



OCEANUS
ORIENTALIS

MADAGASCAR quae et
S. LAURENTII INS. dicitur

C. de S. Sebastian

C. de S. Clara
C. de S. Roman

C. de S. Sebastian
C. de S. Maria



fineart
america

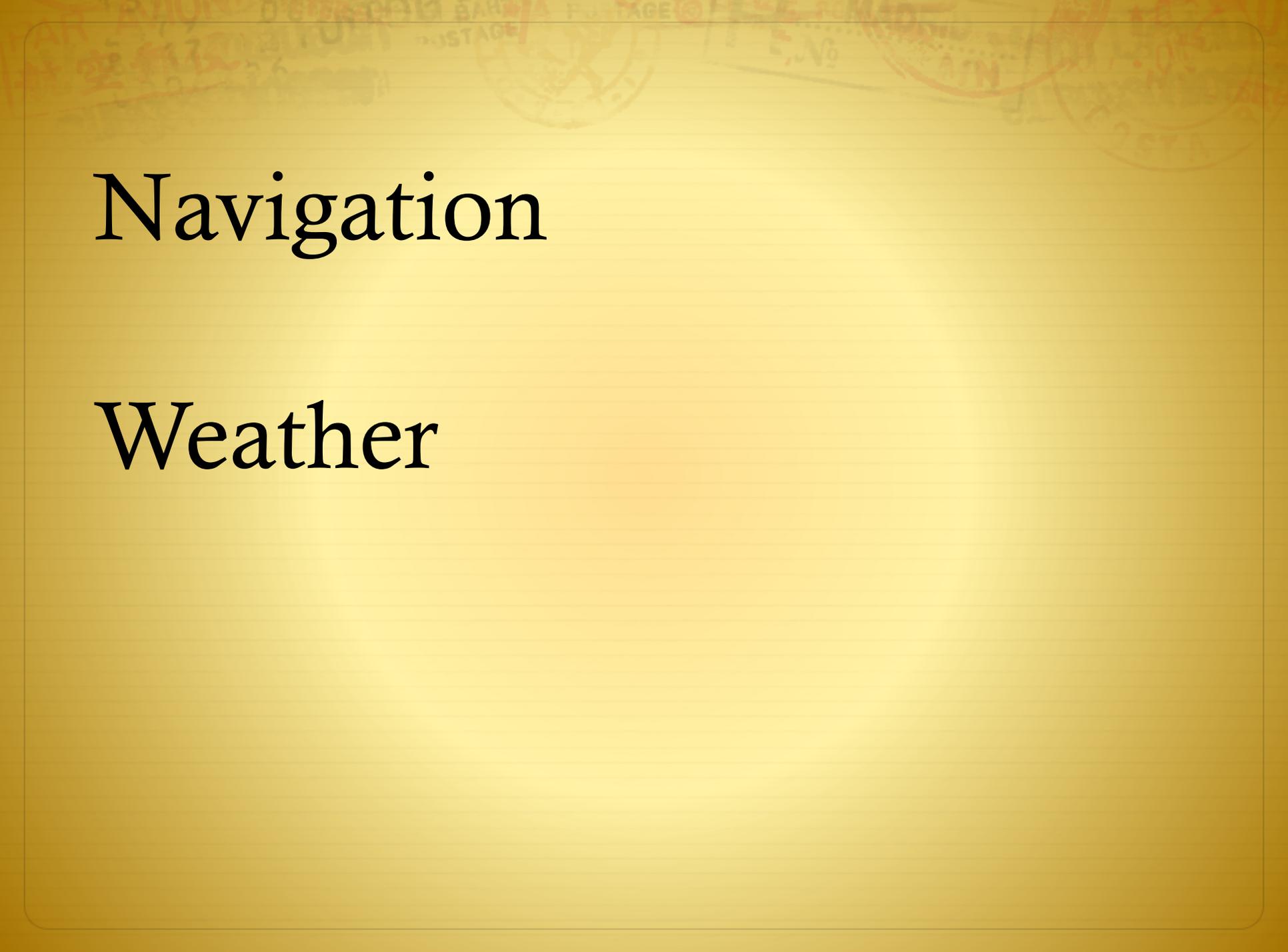
The Challenges of Ocean Exploration



What do you think are the challenges to travelling across oceans?

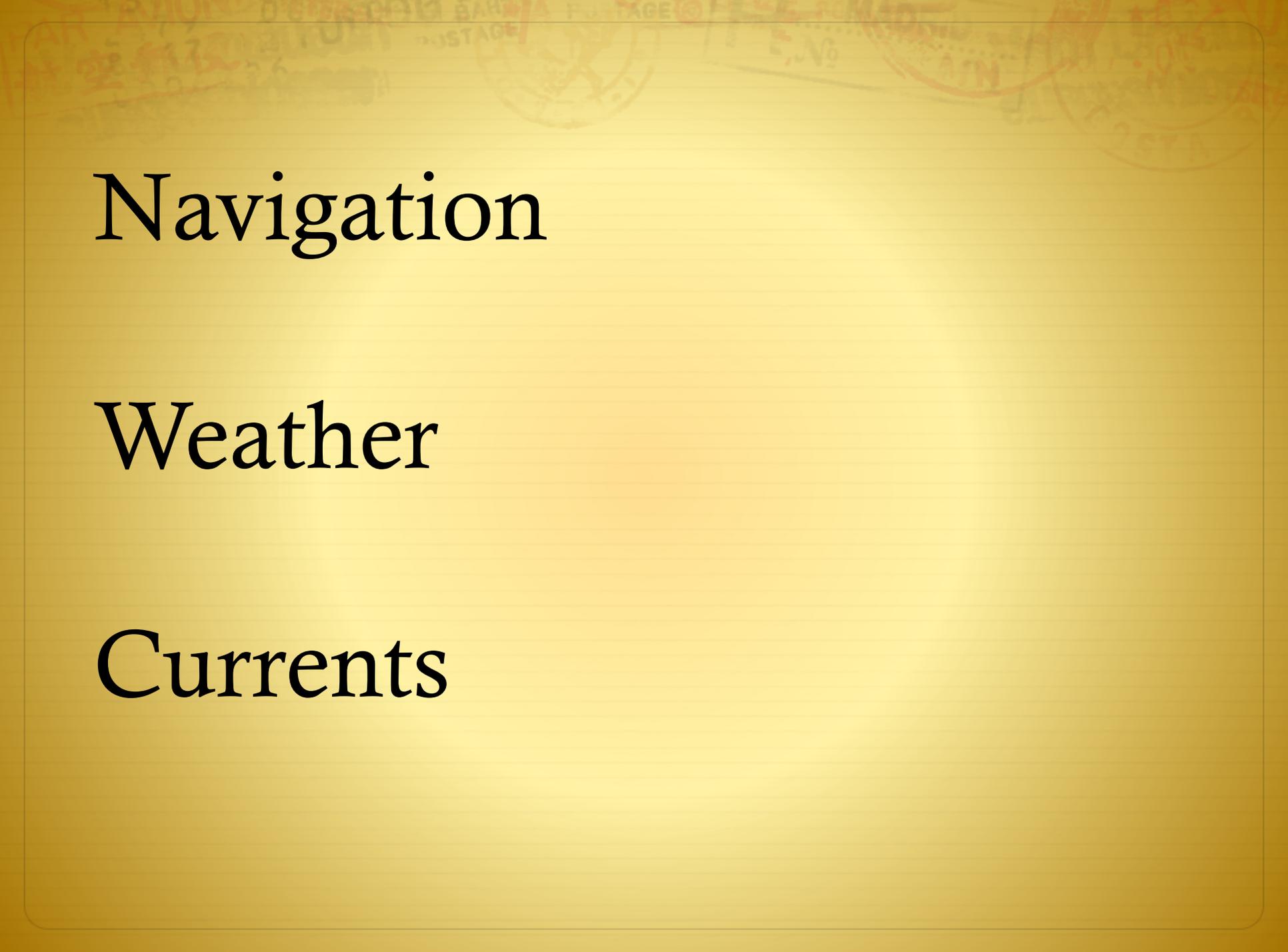


Navigation

The background is a light yellowish-gold color with a subtle texture. At the top, there are several faint, overlapping postmarks and stamps in a reddish-brown hue. These include circular postmarks with text like 'POSTAGE' and 'POSTAL', and rectangular stamps with numbers and dates. The overall appearance is that of an old, weathered document or a collection of vintage postcards.

