

How we take what we know and put it into action!

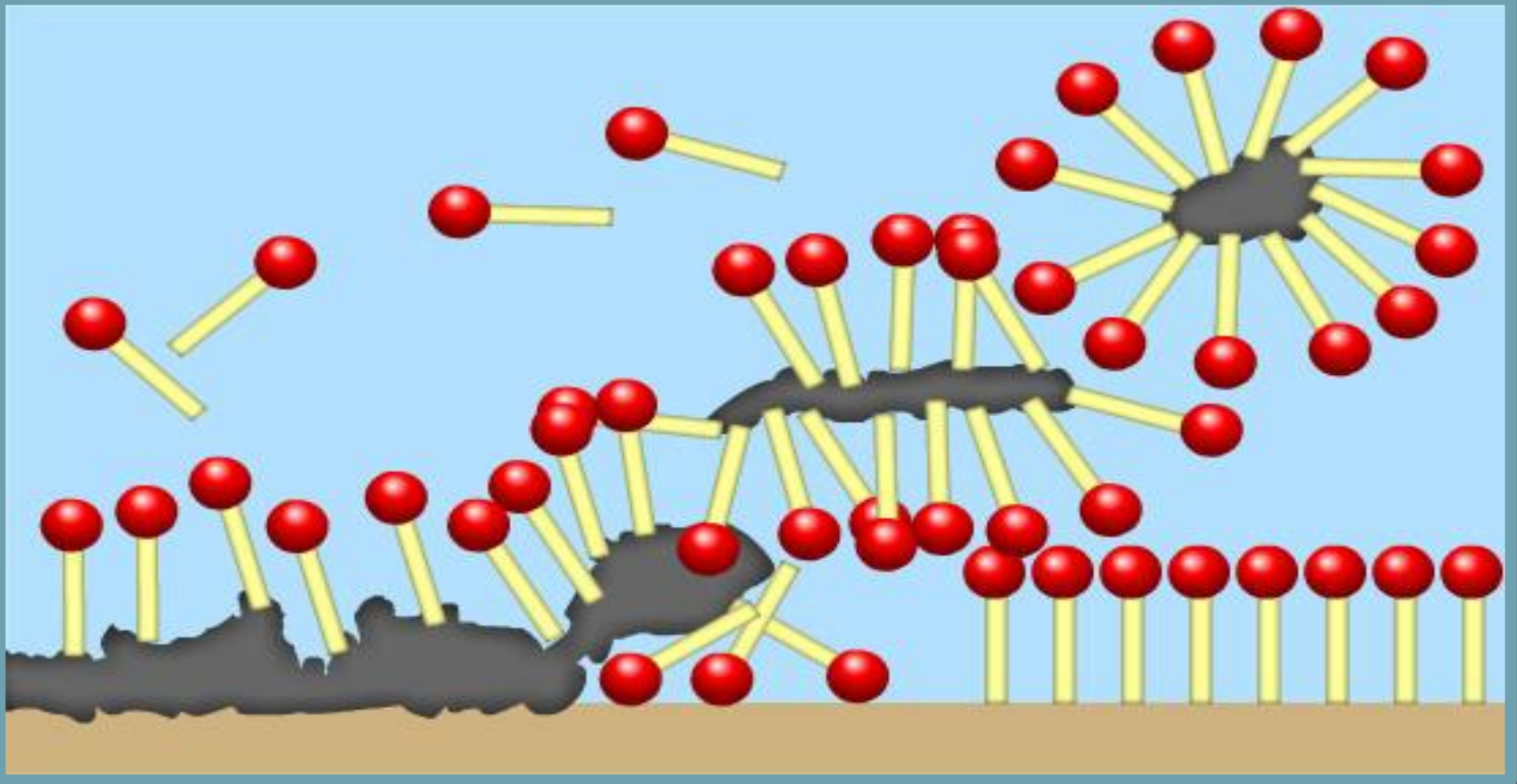
TECHNOLOGIES & FLUIDS

Detergents

- How do they work?
 - Something that removes dirt?
- But how?
 - Contain something called a **surfactant**
 - These attach to dirt and oils
 - Surrounds them so they cannot reattach to the clothes (Suspension Agent)
 - Washed away



