

1. What are the steps in understanding the oceans?
2. What is their problem?
  - SHORE
  - BOAT BUILDING
    - **Water tight**
    - **Propulsion**
      - rowing
      - sailing (wind)
      - self propelled (steam and diesel, ~ 160 y ago)
    - **Direction** – rudder at the back to change the direction
  - BOTTOM
    - Jaw sampling

WHY?

- To travel faster and safer
- To go fishing (trading)
- To conquer the world
- To gain economic power
- National prestige

### Chronology:

4000-3500 B.C. Egyptians

~1500 B.C. Phoenicians (sailors and  
traders in the Mediterranean Sea)

1500 B.C.-1000 A.D. Arab traders (the  
first description of the reversal of  
the currents due to the monsoons  
in Indian Ocean)

- Polynesians discovering the  
Pacific Ocean

~600 B.C. Herodotus (Father of History)

325 B.C. Alexander the Great came on

land to Pakistan, and his  
commander took the first Greek  
ship back home in 80 days

384-322 B.C. Aristotle-oceans cover  
deepest parts of the Earth's surface  
- was aware of evaporation and  
rain

264-194 B.C. Eratosthenes calculated the  
circumference of the Earth to be 40,  
250 km (today 40, 067 km)

127-51 A.D. Ptolemy produced 1.  
World atlas (wrong circumference  
2900 km)

700-1000A.D. Vikings colonized Iceland  
~1000 Roman and Greek knowledge  
preserved by Arabs

~1300 magnetic compass introduced to  
Europe

Middle Ages – Europeans studied tides

~1500 Chinese explored Pacific and Indian Ocean

**Europeans driven by the desire for the riches from new lands**

- Bartholomeu Dias sailed round the Cape of Good Hope
- Christopher Columbus – 4 times across the Atlantic Ocean
- Vasco da Gama sailed to India
- Amerigo Vespucci explored S. American coastline
- Ferdinand Magellan first Circumnavigated the Earth and contributed to the early charting of the oceans

~1600

- Spanish Gallions
- Francis Drake – circumnavigated and fought “Spaniards”

- The beginning of Earth Science
  - Johannes Kepler – planetary motion
  - Galileo Galilei – mass, weight
  - Sir Isaac Newton – law of gravity
- ~1700 Search for Longitude and improvement of charts
  - John Harrison built chronometer (seagoing clock)
  - Captain James Cook – charted the Pacific Ocean, measured ocean depth, temperature, winds and currents
  - Benjamin Franklin and Captain Folger
    - chart of the Gulf Stream current
  - Nathaniel Bowditch – book of celestial navigation

~1800 Beginning of the ocean science

- Alexander von Humbolt – explores S. American sea animals
- James Ross explores the Arctic Ocean and later the coast of Antarctica
- Darwin and voyage of the *Beagle* - atoll formation theory
- Edward Forbes postulates Azoic zone at depths >1800 feet
- Victor Hensen defines **plankton**
- *Challenger* Expedition 1872-1876 measured depth of the oceans and collected many species of sea life
- Nansen aboard the *Fram* charts the currents in the Arctic Ocean

~1900 commerce, fishery and Navy

- Ernest Shackleton's Voyage of the Endurance
- Research vessel *Meteor* charts the mid Atlantic ridge using sonar
- World War II use of sonar to map the floor of the Pacific Ocean
- Bathyscape Trieste reaches bottom of Marianas Trench (10,915 m)
- Teaching Oceanography on campuses
- Studies of the deep sea hot water vents
- Oceans' role in processes of the Atmosphere/Ocean/Land system