



# Grade 8 Science

## Unit 1:

## Water Systems on Earth

## Chapter 2

# Oceans are important...

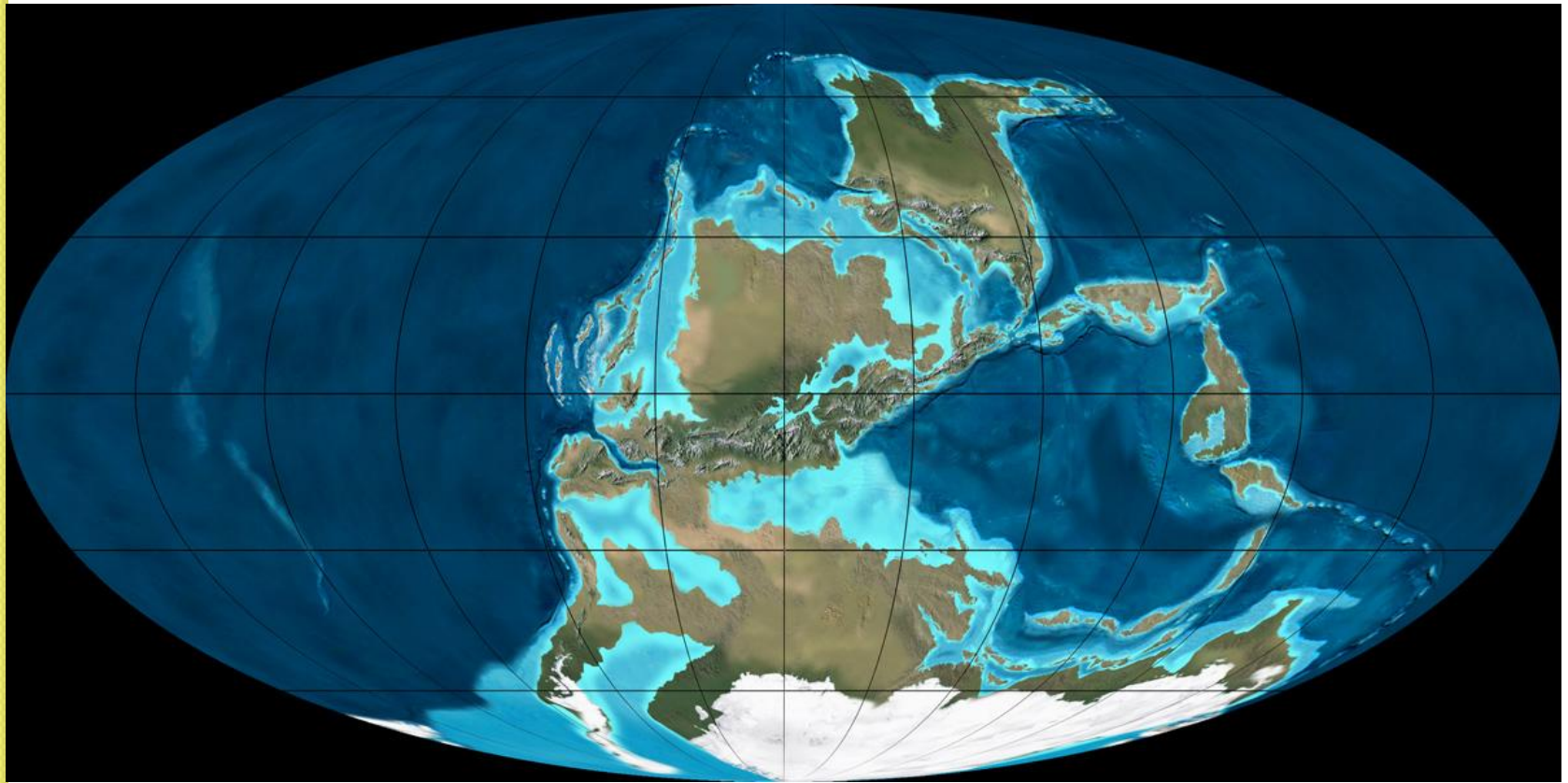
1. Primary water source for the water cycle
2. Control weather
3. Support diverse life
4. Provides humans with food, minerals, and resources

# The Origin of the Oceans

1. Tectonic Plates
2. Volcanic action
3. Erosion
4. Glaciation

# Tectonic Plates

- Has helped determine where ocean basins are located.
- Tectonic plates move changing the position of the continents.



