

Fuel Cell Demonstration Script

Brief Summary

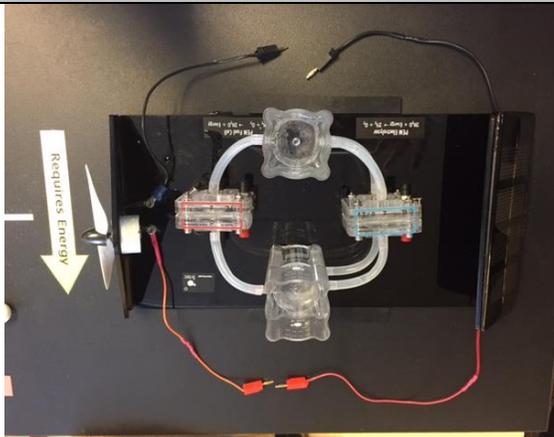
This demonstration explains how a fuel cell can augment a solar cell for the production of electricity.

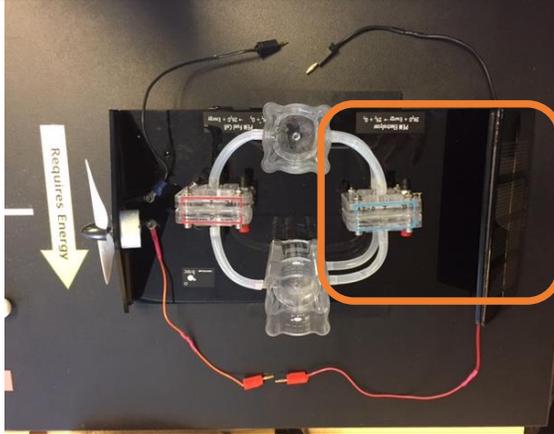
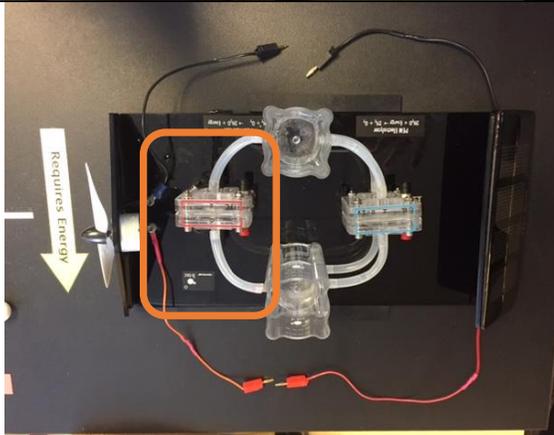
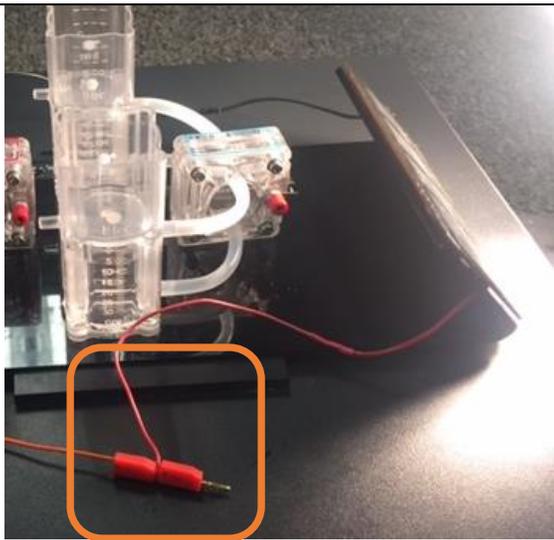
This demonstration is done at the Experiment Bar in Space Odyssey.

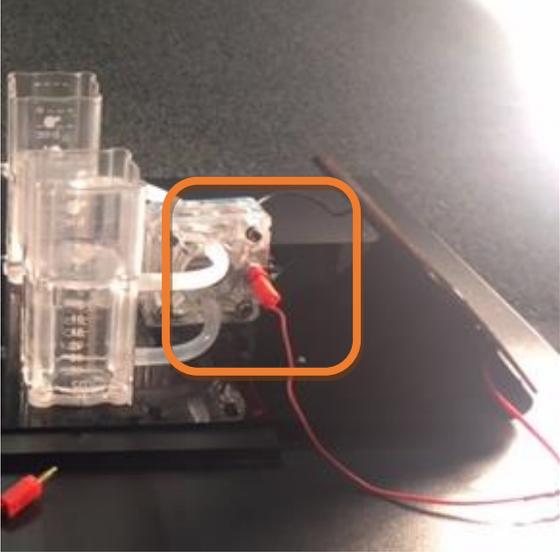
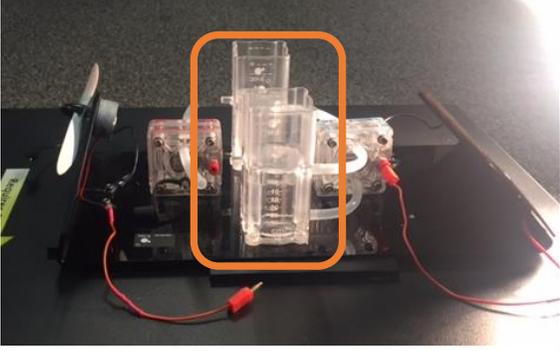
A 10-15 minute pre-show set up is required. The model should be pre-set as follows:

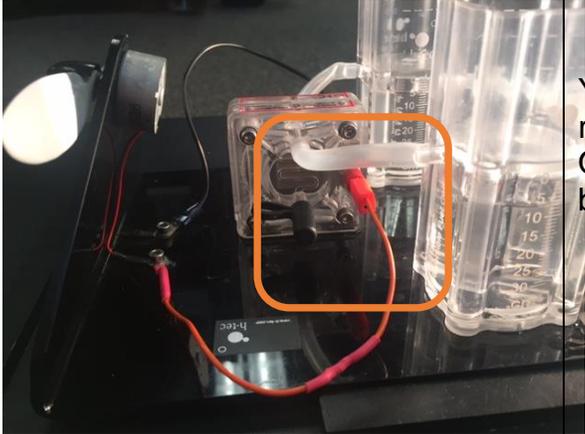
- The light is OFF
- All cables are detached
- All tubes are attached
- Black caps on the Fuel Cell are ON
- Water and gases are stored in the storage tanks as a result of your pre-show set up
- Unit is plugged in

Suggested Way of Presenting the Demo

Photos	Script	Manipulation
	<p>Using solar cells for the production of electricity can be problematic on cloudy days and at night. This is a way to use fuel cell technology to store electricity when sun light is not available.</p> <p>This model is a solar cell with electrolyzer combined with a fuel cell.</p>	<p>(Note: the cables that connect the fuel cell to the fan are NOT connected. All tubes ARE connected.)</p>

Photos	Script	Manipulation
	<p>This is the solar cell and electrolyzer.</p>	<p>Point out the part of the modal shown in the box on the picture here.</p>
	<p>This is the fuel cell.</p>	<p>Point out the part of the modal shown in the box on the picture here.</p>
	<p>The Solar Cell converts light energy to electricity. When you connect the solar cell directly to the fan; it gives its energy to the fan.</p> <p>Try putting your hand in front of the light to block the solar cell. What happens?</p> <p>You can see that if it was a cloudy day, or at night, the fan would stop.</p>	<p>Connect both cables (red cable on one side and black cable on the other) from the solar cell to the cables coming from the fan and point out that connection.</p> <p>Have visitor block the light. The fan stops.</p>
	<p>There are two ways to fix this problem.</p>	<p>Unplug the cables from the fan and hold the loose ends up for visitors to see.</p>

Photos	Script	Manipulation
	<p>You <u>could</u> use the electricity generated by the solar cell to charge up a battery that would provide the electricity to run the fan.</p> <p>But batteries are HEAVY and contain toxic chemicals.</p>	
	<p>So instead, you could use the energy from the solar cell to break water into its two elements with an electrolyzer.</p> <p>Who can tell me what two elements water is made of? (answer: Hydrogen and Oxygen)</p>	<p>Plug the cables from the solar cell into the electrolyzer.</p> <p>Point out the electrolyzer.</p> <p>(Note: The other cable should still not be in use.)</p>
	<p>When water is split into its two elements energy is created and stored in the two elements, Hydrogen and Oxygen.</p> <p>They are stored separately just above the water in the bottom of the tanks.</p>	<p>Point out the tubes on the model where the hydrogen and oxygen are stored, as seen here in the box.</p>
	<p>To take the energy out of storage, so that you can use it on a cloudy day or at night...</p>	<p>Turn off the light. Disconnect the red and black cables from the electrolyzer.</p>

Photos	Script	Manipulation
	<p>You can use the fuel cell to recombine the Hydrogen and Oxygen to get the energy back and power the fan.</p>	<p>Connect the red and black cables to the fuel cell.</p> <p>(Fan should spin at this point using energy from the fuel cell alone. If it doesn't, you didn't take enough time to store up energy in your pre-show set up. Try disconnecting the cables from the fan to the fuel cell, reconnect the cables from the solar cell to the electrolyzer, turn on the light to its highest setting, and wait a few min. Then reverse these instructions and try again.)</p>
	<p>Because fuel cells are lighter than batteries they are used to store electricity on the Space Station and could also be used on the moon or any other place we might visit, like Mars or Jupiter's moon Europa.</p> <p>As long as we have access to water we can not only produce electricity but we could also simply use the electrolyzer to extract oxygen for breathing.</p> <p>We could even use the Hydrogen and Oxygen to make rocket fuel for a return journey to Earth.</p>	