Navigation

Weather



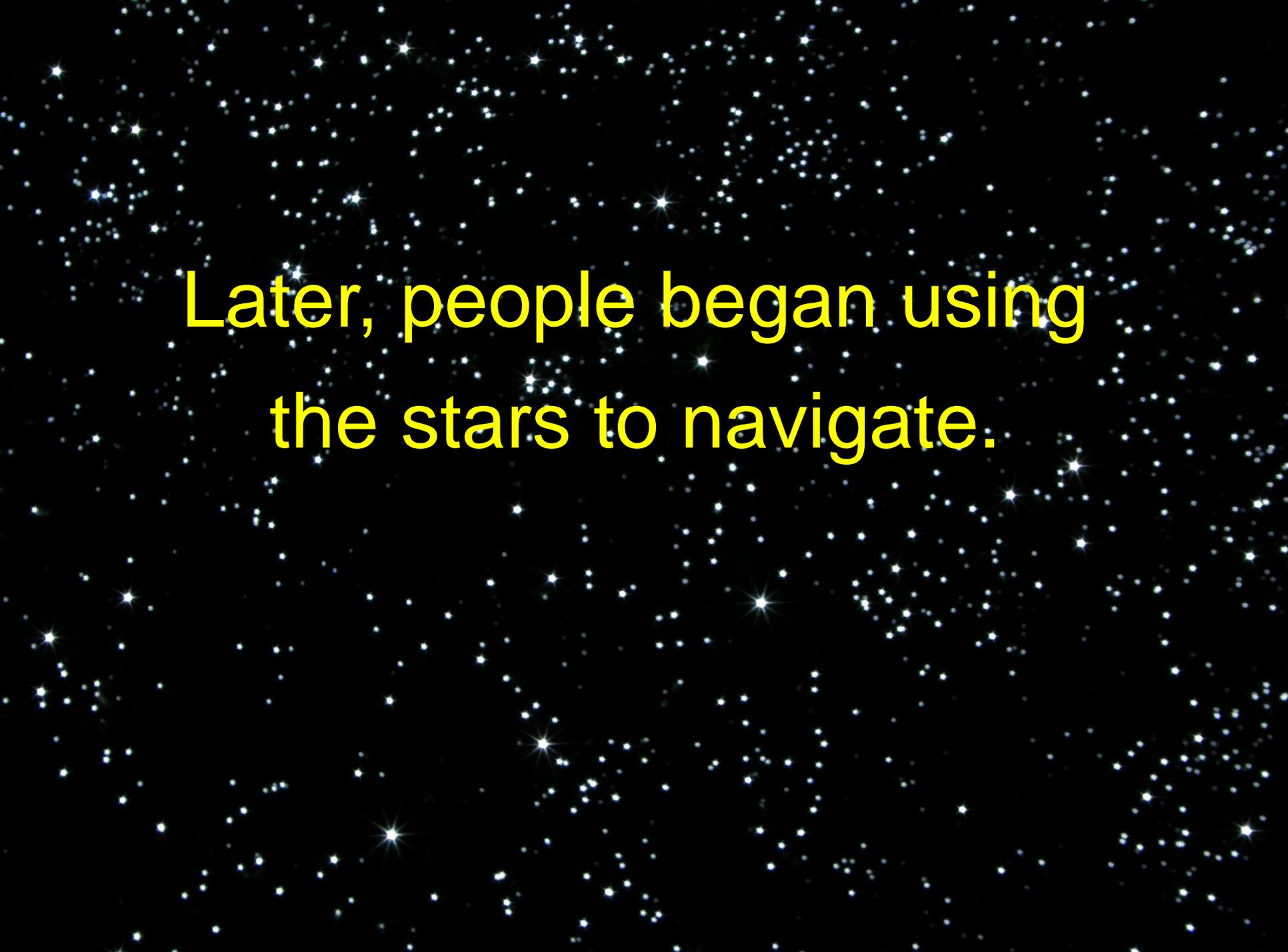
Navigation

Weather

Currents

Early sailors navigated by staying
within sight of the shore.





Later, people began using
the stars to navigate.

Imagine a single dot on a ping pong ball.



How would you describe its location?



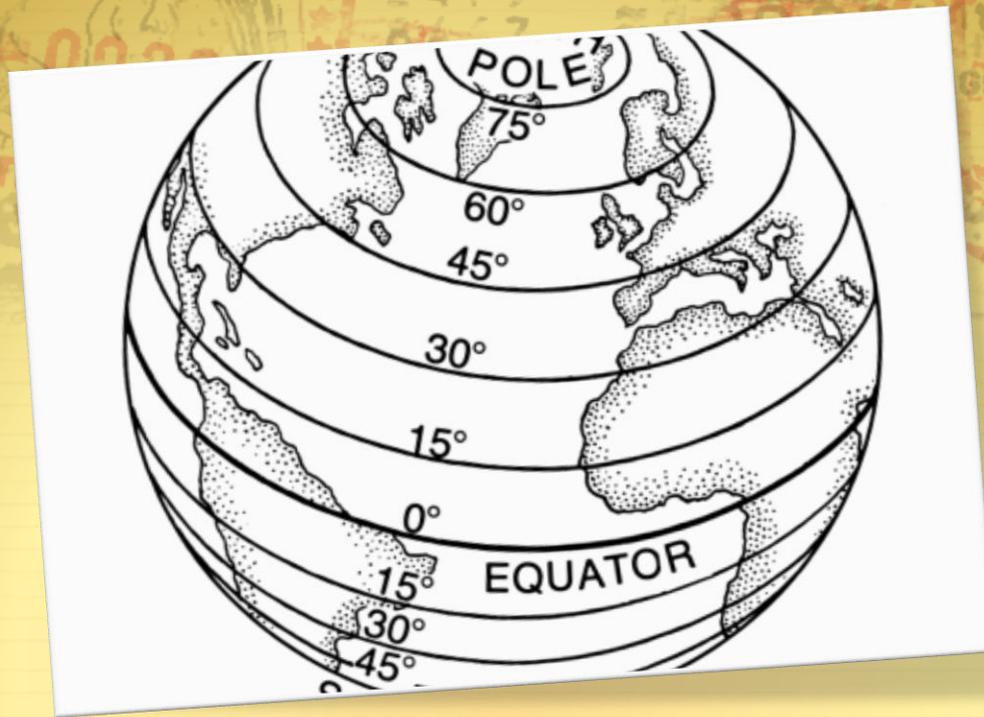
But from the earliest time in which people explored the ocean, they utilized the system of **latitude and longitude**



