# Oceanography 101 – Intro to Oceanography
Online - Asynchronous

Summer 2024 Session - MiraCosta College

Instructor: Ray Rector

# First Day Agenda

- Course Description
- Review Course Syllabus
- Class Introductions
- Intro to Our World Ocean

# Course Description

- Concepts, Features, and Processes of the Ocean, Seafloor and Marine Life
- Course Topics:
  - Origin & Evolution of Earth's Ocean
  - Plate Tectonics
  - Seafloors and Marine Sediments
  - Physical & Chemical Nature of Seawater
  - Atmospheric Circulation
  - Ocean Circulation
  - Waves and Tides
  - Shorelines
  - Marine Life and Ecosystems
  - Environmental Concerns

# Course Design

Purely Online, Asynchronous, Canvas-Based Format

Course Activities Include:

- E-Textbook study
- Video-taped lecture slides
- Ocean Sci video documentaries
- Online interactive exercises
- Lecture discussion forums
- Demonstrations
- Virtual oceanography fieldtrips
- Geologic science research

# Course Syllabus

Canvas Course Page

- Basic Logistics
- Course Objectives
- Important Enrollment Dates
- Instructor's Attendance Policy
- Classroom Do's and Don'ts
- Assessments
- Grading
- Field Trips
- Extra Credit
- Classroom Websites
- Schedule of Study
- Tips on Course Success

WWW.SEASCISURF.COM

MiraCosta OCEA101 - Online

# Course Syllabus

**Oceanography Syllabus** **Summer 2024** **MiraCosta College**

**OCEAN 101 - INTRODUCTORY OCEANOGRAPHY (LECTURE) – CRN's 1123 and 1241**

3 Lecture Hours; 3 Units; Letter Grade; Student may petition for Credit/No Credit (FT).
**Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List.**

**MEETING TIMES**: 6-Week Duration - June 10 through July 20 – Purely Online/Asynchronous on Canvas

**INSTRUCTOR**: R. Ray Rector

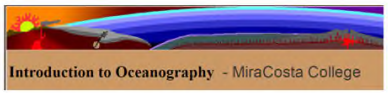
**CONTACT**: e-mail – **oceanprof@seascisurf.com**

**OFFICE HOURS:** By Appointment; via Canvas email: Discussion Board; and Zoom

**COURSE DESCRIPTION**: This course explores the major processes and features of the world's oceans. Topics include the origin and history of the ocean basins, atmospheric circulation and weather, ocean circulation, and the dynamics of waves, tides, and coastlines. The course also reviews marine life (including plankton, nekton, benthos, and marine mammals), explores the oceans as a resource for people, and considers human impacts on marine environments. UC CREDIT LIMITATION: Credit for OCEA 101 or OCEA 101H.

**NO TEXYBOOK PURCHASE REQUIRED.**

**REQUIRED NO-COST OPEN-SOURCE E-TEXTBOOK:**
**MiraCosta Oceanography 101** - Author: **MiraCosta College**




**Digital Copy:** HTTPS://WWW.OERCOMMONS.ORG/COURSES/OCEANOGRAPHY-101-MIRACOSTA/VIEW

**PROFESSOR'S OCEAN ED WEB SITE: www.seascisurf.com**
**Click "MiraCosta OCEA101 Online" icon**

# Course Learning Outcomes

**STUDENT LEARNING OUTCOMES: OCEA101 CORE COMPETENCIES:**

| **Course student learning outcomes (CSLOs)** describe what students should be able to do upon successful completion of OCEA 101. These are assessed using exams, projects, and other assignments. | **MCC core competencies** are broad general education outcomes that demonstrate real-world skills. Each CSLO is mapped to at least one core competency—this means you gain experience with these skills in OCEA 101. |
|---|---|
| **SLO #1:** Explain the theory of plate tectonics and relate it to the formation of major sea floor features. | • Inquiry, analysis, and independent thinking<br>• Critical Thinking<br>• Written Communication Skills<br>• Integration of knowledge<br>• Skills for ongoing personal, academic and professional growth |
| **SLO #2:** Reconstruct the circulation patterns of atmosphere and ocean circulation systems and analyze their interrelationships. | • Inquiry, analysis, and independent thinking<br>• Critical Thinking<br>• Written Communication Skills<br>• Integration of knowledge<br>• Skills for ongoing personal, academic and professional growth |
| **SLO #3:** Describe the major principles involved in the formation and behavior of waves and tides and evaluate their effects on coastal processes. | • Inquiry, analysis, and independent thinking<br>• Critical Thinking<br>• Written Communication Skills<br>• Integration of knowledge<br>• Skills for ongoing personal, academic and professional growth |
| **SLO #4:** Summarize the major physical properties of the oceans and evaluate how each one affects marine communities and marine life. | • Inquiry, analysis, and independent thinking<br>• Critical Thinking<br>• Written Communication Skills<br>• Integration of knowledge<br>• Skills for ongoing personal, academic and professional growth |

# Course Attendance and Enrollment

**CLASS ATTENDANCE, AND ENROLLMENT NOTES, AND DEADLINES:** ALL STUDENTS registered in this course prior to the start date MUST sign-in into the official Canvas course page sometime on or before the end of the FOURTH DAY of classes on the first week of the semester - Thursday, June 13, 2024, in order to stay registered in the course. If you do not log by the above date, then you may be dropped to make room for a waitlisted student.

The last day to withdraw with a refund and with no grade (no "W" placed on permanent record.) is Friday June 14, 2024. The very last day to drop a class with a "W" is Wednesday July 10, 2024 (the official withdrawal deadline). If you fail to withdraw by 7/10/24 and/or stop participating in class, then a final grade must be assigned to you. The deadline to file a petition for PASS/NO PASS grade option is Saturday July 20, 2024. It is the student's responsibility to add, drop, or withdraw from classes before the deadlines stated in the class schedule. Petitions to add, drop, or withdraw after the deadline will not be approved without written proof of circumstances beyond the student's control, which made her/him unable to meet the deadline. Lack of money to pay fees is not considered an extenuating circumstance. Students anticipating difficultly in paying fees before the deadline should check with the Financial Aid Office about sources of funds or other alternatives for which they may be eligible.

**ACCOMMODATION OF DISABILITY:** If you have a disability, you are encouraged to contact Disabled Students Programs & Services at 760-795-6658. Their office is in Building 3000, adjacent to Parking lot 3C at the Oceanside campus. They will help you determine what assistance is available for you. Please submit your DSPS paperwork to the instructor in a timely manner.

**STATEMENT OF RETENTION:** Students, please discuss your plans to withdraw from class with your instructor(s). They may have options for you that may allow you to continue in class.

# Course Work Load and Communication

**INSTRUCTOR'S ONLINE COURSE POLICIES**

**A. Student Work Load Obligations:** Independent direction, discipline and motivation of the student are critical to both learning course content and academic success in this online course. It will be up to you, the student, for staying up with homework assignments, quizzes, and exams. Make sure and consult the instructor and/or fellow classmates about anything in this course that you find difficult and/or confusing. There are no make-up exams or accepted late work, unless the student provides proof of some compelling reason for the make-up. It is the student's responsibility to contact me personally to forewarn me of any problem in completing the regular-scheduled exams or other coursework by their due dates. Business, pleasure, or being generally ill, is not a compelling reason. Being deadly sick, or having a death in the family is good reason. Be ready to supply proper documentation.

**B. Instructor-Initiated Contact Policy:** This course is taught as a completely on-line course. That is, the communication between the instructor and the students, as well as among students, takes place via electronic means on the Internet. The instructor will be initiating contact with students on a nearly daily basis, via announcements, discussion board posts, email, and by phone. Students are expected to log into this class's MiraCosta Canvas course page regularly (several time per week) to update communication with instructor and fellow students.

**C. Course Assignments and Testing:** Assignments, either for discussion on the bulletin board, or for completion and return to the instructor, will be posted on the course Canvas classroom page. Student contributions will be evaluated on both the quality (intelligent use of scientific terminology learned from using the textbook and other sources) and quantity (frequency and length) of comments. Reports from students, which are submitted directly to the instructor, will be evaluated based on quality (use of appropriate scientific vocabulary, for instance) and on rigor of the analysis. Testing will occur via the Internet within the Canvas course platform, and tests will use a variety of formats (true-false, multiple choice, matching, short answer, and essay). Quizzes are untimed, open book and students get three attempts per quiz. Exams are timed, open book, and students get only one attempt per exam.

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# Online Netiquette

**E. Online Netiquette and Student Code of Conduct:** This class will be conducted in accordance with the college code of student conduct and basic standards of academic honesty. Students are expected to respect and obey standards of student conduct while interacting online in this course. As your instructor, I have the following expectations of your academic behavior while online:

Promote a positive learning environment by exhibiting mutual respect and consideration of the feelings, ideas, and contributions of others, as reflected in your written dialog. Demonstrate a genuine desire to learn, interact, and improve.

