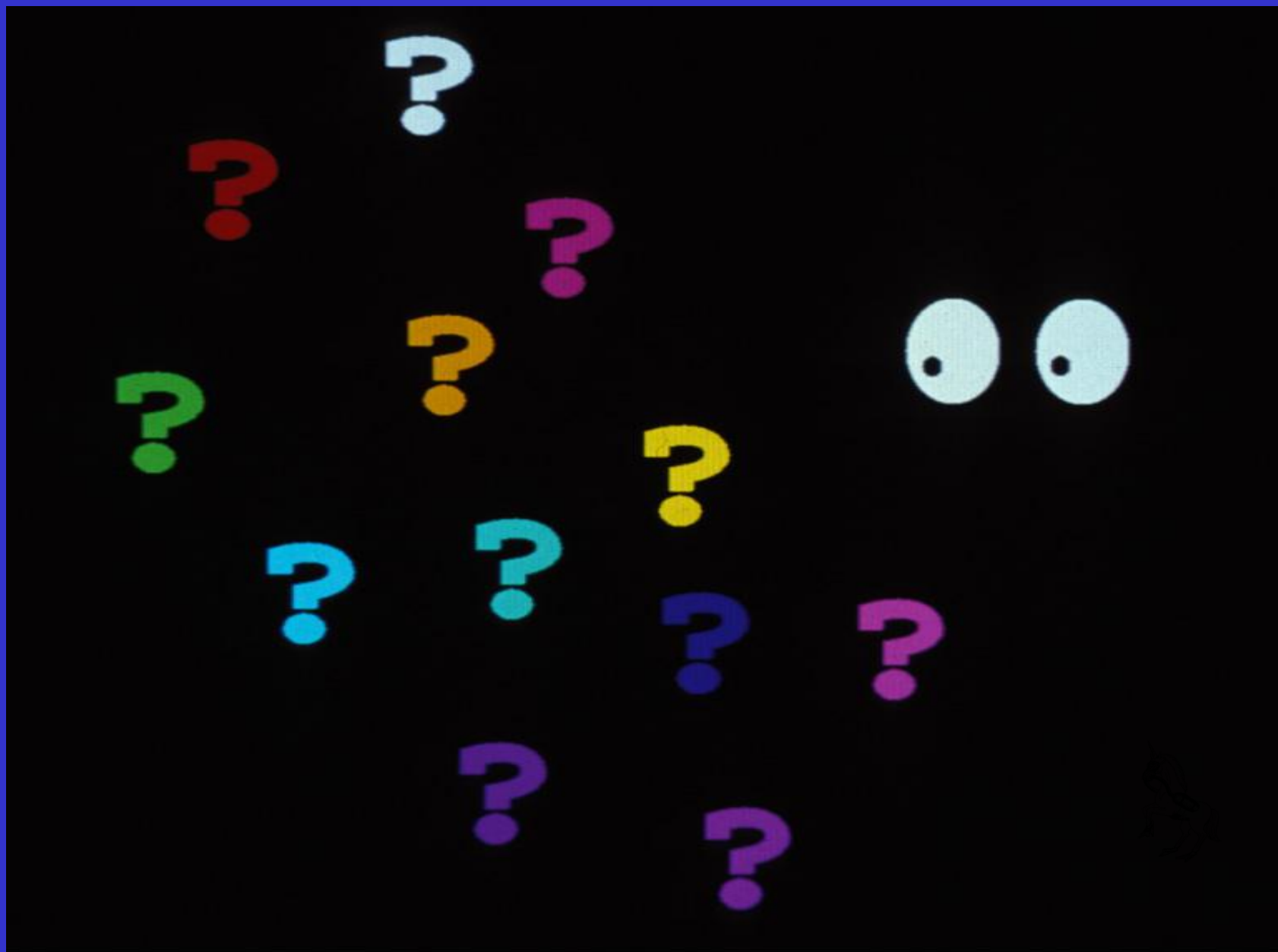




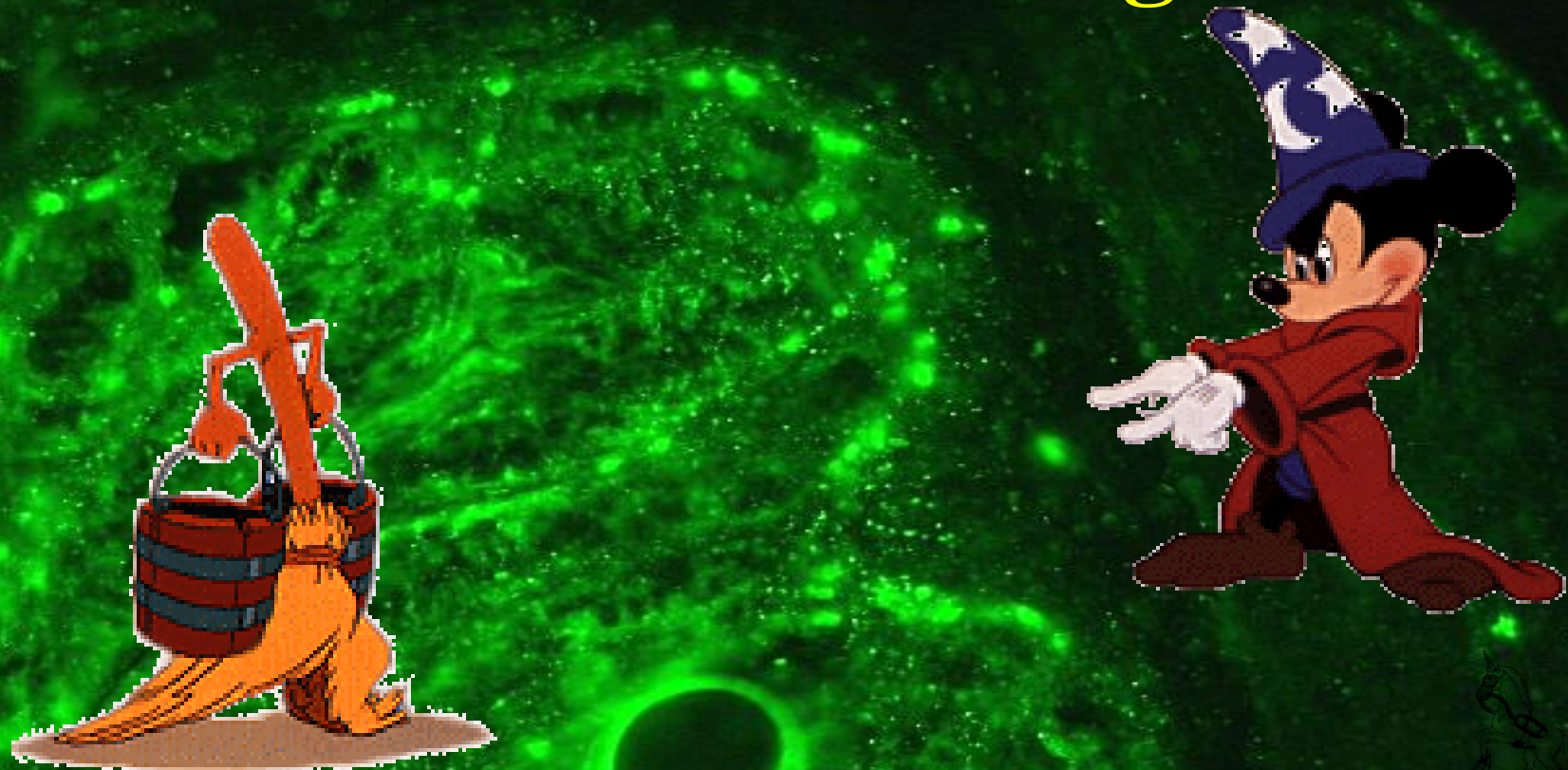
**In Scuba,
Attitude Can Kill!**

**Ignoring Risks
Exposes Your Ass
To Unseen Danger**





Problem Management



Extreme Life Threats Are Rare!





**Best
“Defense” is
Knowledge
&
Experience**



Specialty Programs:
CPR
First Aid
DAN Oxygen
Equipment
Rescue

Environmental:
Cave
Current
Deep
Ice
Wreck



Gather Experience Slowly:

**Extend “Comfort Zone”
With
“Baby Steps”**



Problem Solving:

