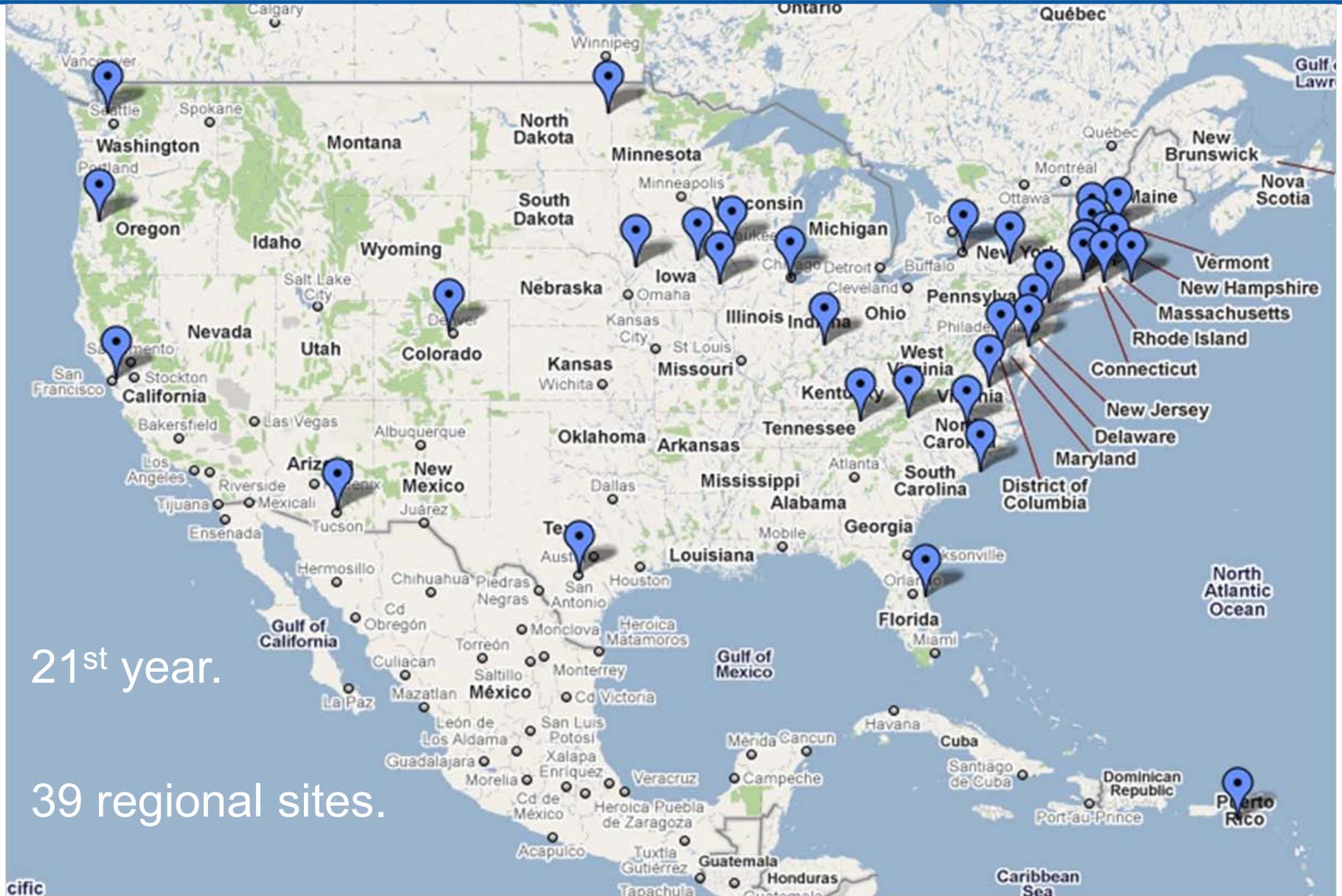




Hydrogen Fuel Cell Teacher Workshop



Junior Solar Sprint/ Hydrogen Fuel Cell Car Race



21st year.

39 regional sites.