Latitude & Longitude

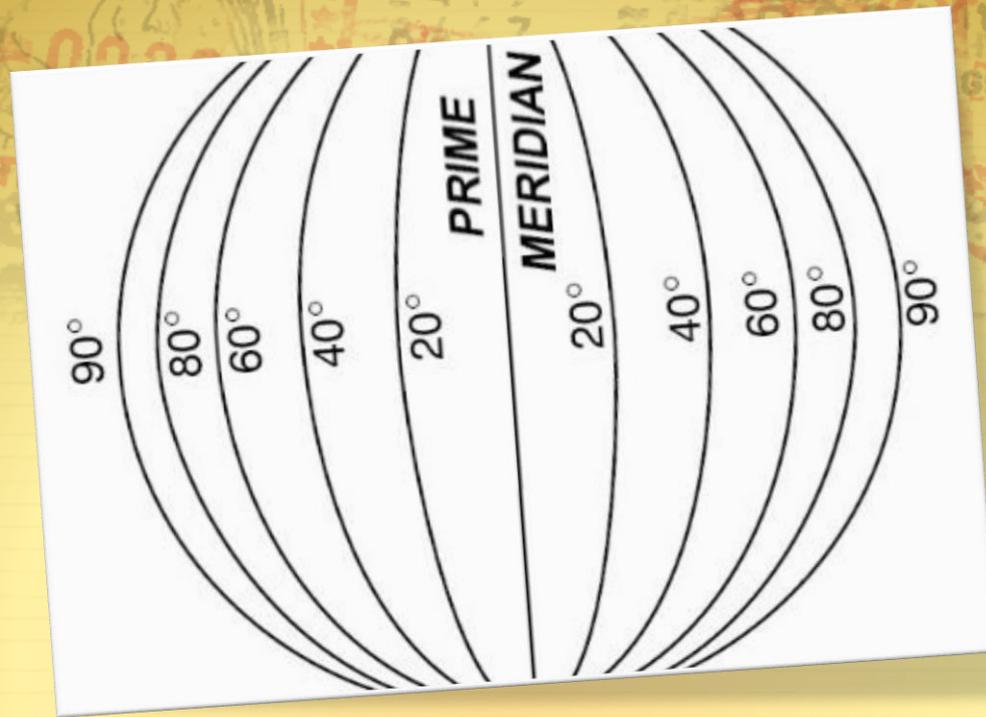


Where in the world are you?



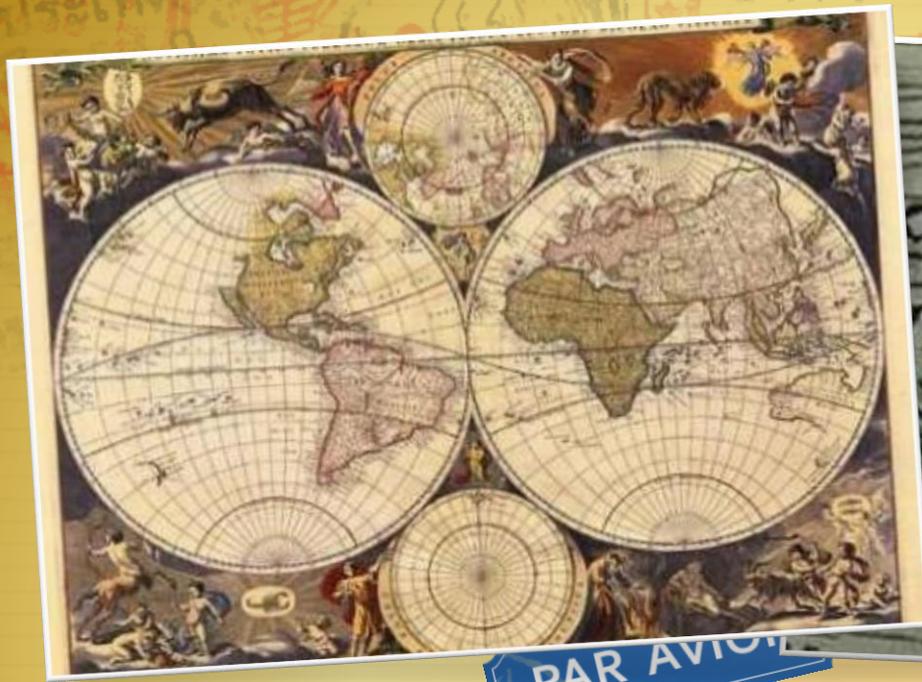
Latitude

Lines separate north from south
(*lat = flat*)



Longitude

Lines separate east from west
(*longitude = long*)



PAR AVION



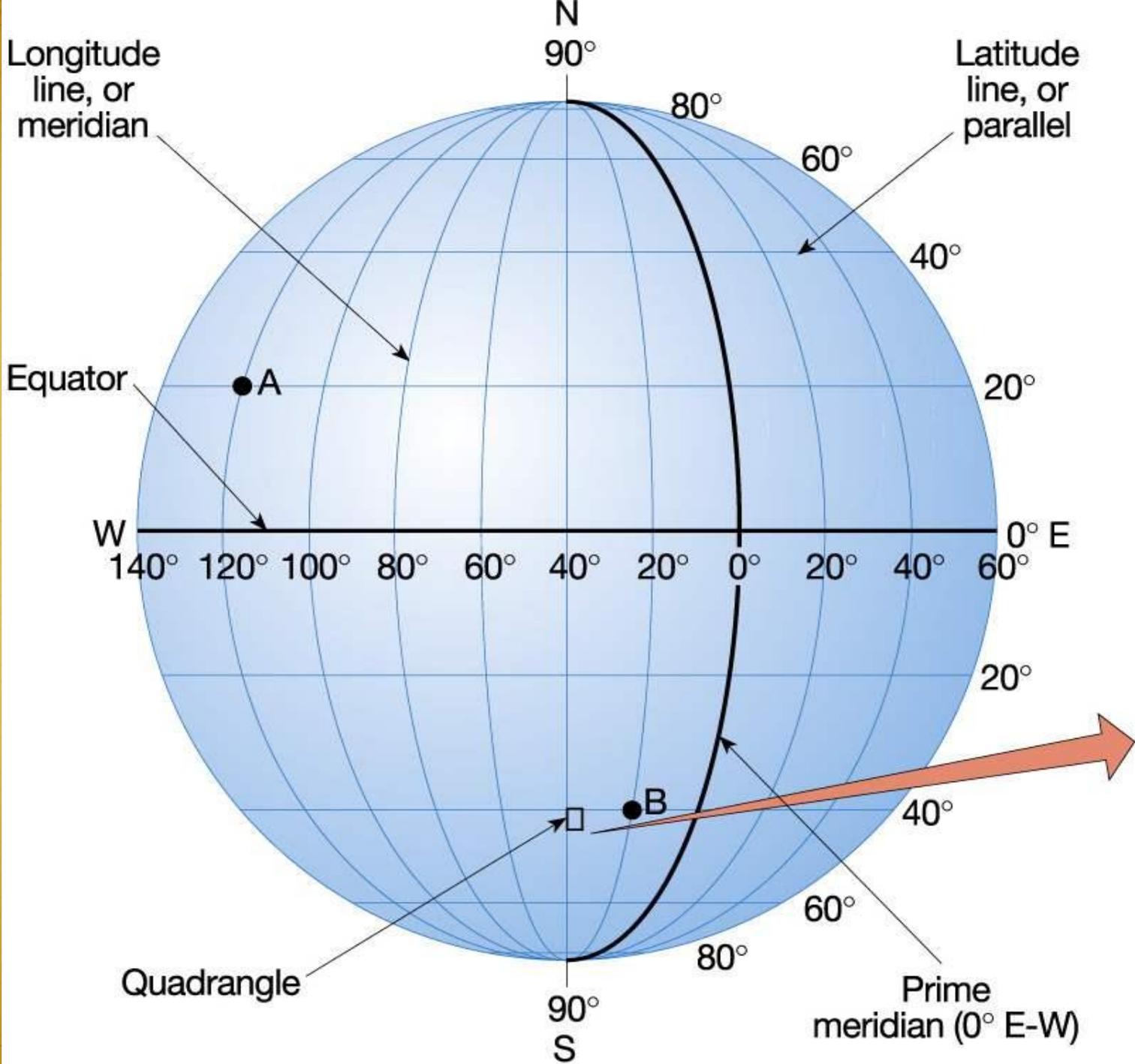
PAR AVION

Where do the lines start?



