Kelp Holdfast Lab Instructions (for instructor's use):

This lab can be adapted to make use of your local surroundings. The idea is to teach students about biodiversity within a habitat and to participate in the study of biodiversity. Though these instructions will be explained with kelp holdfasts (the bottom piece of the kelp that attaches the kelp to a hard surface like a rock) some potential substitute materials could include a chunk of moss, a decomposing log, a clump of grass etc. Additionally, if you have the option to bring students outside, you can have the students create a "quadrat" where they section off an area of habitat to examine. This can be done on a forest floor or marsh or other area where you want the students examining the substrate. Quadrats, or sampling squares, could be made by assembling a few pieces of wood or pvc pipe in to a frame to outline an area or by putting 4 stakes in the ground and attaching string between them to make a square. This acts as the sampling area and can be removed after the lab. Making this area reasonably small (1ft by 1ft) is probably best.

Materials Needed: (list is for the variation of bringing the material in to the classroom – would vary slightly if bringing the students outdoors)

- wide, reasonably shallow bins for examining the material in
- forceps and other sampling tools for picking critters off the substrate
- 2-3 clean containers for putting the found critters in to (may want sea water in them if using kelp)
- Some dissecting microscopes
- Petri dishes for looking at organisms under the microscope
- Student lab notebooks with the data sheet and a space for drawings

Instructions:

Day Before Lab:

Introduce students to the topic of biodiversity using the powerpoint on Biodiversity included in this unit. Time allowing, orient students to the taxa they might see using the kelp lab key powerpoint. Lastly, if there is still time (or for homework), have the students prep their lab notebooks for the wet lab following the structure shown in the kelp data sheet document.

Before Class Starts:

1. Choose substrate/material to be examining. Collect it and bring to classroom or bring the students to the sampling area outside.
2. Divide the material in to multiple sections or have repeat substrates (eg one large kelp hold fast divided in to 6 – 10 segments each about a foot^3.) Place in shallow bins around classroom.

3. Put out sampling tools next to bins and place dissecting microscopes around the room.

During Class:

4. Divide students in to groups around the substrate material.
5. Have them take out their lab notebooks with their prepared data sheet ready from the day before (see kelp data sheet document for an example).
6. Ideally, the day before this lab students were introduced to the species they might see using the kelp lab key powerpoint file. If there was not time, this can be done at the start of class.
7. Have students go at it! They should look for any animal they can find or anything they think is interesting and worth cataloguing. Anytime they find something they should make a tick mark on their data sheet to keep track of the abundance. Then that organism should go in one of the clean, empty buckets so they know they won't count it again on the kelp. Each time they find a new category of something, they will make a new row on their data sheet for that taxa. This lesson uses broad taxonomic groups for simplicity but this could be made in to a larger unit if the students are instructed to identify something to a species or utilize guide books etc to do more "keying out" of organisms.
8. They can take pictures of organisms if you have digital camera access.
9. Have students bring one organism to the microscope during class and draw it.

Day After Lab:

1) Show students the powerpoint on Calculating Diversity. They will need their lab notebooks/data sheets from this lab.
2) Have them tally all of their categories of organisms from the kelp and calculate a grand total of the number of individual organisms.
3) Have them graph their results as a group on large paper that can shared with the rest of the class (see bar graph in the powerpoint for an example).
4) If there is time, have them follow the instructions in the Calculating Diversity powerpoint in order to get a numerical value of diversity in their kelp sections.
5) Have student groups each present their findings to the rest of class.