Cheating, plagiarism, or other forms of academic dishonesty are totally unacceptable and will not be tolerated in this class. Violations of standards of academic honesty will be reported to the school dean for appropriate action. A detailed explanation of academic integrity of students is found below:

The academic integrity of the students in this course and the MiraCosta Community College District Standards of Student Conduct, require that all student work including, but not limited to, discussion postings, assignments, essays, papers, and exams be free of plagiarism. Students must fully cite any text, graphics, or others' ideas they include in that work. For additional details, please review **the Standards Of Student Conduct document**

As part of my commitment to academic integrity, student work in this course may be submitted to an online plagiarism checking service.

Any student caught cheating or plagiarizing will be subject to the disciplinary procedures given in District Policy 3100, which may include receiving a failing grade for the assignment. Any cheating or plagiarism will be reported to the Dean of Student Affairs. Specifically, the following behaviors are examples of cheating/plagiarism (this list is not exhaustive).

# Course Grading Policy

**GRADING/EVALUATION**

**I. Quizzes** (10 @ 30 points each) = 300 points. **Note:** You get three (3) un-timed attempts per quiz. Open book.

**II. Exams** (1 @ 180 points each) = 180 points. **Note:** You get two (2) three-hour attempts. Open book.

**III. Assignments** (2 total @ 20 + 60) = 80 possible points; 1) Personal Greeting assignment = 20 pts;
2) Birch Aquarium Fieldtrip = 60 pts

**V. Late Work Policy**: No late work accepted - No exceptions.

**VI. Extra Credit Policy**: Extra credit is available - up to 30 points maximum. Last day to turn in extra credit work is Friday July 19, 2024 - absolutely no EC work accepted after this date.

**VII. Grading Scale:** Your final grade is based purely on total percentage out of possible 560 points. Your total earned points (combined regular and extra credit) is divided by 560 and multiplied by 100. Your course grade is then determined by how your percentage score compares to the grading rubric below:

100% – 90% = A
89% -- 80% = B
79% -- 70% = C
69% -- 55% = D
Less than 55% = F

**Note:** *Minor adjustments to the total course grade points may be made by instructor during the course period. If changes are made, the instructor will inform the students in a timely manner.*

# Important Deadlines

**ASSESSMENT ACTIVITIES - LOGISTICS AND VITAL INFORMATION:** Assessment of student learning outcomes for this class includes 10 quizzes, 1 exam, and 3 assignments. Each assessment activity has a specific submittal due date. Make sure to keep a VERY CLOSE track of the class schedule of activities, so that you stay on track with your coursework, and get all your fully completed work turned in on time. I suggest printing out the class schedule and taping it somewhere around your work area that you can view it regularly. Below are the most important course dates. Quiz completion dates are on Sundays – end of the day.

**Course Testing Schedule and Other Important Dates:**

**Quiz I:** Sunday June 16
**Quiz II:** Sunday June 23
**Quiz III**: Sunday June 23
**Quiz IV**: Sunday June 30
**Quiz V:** Sunday June 30
**Quiz VI:** Sunday July 7
**Quiz VII:** Sunday July 7
**Quiz VIII**: Sunday July 14
**Quiz IX**: Sunday July 14
**Quiz X:** Saturday July 20
**Final Exam:** Sunday July 21

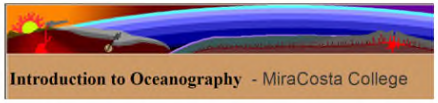
1) Quiz and exam completion dates are on Sundays (by the end of the day).
2) Class Personal Introduction Discussion Assignment due by Thursday June 13, 2024
3) Last day to drop without a "W" is Friday, June 14, 2024
4) Last day to drop with a "W" (withdraw) is Wednesday July 10, 2024
5) Last day to change letter grade to P/NP is Saturday July 20, 2024
6) Birch Aquarium Fieldtrip Assignment due Saturday, July 20, 2024
7) Last day to turn in extra credit is Sunday, July 21, 2024– No late exceptions!
8) Final exam completion date is Sunday, July 21, 2024- NO late exceptions!

**EXTRA CREDIT:** There are several extra credit assignments available: they include virtual fieldtrips, and a couple other research activities. Extra credit assignments are listed in the Extra Credit Assignment Folder. The last day to turn in extra credit work is ***Sunday, July 23***. Absolutely no EC work will be accepted after this date. Up to 30 points of extra credit is allowed in this course.

# Course Learning Resources

**1) Course Textbook List:**

**REQUIRED NO-COST OPEN-SOURCE E-TEXTBOOK:**
**MiraCosta Oceanography 101** - Author: **MiraCosta College**

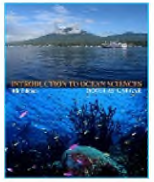



**Digital Copy: HTTPS://WWW.OERCOMMONS.ORG/COURSES/OCEANOGRAPHY-101-MIRACOSTA/VIEW**

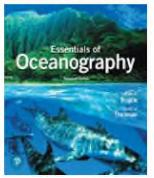
**Optional/Supplemental No-Cost Open-Source E-Textbook:**
**Introduction to Ocean Sciences** r: **Segar**

https://www.reefimages.com/oceans/segarocean4book.pdf
Ctrl+Click to follow link

- **Digital Copy: https://www.reefimages.com/oceans/SegarOcean4Book.pdf**



**Optional/Supplemental Pay Textbook:**
**Essentials of Oceanography - 13th Ed;** Authors: **Trujillo &Thurman**
**13th Edition:** Print ISBN: **9780321814050, 0321814053**
**eText ISBN: 9780133558890, 01335588942) Ocean Video**




**2) Oceanography Video Documentaries:** Endless Voyage Video Series

**3) Professor's Lecture PowerPoints:** Professor's PP Slides

**4) Ocean Topics Video Slide Tutorials:** Introduction to Ocean Lecture Series

**5) Professor's Ocean-Ed website:** http://www.seascisurf.com

# Course Schedule – Week 1

## MiraCosta Oceanography 101 Schedule – Summer 2024

| Week | Study Topics, Tests and Assignments | Homework Study Assignments<br>MiraCosta Oceanography (MCO Text)<br>Intro to Ocean Sciences (IOS Text)<br>Essentials of Oceanography (EO Text)<br>Endless Vogage Videos (EV videos)<br>Prof's PP Slides: (PPP – Prof's Slides)<br>Video Slide Tutorials: (VSL – Tutorials)) |
|---|---|---|
| **Week 1**<br>6/10 - 6/16 | Course Introduction<br>Importance of Studying the Ocean<br>Brief History of Marine Science<br>The Scientific Method<br>Origin of Earth, Moon, Ocean, & Life<br>Geologic Time and Age of the Earth | Course Syllabus and Schedule<br>MCO Ch 1, 2 and/or (IOS Ch 1, 2; EO Ch 1)<br>EV Videos 1, 2<br>PPP 1, 2<br>VSL 1, 2, 3, 4, 5 |
| **Thur 6/13** | Personal Introduction to Class Assignment | Submit (Post) on Discussion Board |
| | Earth's Layered Physiology<br>Plate Tectonic Theory<br>Seafloor Spreading and Subduction<br>Evidence for the Plate Tectonic Theory | MCO Ch 3, 4 and/or (IOS Ch 4; EO Ch 2)<br>EV Video 3, 4<br>PPP 3, 4<br>VSL 8, 9, 10, 11, 12, 13, 14, 15 |
| **Fri 6/14** | Last day to withdraw with NO "W" | Last day to withdraw with NO "W" |
| **Sun 6/16** | **Quiz 1 - Syllabus & Schedule** | Course Syllabus and Schedule |

# Course Schedule – Weeks 2

| | | |
|---|---|---|
| **Week 2**<br>6/17 – 6/23 | Methods of Mapping the Seafloor<br>Continental Margin Seafloor<br>Deep-Ocean Basin Seafloor | MCO Ch 5 and/or (IOS Ch 3; EO Ch 3)<br>EV Videos 5<br>PPP 5<br>VSL 16 |
| | Marine Sediments | MCO Ch 6 and/or (IOS Ch 6; EO Ch 4)<br>EV Videos 6<br>PPP 6<br>VSL 17 |
| | Physical and Chemical Properties of Seawater | MCO Ch 7 and/or (IOS Ch 5 ; EO Ch 5)<br>EV Videos 7, 8<br>PPP 7<br>VSL 18, 19, 20, 21, 22, 23, 24, 25, 26 |
| **Sun 6/23** | **Quiz 2 – Origins and Plate Tectonics** | MCO Ch 1–4; IOS Ch 2-4; EO Ch1, 2 |
| **Sun 6/23** | **Quiz 3 – Seafloors and Marine Sediments** | MCO Ch 5, 6; IOS Ch 3-6; EO Ch 3, 4 |

