FSDB Field Equipment

Descriptions were compiled by Maia McGuire (UF/Sea Grant—824-4564). Hopefully they will provide you with the information you need when deciding what equipment you are going to use for field studies.

PLANKTON NET (1)

Before using this net, make sure that the clamp on the tubing is closed, otherwise you won't have any sample! The net can be towed by a moving boat (being careful not to get the net or tow ropes tangled in the propeller), or can be pulled by hand. Remember that the longer the net is pulled, the more plankton (and debris) will be in the net. If pulling by hand, the net should be pulled into the current. Remember to note whether the tow is being made on an incoming or outgoing tide as this can affect the types of plankton seen. Once the tow is completed, hold the net with the large opening upwards so the water drains out through the net and plankton is washed into the tube at the end of the net. You may need to be patient—if there is a lot of plankton in the net, the water will drain slowly! Once most of the water has drained out (your plankton sample will then be as concentrated as you can get it), place the net so that it is over a small bucket or tray. Open the clamp on the tubing and allow the plankton to drain into the container. Use a pipet or dropper to pick out plankton for viewing. You may want to pour some of the plankton into a clear jar and let it settle—the students will be able to see some of the zooplankton swimming around in the jar. You can view the plankton with the field microscope, or can preserve it in alcohol (approx. 70%--the rubbing alcohol you can buy at the grocery store or pharmacy will work). Once preserved, the sample will stay good indefinitely in a closed jar. If you plan to keep the sample, it is best to make a label out of a small piece of waterproof paper (write in pencil: date of collection, place of collection, tide condition) and place the label in the jar.

Once you have removed your plankton sample from the net, leave the clamp open and pull the net through the water several times to rinse it out. It should be rinsed with fresh water and allowed to dry before being stored.

CAST NET (1)

Cast nets take some practice to use, but can be very effective to catch mullet and other small fish (and shrimp). They are most useful when you can see the school of fish you are trying to catch. Casting "blind" is usually not very productive. The weights around the edges of the net are lead and should not be put in the mouth.







DIP NET (1 TALL, 1 SHORT)

These nets can be used to catch larger, slow aquatic organisms (like cannonball jellyfish), to get trash out of the water or to catch insects (terrestrial or aquatic). They can also be used to help land fish caught with hook and line. If used carefully, they can be pulled along the edges of the floating dock to catch shrimp (the net may snag on oysters or barnacles).



2-WAY VIEWER (2)

This comes apart into 2 pieces—the object to be viewed is placed in the shallow tray (water samples CAN be used, but with care...) and the pyramid-type piece is placed on top. If desired, a piece of tape can be used to hold the 2 pieces together—there is a tendency for people to pick these up by the top eyepiece, which can result in the bottom piece (and specimen) falling off... If used for water samples, please rinse with fresh water and dry with a clean cloth before storing.



BINOCULARS (4)

These are best used for bird watching or dolphinspotting. Care should be taken not to get sand in the cases...



ZOOM SPOTTING SCOPE (1)

This provides 12-36 X magnification and can also be used for bird watching or dolphin spotting.



SHOVEL (1)

This folding shovel can be used for collecting sand/sediment samples. If used in combination with the sieve, it can be used to look for INFAUNA (animals that live buried in the sediment). Please rinse with fresh water and dry after each use.



AQUASCOPE (1)

This allows people to view objects that are underwater without getting into the water with a mask on. It will work best in clear water; otherwise visibility will be very limited. The end with the clear lens is placed into the water and the observer looks through the other end.



MAGNIFYING VIEWER (4)

This device can be used as a microscope or as a monocular (like a spotting scope or half of a pair of binoculars!). It will magnify things to about 8 times their normal size. To use as a monocular, remove the opaque plastic "stand". To use as a microscope (for small objects, but probably not for plankton), set the object to be viewed on a flat surface and place the stand flat on the surface so the object can be seen through the viewer. Do not place in water!



FIELD MICROSCOPE (1)

This microscope will magnify objects 20X. To use, rotate the eyepieces upwards and slide the small lever so that you can see light through the eyepieces. To focus, start with the eyepieces lowered as far as they can go and **slowly** raise the eyepieces while looking through the microscope until the object comes into focus. After using in the field, please wipe down carefully with a damp cloth followed by a dry cloth. Be sure lever is closed and rotate eyepieces back down before storing.