Fuel Cell Car Assembly

Parts List

- A. 1 X 2W Fuel Cell
- B. Axles
- C. 4 X Wheels with gears
- D. Battery pack
- E. 1 X Input valve
- F. 1 X Purging valve
- G. 1X Output valve
- H. Silicon tube
- I. Hydrogen container
- J. 2 X Motor gears
- K. 4X Wheel tires
- L. Red & Black pins
- M. Motor
- N. Hydrogen collecting syringe
- O. Oxygen collecting syringe
- P. Water injection syringe
- Q. Electrolyzer base
- R. PEM Electrolyzer
- S. Chassis
- T. Solar panel
- U. Multimeter
- V. Cables



Parts List

A. 1 X 2W Fuel Cell



B. Axles



C. 4 X Wheels with gears



D. Battery Pack



Parts List

E. 1 X Input valve



F. 1 X Purging valve



G. 1 X Output valve



H. Silicon Tube



I. Hydrogen container



Parts List

J. 2 X Motor gears



L. Red & black pins



K. 4 X Wheel tires



M. Motor



Parts List

N. Hydrogen collecting syringe

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Parts List

S. Chassis



T. Solar panel



U. Multimeter



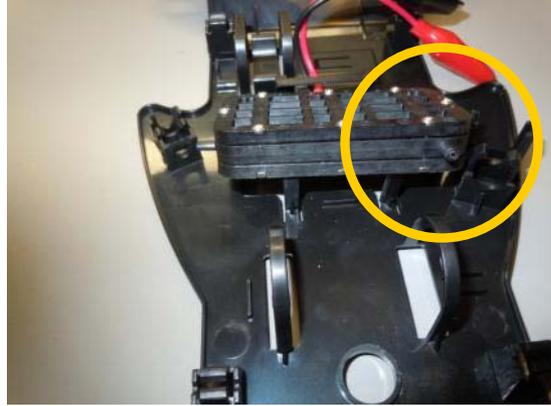
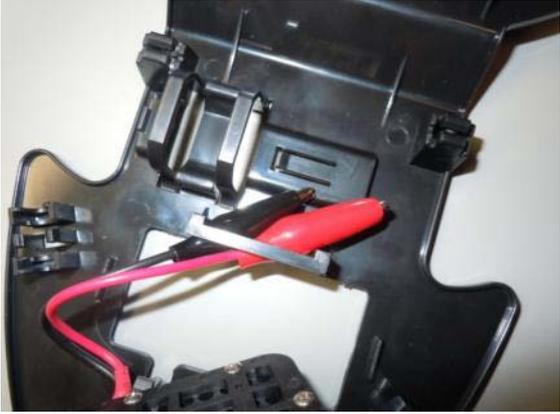
V. Cables



Step One: Assembly of the fuel cell car chassis.

Attaching the Fuel Cell to the Chassis

Slide the fuel cell crocodile clips through the fuel cell buckle on the chassis. Make sure the nozzles on the fuel cell are facing the right direction.



Carefully place and push down on the fuel cell until it clicks into place.

Step One: Assembly of the fuel cell car chassis.

Slide the hydrogen storage container into its position until you hear a click sound. Note the hydrogen storage container will only fit in one way.



Step One: Assembly of the fuel cell car chassis.



Use scissors to cut a 22 mm length of rubber tubing. Push it onto the input valve.

Connect the other end of the tube to one of the nozzles on the hydrogen container.

Insert the input valve into its housing. Make sure the flat surface of the valve is facing upward.



Step One: Assembly of the fuel cell car chassis.



Cut a 40 mm length of tube and then connect it between the open nozzle on the hydrogen container and the nozzle on the fuel cell.

Make sure there are no kinks in any part of the tubing, this could stop the hydrogen from flowing through the system. You can adjust it by turning the hydrogen container.



Step One: Assembly of the fuel cell car chassis.



Cut an 1.8 cm length of tube and then connect it to the purge valve.



Insert the purging valve into its housing on the chassis and then connect the other end of the tube on the purging valve to the nozzle on the fuel cell. Make sure the connection is tight.

Step One: Assembly of the fuel cell car chassis.



Place the tire on the wheels.

There are four different wheels:

- 48-10
- 42-16
- 50-8
- 44-14

The tires should be grouped together:

- 50-8 and 44-14
- and
- 48-10 and 42-16



Step One: Assembly of the fuel cell car chassis.

Once you have the tires grouped correctly place the axles in each wheel as shown below. Keep the axles/ wheels separate.