*Panthalassa...* Oceans then



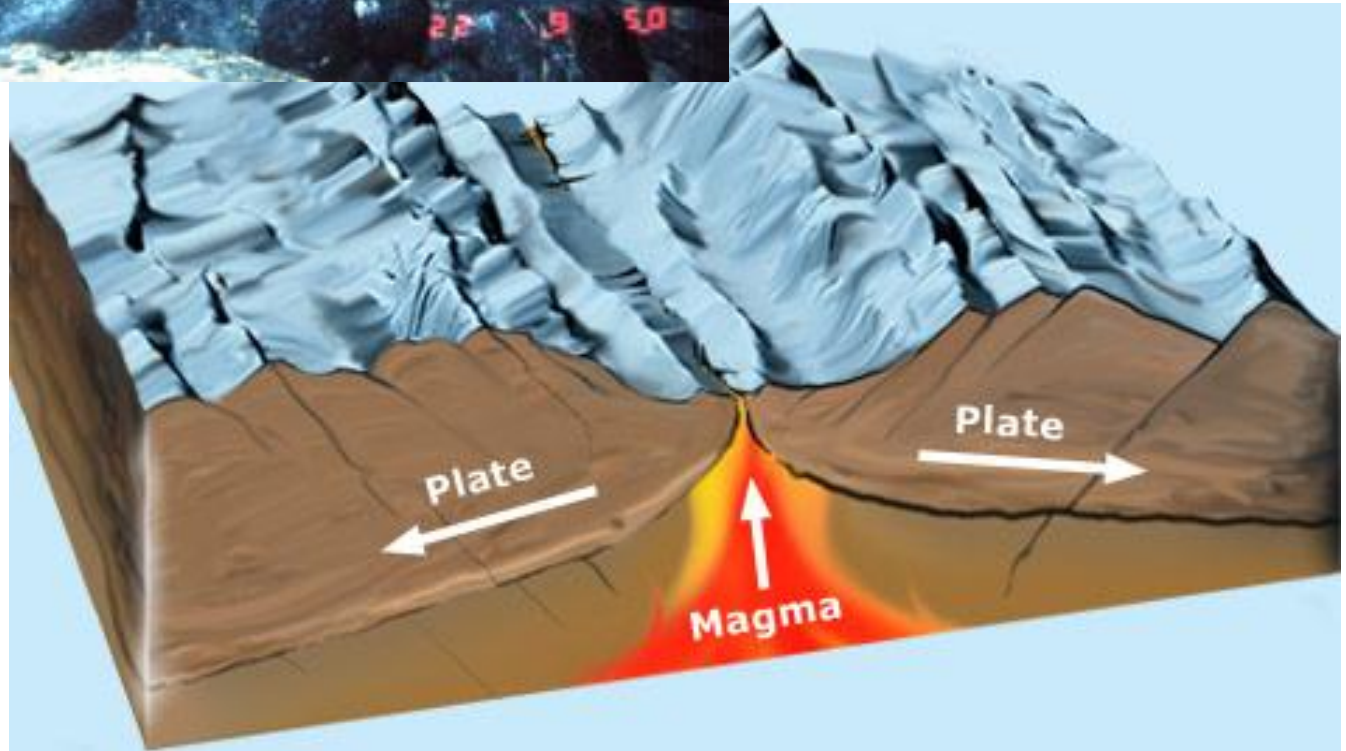
Oceans now

# Volcanic Action

- Has built ocean floor along mid-ocean ridges in areas where plates separate.
- Has helped build continental divides in areas where plates have collided and mountain building occurs.

- Water trapped in volcanic materials were released as vapour. It cooled, condensed and fell back to the earth. This water collected in the lowest parts of the Earth's surface...The ocean basins.





# Erosion

- Has aided the further development of continental drainage systems as material is removed and deposited into the ocean basins.

# Glaciation

- A force of erosion in the development of continental drainage systems.
- Glaciers move materials towards the oceans.



# Hudson Bay Lowlands, Ontario

# Researching the Ocean Floor

Technologies include...

