**Context of lesson:**

When students visit the *Sea World UCLA* they will participate in a station focused on plankton. This lesson is designed to reinforce the major concepts that are introduced about plankton while the students are on the ship.

Pre-requisites:

None

Target Audience:

This lesson is designed for use with elementary and middle school students. The lesson can easily be adapted for younger or older students.

Introduction:

Plankton, derived from the Greek word for *drifters*, refers to all the plants and animals that drift with the ocean currents(plankton also live in fresh water; but our concern here is with marine environments. Plankton have traditionally been distinguished from nexton, those animals which swim rapidly and migrate where they choose, irrespective of the directions of the currents, e.g. fish, squid, marine mammals and sea turtles. In the open sea everything must float, swim, or sink. The only physical objects that can remain near the surface without floating are living organisms. For living plants and animals, there are only a few ways to remain near the surface in safety because in open water there is no cover; no trees or rocks behind which one can hide.

Student learning outcomes:

Students will classify plankton based on physical characteristics

Standards Addressed:

	Grade 5	Grade 6	Grade 7
California Science Content Standards	2f, 6a, 6g, 6h	5a, 5b, 5d, 7e	1b, 5a, 7c
National Science Content Standards	Develop descriptions, explanations, predictions and models using evidence; think critically and logically to make the relationships between evidence and explanations; structure and function in living systems; diversity and adaptations of organisms; nature of science		

Time required:

Lesson can be completed in a 45 minute period, or extended if the teacher chooses.

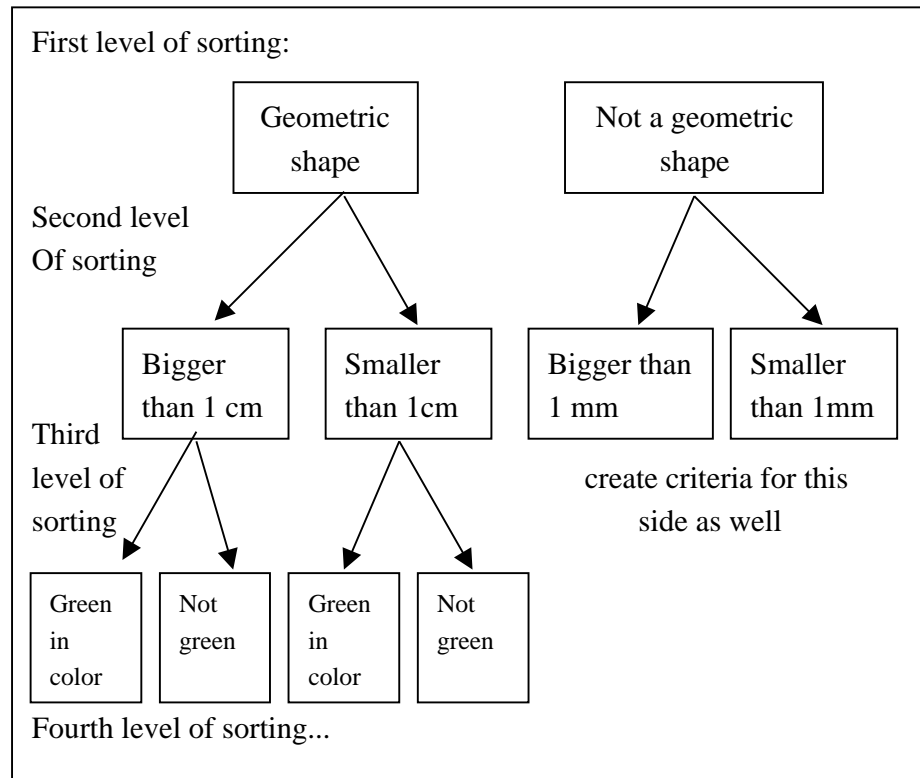
Materials:

- Plankton picture set
- Student sheets
- Scissors
- Glue
- Crayons or colored pencils

Procedures:

- Teacher preparation before the lesson
 - Cut out plankton picture cards
 - Mount cards onto index cards and laminate (so you can use them again in the future)
- With the class
 - Give teams of students a set of the cards (no more than 4 students to a team)
 - Students sort cards into two groups based on specific criteria (such as shape)
 - As a class, discuss which organisms were put into which group and why
 - Give students the opportunity to sort the plankton again (by different criteria, or to correct their first attempt)
 - Once students can sort plankton into two groups, have students sort each group further. These sub-groups can also be given a name based on the

criteria determined. This structure is known as a branching diagram. See sorting sample below:



Points for discussion:

- What is plankton?
- Scientists sort plankton into two main groups: *phytoplankton* (plants) and *zooplankton* (animals). How can you determine which plankton is phytoplankton and which is zooplankton? What are the physical characteristics of these groups? (Students can try to sort cards by this criteria before giving an answer)
- Why are zooplankton and phytoplankton found together?
- Are plankton found throughout the ocean or only at the surface?
- Do plankton have to be small?
- Do organisms live their entire lives in the plankton?

Lesson Extension:

Once students have created the branching diagram, they can turn this into a dichotomous key. Each level of sorting becomes a set of couplets in the key. An example is provided below:

Couplet #1

Does the organism have a geometric shape?

Go to couplet #2

Does the organism not have a geometric shape?

Go to couplet #3

Couplet #2

Is the organism larger than 1cm?

Go to couplet #4

Is the organism smaller than 1 cm?

Go to couplet #5

Couplet #3

Is the organism larger than 1mm?

Go to couplet #6

Is the organism smaller than 1 mm?

Go to couplet #7

Continue this pattern for all your levels of sorting.

Example Assessment:

Student Objective: Student will explain how organisms are classified based on their external characteristics

Evidence: Student will create a branching diagram based on a specific set of images.

Rubric:

Rubric Level	Criteria
4	<ul style="list-style-type: none"> • Contains accurate information • Exhibits effective use of diagramming • Includes all images in the product • Sorting criteria are based on observable characteristics
3	<ul style="list-style-type: none"> • Contains accurate information • Makes use of diagramming inconsistently • Includes most images in the product • Sorting criteria are based on observable characteristics
2	<ul style="list-style-type: none"> • Contains some inaccurate information • Makes ineffective use of diagramming • Includes few images in the product • Sorting criteria are mostly based on observable characteristics
1	<ul style="list-style-type: none"> • Contains inaccurate information • Makes little or no use of diagramming • Includes few or no images in the product • Sorting criteria may not be based on observable characteristics