50-8 and 44-14

48-10 and 42-16



Step One: Assembly of the fuel cell car chassis.

You have two small motor gears. 14-8 and 10-16

The gears are difficult to tell apart. The 14-8 gear has 8 teeth on the small end and the 10-16 gear has 10 teeth on the small end.



Also, note that the 14-8 gear is smaller than the 10-16 gear.

Step One: Assembly of the fuel cell car chassis.

Once you have selected the motor gear you wish to use (14-8 or 10-16) note that the wheels go with specific motor gears.



50-8 and 44-14



14-8 works with 50-8 and 44-14



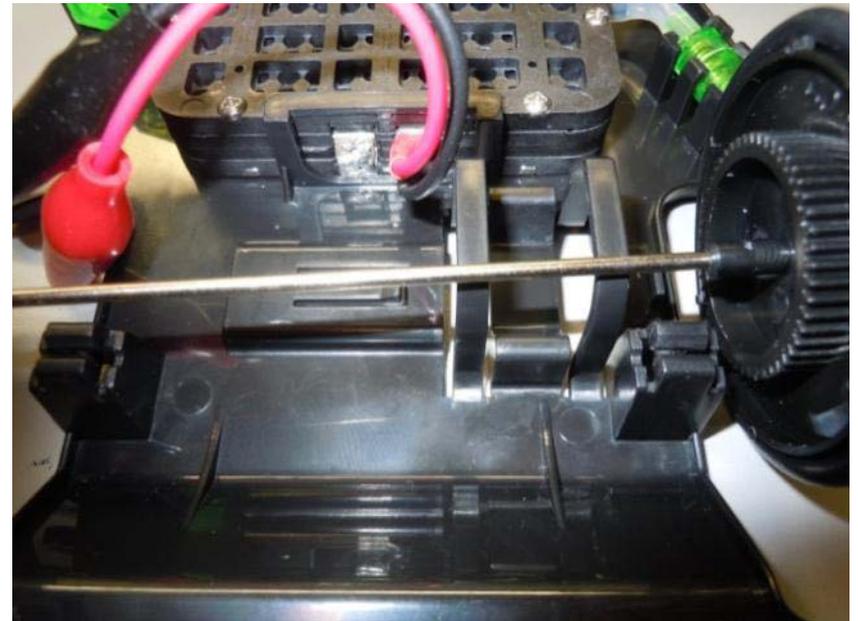
48-10 and 42-16



10-16 works with 48-10 and 42-16

Step One: Assembly of the fuel cell car chassis.

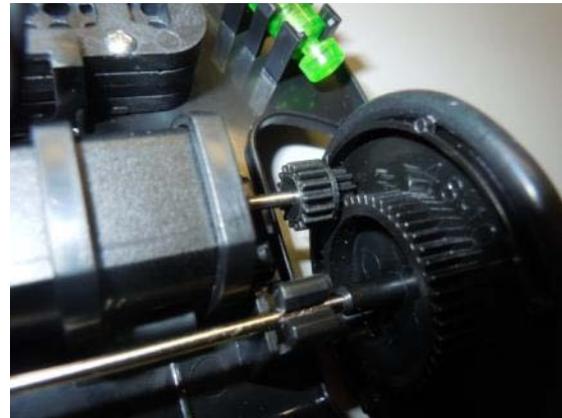
Place the correct wheels into the correct axles.



Step One: Assembly of the fuel cell car chassis.



Insert the motor with the gear into its housing until you hear a click sound. Make sure the gear on the motor and the wheel gears mesh properly.