1. Sonar
2. Satellites
3. Core sampling
4. Underwater photography/  
videography



5. Deep sea submersibles

6. Diving

*Refer to pages 46 - 49*

CORE STSE

***“UNDERSEA  
ADVENTURE”***

# Underwater explorations

- Shipwrecks

Ex. *The Titanic* Discovered in  
1985





# Technologies: Past & Present

## Diving



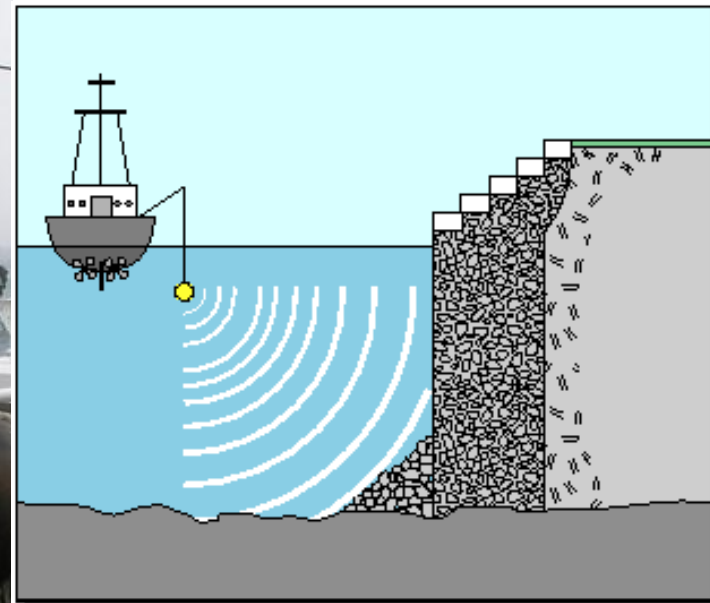
## Submersibles



# Wire line depth probe



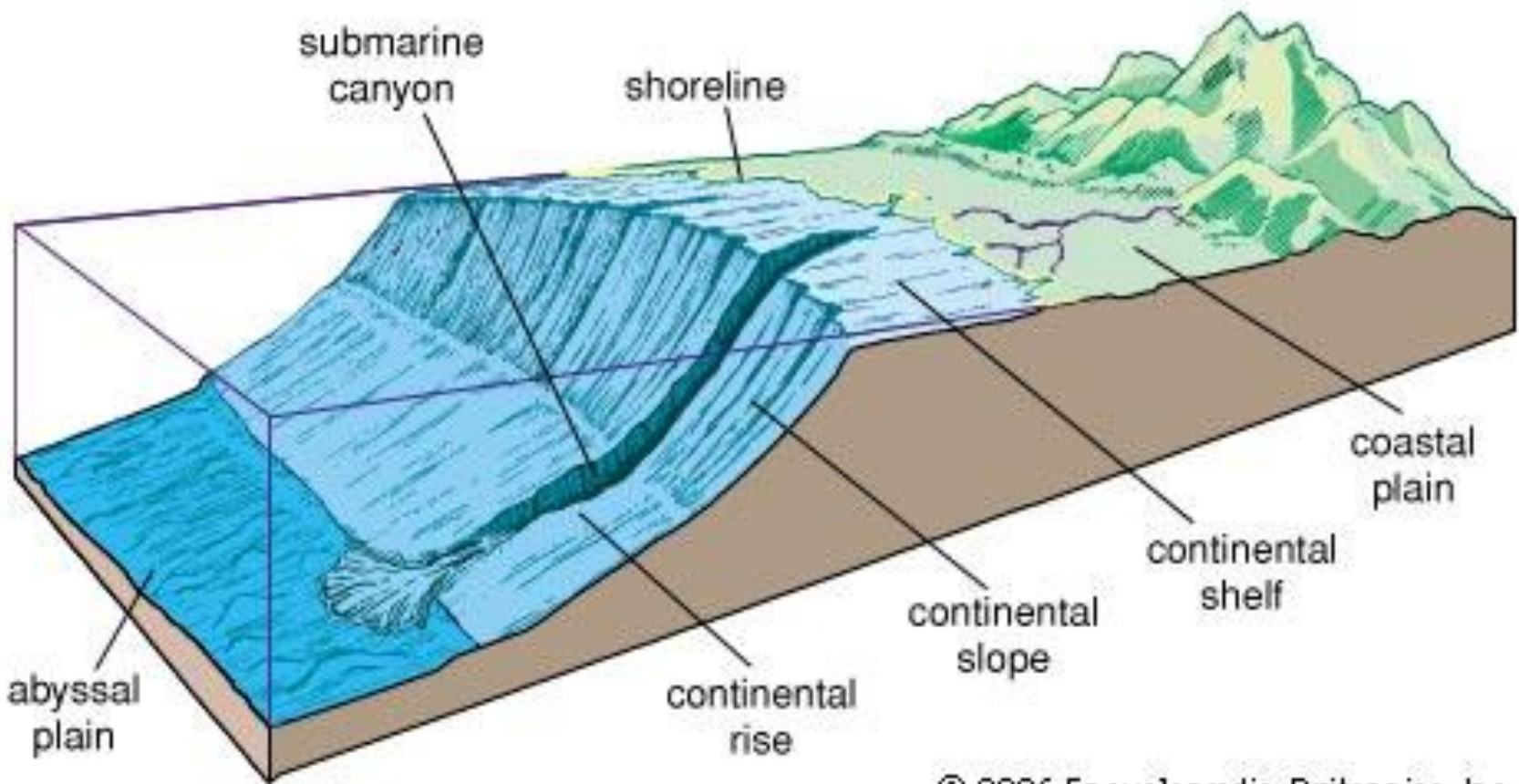
# Sonar



Activity 2-2 page 50-51

**“GETTING TO  
KNOW THE OCEAN  
FLOOR”**

# Continental Margin



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# Continental shelf:

- the submerged part of the continent between the coast and the edge of the basin.

# Continental slope:

- continental shelves slope gradually away from the land before dropping drastically.

## Abyssal plain:

- Wide, open features of the sea.
- Formed of thick deposits of sediments.

*Where do these sediments come from?*

# Mid-Ocean ridge:

- Long, undersea mountain chains formed from volcanic eruptions.

