

Experiment 1*Introductory**Qualitative observations/relationships –*

Students learn about how to switch the apparatus on and observe the effect on the water jet.

They observe the effect of the water jet on the Pelton wheel.

They then relate the increase in the pump speed and the wheel rotation to the serial activation of the 4 LEDs in the house.

They learn about forms of energy.

They learn about energy transformations.

Experiment 2*Introductory**Simple Quantitative Relationships*

Students record the pump speed and wheel rotation rate required to activate 1, 2, 3 and then 4 LEDs in the house.

They produce a graph of these data.

Experiment 3*Electrical Power*

Students learn about electrical power.

They record the variation in electrical power output of the generator as the water flow rate and wheel rotation rate vary.

They produce a graph of these data.

Experiment 4*Voltage and Current*

Students vary the pump rate/wheel rotation rate/generator torque to monitor the effect on voltage and current outputs.

They record and graph these data.

They distinguish between current and voltage.

They learn about the relationship between energy and voltage.

Experiment 5*Water Flow Rate, Pressure and Rotation Rate*

Students gather and record data to monitor the relationship between water flow rate (by varying pump rate), water pressure gauge readings and rotation rate readings.

Experiment 6*Water Flow Rate and Power Output*

Students vary the pump rate to vary the water flow rate.

They record pairs of data for water flow rate and power output at the generator.

They learn about the relationship between kinetic energy of flowing water and electrical energy produced.

Experiment 7*Energy Interconversion*

Students gather and record data about water flow rate, wheel rotation rate and power output.

They use calibration data to inter-relate the energy of flowing water, energy of rotating Pelton wheel and electrical power output to estimate the energy efficiency of the Interconversion process.

They relate the efficiency ratings to the speeds of flowing water and the rotating wheel and make conclusions.