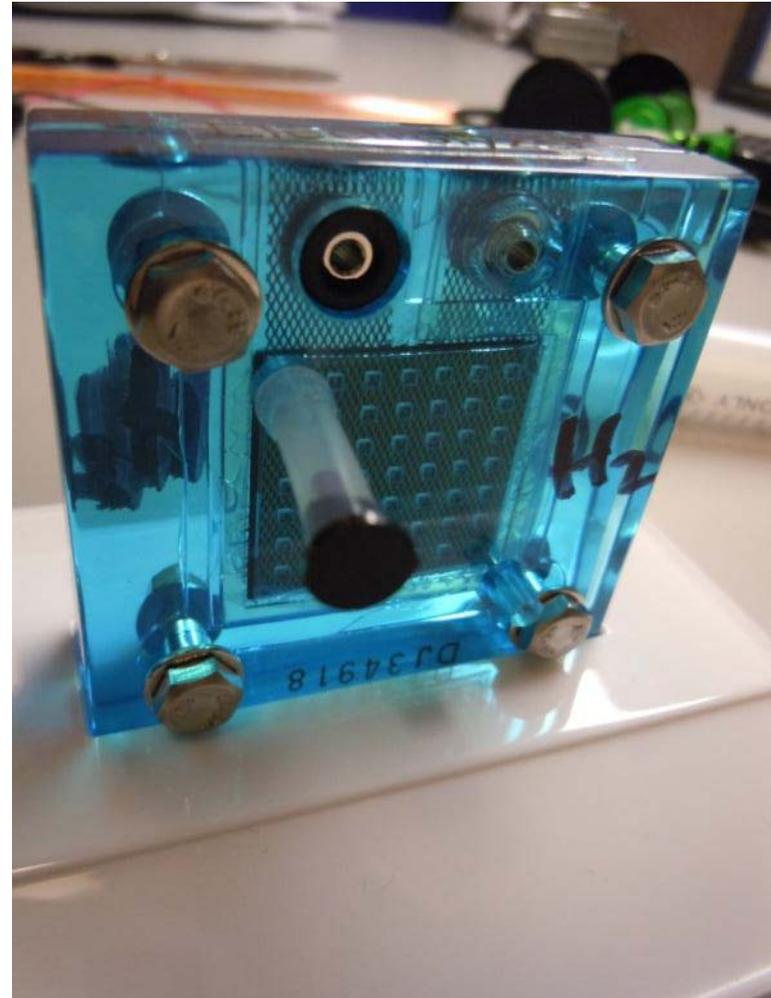


If the gears do not mesh try changing the front wheels to the rear wheels.

Step Two: Assembly of the hydrogen station

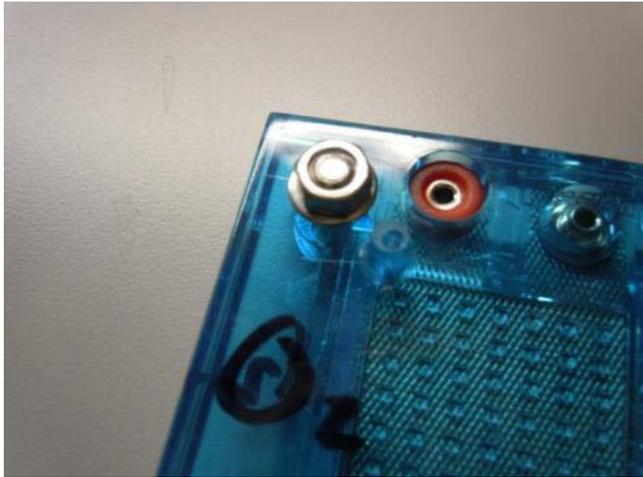
Insert the PEM electrolyzer into the slot located on the electrolyzer base.

Use scissors to cut a 2 cm tube and then connect it to the hydrogen side (black) of the electrolyzer. Place the black pin into the end of the tube.

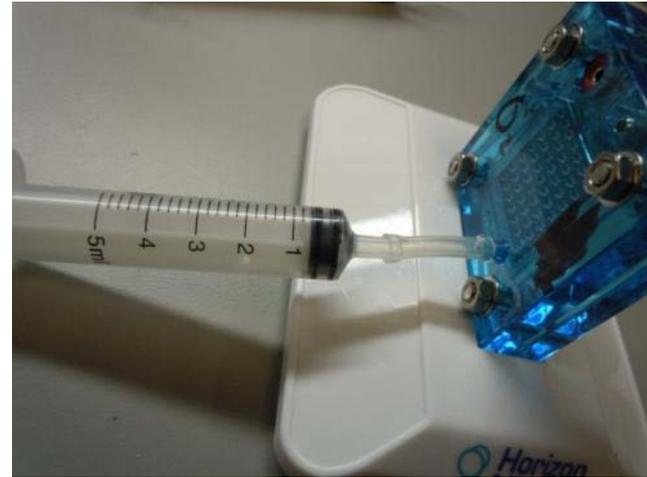


Step Two: Assembly of the hydrogen station

Find the water injection syringe and connect one short tube to the syringe. Push in the plunger to remove all the air inside. Draw distilled water into the syringe.