# Course Schedule – Weeks 3

| | | |
|---|---|---|
| **Week 3**<br>6/26 – 7/2 | Atmospheric Properties, Processes & Circulation; Storm Systems, Weather Patterns and Climate | MCO Ch 8 and/or (IOS Ch 7; EO Ch 6)<br>EV Video 10<br>PPP 8<br>VSL 27, 28, 29, 30, 31 |
| | Ocean surface currents and Gyres<br>Upwelling and Downwelling<br>Thermohaline Deep circulation<br>El Nino and the Southern Oscillation (ENSO) | MCO Ch 9 and/or (IOS Ch 8; EO Ch 7)<br>EV Videos 11 and 12<br>PPP 9<br>VSL 32, 33, 34, 35 |
| | Ocean Waves – Causes and Dynamics<br>Wind Waves - Origin and Behavior<br>Breaking Waves – Surfing<br>Origin and nature of Tsunamis | MCO Ch 10 and/or (IOS Ch 9; EO Ch 9)<br>EV Videos 13 and 14<br>PPP 10, 11<br>VSL 36, 37 |
| **Sun 7/2** | **Quiz 4 - Seawater Properties** | MCO Chapter 7; IOS Ch 5; EO Chapter 5 |
| **Sun 7/2** | **Quiz 5 – Atmosphere and Ocean Circulation** | MCO Ch 7, 8; IOS Ch 7-8; EO Ch 6, 7 |

# Course Schedule – Weeks 4

| | | |
|---|---|---|
| **Week 4**<br>7/1 – 7/7 | Ocean Waves – Causes and Dynamics<br>Wind Waves - Origin and Behavior<br>Breaking Waves – Surfing<br>Origin and nature of Tsunamis | MCO Ch 10 and/or (IOS Ch 9; EO Ch 9)<br>EV Videos 13 and 14<br>PPP 10, 11<br>VSL 36, 37 |
| | Origin and nature of Tides | MCO Ch 11 and/or (IOS Ch 10; EO Ch 9)<br>EV Video 15<br>PPP 12<br>VSL 38, 39, 40 |
| | Coastlines,<br>Beaches, and Shoreline Processes<br>Estuaries<br>Human Influences on Coastal Environments | MCO Ch 12 and/or (IOS Ch 11; EO Ch 10)<br>EV Videos 16, 17<br>PPP 13, 14<br>VSL 41, 42, 43, 44 |
| **Sun 7/7** | **Quiz 6 - Ocean Waves & Tides** | MCO Ch 9, 10; IOS 9, 10; EO Ch 8, 9 |
| **Sun 7/7** | **Quiz 7 - Shorelines and Coastal Waters** | MCO Ch 11; IOS Ch 11; EO Ch 11, 12; |

# Course Schedule – Weeks 5

| | | |
|---|---|---|
| **Week 5**<br>7/8 - 7/14 | Marine Life - Physical Factors and Habitats<br>Marine Life - Evolution & Classification<br>Primary Productivity and Trophic Levels<br>Marine Feeding Relationships<br>Types of Phytoplankton and Seaweeds<br>Marine Zooplankton and Marine Bio Pump | MCO Ch 13, 14 and/or (IOS Ch 12, 13,14; EO Ch 12, 13)<br>EV Videos 18, 19, 20<br>PPP 15, 16, 17, 18<br>VSL 45, 46, 47, 48, 49, 50, 51, 52, 53 |
| **Wed 7/10** | **Last day to withdraw with a "W"** | **Last day to withdraw with a "W"** |
| | Marine Animals In Pelagic and Benthic Marine Environments | MCO Ch 14, 15 and/or (IOS Ch 14, 15; EO Ch 14, 15)<br>EV Videos 21, 22, and 23<br>PPP 19, 20, 21<br>VSL 54, 55, 56, 57 |
| | Marine Biological Resources– Marine Fisheries<br>Marine Seafloor Resources – Physical and Energy | MCO Ch 15, 16 and/or (IOS Ch 15, 16; EO Ch 14, 15)<br>EV Video 24<br>PPP 22<br>VSL 54, 55, 56, 57 58 |
| **Sat 7/14** | **Quiz 8 - Marine Life I – Overview, Primary Productivity and Plankton** | MCO Ch 12-14; IOS Ch 14-15; EO Ch13-14 |
| **Sun 7/14** | **Quiz 9 - Marine Life II – Marine Animals and Marine Communities and the Fisheries** | MCO Ch 15,16; EO Ch 14,15 |

# Course Schedule – Week 6

| | | |
|---|---|---|
| **Week 6**<br>7/15 - 7/21 | Environmental Concerns - Coastal Pollution and Climate Change | MCO Ch 17 and/or (IOS Ch 16; EO Ch 11. 16)<br>EV Video 25<br>PPP 23, 24<br>VSL 58. 59. 60 |
| **Sat 7/20** | **Birch Aquarium Assignment** | See Birch Aquarium Assignment Module |
| **Sun 7/21** | **Quiz 10 - Marine Pollution and Climate Change** | MCO Ch 17; IOS Ch 16; EO Ch 11,16 |
| **Sun 7/21** | **Extra Credit due date** | Submit in Assignment Folder |
| **Sun 7/21** | **Final Exam** | MCO Ch 1–17; IOS Ch 1-16; EO Ch 1-16 |

**Please Note:** **This is a tentative schedule and may be changed by the instructor at any time during the semester. Students will be notified in a timely basis if changes are made.**

# Wise Suggestions for my Students of Oceanography

- 50% Motivation – 50% Perspiration
- READ BOTH the assigned text reading and Power Point BEFORE attending the corresponding lecture
- TAKE thorough classroom notes
- ASK lots of questions
- BE a regular/active participant in the class
- STUDY instructor's posted lecture notes
- STUDY the exam study guides
- TAKE/self-grade the practice exams!
- UTILIZE the Textbook Resources
- GO on instructor-guided weekend field trips
- DO some extra credit
- HAVE FUN learning about the Ocean

# OCEA101 Canvas Home Page

## Welcome to Ocean 101 Lecture Online -Summer 2023!

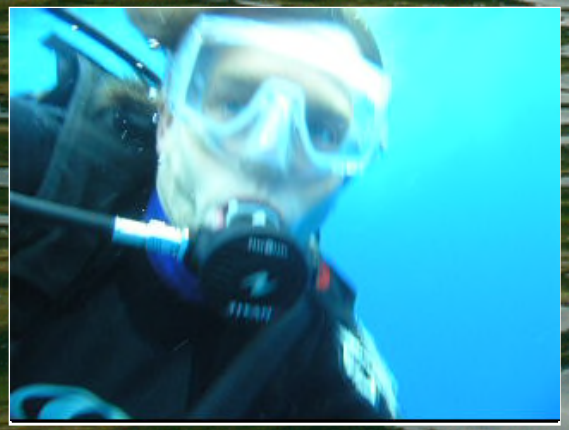

*6-Week Summer Session - June 12th to July 22nd, 2023*

*Asynchronous - No Set Meeting Days/Times*

# Personal Introductions

# Your Ocean Professor: Who am I?

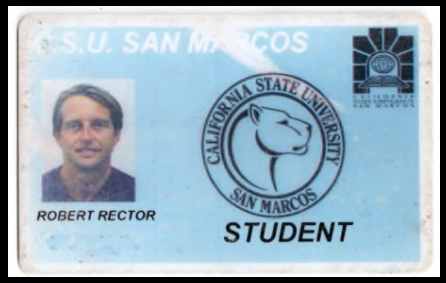
- Academic Background
- Personal Connection with the Ocean
- Purpose in Classroom
- Education Philosophy



# EARTH SCIENCE EDUCATION

**California Single Subject Teaching Credential – Geosciences** -
**California State University, San Marcos, CA**

- 35 graduate-level semester units completed; GPA = 3.9
- Cross-Cultural Language and Academic Development
- Additional emphasis of technology in the classroom




**Earth Science Doctoral Program – Volcanism and Tectonics**
**University of California Riverside, Riverside, CA.**

- 38 graduate-level semester units completed; GPA = 3.9
- Graduate Division Fellowship
- Mineralogical Society of America scholarship


**Master of Science Degree – Igneous Petrology**
**San Diego State University, San Diego, CA**

- 35 graduate-level semester units completed; GPA=3.9
- Achievement Rewards for College Scientists Scholarship

**Bachelor of Science Degree - Magna Cum Laude - Geology**
**San Diego State University, San Diego, CA**

- 172 semester units completed; GPA = 3.8
- Outstanding Senior Research Award--College of Sciences
- Outstanding Research Award—Department Of Geology