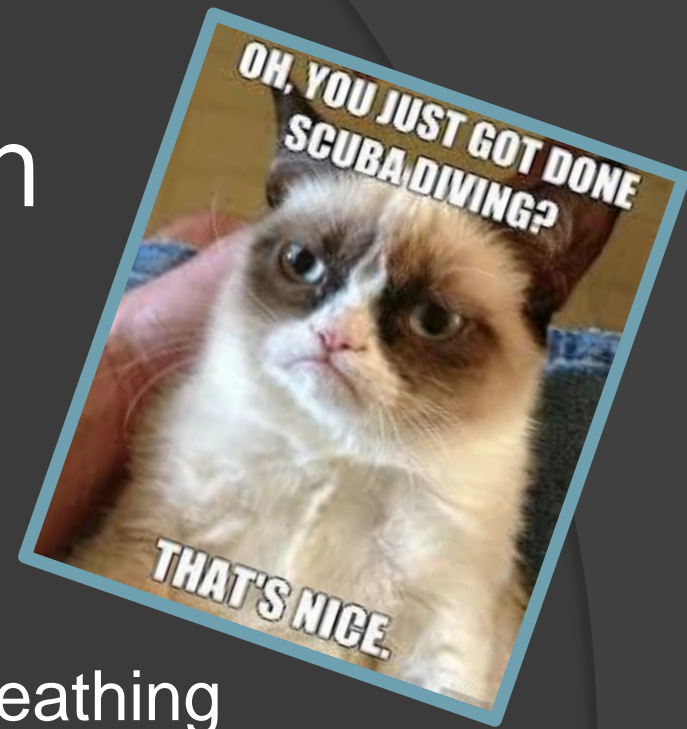
Like this ...



The non-polar tails (in yellow) of 'tadpole shaped' detergent molecules mix with grease, while the polar heads (in red) mix with water, thus forcing the grease and water to mix

Diving & Compression

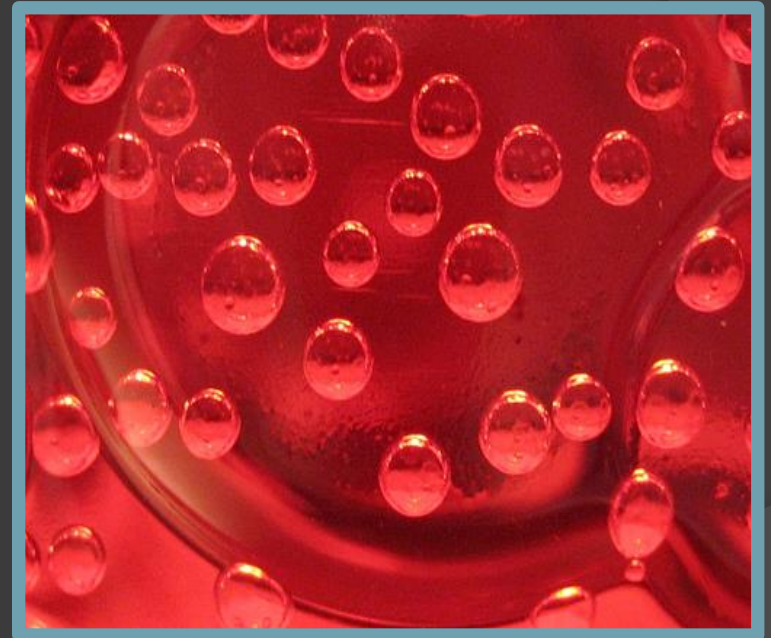
- How do humans breath underwater?
- SCUBA
 - Self-Contained Underwater Breathing Apparatus
- But what about the pressure as you descend?



Diving & Compression

- Deeper you go = more pressure

- As the pressure builds up it causes nitrogen gas to dissolve in our blood and tissues at a much higher concentration than normal



- We learned this the hard way as humans

Diving & Compression

- If you ascend slowly, the gas leaves your body normally ... that's good
- If you ascend too quickly the pressure drops rapidly and you get a decompression sickness known as “The Bends”

