

Saltwater (Saline Water)

- Saltwater is water that contains a **certain amount of salts** with dissolved salt concentration of **more than 1%**.
- **Oceans and seas.**
- Saltwater is also found in some lakes and ponds as well as underground.

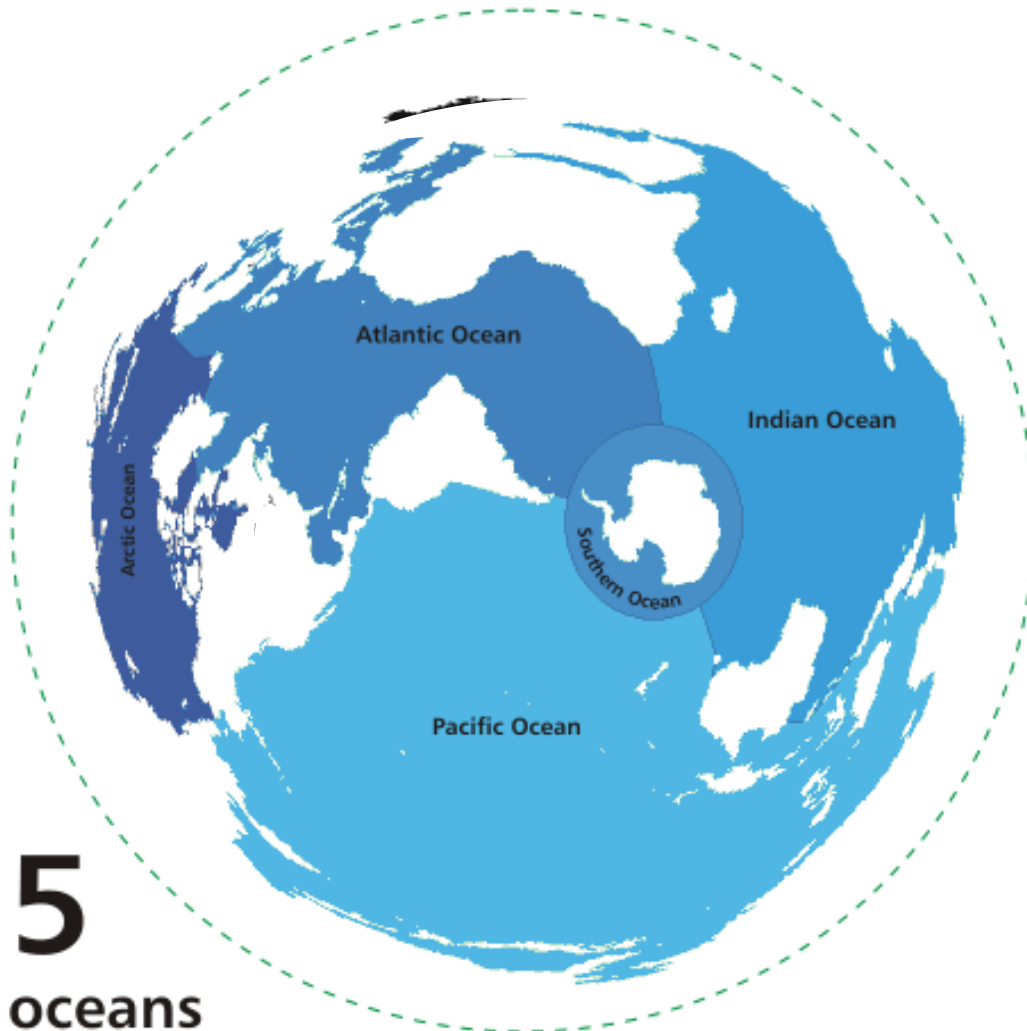


111 Seas of the World



1. Largest sea: **Philippine Sea**, ~2 million sq mi.
2. Smallest sea: **Marmara Sea (Turkey)**, at 4,380 sq mi.
3. Saltiest true (*open*) sea: **Red Sea**, ~4.0%, due to high evaporation, little precipitation, and few (and mostly seasonal) inflowing rivers.
4. Saltiest land-locked sea (*a lake*): **Dead Sea**, ~30%!
5. Lowest salt content: **Baltic Sea**, only 1.0-1.5%, due to low evaporation and many inflowing rivers.
6. Warmest sea: the **Persian Gulf** contains the warmest sea water in the world reaching at 35°C (95°F); Red Sea is the second warmest.
7. Coldest seas are found near the poles.
8. The only sea without a land boundary: **Sargasso Sea**, home to free-floating seaweed called Sargassum and an amazing variety of marine species.