1. Define Problem
2. Evaluate Options
3. Act

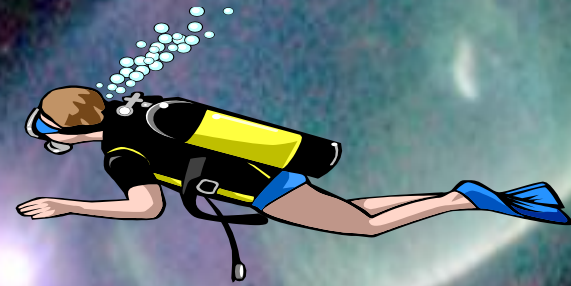




Equipment:
EAP
First Aid Kit
Oxygen
Tool Kit
Spare Parts

**BEST TOOLS
For
Solving Problems**

**Knowledgeable,
Physically Fit,
Well-trained
Properly Equipped
Divers**

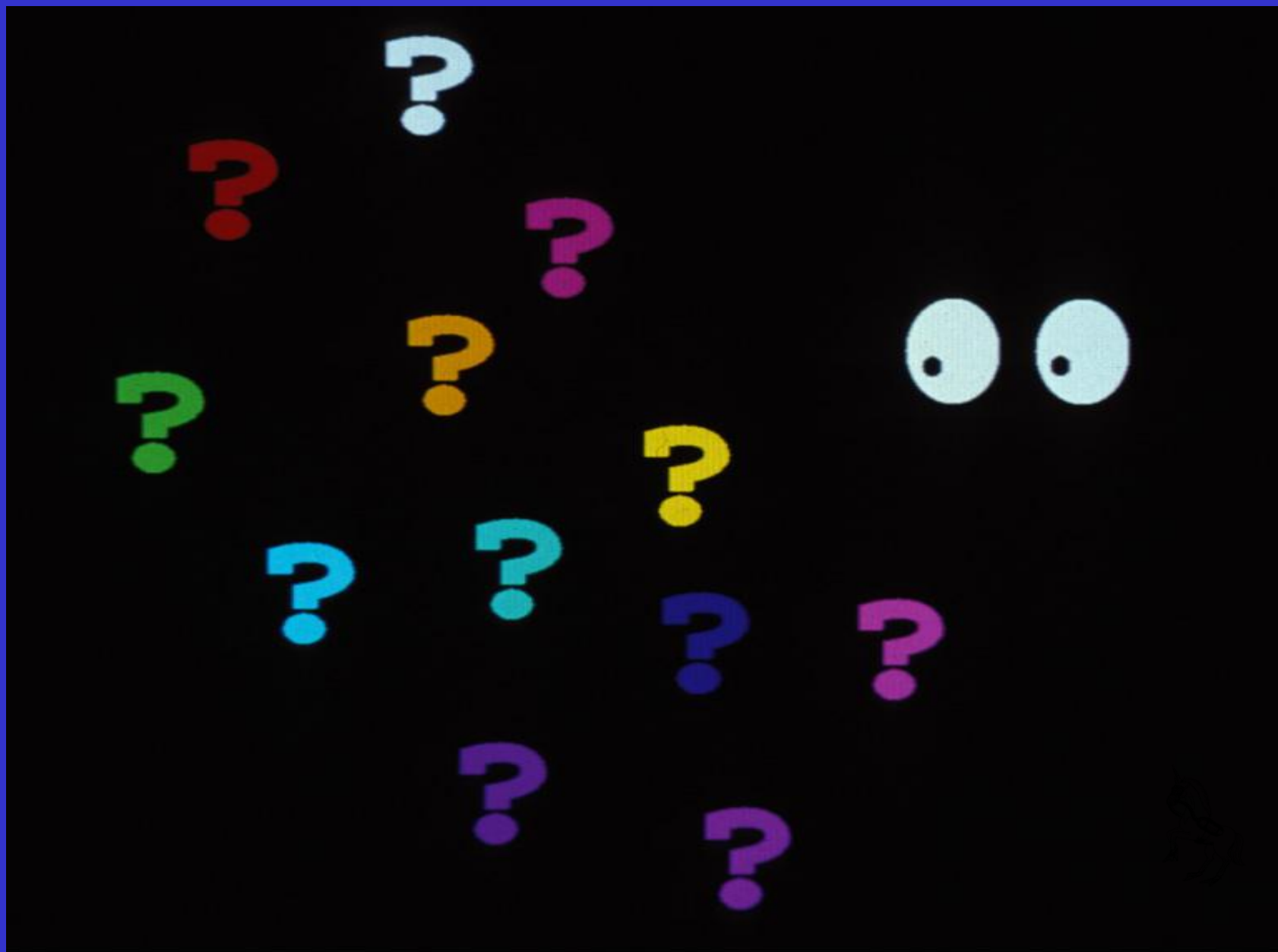




BEST TECHNIQUE For Solving Problems

**Recognition of situation
BEFORE
