

Instruments Lab

This exercise is to be done in the classroom. At each of the seven stations you are to decide what tools or instruments are to be used to conduct the mission that each ship has been assigned.

Use the tools or instruments discussed in class.

Use a short sentence to explain why you chose those tools or instruments.

Your answers are to be recorded on the provided answer sheet.

You may use the back of the sheet if need. Be sure to number your answers appropriately.

Instruments Lab Answer Sheet

Name _____

Block _____

Date _____

Station 1.

Station 2.

Station 3.

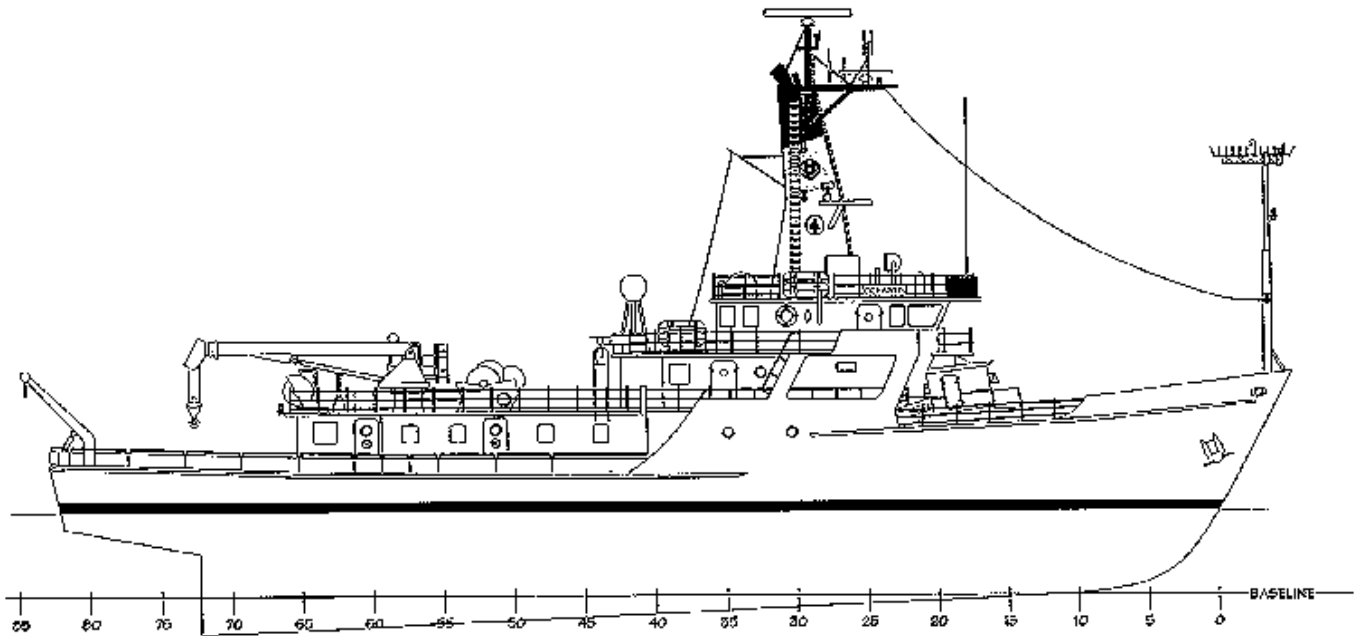
Station 4.

Station 5.

Station 6.

Station 7.