**Engineering Undergraduate Program**
**California State University, Northridge, CA**

- Marine Engineering emphasis

# TEACHING EARTH SCIENCE

**Cuyamaca College, El Cajon, CA** — **2013 - 2017**
- Oceanography Lecture

**University of San Diego, San Diego, CA** — **2007 - Present**
- Earth Science Laboratory

**MiraCosta College, Oceanside, CA** — **2004 - Present**
- Oceanography Lecture and Laboratory
- Online Geology

**San Diego Miramar College, San Diego, CA** — **2003 - Present**
- Geology Laboratory
- Online Oceanography Lecture

**San Diego Mesa College, San Diego, CA** — **2002 - Present**
- Online Geology Lecture
- Geology Laboratory

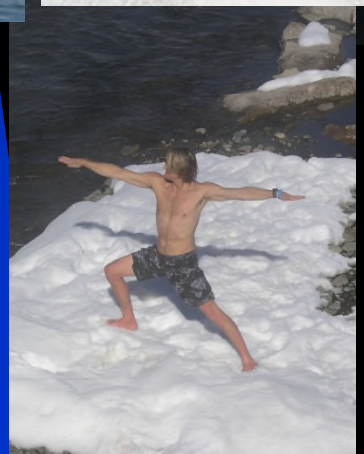
**University of California Riverside, Riverside, CA** — **1994-1997**
- General geology, Historical geology, Mineralogy, Optical mineralogy, Igneous petrology, and Metamorphic petrology

**San Diego State University, San Diego, CA** — **1991-1993**
- General geology laboratory
- Advanced field geology course in Baja, Mexico.

# Professor's Interests

Travel to Cool Places, Adventure, Hanging Out, and Partying with Fun and Interesting Friends

# Outdoor Sports


# Who are You?

Post Your Personal Introduction on the Discussion Board

- **Your Name**
- **Academic focus**
- **Personal interests**
- **Why take Oceanography?**
- **Most memorable time you have been on/near the ocean?**
- **Image of Yourself**


Wishing Everyone a Fantastic Summer

# OUR PLANET IS A WATER WORLD: *PLANET OCEAN*?


- **The Ocean covers about 71% of Earth's surface**
- **About 98% of Earth's surface water is ocean**

# OUR WORLD OCEAN SEAFLOOR


- About 71% of Earth's crust is covered by ocean
- Less is known of the seafloor than the Moon

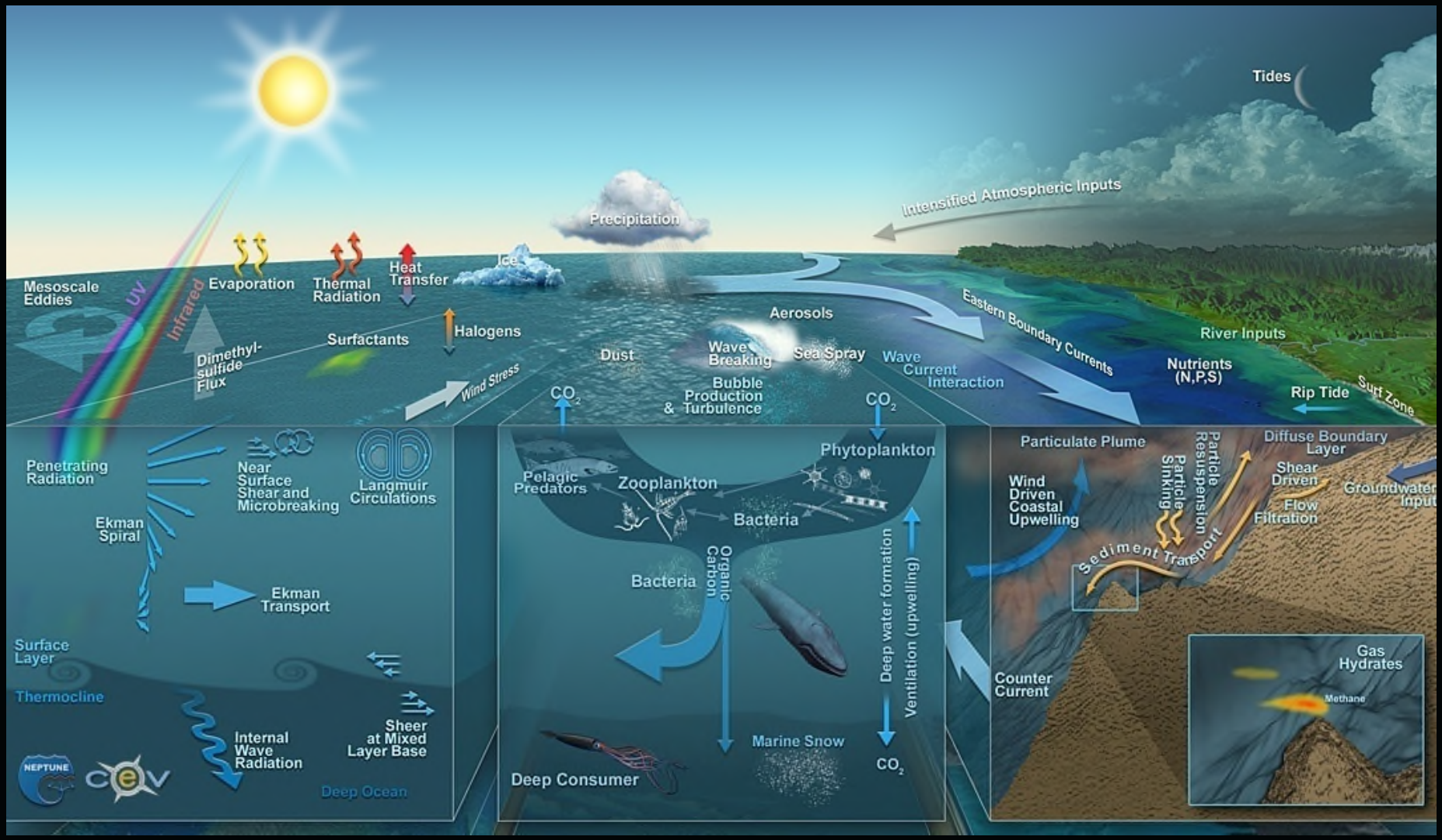
# Our Awesome Water Planet

Everything is ***connected*** to everything else

Everything ***affects*** everything else

***How is the Ocean Connected with Everything Else?***

# The Ocean Makes Life Possible!




**There is an intimate relationship between the living and nonliving world on earth – essential to life in the ocean**

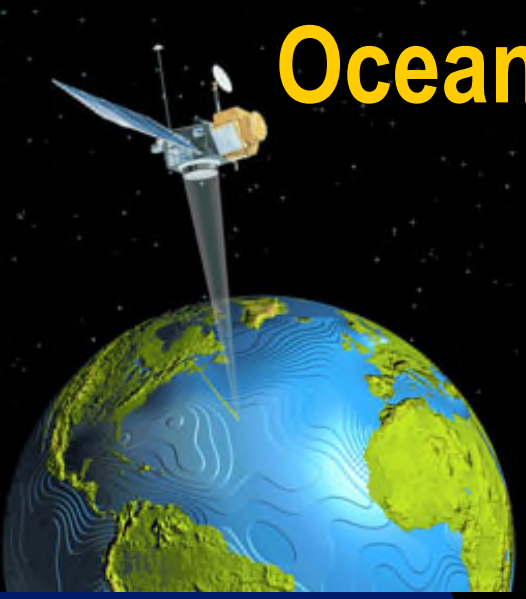
# *Ocean is Key Part of* Earth's Dynamics


*How* Does The Whole Thing *Work*?