Connect the tube on the syringe to the nozzle on the oxygen (red) side of the electrolyzer. Slowly push the plunger to let the water into the oxygen side of the electrolyzer.



Stop pushing on the plunger once the water starts to come out from the chamber.

Disconnect the syringe from the tube and attach the red pin to the tube.

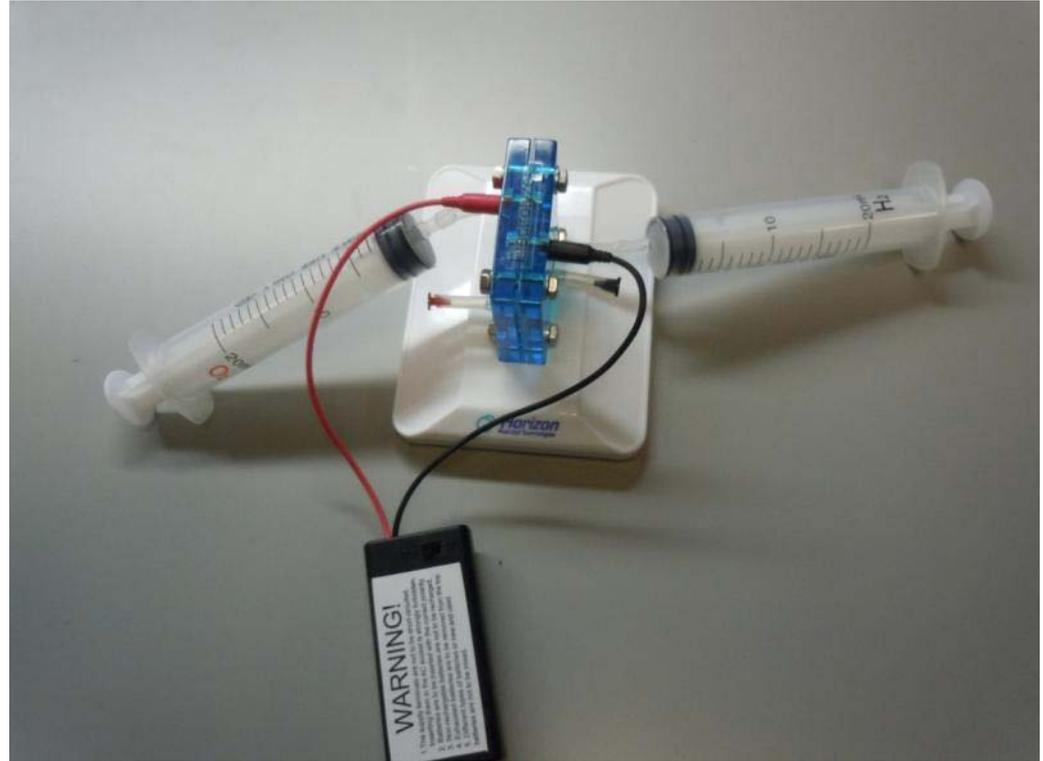
Let the electrolyzer settle for 3 minutes.

Step Two: Assembly of the hydrogen station

Connect a 2cm short tube to the oxygen collecting syringe. Push in its plunger to remove all the air inside. And then connect it to the nozzle on the oxygen side of the electrolyzer. Repeat with the hydrogen syringe, connect it to the hydrogen side.

Remove the back from the battery pack and insert 2 AA batteries. Connect it to the electrolyzer. Connect the red cable to the red hack and the black cable to the black jack.

Turn on the battery pack. The plungers should start slowly moving out. This means the gases are being produced and are filling the syringes.



Step Three: Charge the fuel cell car

Disconnect the gas collection syringes. Leave the oxygen side nozzle open to the air.

Use the scissors to cut a 10 cm tube and connect the output valve to it. Connect the other end to the hydrogen side of the electrolyzer.

Connect the output valve to the car's input valve by firmly pressing the output valve into the car's input valve and turn the output valve clockwise.

Be careful the valves are fragile.



Step Three: Charge the fuel cell car

Connect the battery back to the electrolyzer. Turn it on.

Fill the hydrogen tank and press the purging valve to release hydrogen. This purges any impure gas.

Refill the hydrogen tank.