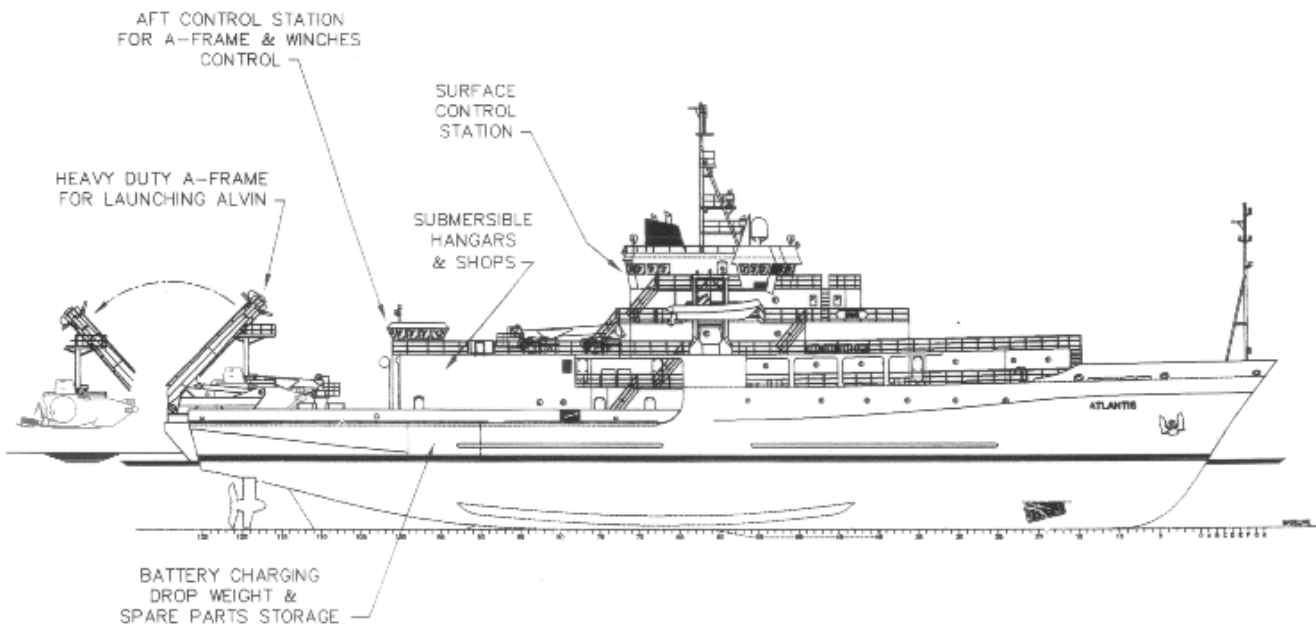
Station 1.



R/V OCEANUS

The Research Vessel *Oceanus* is owned by the National Science Foundation and operated by Woods Hole Oceanographic Institution. The ship's mission is to collect data on the sediment accumulating in-between Trinidad and Tobago, off the coast of South America. You will be heading a grain size analysis study on the differences between the many layers of sediment being deposited. What equipment will you need to accomplish this?

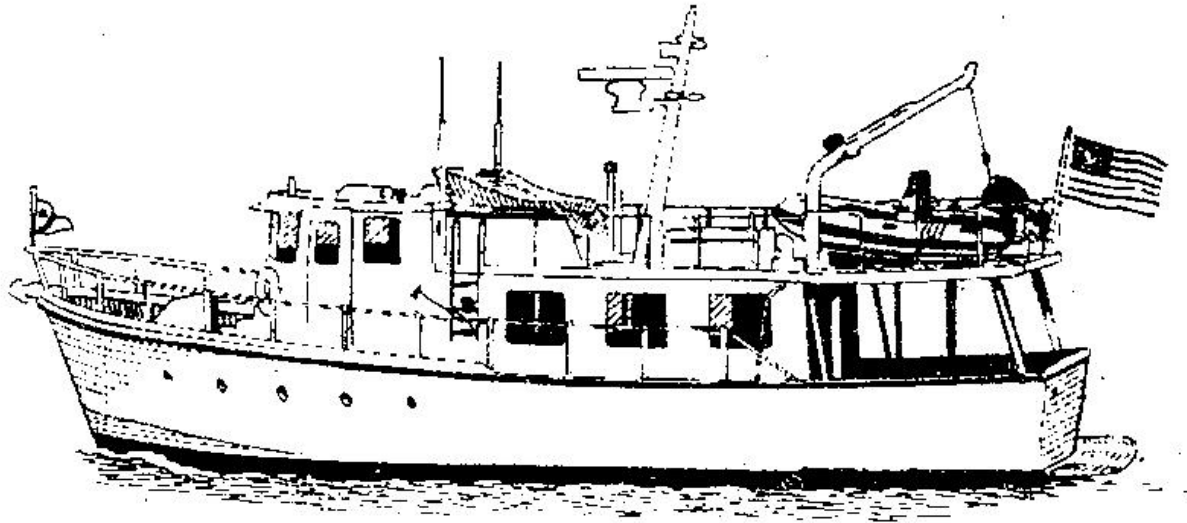
Station 2.