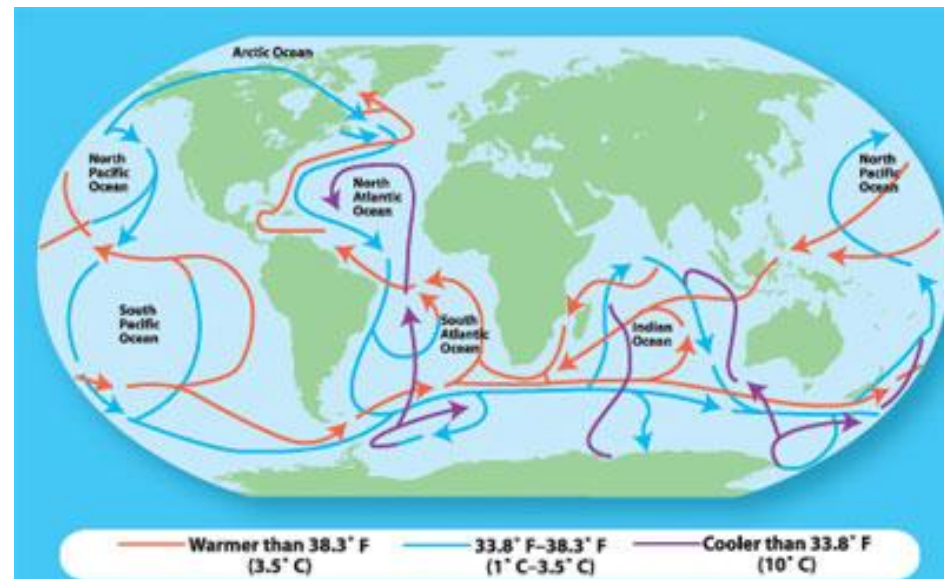


# Canadian Organizations involved in Ocean Research

1. Environment Canada
2. Federal Fisheries
3. Ocean Science Centre
4. Centre for Cold Ocean  
Research (C-CORE at MUN)

# Ocean Currents...

- A large amount of ocean water that moves in a particular and unchanging direction.



# 2 Types of Ocean Currents...

## 1. Surface currents

- Flow in the top 100-200 m

## 2. Deep currents

- Flow below 200 m

# Surface Currents

Factors that influence surface currents are:

1. Wind
2. Earth rotation
3. Shape of the Earth's continents

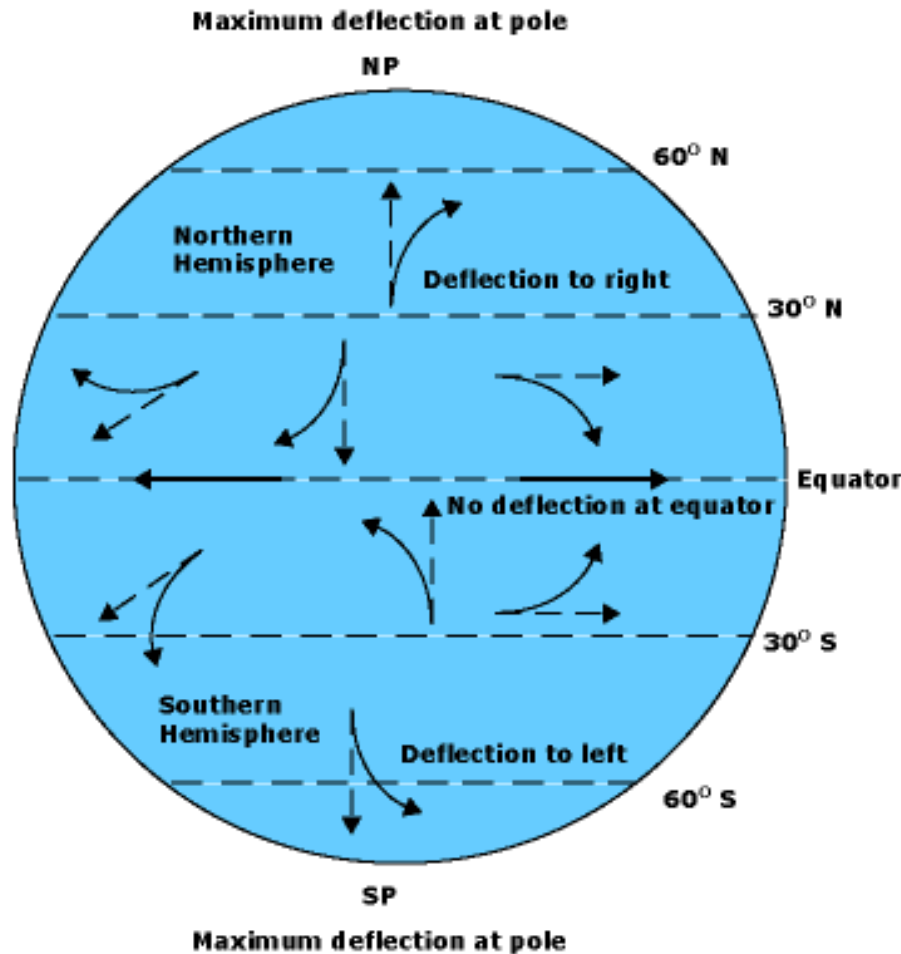
# Wind

- Air movement caused by uneven heating.
- The energy of the moving air is transferred by friction to the water molecules causing it to move.