CLINEFINDER (1)

A digital thermometer--the ClineFinder[™] measures water temperature at any depth from the surface to 50 feet (15.25 meters), with updates every 2.5 seconds. A compact cable reel allows easy extension and retraction of the probe, and depth is marked on the cable every 2 feet (.5 meters) with mil-spec markers. You can use this to measure temperature at one point in the water column, or can create a depth profile of temperature (have the students graph the data—temperature along the X axis and depth on the Y axis; surface at the top of the axis and increasing depth down the length of the axis—conceptually it might be easier for students to graph depth as negative numbers, so 5 feet below the surface would equate to −5 on the Y axis).



SIEVES (SET OF 6) (1 SET)

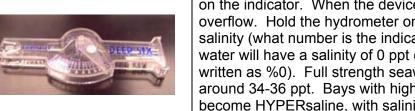
These are used to separate dry sediment or sand samples into different size classes. Sieves should be stacked so the finest mesh size is on the bottom and the largest mesh is on the top. The pan (with a solid bottom) goes at the very bottom and the lid goes on the top. To sort a sample of DRY sand, stack the sieves as described and place the sample in the top sieve. Put the top on the stack and, holding the set of sieves together, tap the bottom of the stack firmly on a hard surface several times, or shake carefully for about 3 minutes. This will cause the sand particles to fall through the various sieves. Carefully separate the 6 sieves and bottom pan and weigh the sand in each sieve. The sieve #5 will contain fine pebbles, 10 contains very coarse sand, 18 coarse sand, 35 medium sand, 60 fine sand, 120 very fine sand and 230 coarse silt. Any sediment in the pan will be classified as smaller than coarse silt (it contains silt and clay).



MEASURING TAPE (1)

This can be used to measure off the distance that the seine net will be pulled (stretch the tape out along the shoreline and have one person stand at each end of the tape so the people pulling the net can easily see them). It can also be used as a transect line (a line along which a quadrat will be placed at intervals). In a pinch, you can even use it to measure a fish!





This is a simple device for measuring the salinity (saltiness) of water. Be aware that water will overflow from this device, so you'll want to use it outdoors or over a sink. Pour some of the sample into the top of the hydrometer and tap the device gently to remove any air bubbles that may form on the indicator. When the device is full, excess water will overflow. Hold the hydrometer on a flat surface and read the salinity (what number is the indicator pointing to?). Fresh water will have a salinity of 0 ppt (parts per thousand, also written as %0). Full strength seawater will have a salinity of around 34-36 ppt. Bays with high rates of evaporation can become HYPERsaline, with salinities greater than 36 ppt (Florida Bay can reach 50 ppt at times) but we're not likely to see that in the St. Augustine area. Salinities may be higher on an incoming tide and lower on an outgoing tide, so tide condition should be noted when salinities are measured. Also, after a heavy rain, there may be a freshwater lens on the surface of the water, with saltier water below...





pH TESTER (1)

This should be CALIBRATED before use—read the instructions to find out how to do this. Once calibrated, you simply turn on the tester and place the tip into the liquid that you wish to test. The digital display will give the pH. Seawater is typically around 8.3, but will vary from place to place. The pH of freshwater will often be affected by the types of minerals in local rocks.



TEMP/HUMIDITY GAUGE (1)

Also called a thermohygrometer (!), this device allows you to record the maximum and minimum air temperatures and humidities. This should not be placed in water.



BUCKETS (2 LG, 2 SM)

You can never have too many buckets! Please bring back as many buckets as you take out and please rinse them before returning them! These are useful for holding fish and invertebrates from seine sampling

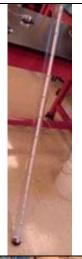


DISSOLVED OXYGEN METER (1)

The Sentry I displays dissolved oxygen in 1 ppm increments ranging from 0 to 16 ppm. It can be used in fresh water or salt water, is easy to calibrate, and features a color-coded scale to indicate which areas have appropriate amounts of oxygen to sustain fish. Before using, this should be CALIBRATED (read the instructions). In estuaries, DO levels below 5 are typically considered to be stressful, although many of the animals that live in estuaries are adapted to tolerate extremely low oxygen levels for at least a short period of time. Generally, the more active an animal, the more DO it will need.

WATERPROOF NOTEBOOK AND PEN (20)

The "Rite-in-the-Rain" brand papers are not totally waterproof, but can be written on underwater. They work best under damp, but not totally underwater conditions. They can be written on with the special pens, or with pencil (if the pencil is TOO sharp, it may tear the paper).



TRANSPARENCY/TURBIDITY TUBE (1)

Before using, make sure that the clamp at the bottom is closed. Fill the tube with sample water. Use the clamp to slowly release water, while looking through the top of the tube, until you can just see the distinction between the black and white sections on the "secchi disk" at the bottom of the tube. Close the clamp at this point and record the secchi depth from the scale on the side of the tube.