ATLANTIS OUTBOARD PROFILE STARBOARD

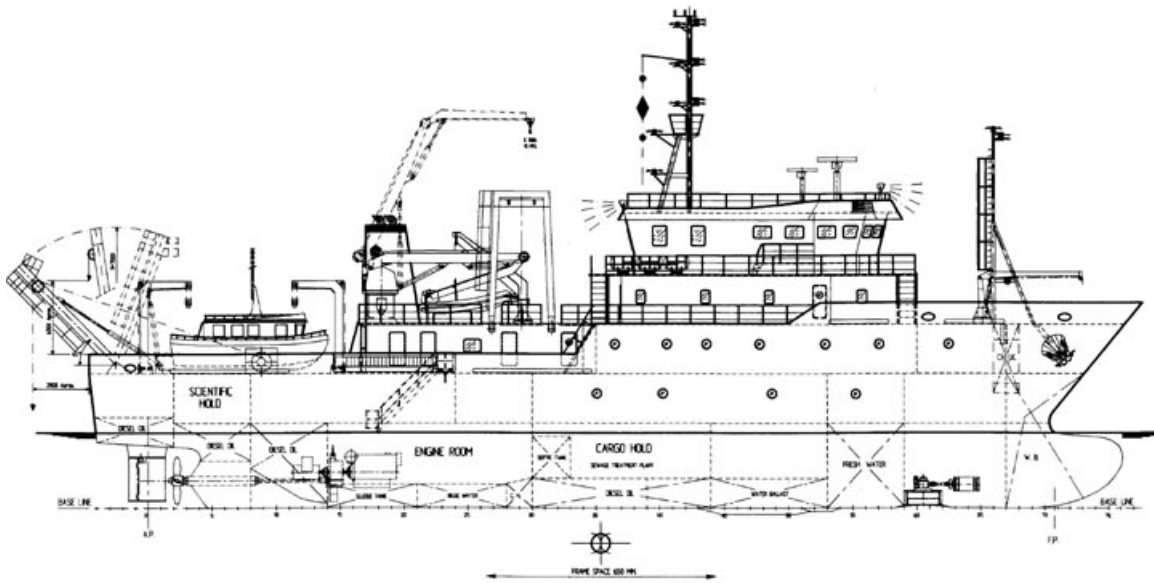
You are the Chief Science Coordinator for the world renowned Woods Hole vessel *Atlantis*. You are developing your gear list for a three month voyage examining hydrothermal vent communities along the Mid-Atlantic Ridge. What scientific instruments will you and the rest of the crew use to collect samples, and gain temperature data on the water surrounding the vents?

Station 3.



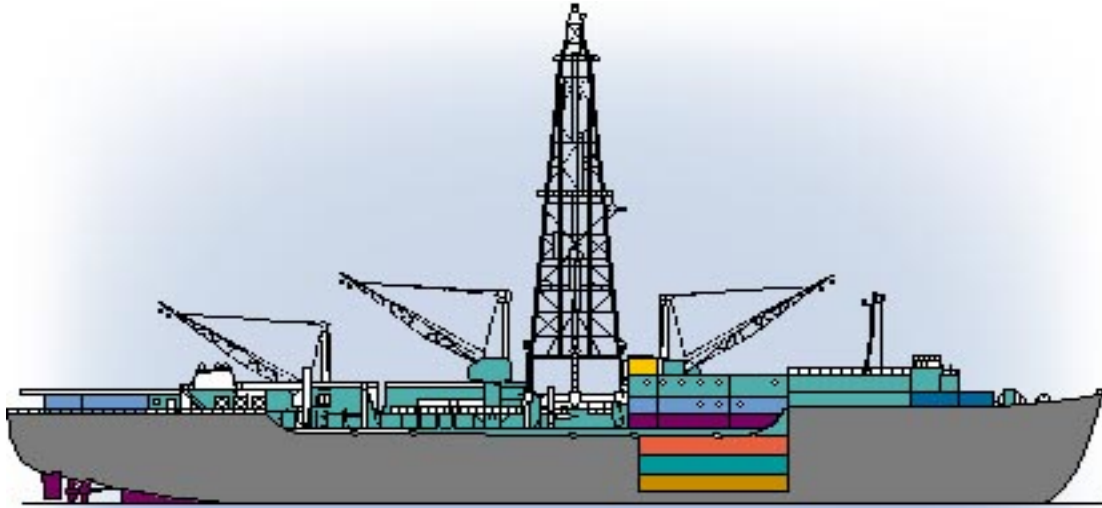
You are a biologist working for the Pacific Whale Foundation based out of Maui (an island in Hawaii). You are to try and study migration patterns, mating areas, and communication habits of the False Killer whale. What scientific instruments will you use to collect this information?