It escalates to a real problem**





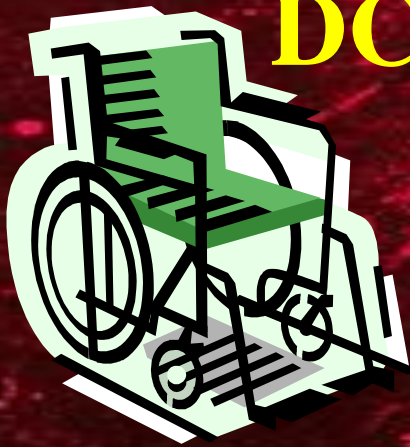
Dive Table Review



Tables Are Theoretical Constructs

NONE can guarantee

DCS Event-Free Diving!



**Sport Divers Tend
To Develop Spinal Hits
Functional Spine Allows:
Walking
Excretion
Sex**

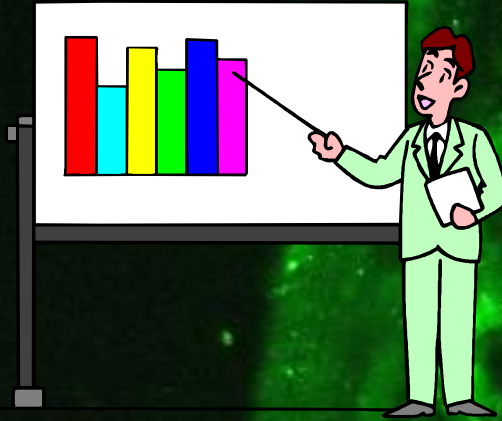
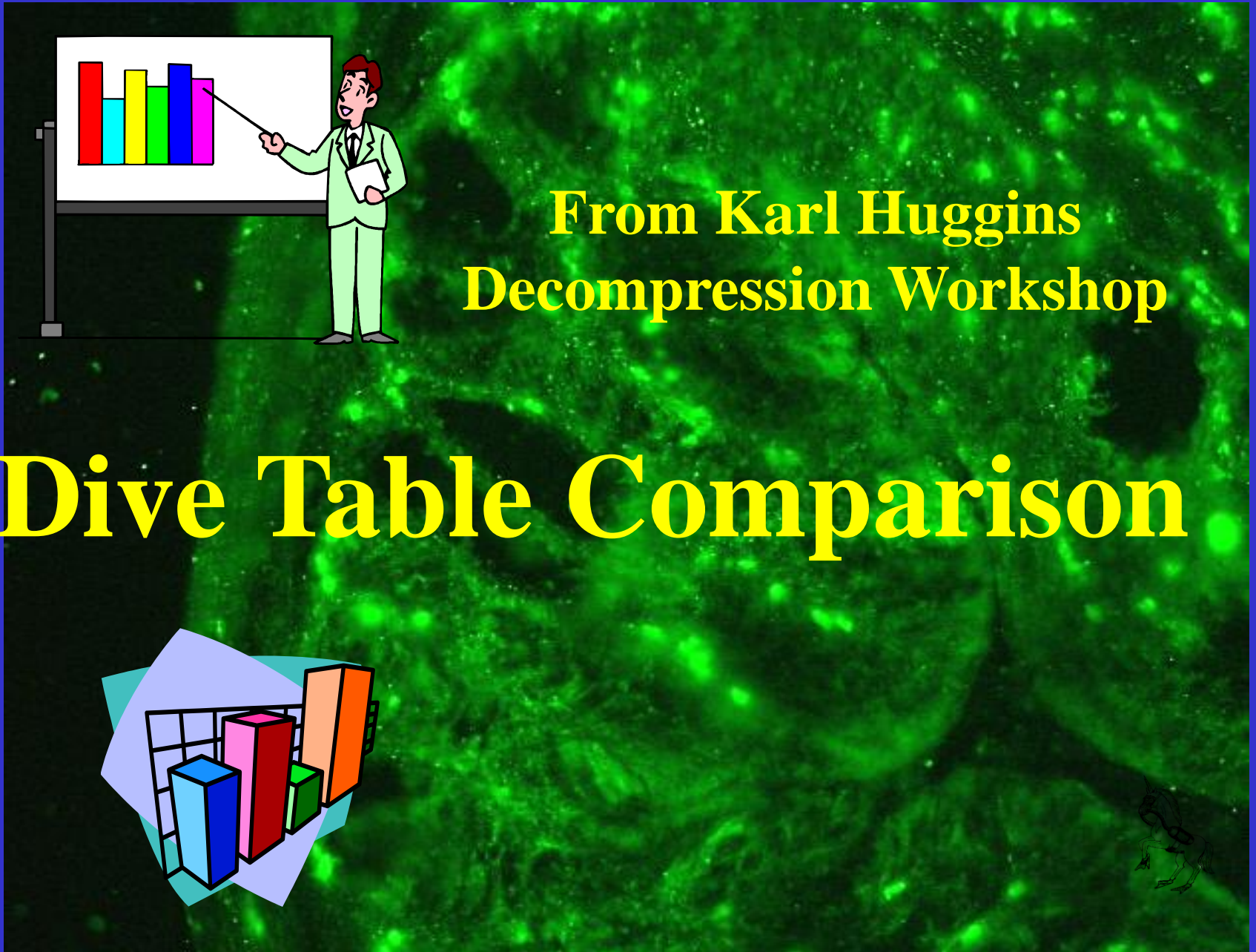




