MIND TREKKERS
Salt Powered Car Lesson Plan

Amount of time Demo takes: 1-2 min
Materials:
1. Salt powered car
2. Extra magnesium strips
3. Race track
4. Salt
5. Water
6. Small beaker
7. Dropper

Set up instructions:
(Refer to kit manual for diagrams and more detailed instructions. Please make sure the manual ends up back in the kit!)

1. Set up race track.
2. Mix salt water mixture in beaker (1 to 5 ratio) and stir. Mix a small amount, using 1 teaspoon of salt per 5 teaspoons of water.
3. Remove the fuel cell module, cover, and the magnesium sheet.
4. Add salt water with dropper on non-woven fabric for the initial run of the day. You need 5 drops: one on each corner and one in the center. After the first run, if the car is getting slow, you can add salt water with a dropper to the back end of the car near the bumper. Do not add salt water through the slits in the fuel cell - doing so can cause oxidation in the connectors. If the fuel cell’s woven fabric is completely dry, disassemble back to step (3) and add salt water as if it were the initial wetting of the fuel cell for the day.
5. Reassemble the cover and magnesium sheet, then reinsert the fuel cell module.
6. Car is ready to run! Place it on the track and watch it go! To stop the car, remove the fuel cell module.
7. When finished: Rinse air cathode (bottom part of the fuel cell), magnesium strip, non-woven fabric, cover, and base. Do not scrub the air cathode or magnesium strip with your fingers. By avoiding that, we can prolong the life of the equipment. Magnesium strips will wear out. Corrosive material can be gently chipped off with a screwdriver or knife if the strip is no longer working (but appears not to be fully worn out).

Lesson’s big idea
- Magnesium reacts slowly with water to produce hydrogen gas: this is an oxidation reaction. This reaction in the fuel cell converts chemical energy into electrical energy.
- In this case, electricity is generated from the reaction between a fuel supply (magnesium) and an oxidizing agent (salt water). The reactants flow into the cell, and the reaction products flow out of it, while the electrolyte remains within it. Fuel cells can operate continuously as long as the necessary reactant and oxidant flows are maintained. Read about fuel cells here (Wiki: fuel cell).
- Gasoline, propane, natural gas and coal all release carbon dioxide, a greenhouse gas, and other pollutants in the production of energy. Exploring other sources of energy can help us reduce the amount of greenhouse gasses and provide the energy we need for our daily lives. This particular fuel cell is not efficient enough to power a large vehicle.

Assessment
Sample questions you can ask:
1. What type of chemical reaction is taking place?
   Oxidation
2. What is the fuel for this car?
   Magnesium
3. What happens when the magnesium is corroded and can no longer react with the salt water?
   The car will stop running

Clean Up
Clean up between demonstrations if needed. When completely finished gather all materials listed for this demonstration and make sure everything is accounted for. If something was used up, broken or damaged, let someone know so it can get replaced or fixed.
When the demonstration is over: rinse the air cathode (bottom part of the fuel cell), magnesium strip, non-woven fabric, cover, and bottom base. Do not scrub the air cathode or magnesium strip with your fingers. If we avoid doing so, it will prolong the life of the equipment. Magnesium strips will wear out eventually.

References:

National Standards:
K-4 Content Standard F, Science in personal and social perspectives, Science and technology in local challenges
K-4 Content Standard B, Physical Science, Light, heat electricity and magnetism
5-8 Content Standard F, Science in personal and social perspectives
5-8 Content Standard B, Physical Science, Transfers of energy
9-12 Content Standard F, Science in personal and social perspectives
9-12 Content standard B, Physical science, Chemical reactions