# Earth Rotation

- The Earth spins counter-clockwise.
- This spinning body deflects winds and currents depending on what side the equator they are on.

- This alteration of direction is called the **Coriolis effect**.



*Clockwise in the Northern Hemisphere and Counter clockwise in the Southern Hemisphere*

# Shape of Continent

- Moving currents are forced to turn when they meet a solid surface.



# Deep Water Currents

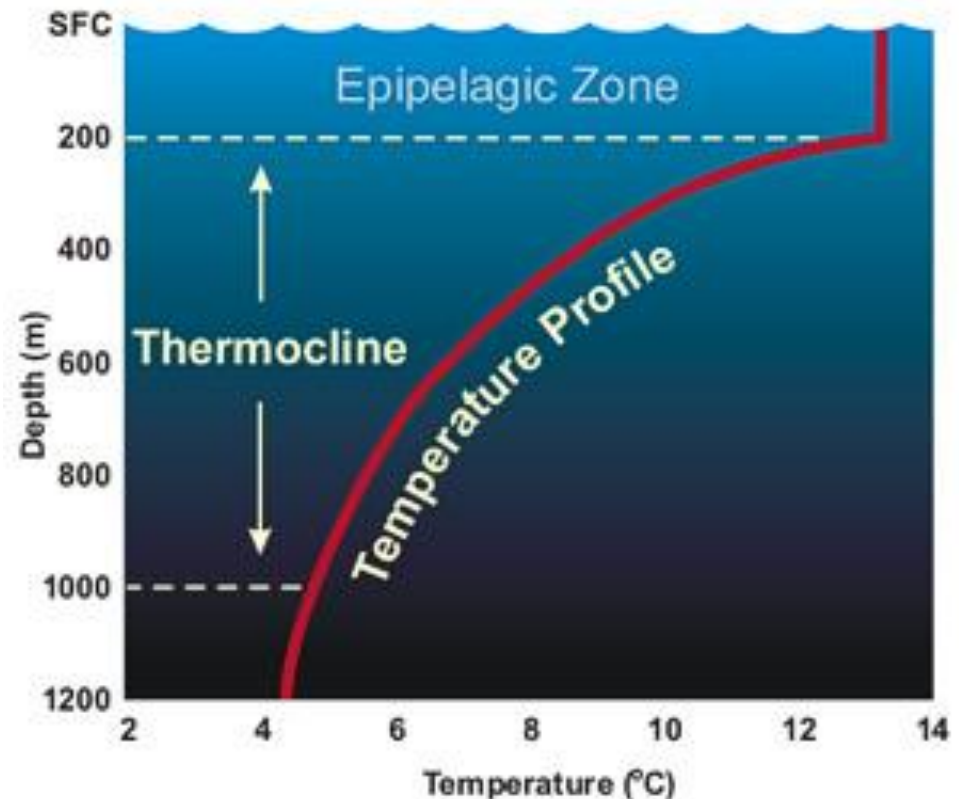
The most important influences are:

1. Water temperature
2. Salinity

# Water Temperature


- Not the same at every depth.

*\*Cold water is also more dense than warmer water.*



# Salinity

- Seawater is less salty at the mouths of large rivers due to the fresh water entering the ocean.
- Fresh water also enters where glaciers and icebergs melt and areas of high precipitation.

- 
- High amounts of evaporation increases salinity as well as freezing.