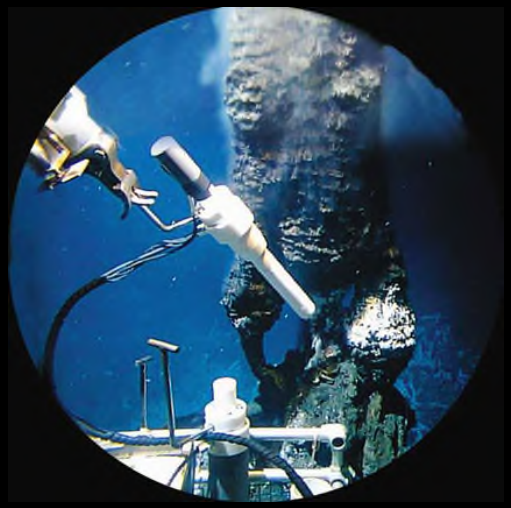
# *What Part Do Humans Play?*

## *How* Do We Affect the Earth?

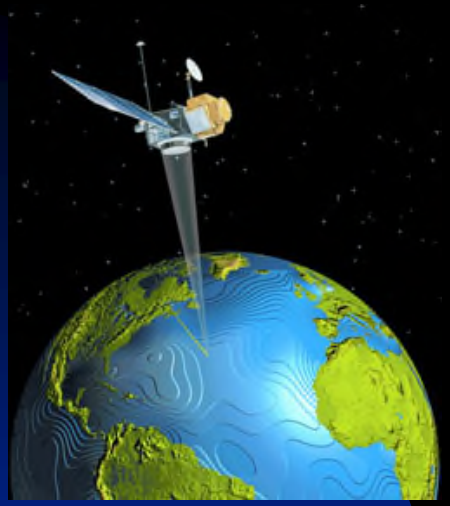
# Oceanography – A Multi-Field Science

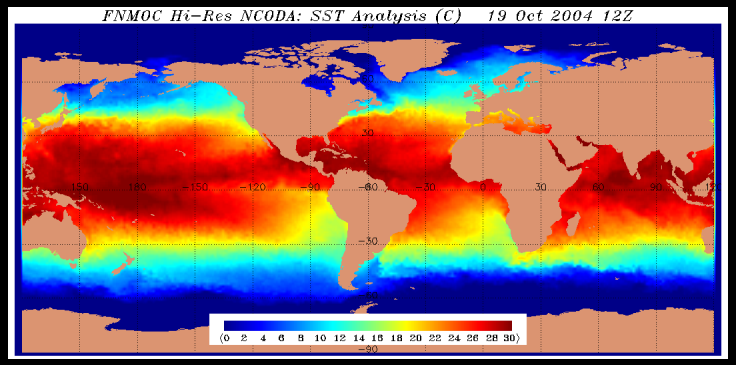


- ✓ The scientific study of the ocean, seafloor, coasts, sea life, and climate:
- ✓ Waves and Currents
- ✓ Seawater properties
- ✓ Seafloor and Shorelines
- ✓ Marine life and Habitats
- ✓ An interdisciplinary science

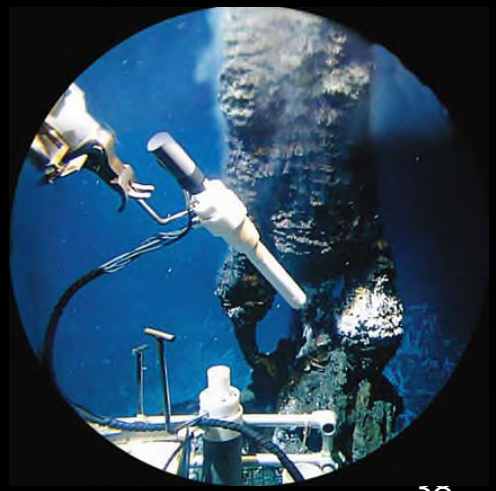



# Science of the Ocean: Oceanography









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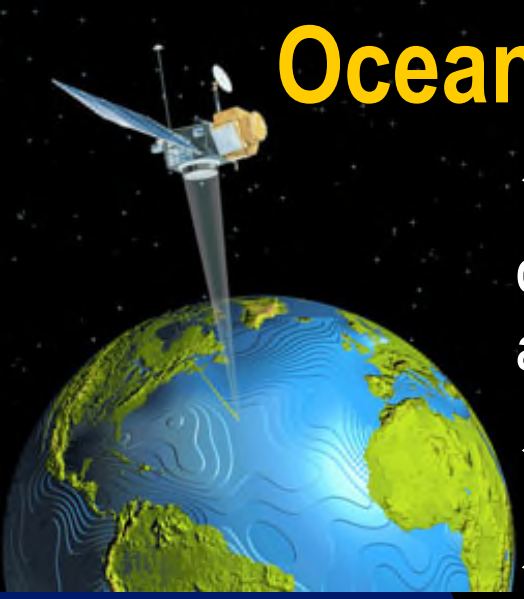

- ✓ The scientific study of the ocean, seafloor, coasts, sea life, and climate:
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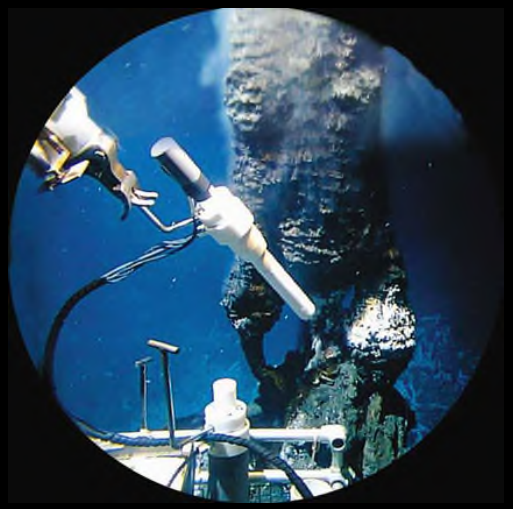
- ✓ An interdisciplinary science

# FIELDS OF OCEANOGRAPHY

## An Interdisciplinary Science

**Oceanography integrates many different types of science.**

- **Marine geology** - the study of Earth's crust and composition
- **Chemical oceanography** - the study of the gases and solids dissolved in the ocean
- **Physical oceanography** - study of ocean's water column and water-air interactions: temperature, pressure, waves, currents, weather, climate
- **Marine biology** – the study of the nature and distribution of marine organisms and their associated marine habitats
- **Marine engineering** - the design and construction of structures used in or on the ocean: ships, machines, instruments, edifices, etc.
- **Environmental oceanography** - the study of human's impact on marine ecosystems

Are there any others?

# What Do Oceanographers Do?

Answer……they do ***ocean science***.

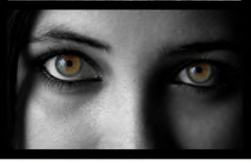
**Ocean Science defined:** The investigation and acquisition of useful, reliable knowledge and understanding of our ocean that is based on empirical observations and measurements (physical evidence).

- ✓ Ocean scientists use a powerful way of thinking, that is rational, logical, and organized, called ***scientific thinking***.
- ✓ Intelligence, imagination, creativity, inspiration, and luck are other important attributes of scientific study.
- ✓ Like all other sciences, oceanographers use a powerful approach to ocean inquiries called the ***scientific method.***
- ✓ Central to science is community and peer review.

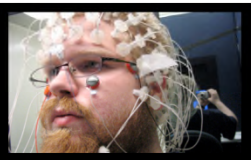
# *Investigate the Ocean by Application of the Scientific Method*



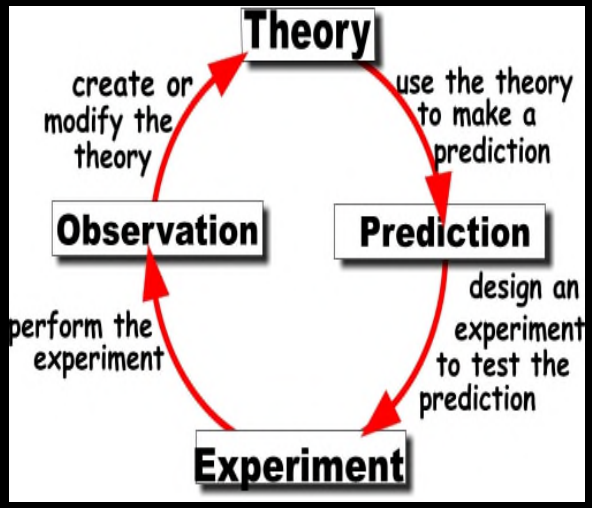
Rationalism
(Logic & Reasoning)



\+ Empiricism
(Experience & Observation)