Where is zero degrees latitude?

Where is zero degrees longitude?



Time to...

PRACTICE

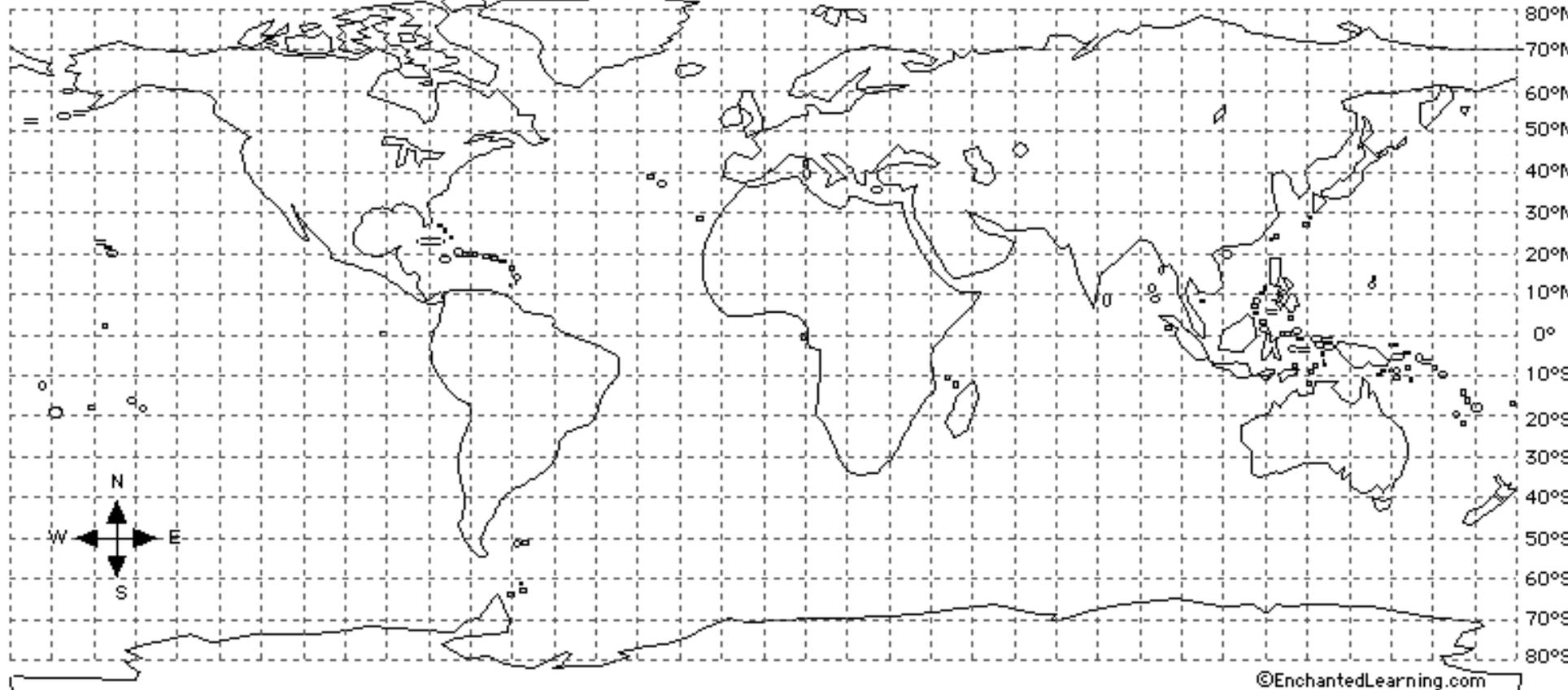
The word "PRACTICE" is displayed in a playful, handcrafted style. Each letter is cut out from a different piece of paper and pinned to a light-colored surface with a pushpin. The letters are: 'P' (yellow on white paper, red pin), 'r' (white on blue paper, red pin), 'A' (white on black paper, green pin), 'C' (black on tan paper, green pin), 'T' (black on white paper, white pin), 'I' (white on blue paper, red pin), 'C' (white on green paper, blue pin), and 'e' (black on white paper, red pin). The background is a warm, yellowish-gold gradient with faint, circular patterns.

West Longitude

World Longitudes and Latitudes (cylindrical projection)

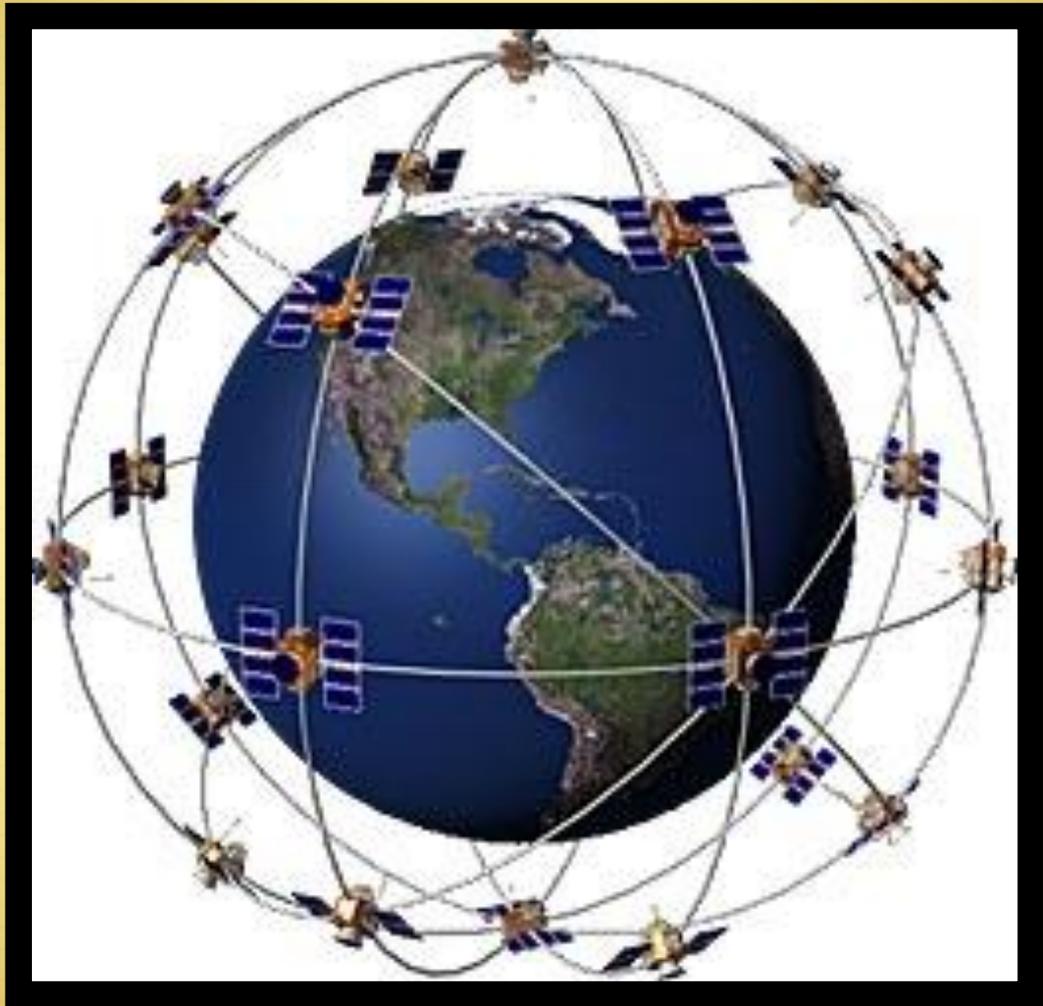
East Longitude

180° 170° 160° 150° 140° 130° 120° 110° 100° 90° 80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30° 40° 50° 60° 70° 80° 90° 100° 110° 120° 130° 140° 150° 160° 170° 180°



Latitude and longitude are still used today.