**Every Time You Dive
You Gamble With
Spinal Cord Function**

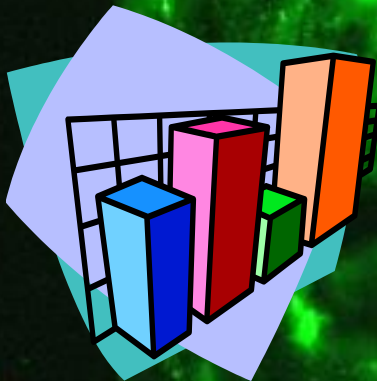
**So,
Best To Know
&
Minimize Risks**





From Karl Huggins
Decompression Workshop

Dive Table Comparison



Dive 65 fsw for 20 min; Wait 2:40.
How much time does a table allow at 65 fsw?

USN	35
Jeppensen	25
Pandora	28
Huggins	21
Swiss	23
DSAT RDP	35
DSAT Wheel	40
DCIEM	21
BSAC	10

Dive 65 fsw for 20 min; Wait 2:40. Dive 65 fsw for 20 min. How long is the wait before No-Stop dive to 53 fsw for 20 minutes?

USN	2:59
Jeppensen	7:36
Pandora	4:03
Huggins	6:05
Swiss	4:00
DSAT RDP	1:00
DSAT Wheel	0:24
DCIEM	9:00
BSAC	16:00