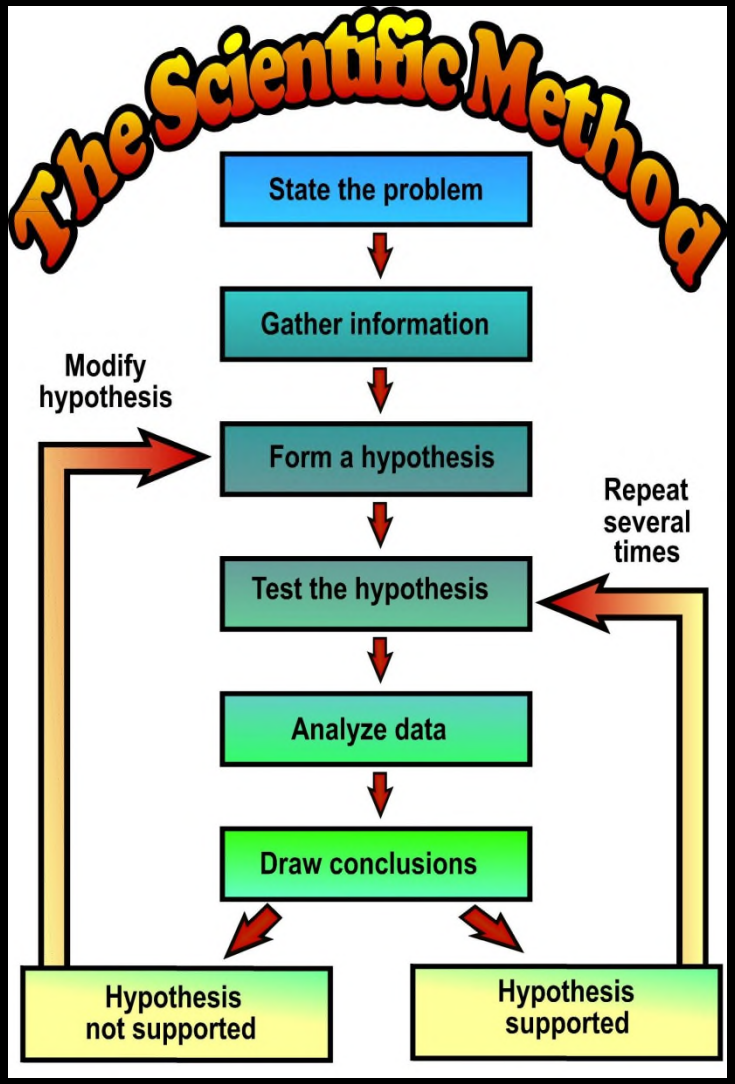
Science



# THE SCIENTIFIC METHOD

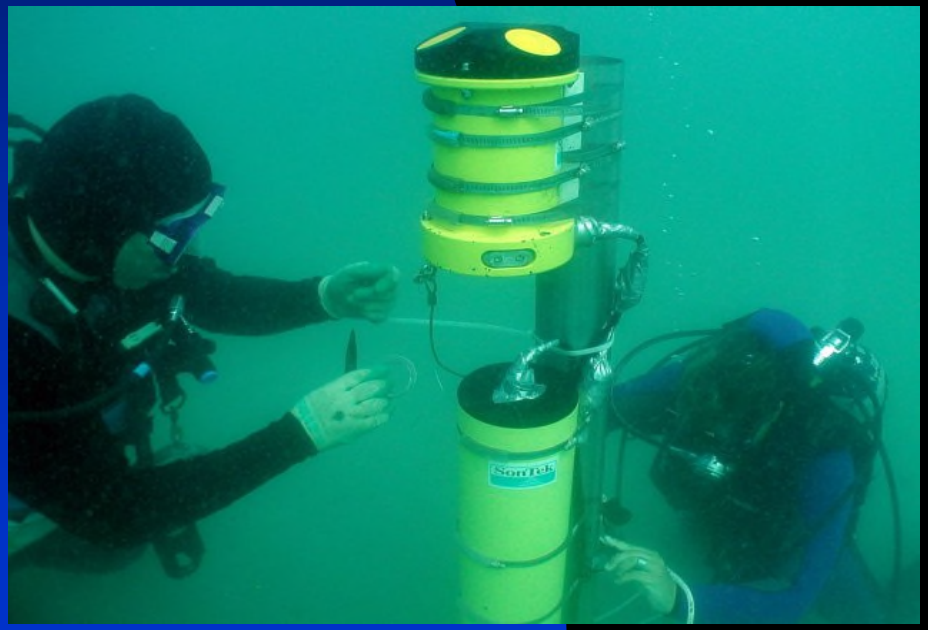
## The Basic Components

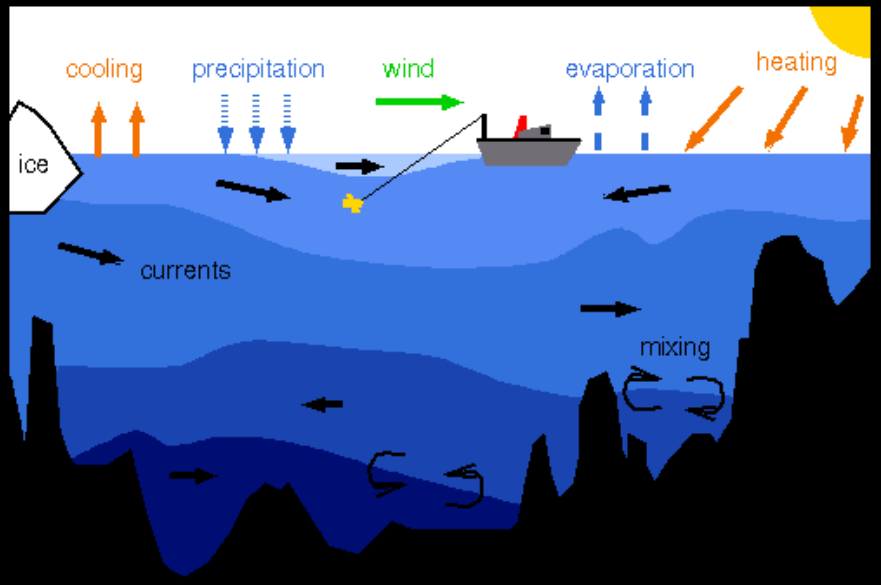
- ✓ *Empirical Observations*
- ✓ *Questions / Problems*
- ✓ *Hypotheses / Models*
- ✓ *Predictions*
- ✓ *Tests / Experiments*
- ✓ *Analysis of Results*
- ✓ *Draw Conclusions*
- ✓ *Reevaluate Hypothesis*




**Note:** The scientific method is NOT a *recipe* – it's a *process*

# Importance of Studying the Ocean?





# Most Humans Live Close to the Ocean


For MANY reasons!

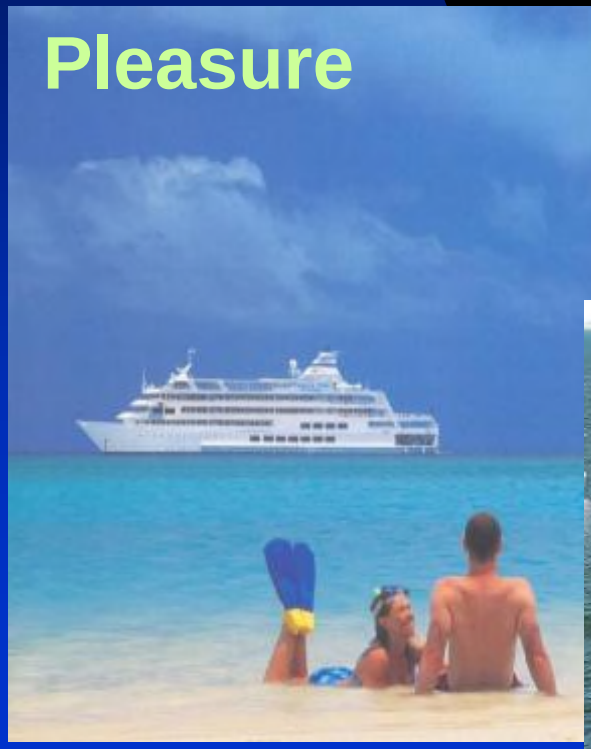
NO surprise there!

# $$ Our Ocean is a Giant Goldmine $$

Fishing

Oil and Gas

Pleasure



There’ s big $$$ out there!

Cargo

Treasure

# Our Ocean is an Adventureland!


**Is there anything more fun than getting in the ocean?**

# The Ocean Can Be Hazardous!

Coastal Storms and High Surf


Rogue Waves

**The Ocean has teeth….all sorts of teeth!**

Animal Attacks


Stormy Seas

# Sometimes Extremely Hazardous!

## Worst Types of Natural Hazards Ever!

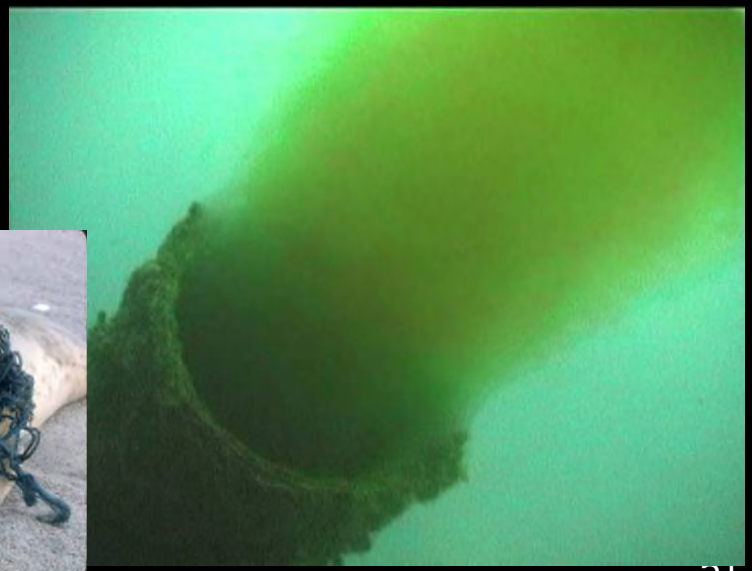
# Humans Need to Understand Ocean Hazards