However, we have modern technology to tell us exactly where we are.



What do you think are the challenges to exploring the ocean depths?

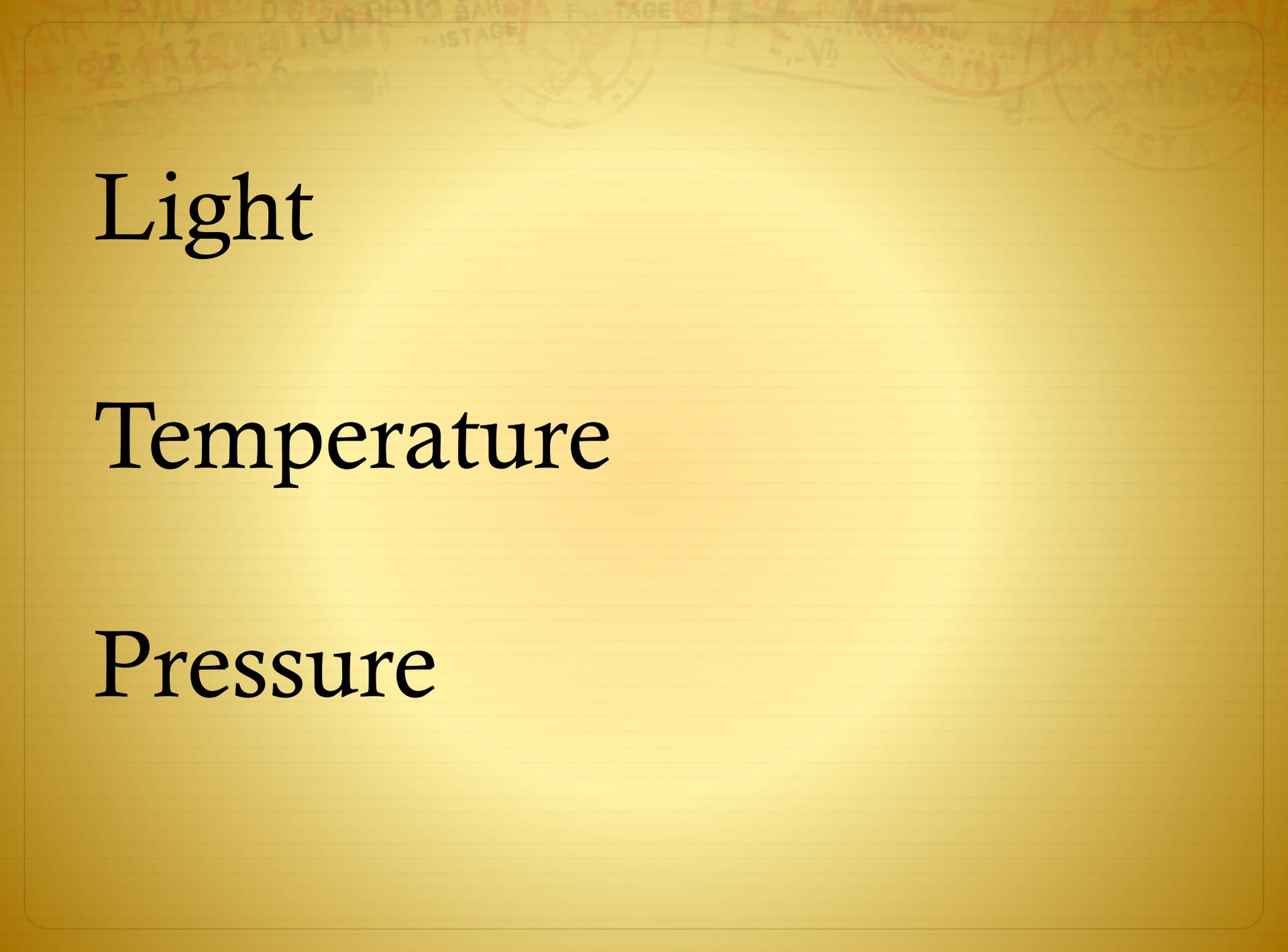


Light

The background is a light yellowish-gold color with a subtle texture. At the top, there are several faint, overlapping postmarks and stamps in red and black ink. One stamp clearly shows the word "POSTAGE" and another shows "POSTAL". There are also some circular stamps with illegible text and numbers.

