



OCEANOGRAPHY STUDY GUIDE

Chapter 2 Section 1

1. Most abundant salt in ocean.
 - Sodium chloride; NaCl
2. Amount of Earth covered by Water
 - 71%
3. Four oceans: What are they?
 - Atlantic, Pacific, Arctic, Indian
 - Largest?
 - Pacific
 - Smallest?
 - Arctic
 - Locations of each?
 - Atlantic – between the Americas and Africa; Pacific – between the Americas and Asia; Indian – beneath Asia, to the east of Africa; Arctic- above Russia, Europe, and Canada

Chapter 2 Section 1

4. What is Salinity?
 - The amount of dissolved salt in a given amount of water
5. How is salinity increased in the ocean?
 - Evaporation, Freezing, More runoff following erosion
 - How is it decreased?
 - Increased rainfall, Melting of ice; Increase of freshwater runoff
6. What influences density of water?
 - Changes in temperature and salinity
7. Basics parts of the water cycle.
 - Condensation – water goes from gas to a liquid
 - Evaporation – water goes from a liquid to a gas
 - Precipitation – water becomes too heavy and falls out of the atmosphere
8. What is the ocean's most important function? EXPLAIN!
 - To absorb the radiation from the sun. This helps regulate to temperatures on land, preventing large temperature fluctuations.

Chapter 2 Section 2

1. How do scientists study the ocean floor?
 - SONAR, satellite, submersibles
2. Major regions of the ocean floor
 - Continental Margin and Deep-ocean basin
 - **Where are these regions located? Can you describe them?**
 - Continental Shelf – located in continental margin; closest to shoreline
 - Continental Slope – located in the margin; steep slope
 - Continental Rise – located in the margin; gentle slope leading into basin
 - Abyssal Plain – part of basin; large, flat area of ocean floor
 - Ocean Trench – part of basin; deepest areas of the ocean floor; found at subduction zones
 - Sea Mount – part of the basin; mountain on the ocean floor; can become a guyot or volcanic island

Chapter 3 Section 1

1. Ocean Layers

- Surface zone – top layer of the ocean; 100-300 m; sun only reaches top 100 meters and surface currents mix the rest
- Thermocline – middle layer; greatest temperature drop with depth
- Deep Zone – bottom layer of the ocean; no sunlight reaches here

2. Surface Currents: What controls how they move?

- Global winds, Coriolis effect, Continental deflections

3. Ocean Gyre

- a) Five main ones: Name them.
 - North Atlantic Gyre, South Atlantic Gyre, North Pacific Gyre, South Pacific Gyre, Indian Ocean Gyre
- b) How do they move based on Hemisphere?
 - Move in a clockwise motion in the northern hemisphere and in a counterclockwise motion in the southern hemisphere

Chapter 3 Section 1

4. Global Winds

- a) Direction of wind flow
 - Move east to west near the equator and move west to east near the poles
- b) How does the wind interact with the ocean?
 - Transfers energy to the water and creates ripples

5. Coriolis Effect- What is it?

- The apparent curving motion of objects from a straight path due to the Earth's rotation
- What does it affect?
 - Effects surface currents, airplanes, thrown balls, bullets

6. Deep Ocean Currents (also known as Density Currents)

- a) What causes density currents to form (changes in...)?
 - Density

Chapter 3 Section 2

1. Surface Currents and Climate

- a) How do surface currents affect the climates of different areas?
 - Warm water currents increase the temperature along the coast line while cold water currents decrease the temperature along the coastline.

2. Upwelling

- a) How is upwelling initiated?
 - Surface currents are moved out away from the shore. This warm water is replaced by deep, cold, nutrient-rich water from below
 - What occurs as a result?
 - Cold, nutrient-rich water rises the surface. This attracts fish and other ocean life to the area.
 - Why is upwelling important?
 - Provides an abundant fishing industry for the area.
- b) How does upwelling affect living organisms of the ocean?
 - Provides the basis for the food chain in the area.

Chapter 3 Section 2

3. El Nino

- a) What is El Niño, why is it important for scientist to learn about El Nino?
 - A change in the water temperature in the pacific ocean that produces a warm current.
 - Important to learn about because it has devastating consequences.
- b) What causes El Niño?
 - The cold Peru current decreases. The trade winds blow the colder water to the western Pacific Ocean.
- c) What effects does El Niño have on different parts of the world?
 - Western Pacific countries experience less rainfall leading to drought. Eastern Pacific countries experience more rainfall leading to flooding and mudslides. Upwelling stops.
- d) How do we study El Niño and the patterns associated with El Niño?
 - Use buoys spread across the Pacific Ocean to collect data on temperature, wind speed, etc.

Chapter 3 Section 3

1. Parts of a wave

- Crest is highest point
- Trough is lowest point
- Wavelength is from crest to crest or trough to trough
- Wave height is from crest to trough
- Amplitude is one half the wave height

2. Why do waves change as they approach the shore and how?

- They begin to interact with the ocean floor when they enter water that is less than $\frac{1}{2}$ their wavelength. They become a shallow-water wave and increase in wave height.

3. What are waves on the surface of the earth caused by?

- Caused by wind

Chapter 3 Section 3

4. Types of waves:

- **deep-water waves** – found in water that is greater than $\frac{1}{2}$ the wavelength
- **shallow-water waves** – found in water that is less than $\frac{1}{2}$ the wavelength
- **shore currents** – waves that crash onto the beach head-on
- **undertow** – a subsurface current that is near shore and the pulls objects out to sea
- **riptides** – when two shore currents come in at an angle and combine forming a stronger undertow
- **long shore currents** – a water current that travels near and parallel to the shoreline
- **whitecaps** – the bubbles in the crest of a breaking wave
- **swells** – rolling waves that move steadily across the ocean

5. What is a Tsunami?

- A giant ocean wave
- What causes a Tsunami to occur?
 - Earthquake, volcanic eruptions, and landslides
- How are Tsunami's different from wind driven waves?
 - They have much longer wavelengths and involve the entire water column

Chapter 3 Section 4

1. Tide

- the periodic rise and fall of the water level of the oceans

2. Spring Tide

- when the sun, Earth, and moon are aligned; causes higher high tides and lower low tides,

■ Neap Tide

- when the sun, Earth, and moon form a 90 degree angle; causes lower high tides and higher low tides

3. What causes the tides?

- The pull of the sun and moon

4. Gravity

- Moon has a greater affect because it is closer than the sun

5. How often can/do tides change?

- Takes a little longer than 12 hours from 1 high tide to the next