**Name(s)**

Annie M. Robison

**Project Number**

# J0123

**Project Title**

## A Weir-d Project

**Abstract**

**Objectives/Goals**

The purpose of my project was to confirm that the weir equation that relates water height or stage above an obstruction to stream flow in a rectangular stream channel is adequate. Furthermore, I wanted to find out just how accurate the weir coefficient of 0.465 is.

**Methods/Materials**

A stream model was constructed. To find the amount of discharge for different undetermined flow settings on my pump, I operated eight runs in which I measured the volume of water coming from the stream and divided it by the amount of time it took. I then substituted values in the weir equation for each of the eight runs I did to find the discharge according to that equation. The different flow measurements of the model and the equation were compared. I then back calculated my results for each run to find what the coefficient would be if my results were without error.

**Results**

The difference between the calculated discharge using the timed bucket method and using the weir equation ranged from 0.3 # 25.6 cubic centimeters per second. The timed bucket flows ranged from 114.4 # 376.1 and the calculated discharges of the equation ranged from 114.1 # 351.5. Furthermore the relationship between the weir equation and the timed bucket almost fit a one to one relationship with regression analysis giving an equation of $y = 0.9533x$ with an r squared of 0.9986. If the calculated discharges of the model were exact, the coefficient would range from 0.466 # 0.497, but, as I said, my calculated model discharges were slightly off.

**Conclusions/Discussion**

My results show that this weir equation is a sufficient representation of the discharge of a stream and the weir coefficient 0.465 is accurate. Because I was unable to take absolutely precise measurements of the water in each of the runs, the calculated discharge of the model was slightly different than that of the equation and the weir coefficient altered somewhat when I back calculated. However, it was an insubstantial variation and it is obvious that the weir equation can be relied on to take accurate flow measurements and the weir coefficient of 0.465 is adequate.

**Summary Statement**

In my project, I tested a weir equation for its accuracy measuring stream flow.

**Help Received**

My dad helped me learn the statistics; My mom helped me build the model.