

Fuel Cell Assembly Procedure:



It is very important that the battery pack is connected correctly to the fuel cell. The rule is easy. Use red wire to connect red things. Use black wire to connect black things. For example, there is a red connection on the fuel cell and a red wire coming out of the battery pack, connect red to red. Red is used to indicate the positive wire. Black is used to indicate the negative wire. Pay attention!



1. Cut the rubber tube into four equal pieces by folding it in half and cutting it. Then taking the two halves and folding them in half and cutting them.
2. We will now make our collection apparatus. Take one of the black plastic tube connectors and two of the plastic tubes. Place the two tubes on the ends of the black plastic tube connector that run parallel to each other. On the end that is perpendicular, secure the tube that leads to the collection cup. Repeat this step again so you have two sets of collection tubes. When done, yours should look like the picture below.



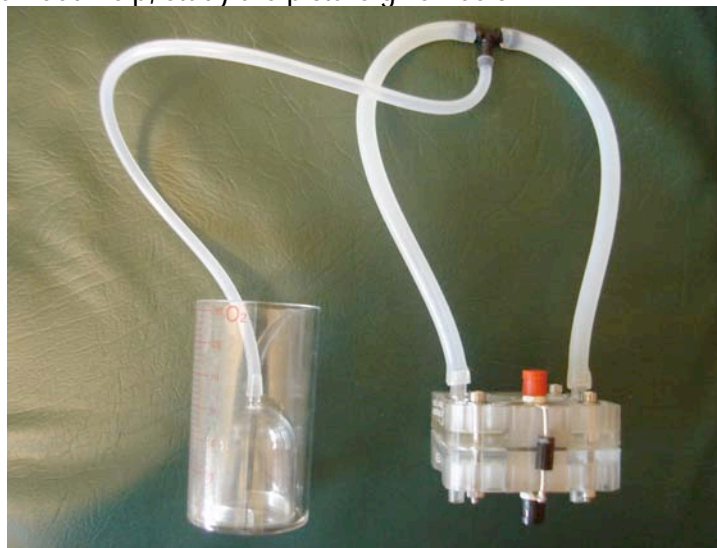
3. Place each collection cup into a graduated cylinder provided (one is labeled hydrogen and the other is labeled oxygen). Placement of the cups into the graduated cylinder is important. You will notice that each collection cup has two notches out of the bottom. The cylinders also have two rivets on the bottom. The collection cup needs to be placed in the cylinder in such a way that the notch in the collection cup is not blocked. The notch will allow water to flow in and out of the collection cup.



4. Fill each graduated cylinder with distilled water to the 0 mL mark so that the collection cup is completely under water. When the collection cup is completely underwater, it should also be full of water. **MAKE SURE TO USE DISTILLED WATER!!!** Distilled water is NOT the water you can get from the sink. Water from the sink will break the fuel cell. If you have trouble locating the distilled water, ask your teacher for help.
5. Put the collection apparatus to the side. Now we will be dealing with the fuel cell.
6. From either of your graduated cylinders, draw about 1 mL of distilled water into the syringe.



7. In this next step, we will be flooding the inside of the fuel cell and getting the inside wet. In a PEM (Polymer Electrolyte Membrane) fuel cell, the center has to be wet in order to work. The fuel cell has four clear, tube-like projections. Use the syringe to put water into each of the projections on both sides of the fuel cell. It doesn't take much distilled water but you may have to refill your syringe a few times. The picture below shows where the distilled water goes into the fuel cell. Water will spill out while you are doing this and this is okay.
8. Make sure you still have enough water in your graduated cylinder so that the collection cup is still completely underwater.
9. Now we are ready to hook up the collection apparatus to the fuel cell. You'll notice that one side of the fuel cell has a black connection and the other has a red connection. These connections are for the electricity. The graduated cylinder labeled O₂ goes with the side of the fuel cell with the red connection. The two free tubes coming out of the graduated cylinder should be connected to the clear, tube-like projections on this side of the fuel cell. If you need help, study the picture given below.



10. Do the same as step nine but for the other side of the fuel cell. The black H₂ label on the graduated cylinder goes with the black side of the fuel cell.
11. Take the battery pack and make sure it is switched off. Make sure the battery pack has batteries in it.
12. There is a red wire and a black wire coming out of the battery pack. Connect the BLACK wire to the BLACK electrical connection on the fuel cell. Then connect the RED wire to the RED electrical connection on the fuel cell. You may need to have a team member hold the wires in place. It is important that the metal on the tip of the wire is touching the metal inside of the electrical connection. Your final apparatus should look like the picture below.

