**SAND TIMER**

**OBJECTIVE:**

Campers are given the task to make a sand timer that goes for 30 seconds.

**TERMS TO GO OVER:**

Time Seconds Line Graph

**PRE LAB MATERIALS**

* Tape
* Two Bottles (per group)
* Card Stock
* Hole Punch
* Yard Stick
* Graph (large enough to be seen at desks and post entire class’s results)
* Pencil
* Scissors

**PRE LAB PROCEDURE**

Use the bottle neck to trace a circle onto the card stock so it is the exact circumference of the opening. Cut it out and use a standard hole punch to punch a hole in the middle of the card stock circle.

Tape the circle over the opening of one of the bottles using scotch tape, but don’t cover the hole you punched in the card stock.

Post Graph on the wall. One axis will display Mass in grams (increments of 50 grams up to 600 grams), and the other will display Time in seconds (increments of 5 seconds up to 60 seconds).

**LAB MATERIALS, Part 1 (per group):**

* Stop Watch
* 1 lb Sand
* Balancing Scale
* Two small pop bottles (pre-prepared)
* Funnel
* Pencil/Marker
* Tape (to secure the two bottles together)

**GROUP LEADER/VOLUNTEER/TLC ROLE**

Assist the campers in using tools such as the stop watch and balancing scales. When the campers are putting their timers together, help them secure the two bottles with tape. As the students collect their data, assist them in plotting their points on the graph.

**LAB PROCEDURE, Part 1**

Each group (no more than four students) is assigned a certain number of masses to test. For example, there are 12 separate masses to test. If there are three groups, one group tests 50-200 grams, another tests 250-400 grams, and the last group tests 450-600 grams. The goal of each group is to test how long it takes each of the various amounts of sand to pass through the timers. (Hint: start off with the smallest amount of sand the group is assigned, i.e. 200 grams. As the campers test more amounts of sand, don’t pour out all the sand. Instead, simply add 50 grams each time.)

To assemble the timer: pour the sand into the bottle without the cardstock using the strainer. Tape the two bottles together neck-to-neck. Because the cardstock does not allow for the sand to come out quickly, encourage the campers to time their sand timers twice for ‘more accurate results.’

To test the timer: campers weigh out the various masses of sand assigned to put into their timers, and each take turns using the timer to time. The campers’ goal is to come within three seconds of their goal while being as accurate as possible.

The campers then time each of the masses they are assigned, write down the amount of time it takes for each mass, and plot it on the graph provided by the teacher. Once all of the groups plot their point, the students should be able to see a trend in the graph and that the points pretty much fall on a diagonal line.

The instructor can then challenge the students to create timers of uneven amounts of time (i.e. 37 seconds, 42 seconds, 13 seconds) and ask them to predict and determine how much sand they will need to use in order to create their timers.