## Waves, Currents, Storms, Shorelines and Sea Life

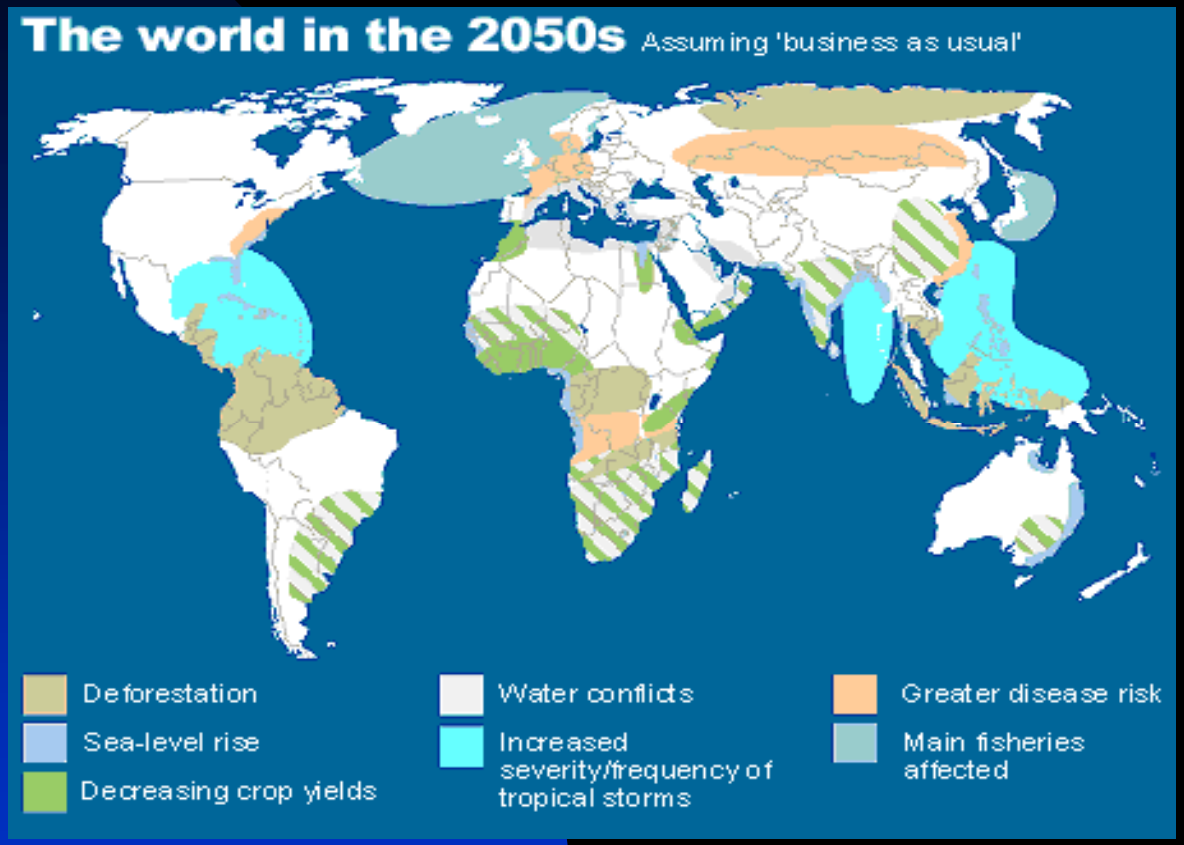


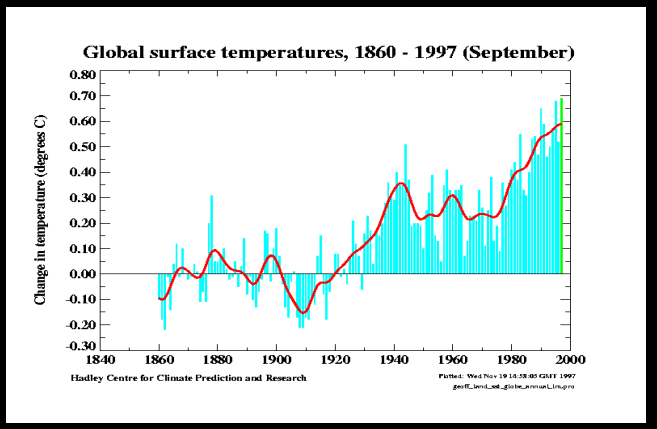

# Humans Need to Understand Human Hazards

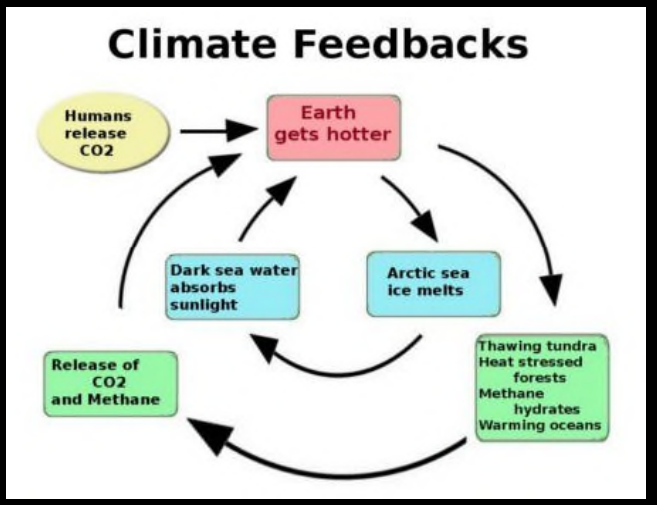


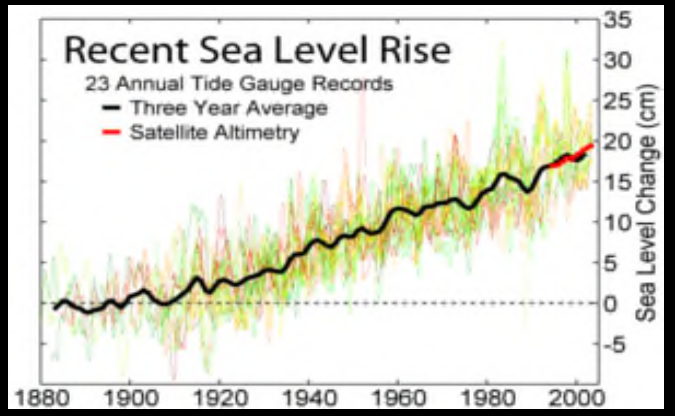
# Climate Change:

## The Ocean-Human Equation




## Global Warming – Fact or Fiction?

*Slow or Abrupt Change?*

# The Many Reasons Why the Ocean is So Important?

**Make a List –** 8 Most Important Things about our Ocean:

1)
2)
3)
4)
5)
6)
7)
8)

?

# Why Do We Need to Study the OCEAN?

# IMPORTANCE of MOTHER OCEAN

1) Moderates Earth's Surface Conditions
2) Controls Climate and Weather Patterns
3) Original Birthplace for Life on Earth
4) Provides Vast Habitats for Marine Life
5) Huge Source of Food, Oxygen and Resources
6) Medium for Transportation and Recreation
7) Natural socio- and political barrier/isolator
8) Out of sight place to Get Rid of Unwanted Stuff

# OCEAN LITERACY

## What All of Us Need to *Know* About the *OCEAN*

***OLP #1:*** **The Earth has one big ocean with many features.**

***OLP #2:*** **The ocean and life in the ocean shape the features of Earth.**

***OLP #3:*** **The ocean is a major influence on weather and climate.**

***OLP #4:*** **The ocean makes the Earth habitable.**

***OLP #5:*** **The ocean supports a great diversity of life and ecosystems.**

***OLP #6:*** **The ocean and humans are inextricably interconnected.**

***OLP #7:*** **The ocean is largely unexplored.**

# OCEAN LITERACY

## An ocean-literate person:

1) Understands the essential principles and fundamental concepts about the functioning of the ocean;

2) Can communicate about the ocean in a meaningful way;

3) Is able to make informed and responsible decisions regarding the ocean and its resources; and

4) Knows how very cool, awesome, and spiritually-soothing it is to be by, on, or in the ocean – to beachcomb, surf, paddle, swim, snorkel, dive, boat, float and/or fish in the ocean – to be at one with the ocean and all its sea life.