Light

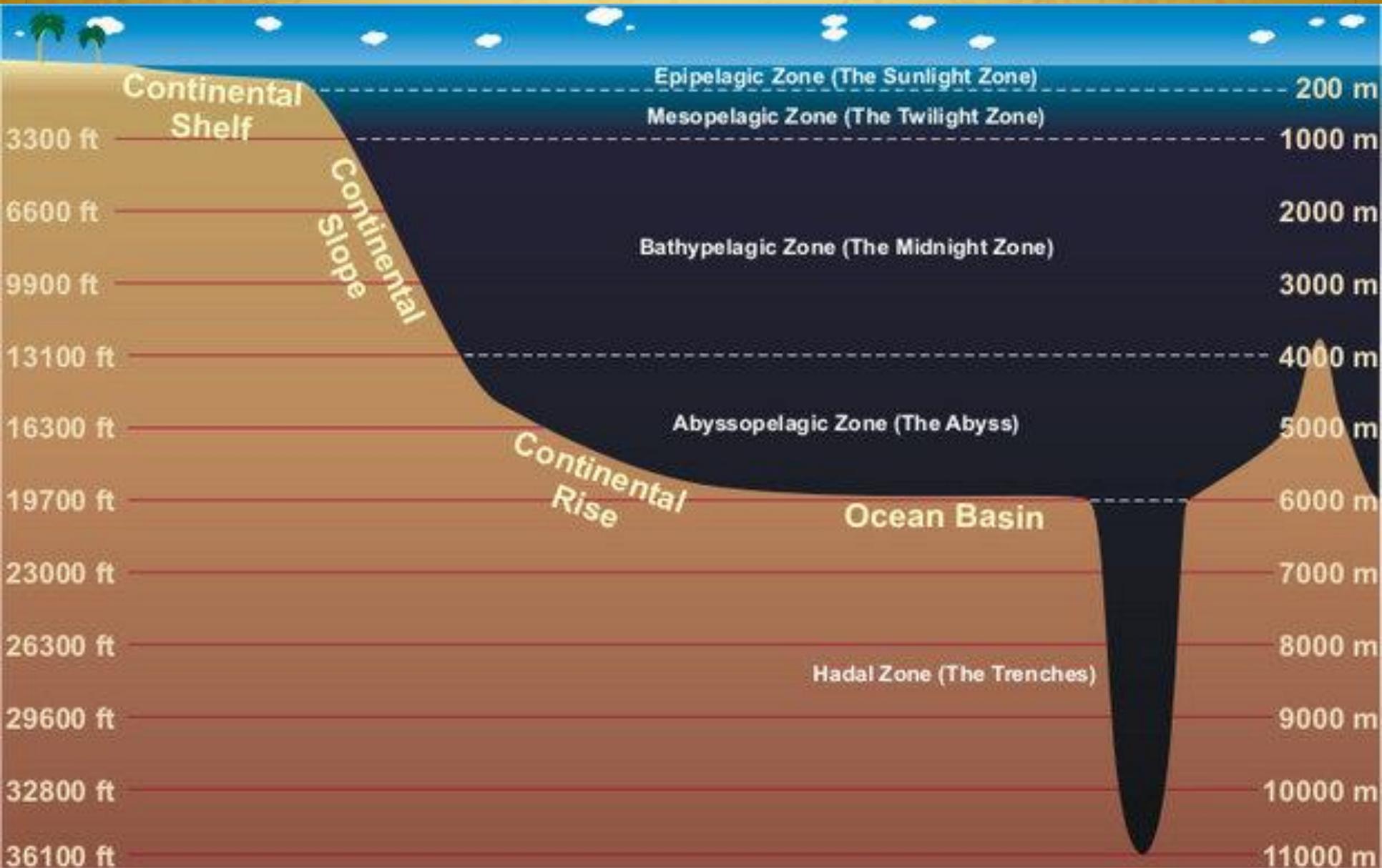
Temperature

The background is a light yellow color with a faint grid pattern. At the top, there are several faint, overlapping stamps in red and black ink, including the word "POSTAGE" and some illegible numbers and letters.

Light

Temperature

Pressure





The Empire
State Building is
1,250 ft. tall.

This is equal to
380 meters.

You could stack

30

Empire State Buildings

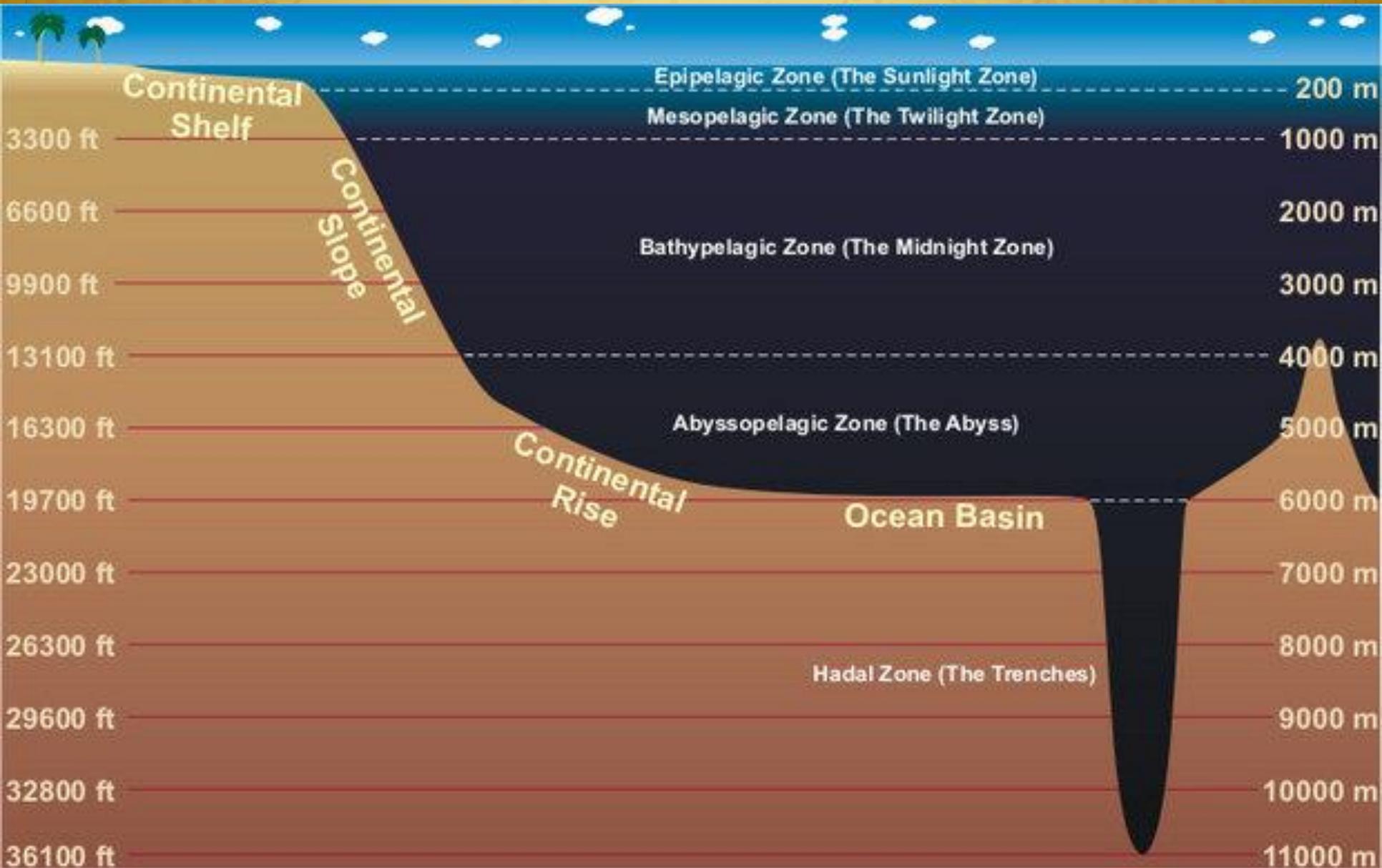
on top of each other from
the deepest part of the
ocean to the surface!

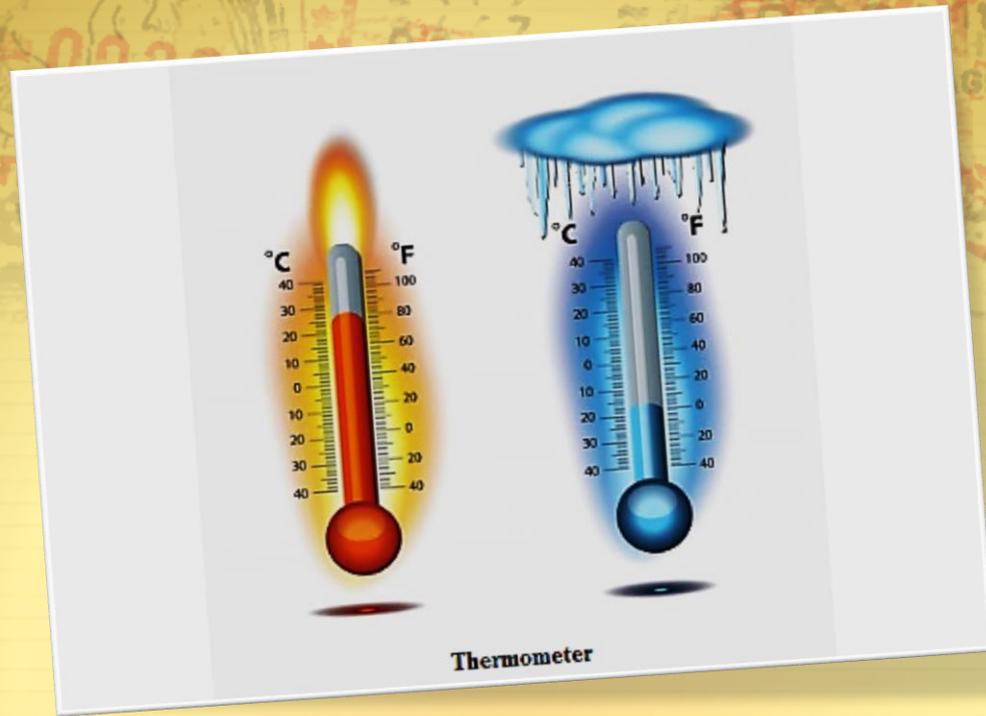
← *I could only fit 14 on this slide*



Let's explore some
questions...