SIFTER (1)

This screen is best used with the folding shovel to look for INFAUNA in the sediments. Take a shovelful of sediment and place it in the sifter. You can then either gently shake the sifter from side to side (for dry sediment) or carefully pour water over the sediment to wash off the dirt and leave behind any clams, worms, etc.



SECCHI DISK WITH LINE (1)

This is another way to measure water clarity. To use the Secchi disk, lower it down into the water until the distinction between black and white sections disappears. Mark the rope at that point (at the water's surface). Pull the disk up and measure the distance from the mark to the top of the Secchi disk. Lower the disk back into the water beyond the first mark, then slowly pull it back up until you can just make out the difference between the black and white sections. Make a new mark on the rope and measure this second distance. The Secchi depth is the average of the two numbers.



SEINE NET (1)

This net should be pulled by two people, one at each end. The pullers should walk into the current (i.e. in the opposite direction of the water flow) and should pull the net parallel to the shoreline. For best results, the net should form a small arc between the two people, with the lead weights dragging along the sea floor and with the floats at the water's surface. This net is best used in water that is 2-3½ feet deep. At the end of the pull, the two pullers should rotate towards the shoreline and bring the net up onto the shore, keeping the weights on the sea floor all the way. Fish and invertebrates can then be scooped by hand or dip net into buckets or tubs of water for examination. Critters should be released as soon as reasonably possible to prevent undue stress.



SLURP GUN/AQUATIC SUCTION SAMPLER (1)

Believe it or not, this is actually a device used by many marine biologists to capture critters without harming them! It works best for extracting shrimp etc. out of holes in the sand or rock, but can also be used to collect other types of critters. From the catalog description: "Easily extract burrowing aquatic invertebrates from wet sand or loose muck using this durable sampler! Just place the end of the sampler over the hole left by the invertebrate or over any other area where you suspect specimens are located. Pull up on the sampler's handle. An area of negative pressure is formed in the void and the substrate as the inner piston moves up the sampler's housing, allowing the specimens to be securely drawn inside." Once you have the sample in the tube, you can push it out into the sifter and use water to expose the critter(s).



STAKES (100)

Use these to mark out your study area or to set up different areas for different projects.



SOIL CORER (1)

This is designed for terrestrial soil sampling. Push the corer straight down into the soil, wiggle it back and forward a bit to loosen the area, then pull back out. You should have a nice soil core and may be able to see different layers in the dirt. Layers may be clearer if you place the core on a tray and slice it in half with a knife. Please clean before storing!



SOIL TEST KIT (1)

Provides four individual modules of test equipment covering nine test factors important in plant nutrition. Module A: calcium and chlorides. Module B: ammonia and nitrite nitrogen. Module C: magnesium and manganese. Module D: iron, aluminum, and sulfate. Reagents provided for making 50 tests on each factor. Results: ppm. Soil science handbook and complete instructions included

AQUACULTURE TEST KIT (1)

This kit allows you to make nine critical test factors efficiently and accurately in the field. Unit is supplied complete with labware, accessories, sampling bottle, and reagents for 50 tests of each factor: Ammonia Nitrogen, Nitrite Nitrogen, pH, Alkalinity, Carbon Dioxide, Chloride, Dissolved Oxygen, Hardness Total as CaCO₃, Temperature. Read instructions CAREFULLY before using this!



QUADRAT (1)

Assemble this so that all of the protruding parts are on the same side, then slip the rings on the ends of the bungee cords over these so that the end result is a 4 x 4 grid. Each side of the quadrat is 1 meter. Use this to estimate percent composition or cover in terrestrial situations—e.g. randomly place the quadrat by tossing it into an area. Have the students look at each subsection of the quadrat and decide what the dominant thing in that subsection is (e.g. dollarweed). Repeat for each subsection, then compile the data and calculate what percent of the ground is covered with dollarweed. Older kids may be able to calculate abundance of several species. This can be used in shallow water (e.g. to survey marsh grass density) but should be rinsed in fresh water and dried before being stored.



COLIFORM TEST KIT (1)

The presence of coliform bacteria in a water sample indicates that fecal waste has been in that water. Coliform counts above a certain level can result in the closing of waters to swimming and fishing. Read the instructions on this test kit before using. The state is required to perform coliform tests on coastal waters on a regular basis (usually this is done by the county health departments)—you might be able to get someone from the health department to come and talk to your students about this... This kit is designed to test for coliform in drinking water.