



## **Fuel Cell Car Instructions**

## Items included:

Quantity	Item	Item Label	Included Yes/No
1	Car Chassis	А	
1	Gas Collector Tank	В	
1	Fuel Cell	С	
4	Wheels	D	
2	17 cm Hose	Е	
2	5 cm Hose	F	
2	Clear Hose Connectors	G	
2	Hose Plugs	Н	
1	Battery Holder	I	
1	Metal Wheel Axle	Not Labeled	

## **Procedure:**

## Use Figure 1 for steps 1-4.

- 1. Attach the two front wheels onto the front axle making sure not to bend the axle.
- 2. Be careful that your finger is not covering the middle hole on the wheel. The axle could slip through and hurt you.
- 3. Slide metal axle through the holes at the back f the chassis and attach the two back wheels onto the back axle like you did in step 1.
- 4. Remove gas tank from the back of the chassis.

# The wheels should be so to that the tapered old prints lived, so as to reduce first.

Figure 1: Car Assembly

## Use Figure 2 for steps 5-8.

- 5. Insert the ends of the 17 cm tubes into the holes in the top of the gas collector. Push the tubes all the way through the bottom of the tanks.
- 6. Insert the clear hose connectors into the ends of the tubes.
- 7. Pull the hose up to wedge the connector into the hole in the tank to create a tight seal.
- 8. Insert gas collector to the back of the chassis with oxygen tank on the left and the hydrogen tank on the right.

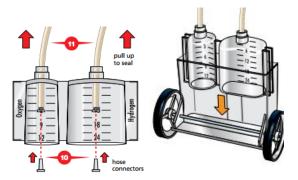


Figure 2: Gas Collector Assembly





### Use Figure 3 for steps 9-12.

- 9. Set fuel cell into the slot in the middle of the chassis so that the side with the red ringed socket is on the left and the black ringed socket is on the right.
- 10. Attach the free ends of the 17 cm tubes to the bottom nozzles. (The hose coming out of the larger tank should go into the black side of the fuel cell, and the hose from the smaller tank should go into the red side of the fuel cell).
- 11. Attach the 5 cm tubes to the top nozzles of the fuel cell.
- 12. Insert the red hose plugs into the ends of both 5 cm tubes.
- 13. Call your instructor to help begin charge the fuel call.
- 14. After instructor fills fuel cell with distilled water carefully plug cables from the battery holder into the corresponding sockets. (Red wire with the red ringed socket and the black wire with the black ringed socket).

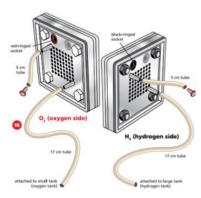


Figure 3: Fuel Cell Assembly





# **Fuel Cell Car Exercise**



In this activity, you will learn about using water for energy.

The vehicle is powered by the chemical reaction and energy from the sun. The fuel cell will split the water into the two components and re-combine them when reverse it. You and your team will learn how to distinguish different types of energy.

❖ Draw a diagram of how you think the energy is converted from water into fuel. Show how you think the energy conversion process is occurring in the car.

What are the two tanks on the back meant to do? Hint: What are the elements of water?





<b>*</b>	Ask for help to add the distilled water to the car
*	How much power did the car use?  ➤ How far did the car travel?  ➤ Remember that Power = Force x Distance/Time
	➤ What is the Average Velocity (Distance/Time)?
	➤ What is the acceleration of the system (Average Velocity/Time)?
	➤ If the vehicle has a mass of 0.3 kg, what is the Force that the vehicle produces?
	What is the Power out of the system?





# **Formula Sheet**

**KINETIC ENERGY:** 

$$KE = \frac{1}{2}\dot{m}v^2$$

**POTENTIAL ENERGY:** 

$$PE = \dot{m}gz$$

**EFFICIENCY:** 

$$n = \frac{\textit{Energy Output}}{\textit{Energy Input}}$$

**POWER:** 

$$P = I * V$$

$$P = A_s * P_{sun}$$

**WORK:** 

$$W = F * d$$

**FORCE:** 

$$F = m * a$$

**ACCELERATION:** 

$$a = \frac{v}{t}$$

**VELOCITY:** 

$$v = \frac{d}{t}$$

**COMPONENTS** 

$$\dot{m} = mass flow rate$$

$$A_s = solar panel area$$

$$P_{sun} = power produced by the su$$

$$\dot{V} = volumetric\ flow\ rate$$

$$A_c = crossectional area$$