# Local Ocean Currents...

## 1. Labrador Current

- cold water

## 2. Gulf Stream

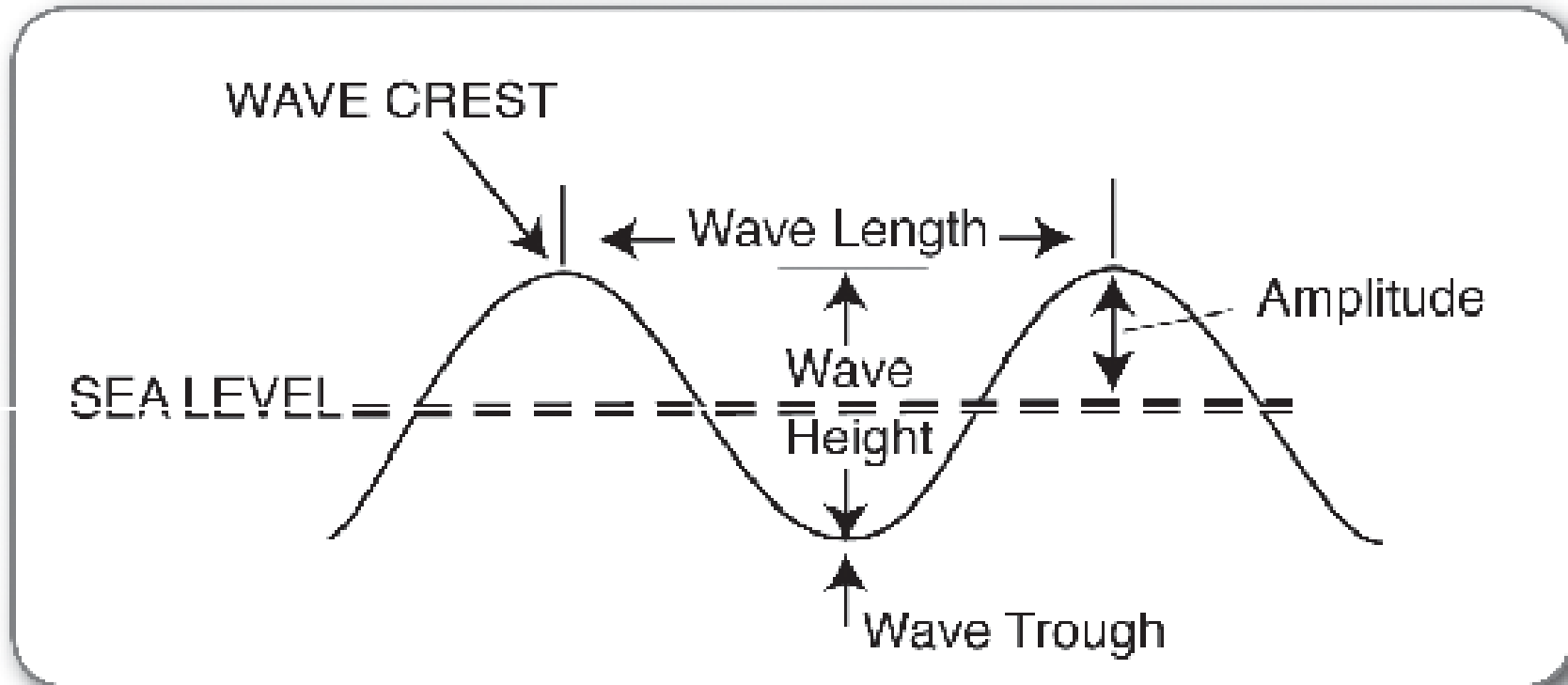
- warm water

*Refer to map p. 54*

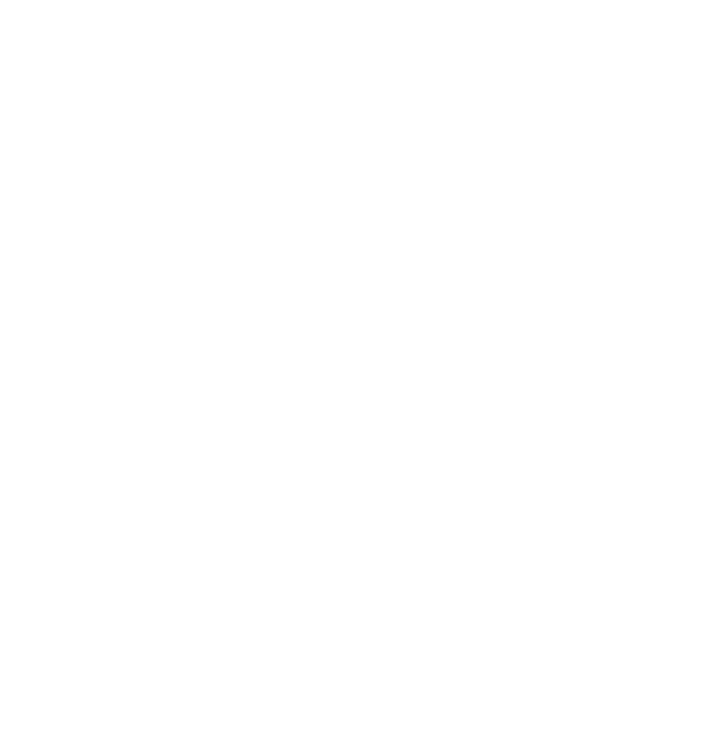
# Waves...

- Large ripples set in motion by steady winds.
- Waves on the surface of water are the result of a transfer of energy from moving air to the water.

# Common Wave Features:



*\*As a wave approaches a shoreline, the wavelength decreases and the wave height increases.*





# 2 Types of Waves:

## I. Swells

- Smooth waves caused by wind and storms far out in the ocean.



## 2. Breakers

- The tumble of water when a wave collapses onshore.



# Tsunamis

- Giant waves that can be sent in motion by earthquakes on the ocean floor, landslides or volcanic eruptions near the shoreline.

- Can be very destructive.