The Bends

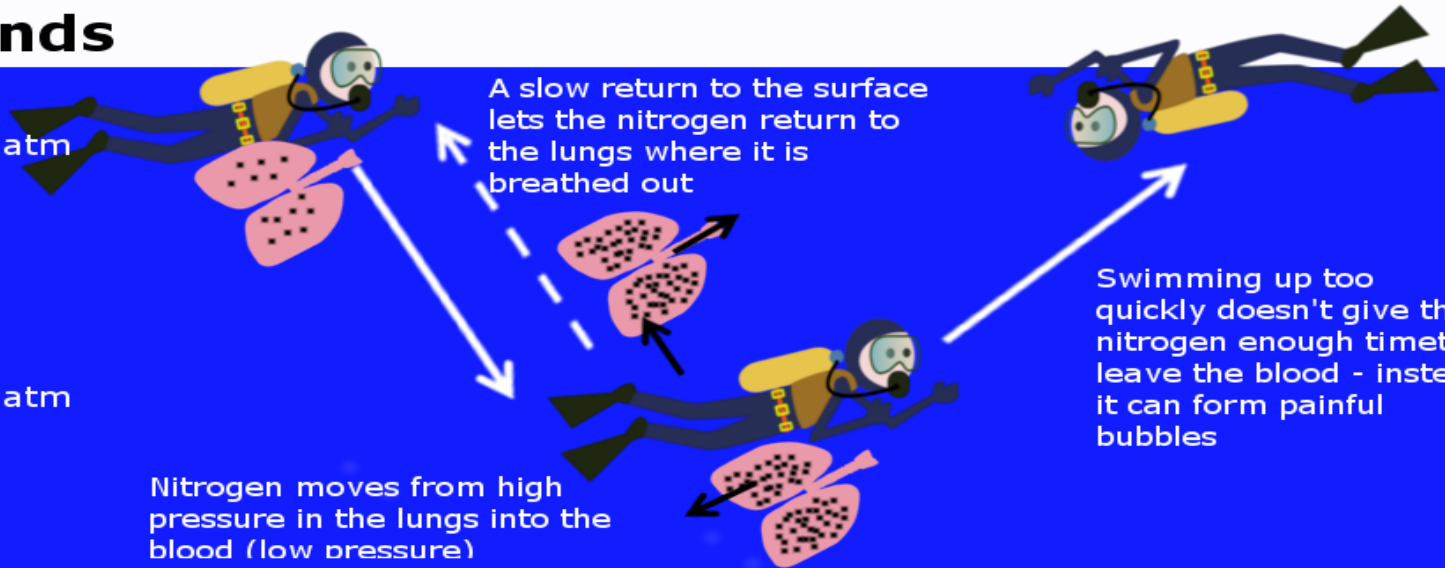
0 metres
Pressure = 1 atm

10 metres
Pressure = 2 atm

Nitrogen moves from high pressure in the lungs into the blood (low pressure)

A slow return to the surface lets the nitrogen return to the lungs where it is breathed out

Swimming up too quickly doesn't give the nitrogen enough time to leave the blood - instead it can form painful bubbles



The Bends

- A rapid change in pressure causes the gas to bubble out of the blood and tissue
- It can collect in your body and cause considerable pain
- You can die if it isn't treated



The Bends – Treatment

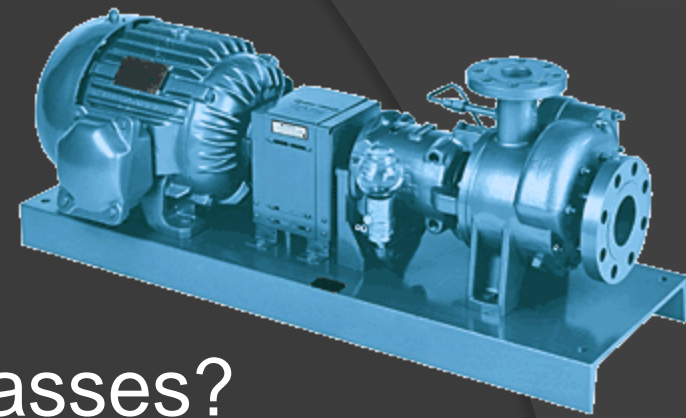


The Bends

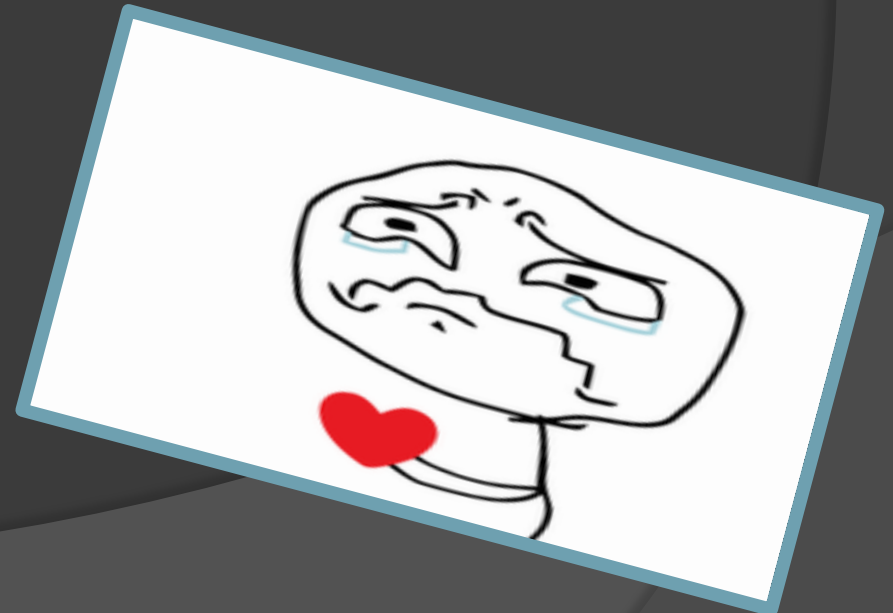
- Here is a video clip of a real world scenario of someone who experienced the Bends ...

