**Unit 1:**

**Chapter 2 notes**

**Oceans control the water cycle**

Oceans are important because they:

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

**Origin of the Oceans**

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

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 was 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

**Researching the Ocean Floor**

Technologies include…

1. Sonar
2. Satellites
3. Core Sampling
4. Underwater photography/videography
5. Deep sea submersibles
6. Diving

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

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**

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 200m

Surface Currents

Factors that influence surface currents are:

1. Wind
2. Earth rotation
3. Shape of the Earth’s continents
4. 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

1. Earth Rotation

* The Earth spins counter-clockwise (ccw)
* 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)

1. Shape of Continent

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

Deep Water Currents

Factors that influence deep water currents are:

1. Water temperature
2. Salinity
3. Water temperature

* Not the same at every depth
* Cold water is more dense than warmer water

1. 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

1. Gulf Stream

* Warm water

*Refer to map p.54*

**Waves**

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 increase

2 Types of Waves:

1. 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

**Tides**

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

2 Types of Tides

1. Spring Tide

* Occur when the earth, sun and moon are in a line
* Causes extra high and low tides

1. Neap Tide

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

Tidal Range: The difference in level between a high and a low tide.

**Shaping our Shorelines**

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.**
* Shorelines can change quickly. Example: Intense wave action during winter storms, hurricanes, etc.