Oceans are the **largest bodies of water** on Earth (contain salt water only)



- Historically, people first began exploring **shoreline shape**, **ocean depth**, and **tides**.
- **Temperature** and **salinity** are two important factors that influence **ocean circulation** and as a result, the **climate** of the Earth.

Tides

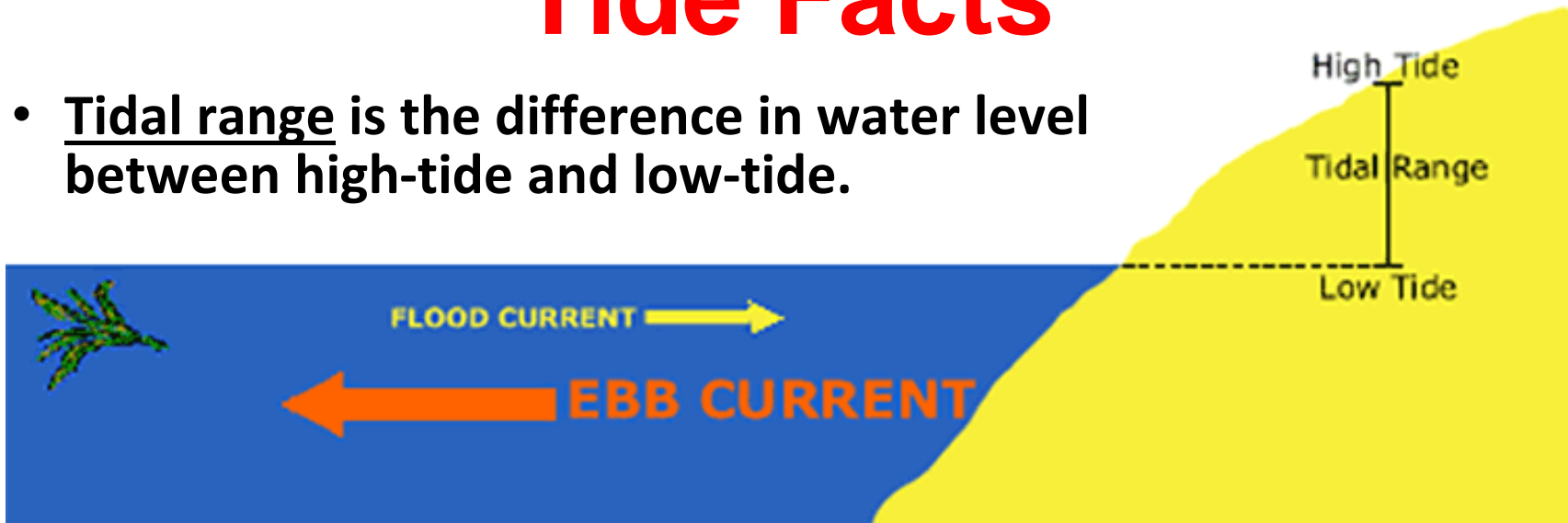
Tides are the slow, periodic **vertical rise and fall of the ocean surface** caused by **gravitational pull of the Moon and Sun** on the rotating Earth.



- Tidal forces affect the entire Earth, but the gravitational pull on LIQUIDS is much more noticeable than on SOLIDS (because liquids move more easily than solids).
- While tidal changes in sea level are easier to observe where land and water meet, they **exist everywhere** - even in the middle of the ocean.

Tide Facts

- Tidal range is the difference in water level between high-tide and low-tide.



- Tides produce oscillating currents known as tidal streams.



