

Ateneo De Manila High School  
Fourth Year Advanced Physics Class  
Investigatory Project

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**4B/S**  
**4A/S**

**METHODOLOGY AND SAMPLE DATA TABLES**

I. METHODOLOGY

a. Materials

<b>Item</b>	<b>Quantity</b>	<b>Total Cost (in pesos)</b>
Automotive Alternator	1	Pre-owned
Electric Fan	1	Pre-owned
Voltimeter	1	Pre-owned
Rubber Fan Belt (2 m)	1	Pre-owned
Standard Copper Wire (1 m)	1	Pre-owned
Plastic Measuring Cup	1	30.00
Plastic Funnel (2" diameter)	1	15.00
Plastic Funnel (4" diameter)	1	15.00
Plastic Tablespoon	20	Pre-owned
Measuring Spoon (Deep Ladle)	10	Pre-owned
Philips Screwdriver	1	Pre-owned
Plastic Disk (30 cm diameter)	2	Pre-owned

b. Procedure (Construction and Initial Testing)

- 1) Using a screwdriver, an acquired old electric fan will be disassembled such that only the rotating axle, motor component, and base of the fan will be left.
- 2) Attached to the axle, a makeshift water wheel will be constructed with an approximate diameter of thirty (30) cm using a plastic circular disk. Every three (3) cm a plastic tablespoon will be attached facing upwards to be used as fan blades.
- 3) A fan belt of approximate length of two (2) m will be connected to the rotating fan through the disassembled motor component (if possible) or through gears that will be manually attached to the axle.
- 4) The other end of the fan belt will then be affixed with the automotive alternator by linking the two rotors with the belt. Copper wires will be connected to the alternator as well as a voltmeter at the opposite end.
- 5) To channel and concentrate the simulated rainfall, a funnel with a two (2) inch diameter will be suspended above the plastic spoons to focus water and produce the rotating motion of the rain turbine.
- 6) As the wheel turns, the automotive alternator generates electrical output. This output will then be measured and recorded through the copper wire and the voltmeter. Other measurements will be made such as the dimensions of the rotor and fan blades (water holder arms).
- 7) A total of two (2) L of water will be focused on the modified fan blades of the rain turbine to determine initial electrical output, total revolutions and revolution speed.
- 8) This set-up will serve as the control group of the experiment and will undergo four (4) trials. Data will be recorded.

c. Procedure (Funnel Size Experimentation)

- 1) Following the procedure testing for electrical output in the construction of the rain turbine, the plastic funnel with the two (2) inch diameter will be placed above the fan blades of the rain turbine.
- 2) Two (2) L of water will be poured down the funnel as electrical output, revolutions made and revolution speed of the rain turbine will be recorded. This will be done for three (3) trials.
- 3) The same procedure will be done for the funnel with a four (4) inch diameter for three (3) trials as well.

d. Procedure (Fan Blade Type)

- 1) Two (2) plastic wheels will be outfitted with two (2) types of fan blades. The first will use the standard of plastic tablespoons as fan blades. The second will utilize deep ladle measuring spoons as fan blades, similar to the design in the construction process.
- 2) The first plastic wheel with plastic spoons will be affixed to the fan rotor. Two (2) L of water will be poured down, and electrical output, revolutions per minute and total revolutions made will be recorded, for four (4) trials.
- 3) The same procedure will be done for the plastic wheel with the deep ladle measuring cup for four (4) trials as well.

e. Procedure (Water Focus by Funnel Testing)

- 1) Two (2) L of water will be poured down the rain turbine without a funnel for three (3) trials to test the effectivity of the funnel in focusing water.
- 2) The results on electrical output, total revolutions made and revolutions per minute will then be compared to standard funnel use with the rain turbine.





