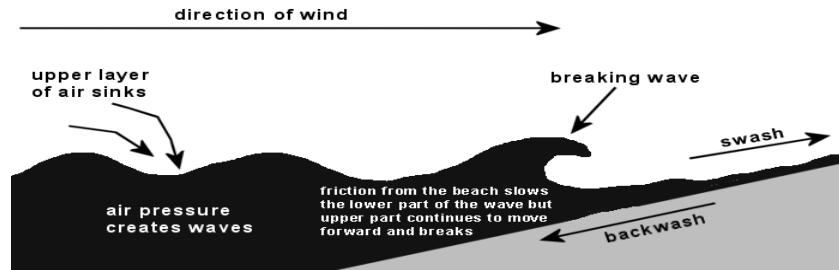


Trial/Pilot Event

Contact the organizers of your tournament to find out what trial/pilot events will be held.

OCEANOGRAPHY C

1. **DESCRIPTION:** Students will use process skills to complete tasks related to physical **and geological** oceanography.
A TEAM OF UP TO: 2 **APPROXIMATE TIME:** 50 minutes
2. **EVENT PARAMETERS:** Participants **may bring only one 8.5" x 11"** sheet of paper of computer-generated or handwritten notes per team. Notes may be written on both sides and may include graphics, tables, and/or text. Participants may bring any kind of calculator. No other resources, including computers, are permitted.



3. **THE COMPETITION:** Participants will be presented with one or more tasks, each requiring the use of process skills. These skills include, but are not limited to, generating inferences, making predictions, problem solving, making and recording observations, formulating and evaluating hypotheses, interpreting data, and graphing. This event may be administered in a timed station-to-station format **with the possible use of probeware at stations.**
4. **TOPICS MAY INCLUDE ANY OR ALL OF THE FOLLOWING:**
 - a. **Seawater:** dissolved salts and gases, nutrients, pH, density, temperature, pressure
 - b. Variations in salinity: evaporation, precipitation, river runoff, thawing and freezing icebergs and sea ice
 - c. **Sources of salt:** volcanic eruptions, spreading zones, chemical weathering of rocks
 - d. **Measuring seawater properties:** hydrographic (temp., salinity, oxygen, nutrients), dynamic properties (currents, waves, sea level, mixing processes), depth, topography
 - e. Three-layered structural zones: surface mixed zone, transition zone, deep zone, also pycnocline and thermocline
 - f. Passive and active continental margins and associated features
 - g. Convergent and divergent **plate boundaries** and associated features
 - h. **Formation** of seamounts, atolls, reefs, hydrothermal vents, cold seeps
 - i. **Meteorology:** sea and land breezes, hurricanes, El Niño, La Niña
 - j. **Waves:** formation, parts, breaking and nonbreaking features, motion, tsunamis
 - k. **Currents:** longshore, rip, turbidity, benefits (climate, upwelling)
 - l. **Circulation:** Coriolis effect, Ekman spiral, geostrophic flow, gyres, upwelling, downwelling, thermohaline, density
 - m. **Sediments:** lithogenous, biogenous, hydrogenous, cosmogenous
 - n. **Tides:** spring, neap, mixed, diurnal, semi-diurnal, tidal currents
 - o. **Coastline:** erosional and depositional features, emergent and submergent features
5. **REPRESENTATIVE ACTIVITIES:** Given a diagram of the Galapagos Spreading Center, compare and contrast the motion of the ridge segments with that of the transform fault. See galapagos.html below.
6. **SCORING:** Points will be awarded for the quality and accuracy of responses. Ties will be broken by the accuracy and/or quality of answers to selected questions.

Suggested Resources:

<http://oceanmotion.org/html/background/ocean-in-motion.htm>

http://www.uwsp.edu/geo/faculty/ritter/geog101/textbook/coastal_systems/outline.html

http://oceanworld.tamu.edu/resources/ocng_textbook/contents.html

<http://www.pmel.noaa.gov/tao/elnino/nino-home.html>

<http://oceanexplorer.noaa.gov/explorations/02galapagos/galapagos.html>

National Science Education Standards: Content Standard D. Earth And Space Science: Energy in the Earth System; Origin and Evolution of the Earth System.