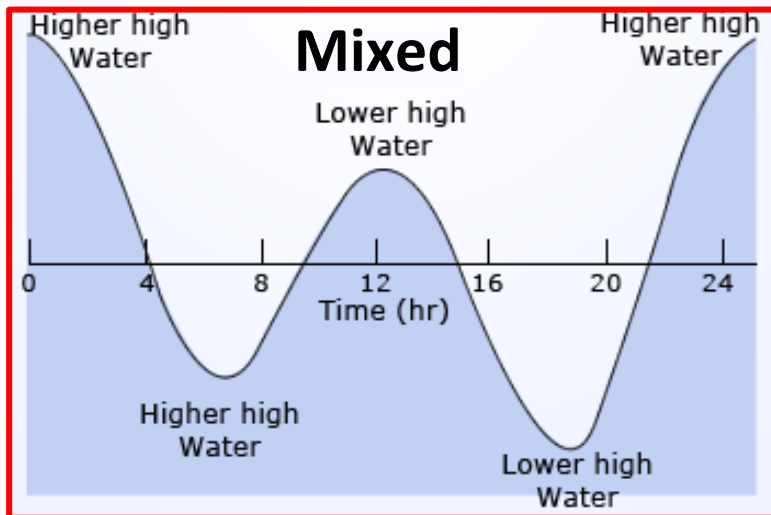
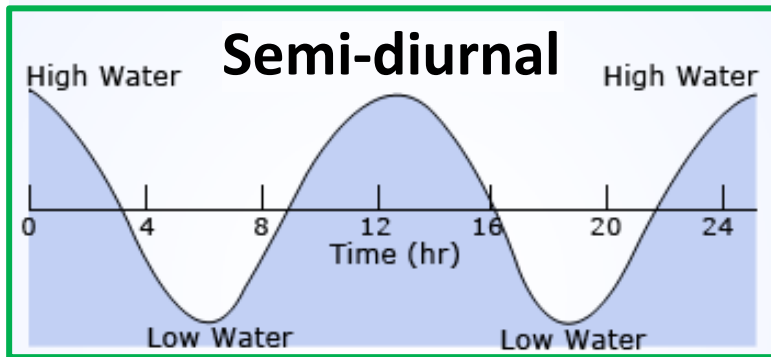
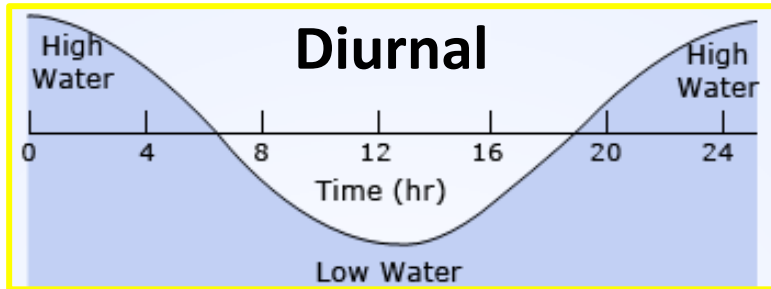
Bay of Fundy Tidal Streams



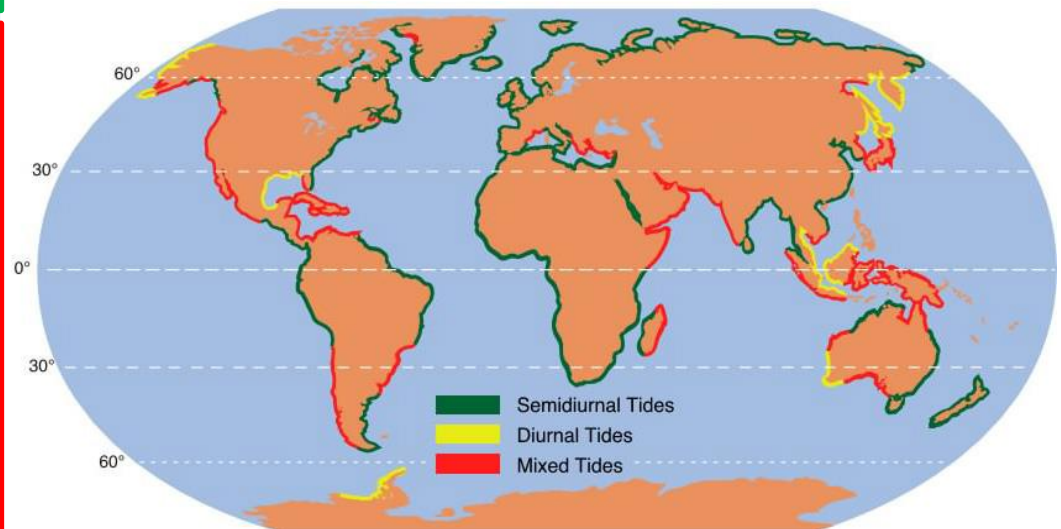
- One low-tide/high-tide cycle takes about **12 hours and 25 minutes** (the *lunar day* is equal to about 24.8 hours).

Types of Tides

depend strongly on the location and shoreline



- **Diurnal**: one tidal cycle per day (Gulf of Mexico)
- **Semi-diurnal**: two high waters and two low waters each day (Boston, MA)
- **Mixed**: two high and two low waters each day, all four with different heights (Los Angeles, CA).



The Bay of Fundy, Canada: world's largest tidal range

- Tidal energy is focused by shape and shallowness of bay.
- Maximum spring tidal range in Minas Basin = 17 meters (**56 feet!**).

Alma harbor at **High Tide** and **Low Tide**