**Correct Interval varies between
23 minutes and 16 hours!**

**Tables DO NOT Bend,
But divers do!**



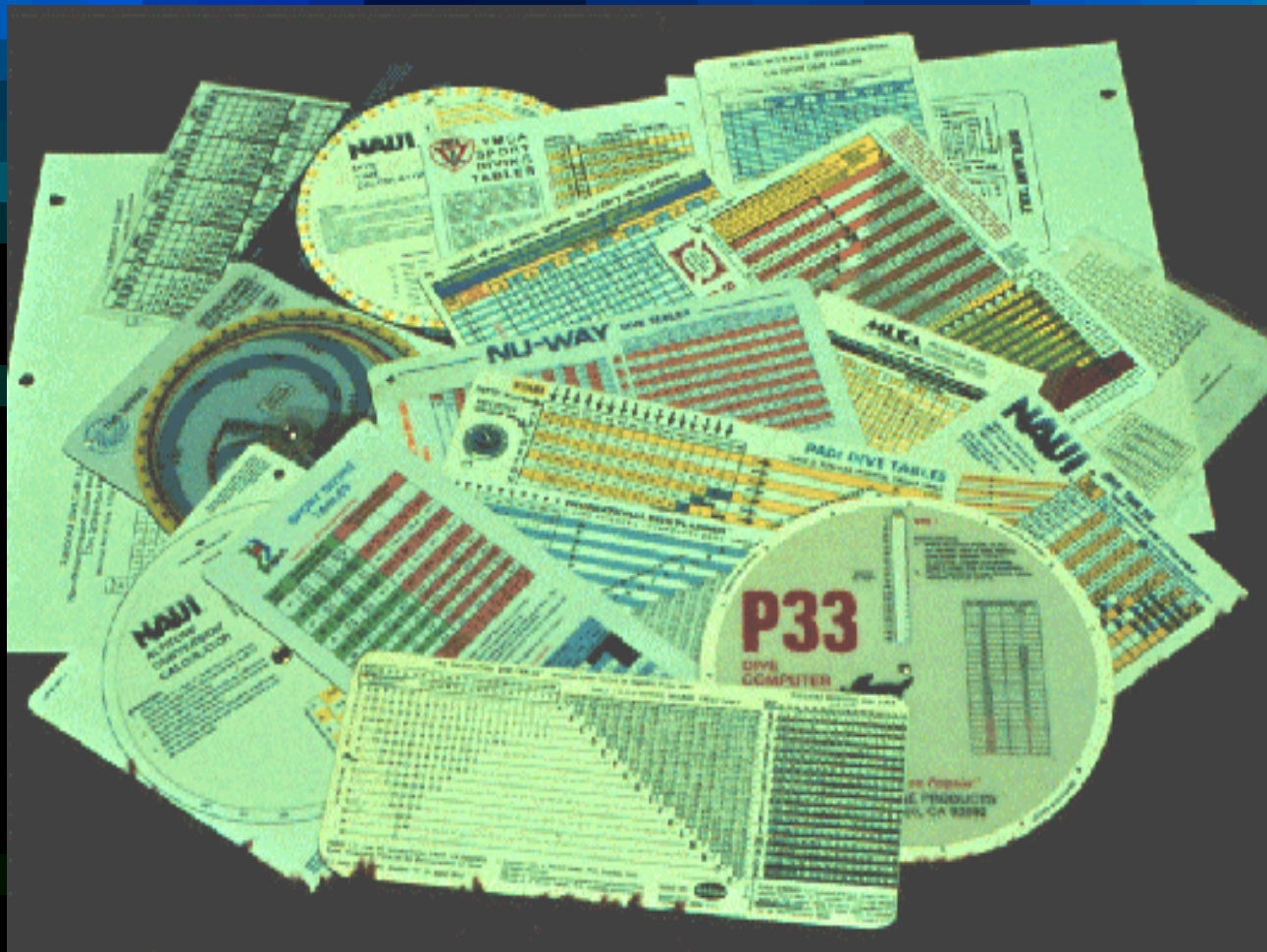


Choosing A Table Is Like Choosing A Religion...

**You Select A Gospel
(Decompression Model),
Follow Its Commandments
Accept “On Faith” That
It Will Protect From
Evil (DCS)**



Choose Wisely!



Practice Problems



Practice Problems

**You snorkel for 3 hours
Your deepest free dive is 47 fsw.**

What is your rep group?



Practice Problems

You snorkel for 3 hours

Your deepest free dive is 47 fsw.

Irrelevant 'cause

NOT on SCUBA



Practice Problems

**You SCUBA dive to 50 fsw for
45 minutes.**

What is your rep group?



Practice Problems

You SCUBA dive to 50 fsw for 45 minutes.

What is your rep group?

NAUI: G

RDP: O

USN: G



Practice Problems

You SCUBA dive to 50 fsw for 45 minutes.

Wait 30 minutes.

What is your rep group? &

No Deco Limit for 50 fsw?



Practice Problems

You SCUBA dive to 50 fsw for 45 minutes.

Wait 30 minutes.

*What is your rep group? &
No Deco Limit for 50 fsw?*

NAUI: G; 24 minutes

RDP: I; 49 minutes

USN: G; 44 minutes



Practice Problems

You SCUBA dive to 50 fsw for 45 minutes.

Wait 1 hour & 15 minutes.

Then SCUBA dive to 50 fsw for 30 minutes

What is:

Rep Group on initial descent?

RNT?

Adjusted bottom time?

Final rep group?



Practice Problems

You SCUBA dive to 50 fsw for 45 minutes.

Wait 1 hour & 15 minutes.

Then SCUBA dive to 50 fsw for 30 minutes

What is:

	NAUI	RDP	USN
Rep Group on initial descent?	F	C	F
RNT? (minutes)	47	17	47
Adjusted bottom time?	77	47	77
Final rep group?	J	O	J



Practice Problems

You SCUBA dive to 50 fsw for 45 minutes.

Wait 1 hour & 15 minutes.

Then SCUBA dive to 50 fsw for 30 minutes

**How long before a no-deco obligation dive to
45 fsw for 50 minutes?**



Practice Problems

You SCUBA dive to 50 fsw for 45 minutes.

Wait 1 hour & 15 minutes.