Station 4.



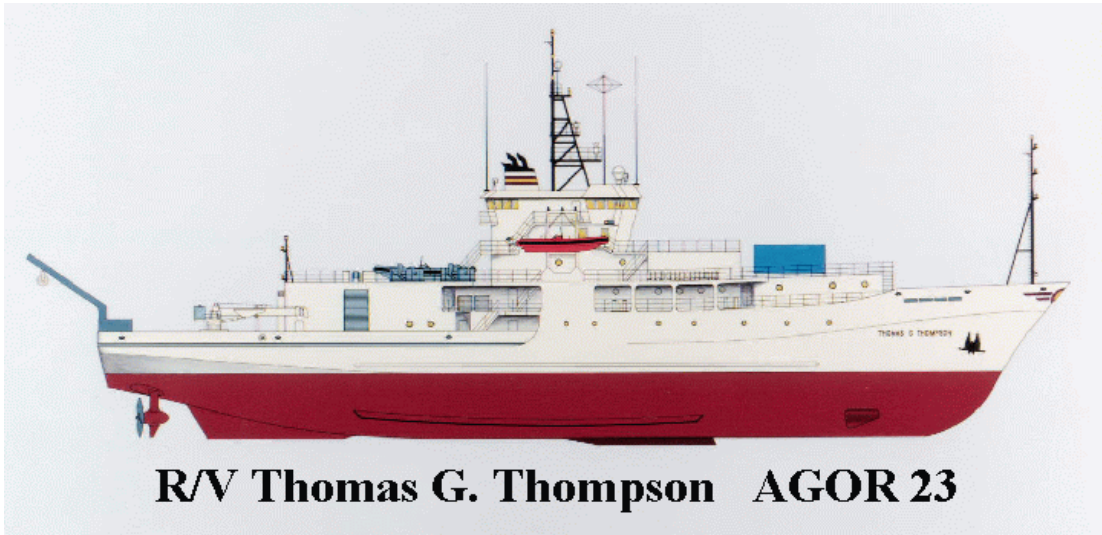
You are the one of many scientists aboard the new boat *Stream Line*. This boat was constructed in Woods Hole and will be used to collect water samples at various depths through the entire Gulf Stream and to deploy equipment that will monitor the temperature and velocity of current. What scientific instruments will you and the rest of the crew use to collect this information? What aspects of the water's chemistry might you look at?

Station 5.



You are the Chief Science Coordinator for the research vessel *Bottoms Up*. You are getting ready to deploy into the Sargasso Sea to collect samples and study the ocean floor. What scientific equipment will be essential for you to bring and why?

Station 6.



You are the Chief Science Coordinator for the world renowned Scripps vessel *Thomas G. Thompson*. You are developing your gear list for a six month voyage off the coast of Alaska. You will be supervising an intensive biological study focusing on the adaptations of certain cold water organisms. These organisms range from the sea floor to the surface of the water. What equipment must you bring to collect samples of all these organisms?

Station 7.



You are a Naturalist that works for the State on board a number of deep sea fishing vessels that operates out of Virginia Beach. You are monitoring the productivity of an algae bloom that is located near the Gulf Stream and you are examining how it affects the water's clarity. What are two important pieces of equipment that help you conduct your research?

