Lesson 5: Hydropower Experiment

Materials

* Thames & Kosmos Hydropower kit
  + Water wheel model
* Water bottles with three different sized openings
* Hydropower Experiment Handout

Procedure

Determine flow rate for each water bottle:

* Pour water into a container with a known size – time how long the water takes to fill the container.
* Determine the flow rate for that water bottle (volume/time).
* Repeat with other two water bottles.

Which water bottle do you think will turn the water wheel fastest?

Experiment with water wheel:

* Choose one of the water bottles. Hold the water bottle just above the wheel and pour water over the water wheel.
* Watch how the paddles fill up with water and empty themselves as the wheel turns. See if you can find an optimal location for pouring the water onto the wheel (directly on top, in front, in back, etc.). Pay attention to the speed of the water wheel – you will compare the speeds from the other water bottles to this one. Record your observations.
* Choose another water bottle. Pour the water from the optimal location that you determined in the previous step and compare the speed to the first water bottle. Record your observations.
* Repeat the process with the third water bottle.

Which water bottle made the water wheel turn the fastest?

How did this compare with your prediction?

What is the correlation between water flow rate and wheel speed?

Teacher Notes

There are many other variations that can be tested based on time and student interest.

* The students can attempt to count the rotations of the water wheel rather than just guessing the speed
* The hammer mill can be used instead – this offers other ways to change the water flow.
* The water wheel with the LED bulb attached can be used and the brightness of the buld can be compared.

The Thames & Kosmos instruction book has additional experiments as well.