*November 18,  
1929  
South Coast of NL*

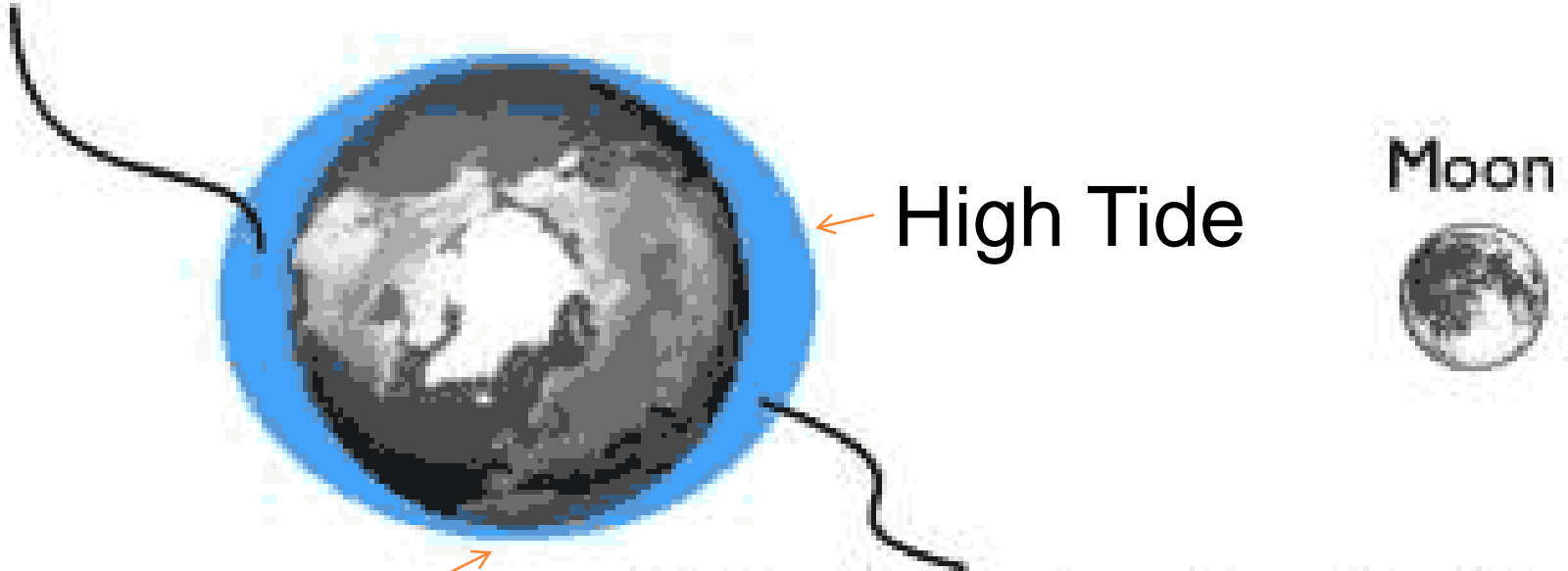


# Tides...

- The slow rise and fall of the ocean.
- The upper and lower edges of a beach are determined by the high- and low- tide mark.

- 
- Tides are connected to the motion of the moon and the spinning of the Earth.
  - The moon exerts a greater force of pull than the sun due to its closer proximity to Earth.

Water 'bulges' on the opposite side of the Earth to the Moon



High Tide

Moon

Low Tide

Water 'bulges' on the side of the Earth facing the Moon

## 2 Types of Tides:

### I. Spring Tide:

- Occur when the Earth, Sun and Moon are in a line.
- Causes extra high and low tides.



## 2. Neap Tides:

- Occur when the Sun and the Moon are at right angles to one another.
- Causes the smallest tidal movements. There is little difference between low and high tides.



Neap  
Tide

Moon



Earth

Spring  
Tides






**Tidal Range:**

**The difference in level  
between a high and a low  
tide.**

# Shaping Our Shorelines...

Waves have the power to erode and deposit sediments on the shore.

Tides work with waves to determine the range of shoreline that can be affected by wave action.