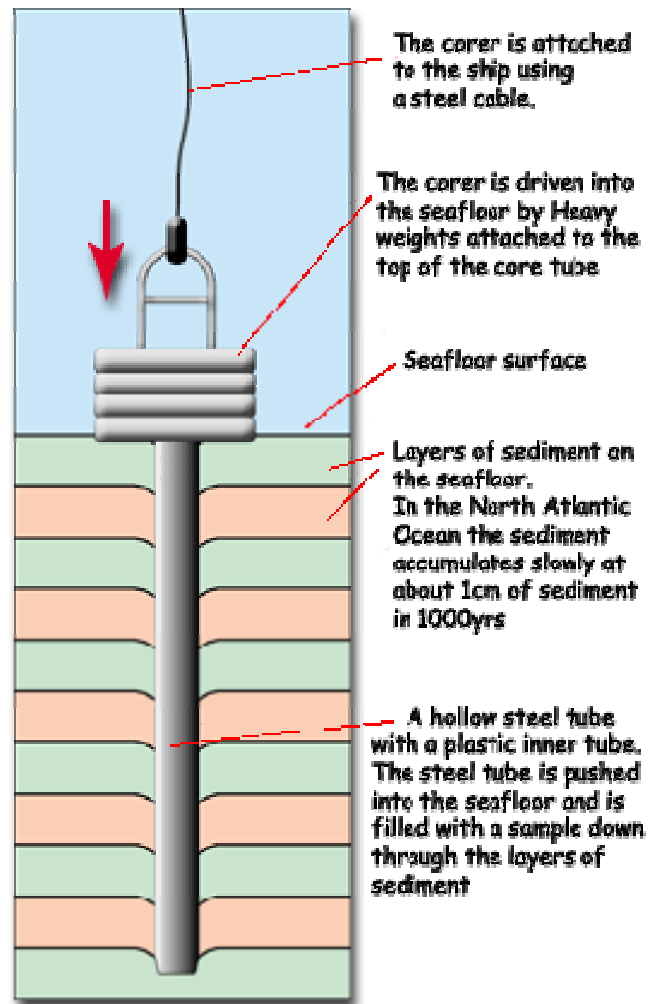
instruments
and

Tools

Gravity core:

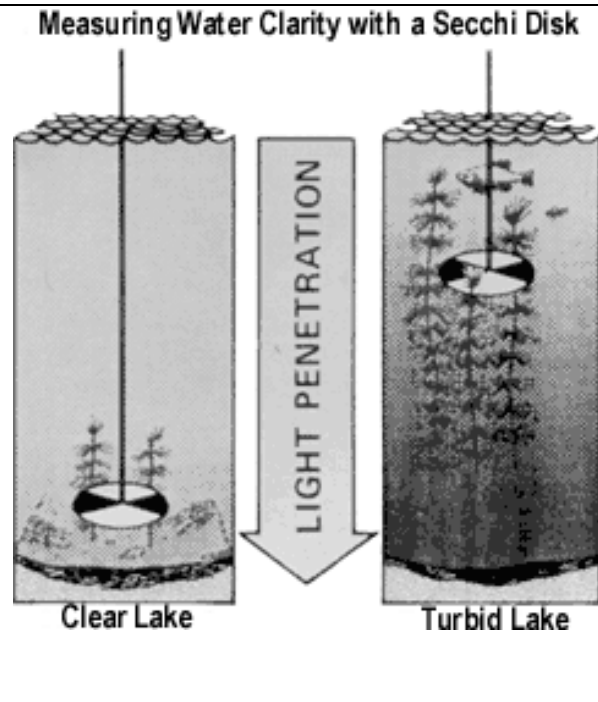
The most basic sampling device used to collect core samples from the seafloor, it penetrates less than 10 meters into the sediment

- How the climate has changed
- The effects of pollution on animals that feed on the seafloor
- Etc.



Secchi Disk:

Used to estimate the transparency of seawater, and can provide a relative measure of productivity or turbidity.



Dip Net:

Useful for scooping up seaweed, jellyfish, and other drifting organisms from docks and the side of the vessel.



Sediment Sieves:

Used to analyze sediment grain size composition.



