



Grade 8 Science

Unit 1:

Water Systems on Earth

Chapter 3

Heat Capacity

- A measure of how long it takes a material to heat up or cool down.
- Water has a high heat capacity... It takes a long time to heat up and a long time to cool down.

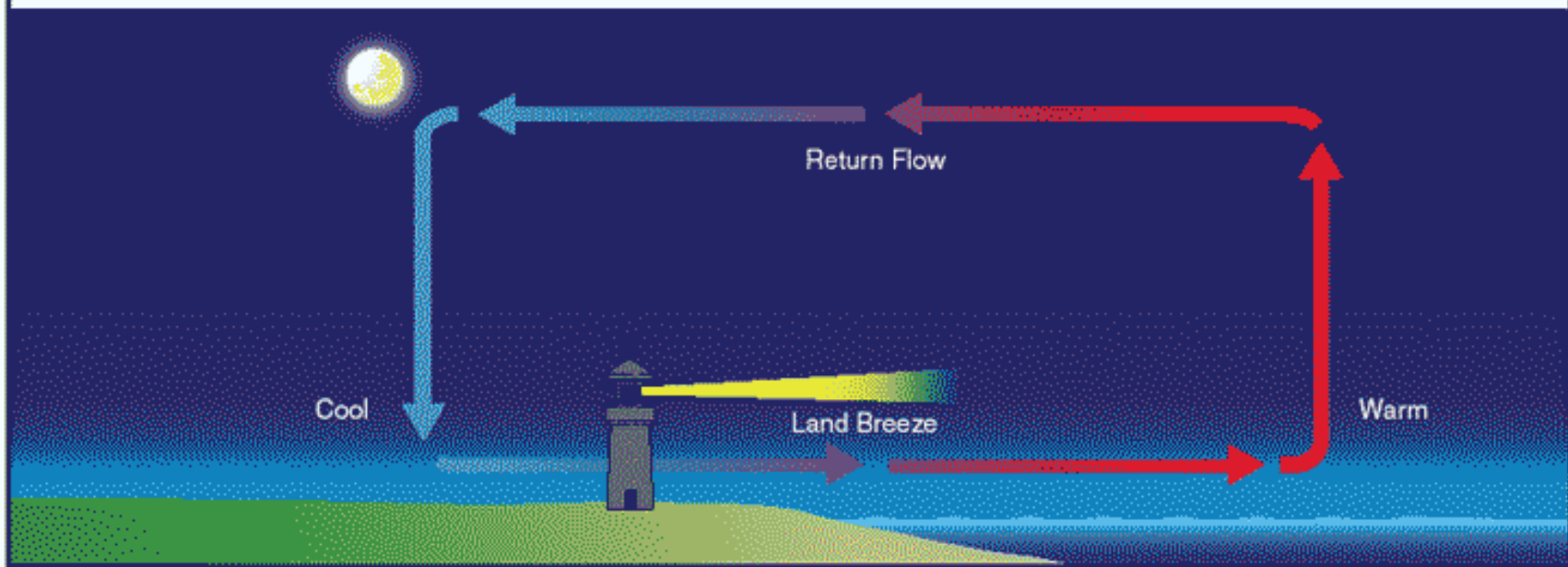
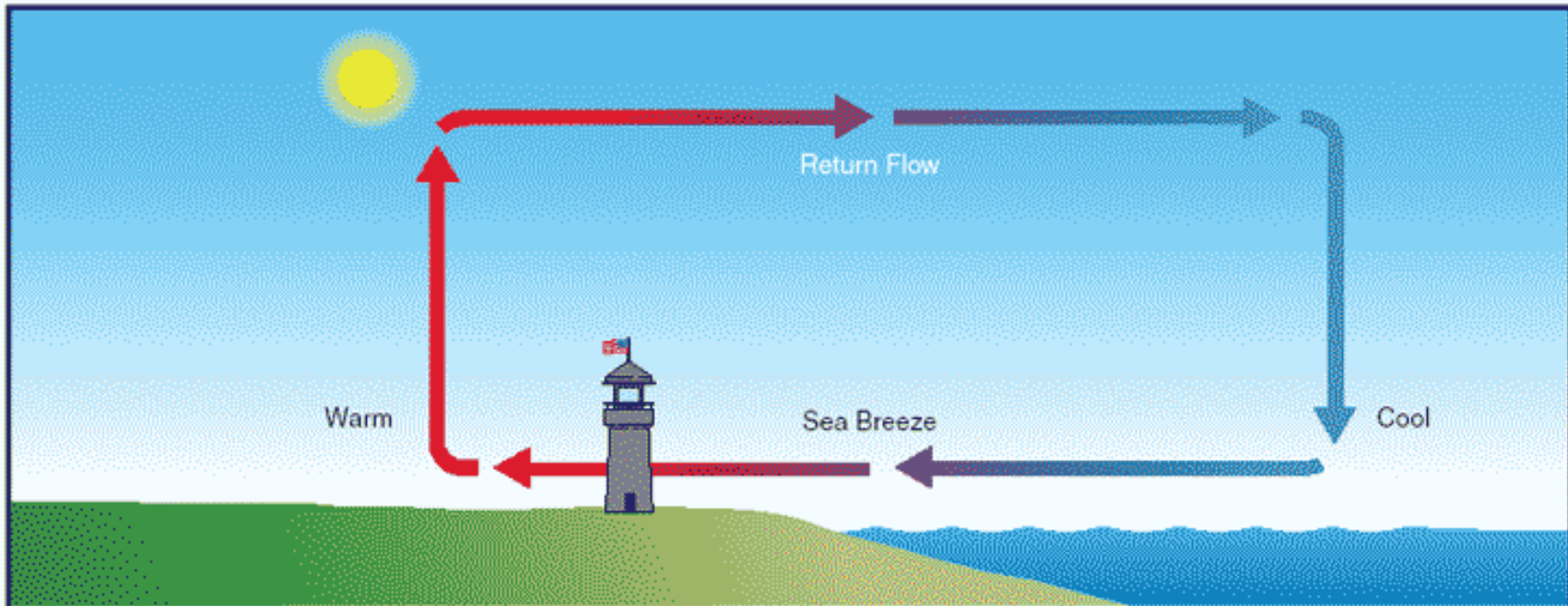
- Oceans can store large amounts of heat. Currents will transfer this heat to other parts of the world.