Connect the red crocodile clip to the red terminal and the black clip to the black terminal. Your motor should start.



Possible Storage Methods

Du-Bro Cat. No. 241 \$1.80

Du-Bro Cat. No. 539 \$1.90

Du-Bro Cat. No. 2370 \$2.15

Hangar 9 Fuel Filler \$4.95

Where to buy:

[HobbyTown USA](#)

[Toysonics.com](#)

[Hobbyzone.com](#)



Possible Storage Methods

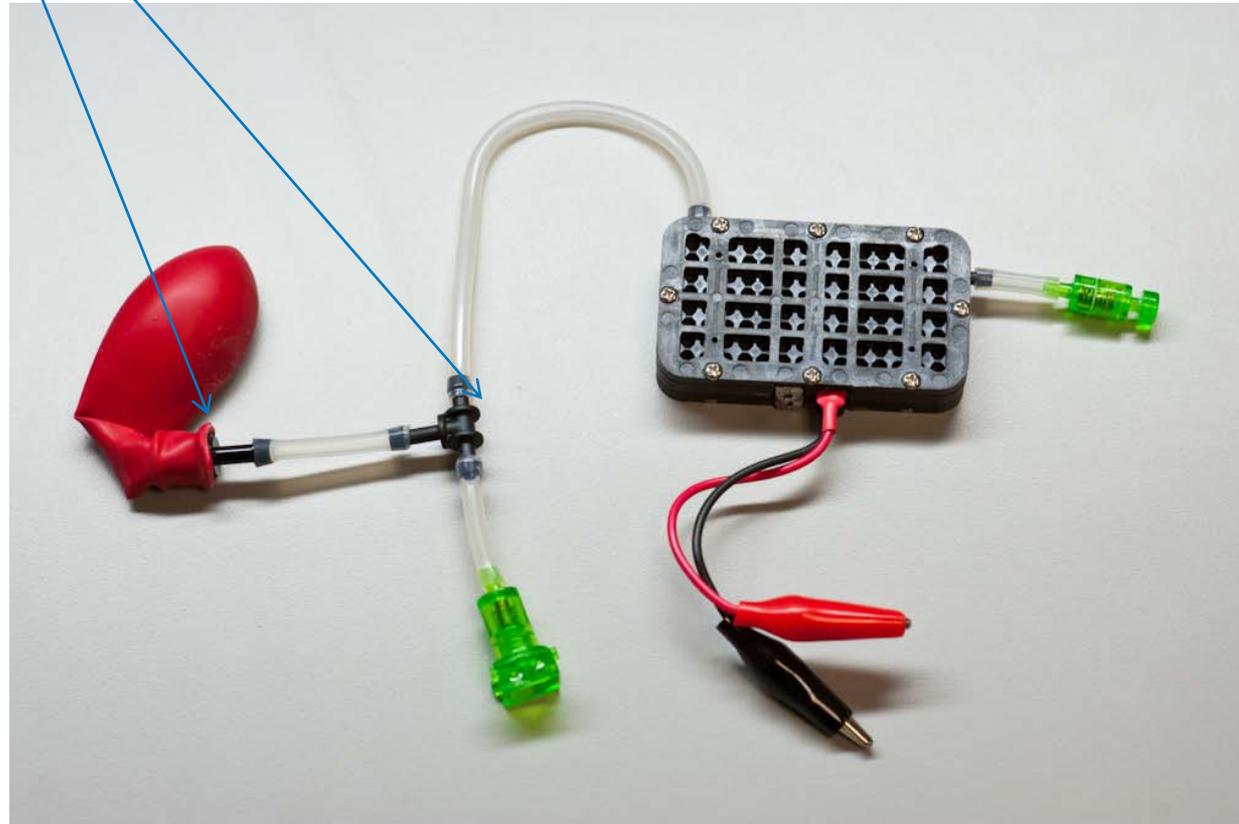


Use the pieces to the right to create a balloon storage system.

The t-connector is shown here.

The connection with the washer is shown here.

Hangar 9 Fuel Filler \$4.95



Possible Storage Methods

Du-Bro Cat. No. 241 \$1.80



Create a hole in the top of the water bottle lid and screw in the two of the fuel line connectors. Place a balloon over the top of the bottle and then screw the lid back on. This is a basic construction of the storage system included.