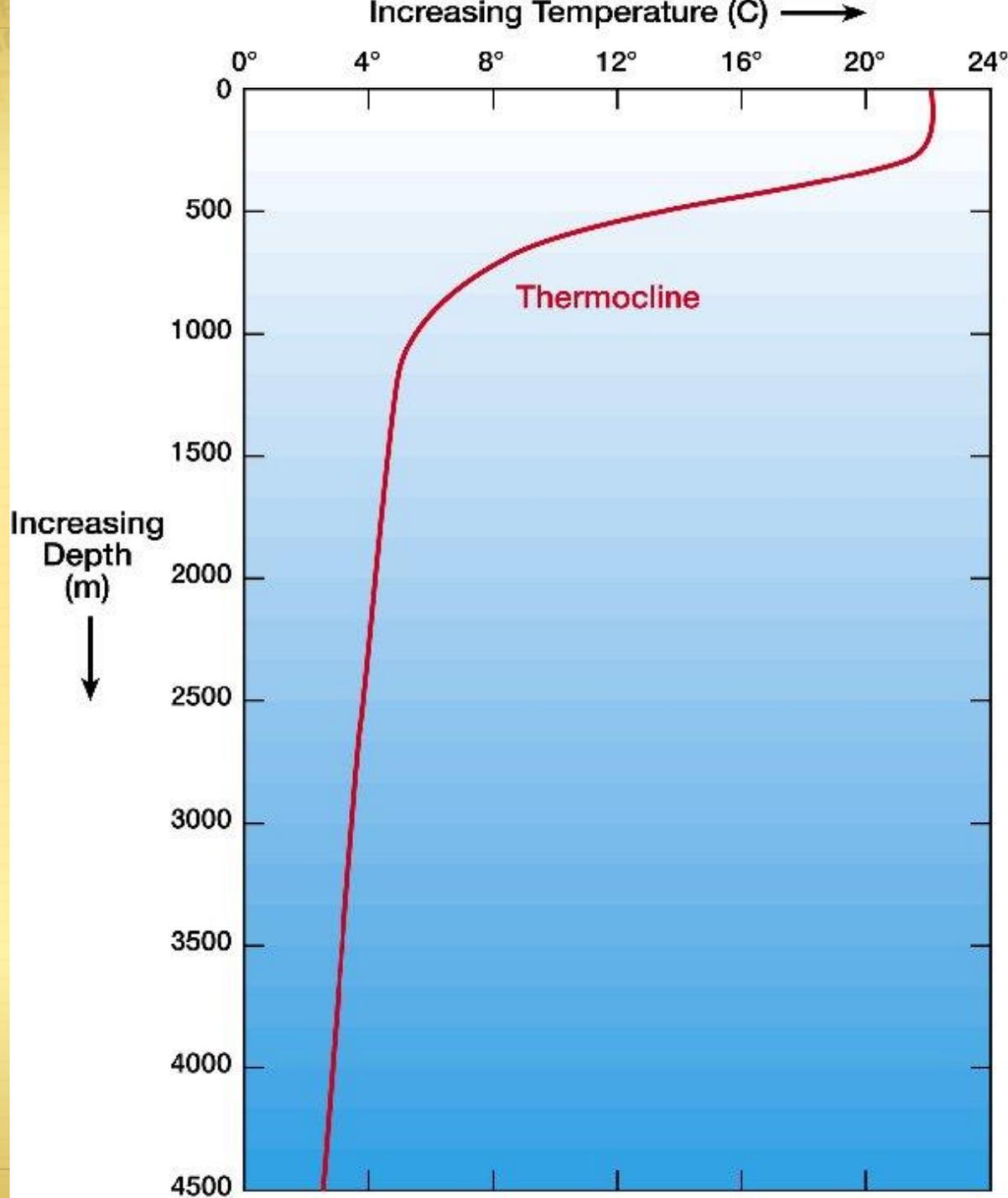






What would you predict happens to **temperature** as you dive deeper into the ocean?

This is a
temperature
profile of the
ocean





What do you think **pressure** has to do with deep ocean exploration?



For every 10 meters you dive,



The pressure of the water above you increases by

14.7 psi

What is the water pressure
at 50 meters of depth?

What is the water pressure
at 50 meters of depth?

$$50\text{m} \div 10\text{m} = 5$$

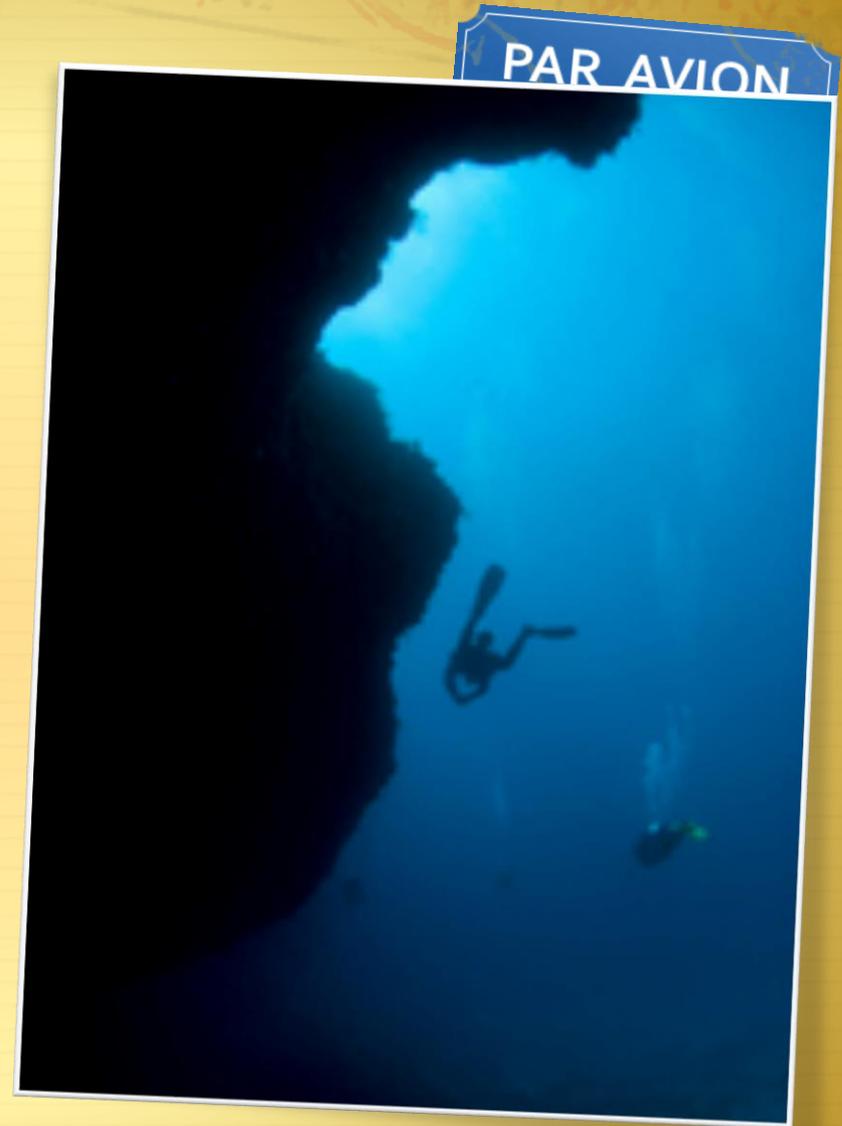
What is the water pressure
at 50 meters of depth?

$$50\text{m} \div 10\text{m} = 5$$

$$5 \times 14.7 = 73.5\text{psi}$$

The deepest dive
on record is 330
meters.