Heat Capacity \neq Specific Heat Capacity

Convection & Weather

Weather: is described in terms of temperature, wind speed and direction, air pressure and moisture.

Convection: heat transfer resulting from circulation.



Oceans & Climate

Climate: refers to the main characteristics of an area's weather.

- Ocean temperatures can have an effect on the climates of coastal communities.



Due to its high heat capacity:

- Oceans stay warmer through the fall and into winter than land masses.
- Oceans remain cooler through spring and into summer.

- This keeps the climate of coastal areas from being extremely hot in the summer and extremely cold in the winter.

This is called a **Moderate Climate**

El Niño...

- Occurs every 3-7 years
- The trade winds do not increase after having been slowed down.
- The waters are warmer than usual.


- Is responsible for changing rainfall patterns around the world.

Drought & Fire	Storms & Floods
Australia	Peru
Africa	Chile
Central America	North America

- These warm waters force the smaller ocean organisms (**phytoplankton**) to move deeper into cooler water. Fish and other animals that eat these organisms must follow.

La Niña...

- Often follows El Niño
- The equatorial trade winds increase allowing continuous upwelling of cooler water.


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- Brings heavy rains to Australia, Africa and South America.
 - Marine life flourishes as the upwelling bring nutrients for the phytoplankton.


A Summary...

	El Niño	La Niña
Trade Winds	Decrease	Increase
Ocean Temperature	Increase	Decrease
Weather	Increased Extremes (Floods, Droughts)	Decreased Extremes
Marine Productivity	Decrease	Increase

Ocean Current & Climate...

- Our weather patterns are rapidly changing due to the interaction of the Labrador Current and the Gulf Stream.


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- Warm surface currents transfer tropical heat to the atmosphere and colder currents remove heat from the atmosphere.

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- When the warm, moist air above the Gulf Stream blows over the colder water of the Labrador Current, it cools and condenses, producing fog.



Fog in NL



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- Temperature fluctuations occur rapidly in NL due to our location between warm, tropical winds moving north and cold, arctic winds moving south.
 - Local atmospheric temperatures depend on which of these prevail.

Abiotic Factors that affect plant and animal distribution:

- **Temperature:**
Low temperature means more dissolved oxygen.
- **Dissolved Oxygen:**
levels should be $\geq 5\text{mg/L}$

- **Phosphates:**
levels should be $< 10\mu\text{g/L}$
- **pH:** level of acidity
range should be 5 – 8.5
- **Turbidity:**
how cloudy is the water
- **Pollution**

- **Upwelling**: the vertical motion of water in the ocean by which subsurface water of lower temperature and greater density moves toward surface of the ocean bringing with it an abundance of nutrients.

- **Salinity** (marine)
- **Ocean currents** (marine)

How do these factors affect productivity and species distribution in both marine and fresh water environments?