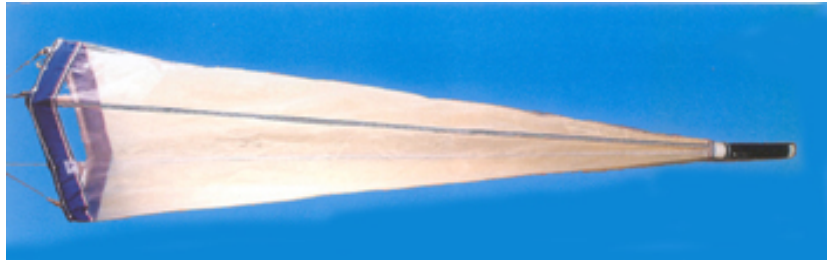
Phytoplankton nets:

This fine mesh net collects the smallest plant plankton, which is then easily analyzed under the compound scope for diversity and species composition.



Neuston Net :

This new large mesh surface water net enables us to tow for the larger zooplankton (animal plankton), which are readily visible under the dissecting scope.



Niskin Bottle,
Van Dorn Bottle:

Used to collect water samples from discrete depths, which are then chemically analyzed.

- Phosphates, nitrates, and silicates
- Dissolved Oxygen



Hydrophone:

A microphone for acoustic measurements in fluids.



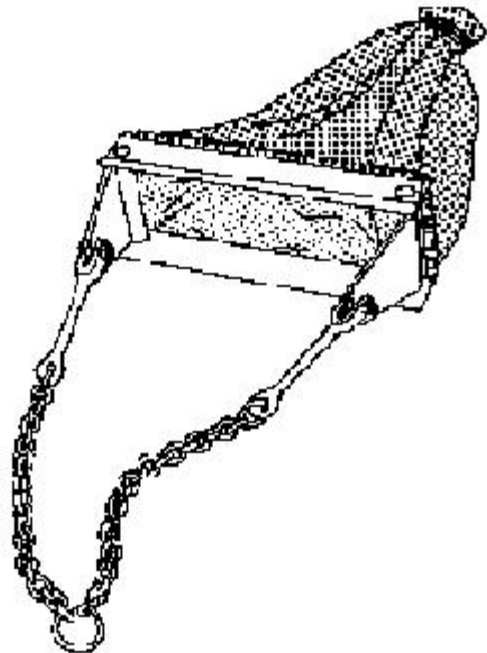
Shipek Grab:

Samples a wide variety of ocean and fresh water sediment. The sampler is designed to take samples in soft ooze, clay, sand, gravel and pebbles on flat or gently sloping bottoms.



Dredge:

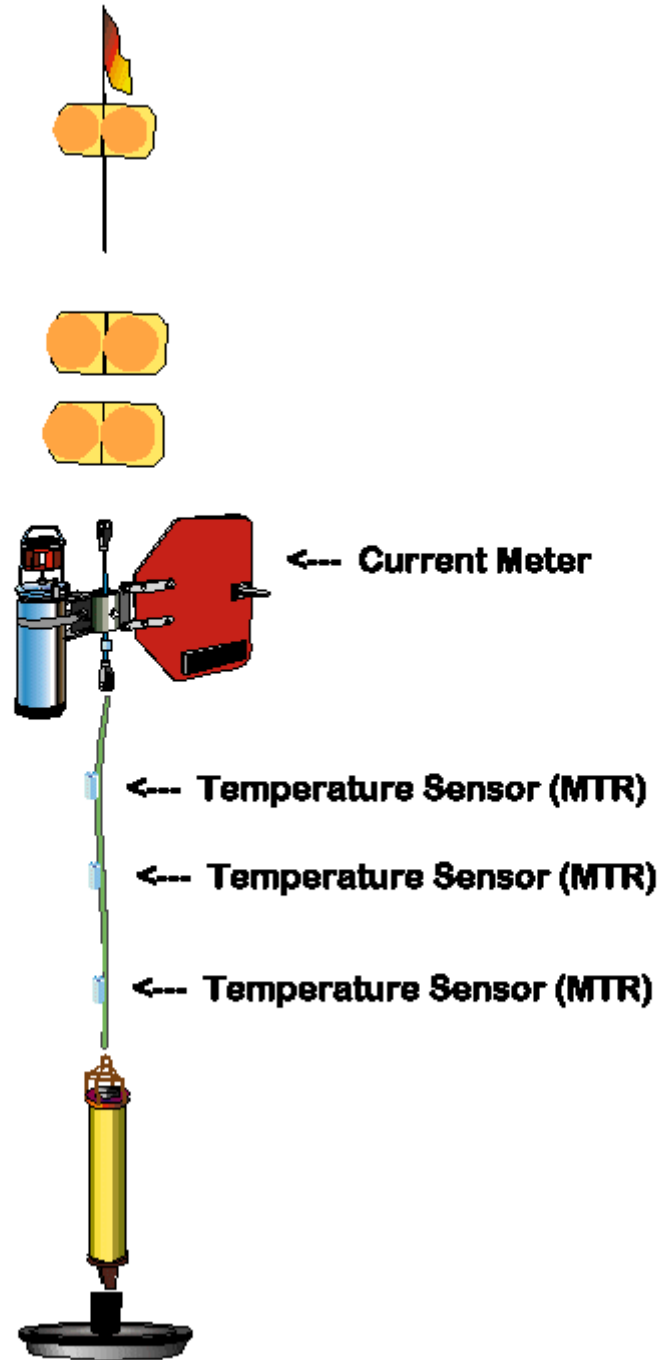
Used to sample organisms living on the bottom of the ocean.



