

Experiment P-43 Flowing Water



Objectives

- To investigate water velocity in different positions of a falling stream.

Modules and Sensors

- VIEW-200 digital display module 
- BAT-200 Battery module 
- NUL-224 Flow logger sensor 

(It is also possible to conduct the experiment with a USB-200 module  and a PC)

Introduction

Fluid mechanics deals with moving and stationary fluids. Approximately 70% of the Earth's surface is covered by fluids. Life, as we know it, is not possible without them. This field is related to physics, mathematics, biology, geology, oceanography and engineering. It has a great importance for transportation, power generation and more.

Like everything else, water accelerates at a constant rate of 9.8 m/s^2 as it falls, but its motion is relatively complicated. Because the water moves at different speeds, it does not stay in the continuous stream in which it starts and after a while it turns into droplets.

In this activity we will conduct a simple fluid mechanics experiment; we will investigate water velocity in different positions of a falling stream. We will use a flow logger sensor, with inlet and outlet pipes.

Water flows through them, revolving a rotation wheel within the sensor.

Procedure

Experiment setup



1. We will measure the rate of water flowing through a faucet into a sink.

Sensor setup

2. Connect the flow logger sensor  to the digital display module  and to the battery module  (Alternatively you can use a USB-200 module and a PC).
3. In a few seconds you will see the velocity value (in m/s).

Testing and measurements

4. Turn on the faucet and place the probe under the stream. Move the sensor closer to the faucet and then closer to the sink.



5. Look at the digital screen to see how the values change as you move the probe.

Challenge research

6. If you are close to another source of flowing water like a body of water, measure the velocity of the stream and compare the value to the first experiment.

Summary questions

1. How did the velocity change when you placed the sensor at a different distance from the faucet? Explain.
2. Hydroelectricity is electricity generated by falling or flowing water. It is a good example of renewable energy. How could you use what you have learned in this experiment for choosing the best location for that purpose?