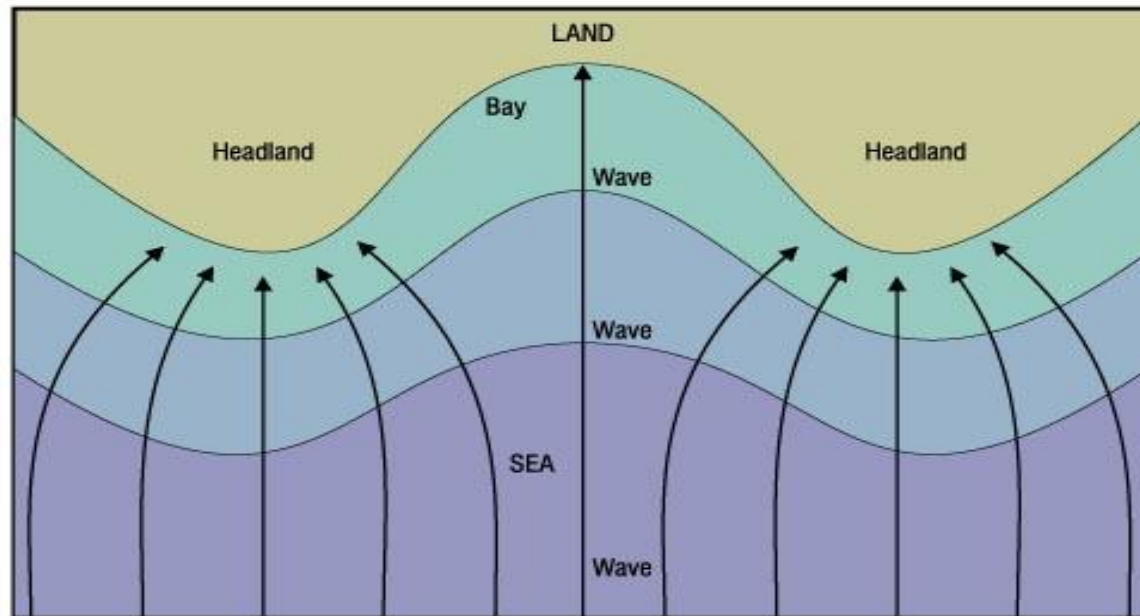


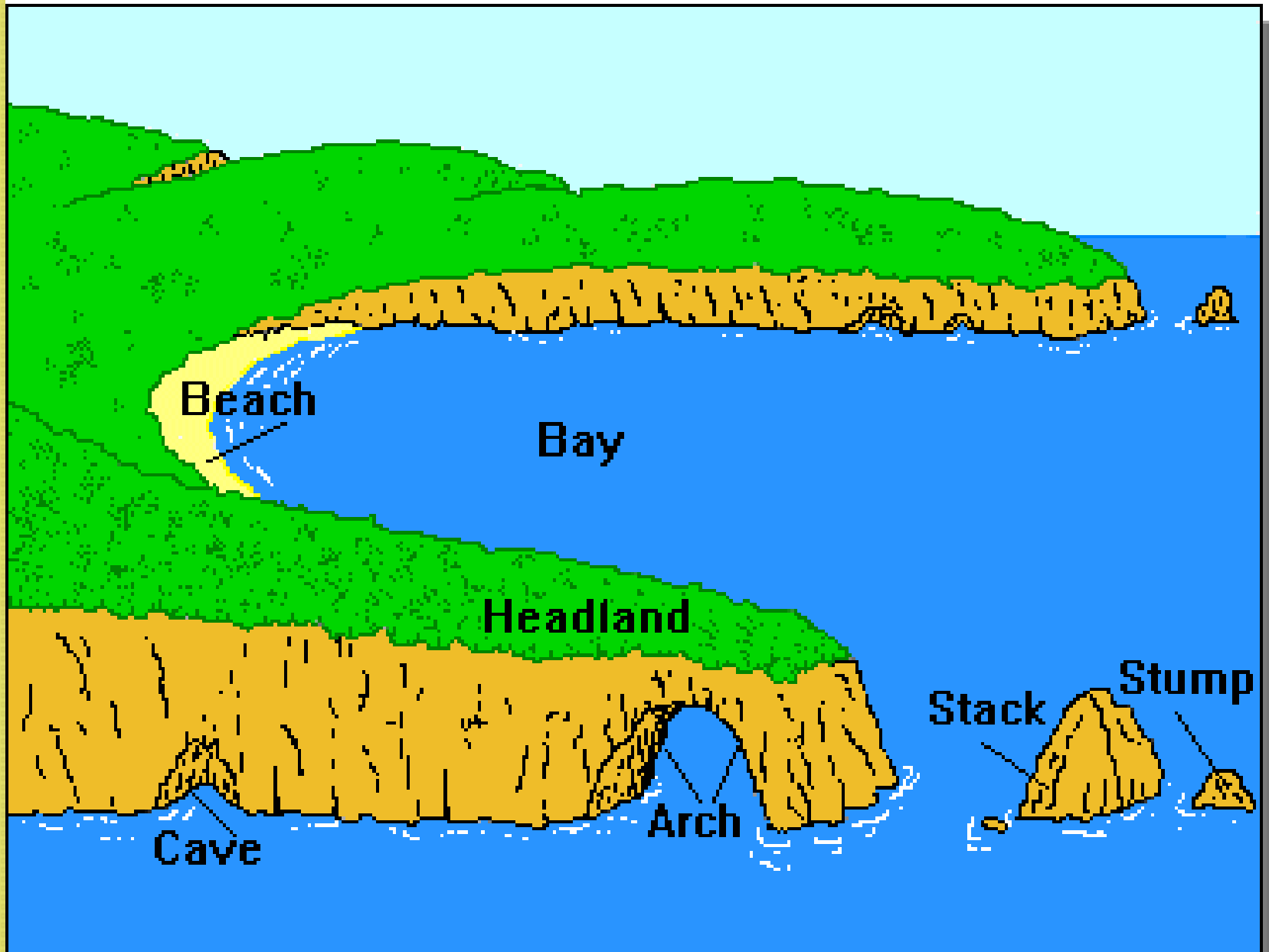
**Factors that affect the interaction of waves and tides on the shorelines are:**

- 1. Slope of the shoreline**
- 2. Shape of the shoreline**
- 3. Type of rock material**
- 4. Wave energy**

# Shoreline Features...

Wave energy is concentrated on **headlands** and spreads out as it reaches **bays**.







**Sand bar or Shoal**



# Shorelines can change quickly

Example...

Intense wave action during:

- winter storms
- hurricanes

Etc.