[BBC - The Bends](#)

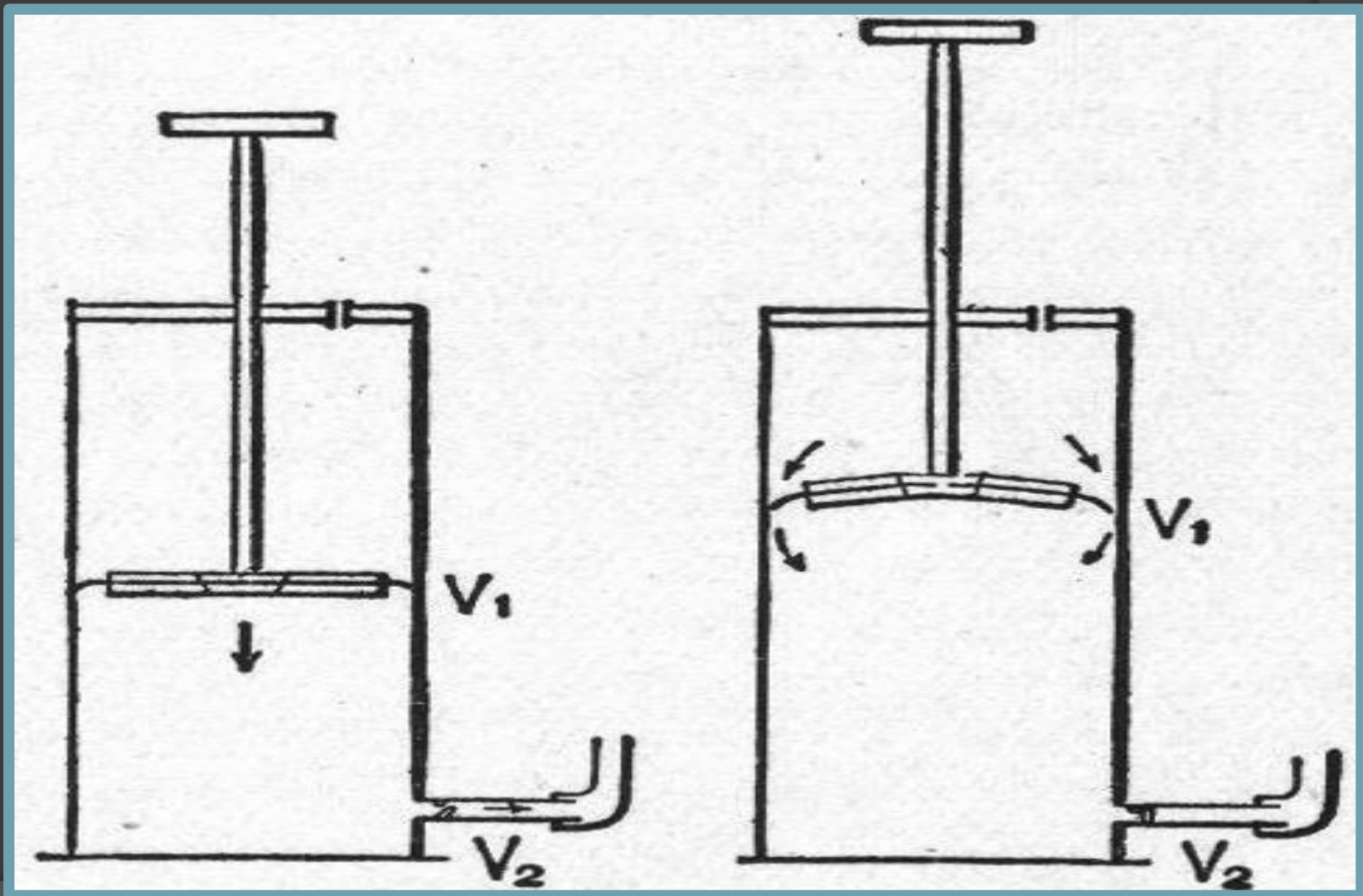
Moving Fluids



- How do you move fluids & gasses?
- Pumps
 - A device that moves a fluid through, or into, something
- What is a naturally occurring pump?



The Bicycle Pump



Pipeline Pigs

- A computerized unit used to monitor and clean pipelines
- Propelled by moving gases in the pipeline



Valves

- These control or regulate the amount of flow
 - Taps in your bathroom sink
 - Faucet for outdoor hose
- Different types of valves

