Developing an Understanding of Length and Weight

Objective/Purpose:
These lessons provide a hands-on approach to developing a qualitative understanding of length and weight. By having the students work with each other, some of the lessons allow the students to work as a team. Counting and identifying colors are also important in these activities.

Materials:

Experiments 1-3 (length)
1) enough paper for each student to have a sheet
2) crayons
3) a minimum of 2 sheets of different colored poster board
4) construction paper

Experiments 4-6 (weight)
1) M&Ms (preferably of the peanut variety because they weigh more)
2) A children’s balance
3) Objects of varying weight (described below)

Time required for each small group of 4-6: 1 hour

Background Information:
Just through brainstorming with several other students these lessons were created. The children enjoyed working as a group and comparing their strips of paper in experiment 2. It is good to ask the students why one strip of paper is longer, or why one square fits into the other.

Preparation:
Have all of the materials ready to be used before beginning the experiments. Make sure to have enough M&Ms for the weight experiments.

Activity Outline/Teacher Procedures:

Length:
Experiment 1- The facilitator of the experiment will have a sheet of paper with four lines drawn on it large enough for each student to see the paper clearly. Each line will be of a different length and color. The students should then identify which line is the longest, the shortest, and which are of middle length according to the lines’ corresponding colors. The students will then, on their own sheet of paper, draw the four lines they just observed in the correct order of lengths and colors.
Experiment 2- Strips of paper (prepared from the poster board) of sequentially shorter length and alternating color will be given to each student. The students will then have to arrange themselves in order of longest to shortest strip in a line. Once they are lined up correctly, take all of the strips and overlay them to highlight why each strip was shorter than the next. Ask the students to point out which strips were theirs’.

Experiment 3- Begin with a short discussion on the definition of a square (four sides of equal length). Five squares cut from different colored construction paper should be prepared. The five squares’ sides will be of increasing length. The students will then place the five squares of paper on top of each other to construct a “pyramid” with the largest square at the bottom.

Weight:

Experiment 4- Five objects of clearly varying weight will be presented to the students. Their task is to arrange the objects in order of heaviest to lightest. (recommended objects: balloon, book, pebble, feather, sheet of paper, wooden block, etc.)

Experiment 5- Using a balance, M&Ms will be used to balance objects of varying weight. The facilitator should ask the students which of the objects to be weighed will give them the most M&Ms. This is also a great exercise in counting and identifying colors.

Experiment 6- This experiment is designed to highlight that weight is not always tied to volume. Three sets of objects of similar size will be presented and the students will be asked to guess which object is heavier without touching the objects. Then the students will be allowed to pick them up and use the balance to determine which of the two is heavier. (recommended objects: balloon filled with sand/water vs. balloon filled with air, shoeboxes empty vs. filled with books, book vs. piece of foam of similar size and shape)

Possible Questions:

1. Are size and weight the same thing?
2. What is longer: a toe or a finger?

Safety:
Before handing out peanut M&Ms, make sure no one is allergic to peanuts (a very common allergy). When dealing with heavy objects, make certain the students lift them only over the tables. This will keep anything heavy from being dropped on someone’s toes.

Assessment/Evaluation:
Assessment was based on the students’ ability to answer questions about comparative length and weight, as well as their ability to work together.