Current Meter:

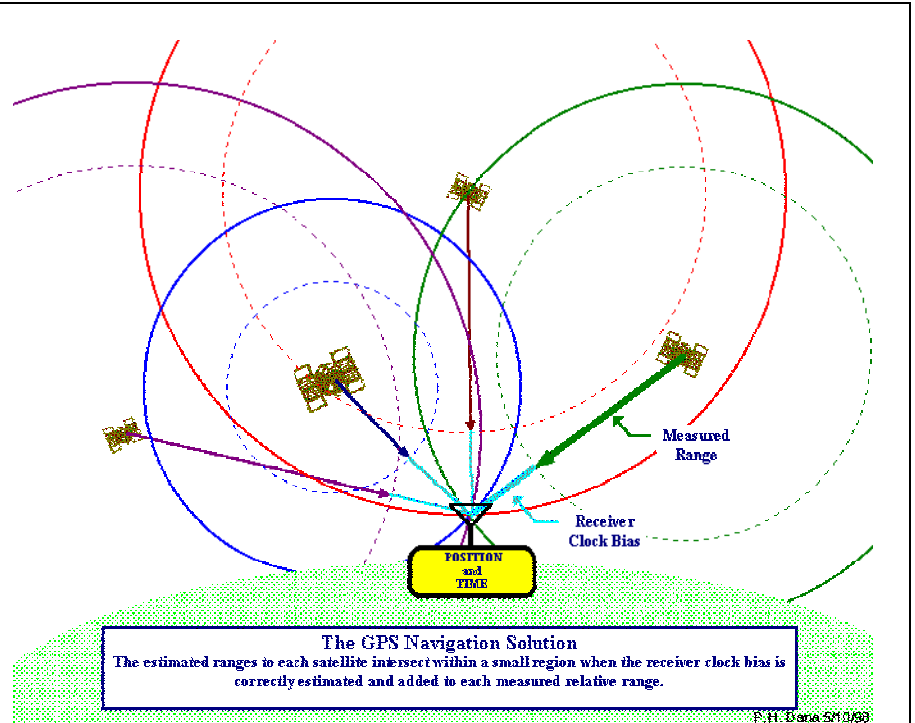
An instrument for measuring the velocity, force, etc., of currents.