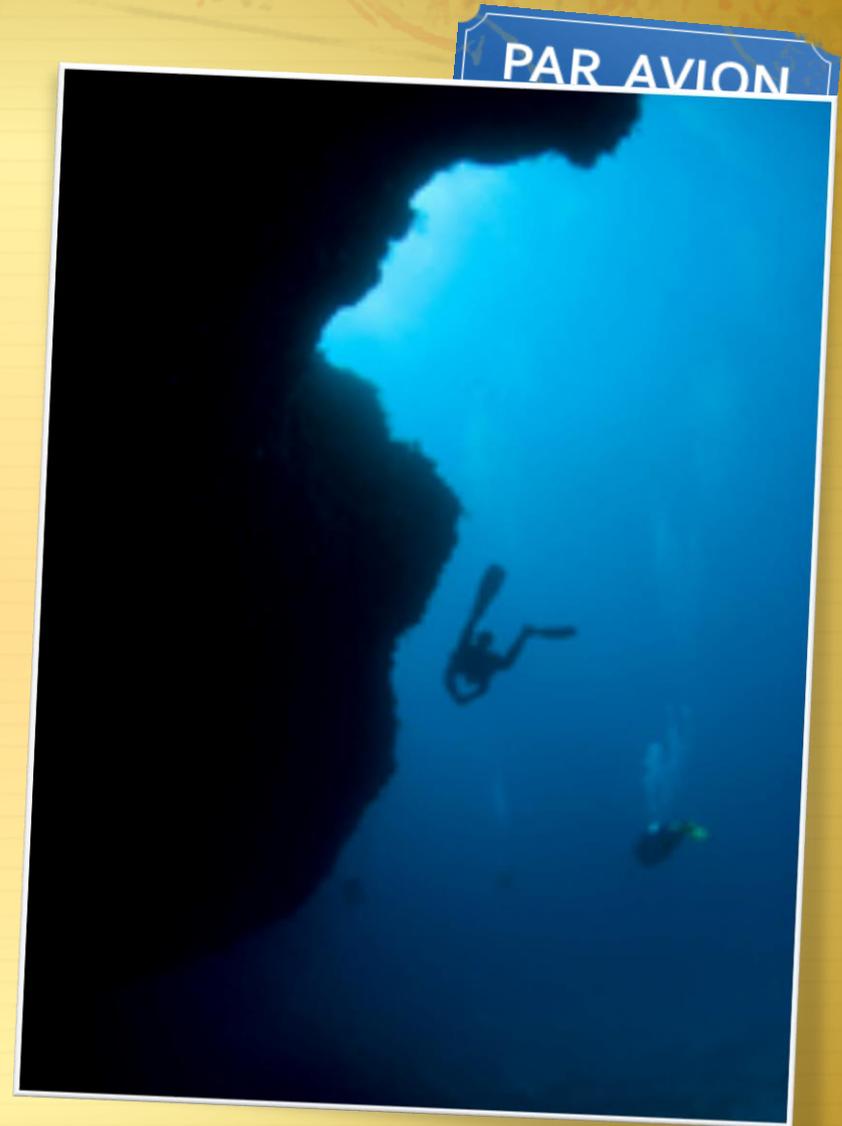
What was the
pressure felt by
this diver?



The deepest dive on record is 330 meters.

What was the pressure felt by this diver?

485 psi



Atmospheric Diving Suits

can be used for very
deep dives of up to
700 m (2,300 ft)
for many hours



Henry's Law



The solubility of a gas in a liquid is directly proportional to the partial pressure of the gas above the liquid

wait... what?

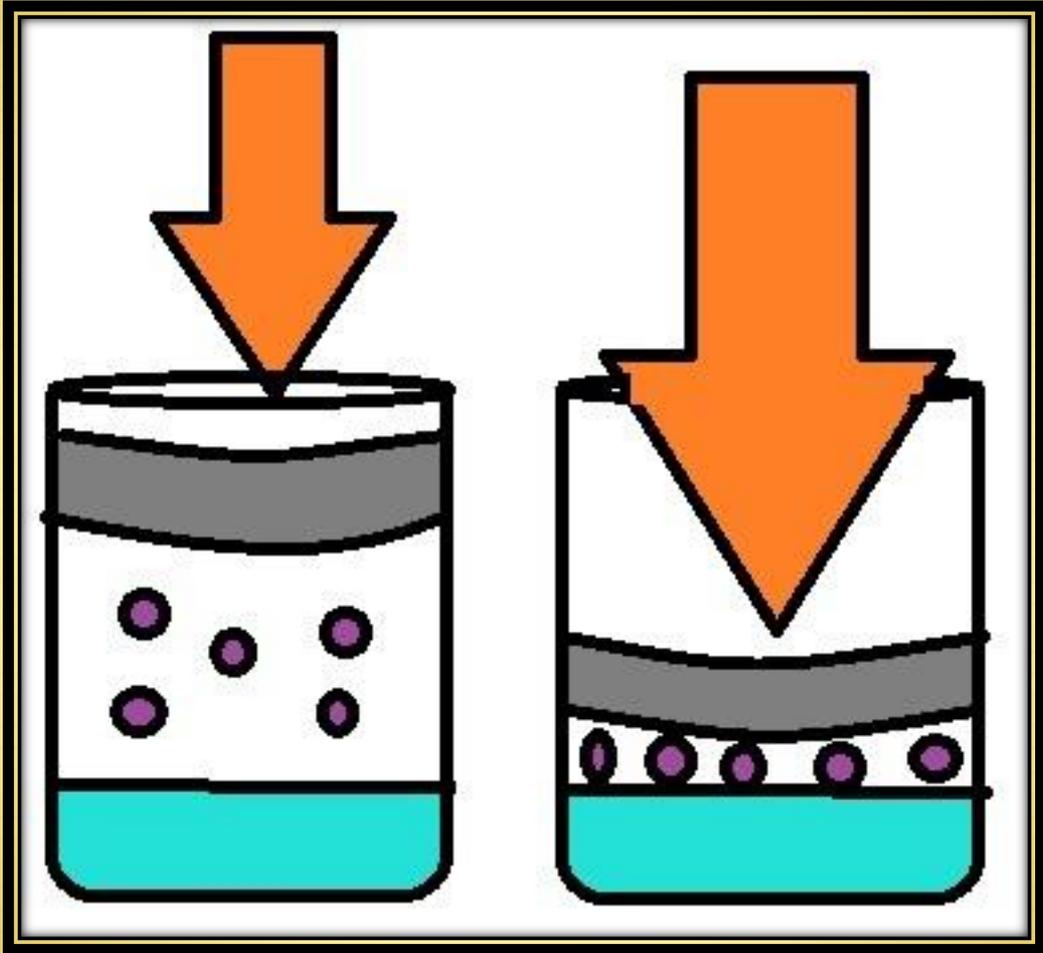


Simply put,

When you increase the pressure on a liquid, more gas will dissolve in that liquid

Think of soda



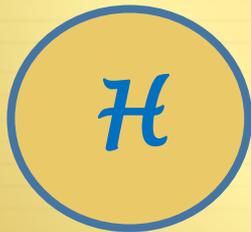




Decompression sickness, a.k.a **the bends**

Read & Annotate

Explain decompression sickness in terms of Henry's Law.



has to do with Henry's Law



question I have