Core Lab Activity

Activity 3.6 p. 108- 111

“Water Health Test”

Marine Technologies

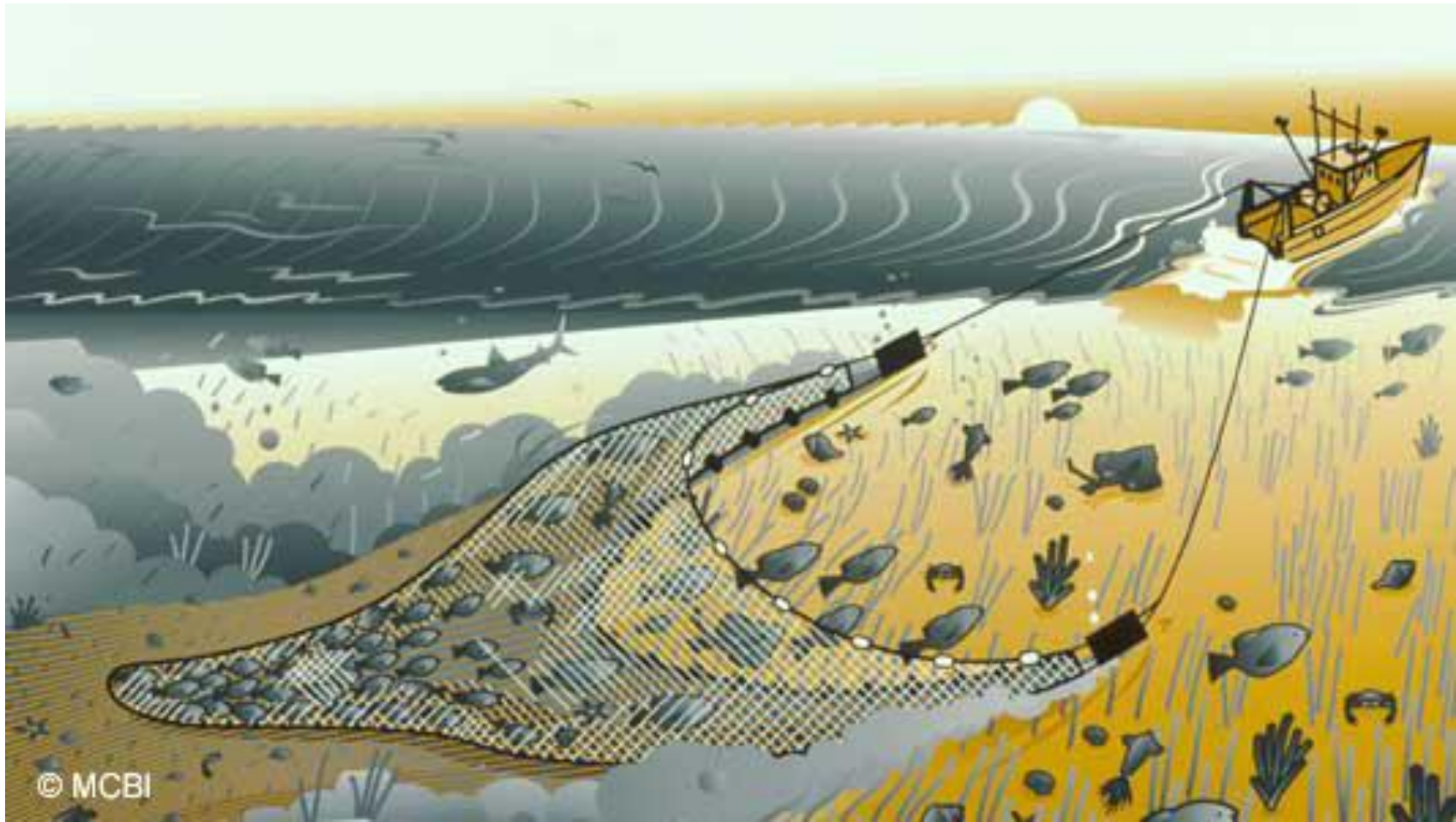
For Example:

1. Confederation Bridge
2. Oil rigs
3. Sable Island gas development
4. Fundy tidal power

Overfishing... p. 105-6

Technologies that have contributed to overfishing include:

1. Fish finding technologies such as radar
2. Factory freezer trawlers



Bottom Trawling

Offshore Oil Industry...p. 104

Affects on the marine environments include:

1. Pollution
2. Scouring the ocean floor
3. Marine habitat destruction
4. Release of foreign species in bilge water

Hibernia Platform



Aquaculture...p. 106-7

- The growing and harvesting of marine species in a controlled marine area.
- Usually built in sheltered areas such as a bay.
- May have accidental release of organisms and spread of diseases.

*Salmonoid Farm in
Bay d'Espoir, NL*