# Increase Our *Awareness & Understanding* of the Ocean

Be ***Ocean-Wise***… Think Globally – Act Locally

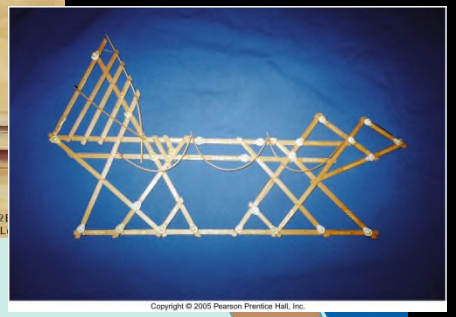
# Care and Respect For Our Ocean

She Takes Care for Us - We Need to Care for Her

# Humans Have Been Exploring the Ocean For Many Centuries

- Polynesians
- Egyptians
- Phoenicians
- Greeks
- Chinese
- Vikings
- Europeans
- Modern Day

# Polynesian Exploits

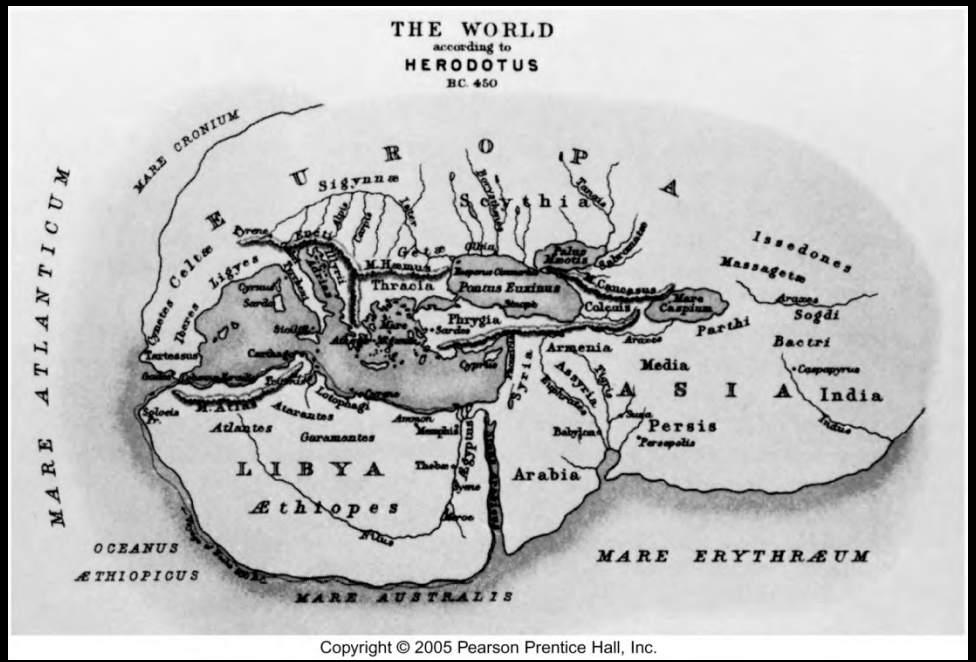




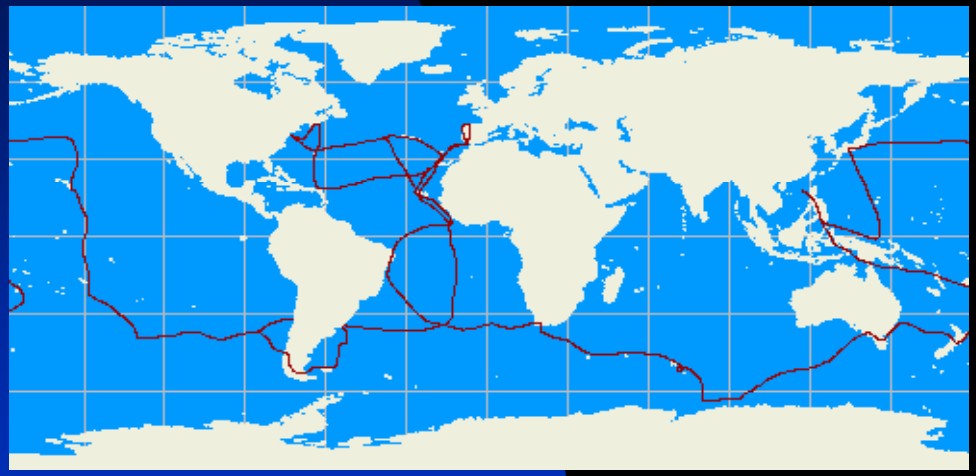
- Exploration - 25000 BC to 500 AD
- Used large outrigger canoes equipped with sails
- Navigational aides included stars, waves, currents, clouds and use of stick charts
- Settled the entire South Pacific and Hawaii
- Purpose: colonization, mapping and resources

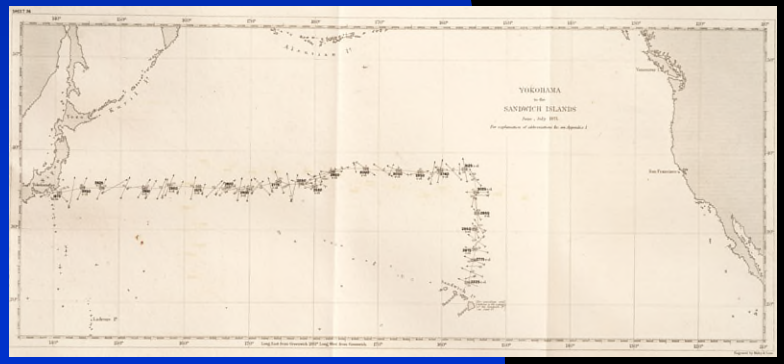
# Ancient Mediterranean Seafarers


- Exploration - 3200 BC to 200 AD
- Egyptian-design equipped with sails
- Few Navigational aides
- Explored Mediterranean region
- Purpose: Trade and Seapower



# The Challenger Expedition

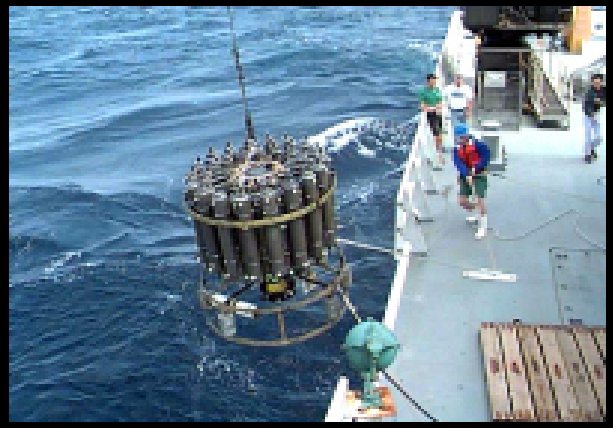



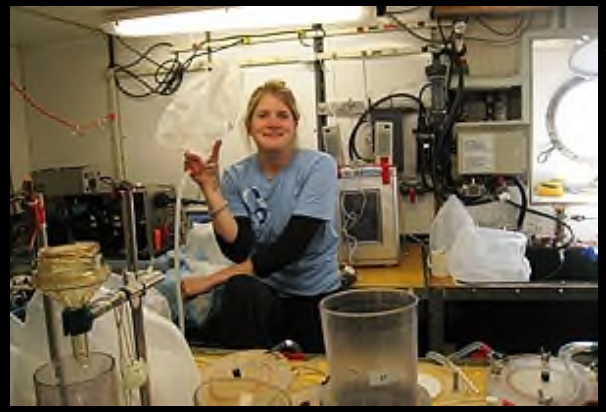



Soundings from Hawaii to Japan

- 3 ½ year Circum-global voyages from 1872 to 1876
- Led by Charles W Thomson
- Used British naval corvette equipped with laboratories, winches, and scientific gear
- Crew of 243 + 6 scientists
- Studied all 3 oceans
- Sailed 68,890 miles
- Number of sampling stations = 362
- Number of Soundings = 492
- Number of dredges = 133
- Number of new species = 4,700
- Purpose: Purely scientific

# Modern Day Oceanographic Ventures



Modern-day Arsenal of Oceanographic Equipment

## Notes:

1) Large academic institutions
2) Most started 100 years ago
3) Quickly grew during and after WWII
4) Mostly government funded
5) Large array of ships and high-tech equipment
6) Scripps Institute of Oceanography
7) Woods Hole Institute of Oceanography

# Next Lecture

1) The Scientific Method

2) Origin of Solar System, Earth, Ocean, & Life

3) Overview of Earth Composition & Structure

4) Geologic Time and The Age of Earth

***Homework for this week* –**

1) Read and Study Chapter 1
2) View Endless Voyage  Videos 1 & 2
3) Study Prof's Power Points and Lecture Outlines

**Study the Instructor's Website @ www. seascisurf.com**