

## ACTIVITY 2: PICO-HYDRO SYSTEMS PROJECT

**Activity Objective:** Build or design a pico-hydroelectric power system that simulates the generation of electricity without actually doing it.

**Materials:** Chapter 10, paper, computer, printer, Internet Access, PVC pipes, 2 5 gallon plastic buckets, plastic spoons, other materials as shown in the videos.

**Definition:** Micro-hydro is hydroelectric power that produces from 5 kilowatts (kW) to 100 kilowatts of electricity using the natural flow of water. Installations that are less than 5 kilowatts are called **Pico-hydro**. It is a run-of-river" system meaning that water diverted from the stream or river is redirected back into the same watercourse. These installations can provide power to an isolated home or small community, or can be connected to electric power grids, where net metering is accessible. You will find these installations in developing nations as they can provide an economical source of energy without the purchase of fuel.

Pico hydro is used for hydroelectric power generation of are less than 5 kilowatts. It is used in small, remote communities that require only a small amount of electricity to power one or two fluorescent light bulbs and a TV or radio in 50 or so homes. Even smaller turbines of 200 to 300 watts may power a single home in a developing country with a water head of only one meter. Pico-hydro like micro-hydro is a run-of-river" system meaning that water diverted from the stream or river is redirected back into the same watercourse. Pipes divert some of the flow, drop this down a gradient, and through the turbine before being exhausted back to the stream.

Like other hydroelectric and renewable source power generation, pollution and consumption of fossil fuels is reduced but there is still typically an environmental cost to the manufacture of the generator and distribution methods.

### REVIEW VIDEOS:

1. Hydro Electric Science Fair Project - Part of the 2015 Google Science Fair promo:  
[https://www.youtube.com/watch?v=TXfwZ5\\_kyr4](https://www.youtube.com/watch?v=TXfwZ5_kyr4)
2. Amazing Hydro-Electric Power Collector  
<https://www.youtube.com/watch?v=x1fXAdODGvA>
3. Pico hydro for science: <https://www.youtube.com/watch?v=1tXgvoo6v10>
4. An introduction to micro hydro system:  
<https://www.youtube.com/watch?v=Nv4nJJbQPfk>

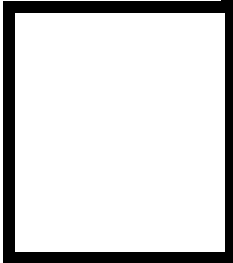
### Procedure:

1. Work as partners or small teams.
2. Research the building of pico- hydroelectric power system or how to design one.
3. Take a look at VIDEOS #1 and #2 and use the material shown in the video listed in the materials section. You are going to build a model that simulates how a run of the river pico-hydro electricity generating system would work. In a sense you will be building a waterfall.
4. Build a model similar to those shown in the video or create a detailed plan on how to build one.



RUBRIC

<b>4 World-Class Learner</b>	<b>3 Proficient Learner</b>	<b>2 Developing Learner</b>	<b>1 Emergent Learner</b>
Learner at this level has gone beyond mastery of knowledge, skills, & attitudes described in project. World-class learner consistently exhibits high-quality performance.	Learner at this level has had opportunities to apply knowledge, skills, & attitudes of component of project. Proficient learner has mastered essential attributes, thus proving mastery.	Learner at this level has been exposed to & had opportunity to apply knowledge, skills, & attitudes of project. Developing learner may have only a few essential attributes to master before mastery.	Learner at this level may or may not have been exposed to knowledge, skills, & attitudes required by academic standards of the project.



- 1 = Emergent Learner**
- 2 = Developing Learner**
- 3 = Proficient Learner**
- 4 = World-Class Learner**