Then SCUBA dive to 50 fsw for 30 minutes

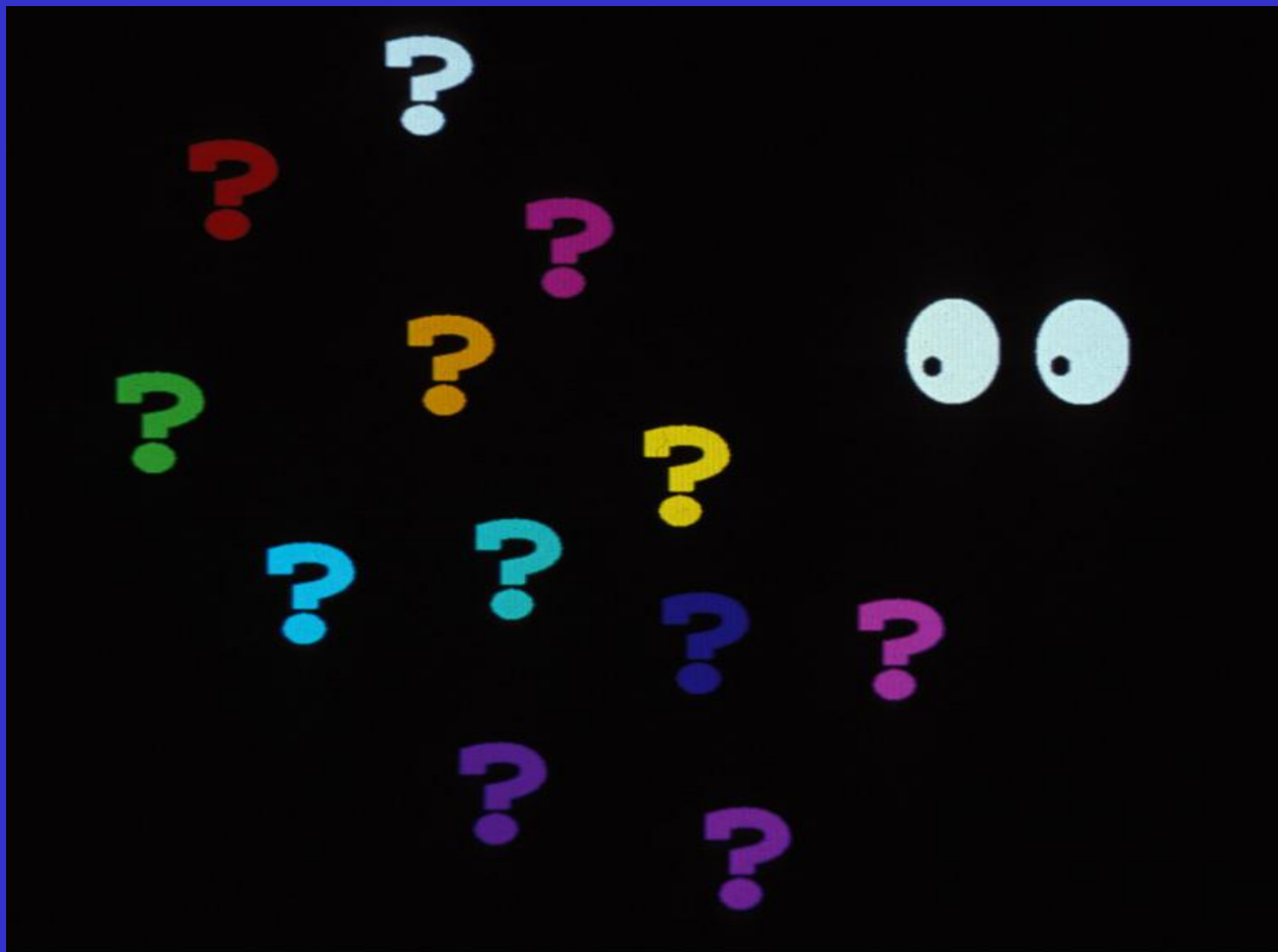
**How long before a no-deco obligation dive to
45 fsw for 50 minutes?**

NAUI: 3:05 (J => D)

RDP: 0:35 (O => H)

USN: 1:48 (J => F)





FINAL THOUGHTS





A Proper Attitude



Equipment Appropriate For The Dive





**No Matter
Where You
Dive**



**You
Will
Have Fun!**

Welcome To Planet Ocean!



**Dive Long
And
Prosper!**