Temperature Sensor/Current Meter Mooring



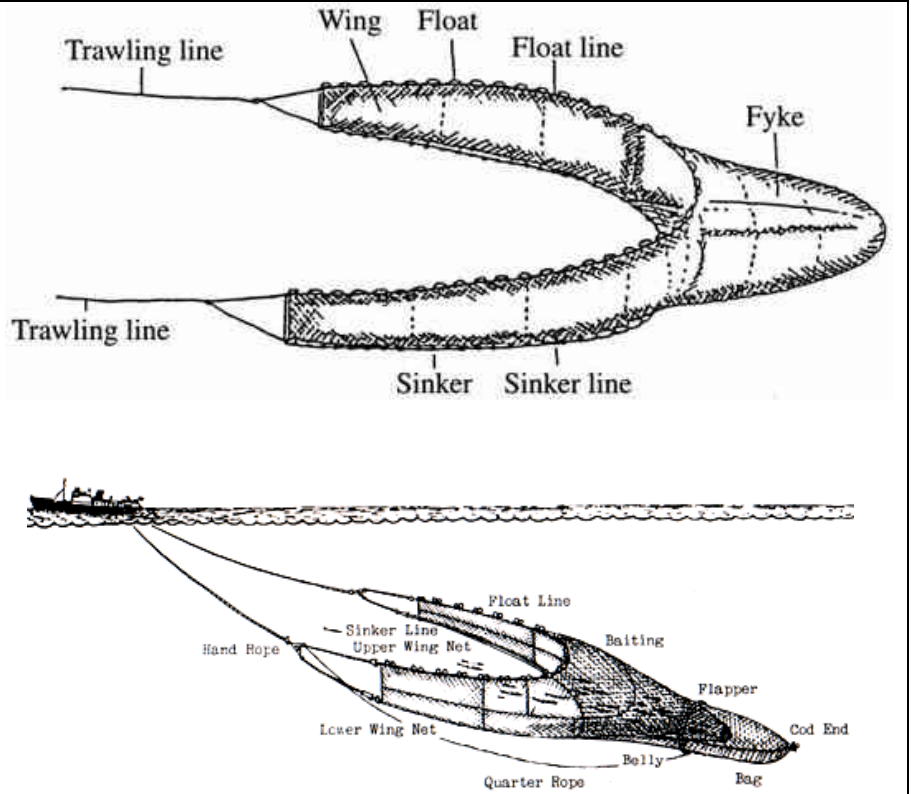
Global Positioning System (GPS):

A worldwide radio-navigation system that utilizes satellites to triangulate a specific location on earth.



Trawl Net:

The mouth of the net is kept open through "otter boards" attached to the leading ends of the net, or, by current passing through the net.



Hydrometer:

A device used to measure the densities of liquids and solutions.



**Remotely
Operated
underwater
Vehicles (ROVs)
are unoccupied,
highly
maneuverable
underwater
robots operated
by a person
aboard a surface
vessel.**



**The use of drift
bottles as a
means of
charting ocean
currents is an old
one, and their
use in research is
not without
precedent**



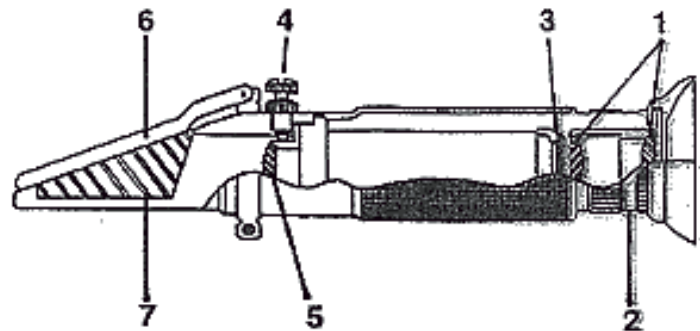
Plankton Net

A cone shaped net of fine mesh material with a collecting jar at the base.



Refractometer

An instrument used to measure the salt concentration of seawater by using the refraction of light.



1. Eyepiece
2. Scale focusing knob
3. Scale
4. Scale calibrating knob

5. Lens
6. Plastic cover
7. Prism

SCUBA

Self
Contained
Underwater
Breathing
Apparatus



Grab Sampler

This instrument is used to remove a piece of the ocean floor for study



Nansen Bottle

Sub-surface measurements of water samples are made with water sampling bottles.

There it is closed by tripping action. When the bottles have been brought back on deck, the water samples are analyzed.



Salinometer

A hydrometer that determines the concentration of salt solutions by measuring their density



THE AP-IE PANEL