

# Intro to Oceanography

- **What is Oceanography?**
- **Geological Oceanography**
  - Origin and evolution of ocean floor, physiographic provinces, geologic processes, sediments & resources
- **Physical Oceanography**
  - Causes & characteristics of water movements, currents, waves, tides, air-sea interactions, El Nino
- **Chemical Oceanography**
  - Chemical make up, reactions, nutrient cycling
- **Biological Oceanography**
  - Marine life, ecosystems, biodiversity

# Outline for Intro to Oceanography

- Is the knowledge of the oceans important to a non-scientist or non-oceanographer? Explain why.
- Know at least ten reasons (but could be more) as to why people should study the world oceans.

# Origin of Earth and Ocean

## ■ The Nebular Hypothesis

- All planets in the solar system have same age (~ 5 .b.y. ago)

## ■ Differentiation by densities

- Molten Earth at the beginning due to internal heat
  - Layered Earth by densities
  - Internal structure of the Earth: Crust, Lithosphere, Asthenosphere, Mantle, outer and inner Core

## ■ Outgassing or degassing or “Big Burps”

- Creation of atmosphere and oceans
  - Different atmospheric composition over time

## ■ Origin of Life

- Stanley Miller’s Experiment to synthesize inorganic gases into organic matters

# What You Need to Know for Lab

- Measurements in metric system & **Units**
  - Vernier Calipers to measure length
- Significant figures and scientific notation
  - E.g. 3400. = 4 digits, 3400 = 2 digits,  $33.46 \pm 0.8 = 34.3$
- Basic statistical terms
  - Range, mean, mode, std dev, normal distribution, etc.
- Bar graph, scatter graph, line graph
  - Graph elements, Best-fit line, R sq. values (Excel)

# Outline for History of Oceanography

- Know the history of oceanography in chronological order (i.e. starting with old history and ending with 21<sup>st</sup> century).
- History of civilization and history of oceanography parallel each other
  - Early age (BC to early AD): Phoenicians, Greeks, Romans
  - Middle ages (1000 – 1500 AD): Vikings, Arabs, Chinese
  - Age of discovery (1500-1900 AD): Europeans/Americans
    - Columbus, Magellan, Darwin, HMS Challenger, Cook, Franklin
  - Modern ages (1900-2007): Americans/Europeans, etc.
    - Scripps, WHOI, Lemont-Doherty, ODP, NOAA, GOOS, AUV