

4. What We Know About Fuel Cells

Build Knowledge

INTRODUCTION

WHAT STUDENTS DO IN THIS ACTIVITY

As a challenge pre-test, each student is given a diagram of a PEM (Proton Exchange Membrane) fuel cell with a word bank and asked to label the parts of the fuel cell. After viewing some animations of how a PEM fuel cell works, design teams meet to share their thinking and work cooperatively to complete the labeling of a new diagram of a fuel cell. Teams then write a description of how the PEM fuel cell works, describing the paths that hydrogen electrons and protons take through the cell, and the results. Design teams then use a PEM fuel cell to make, collect, and use hydrogen as an energy source.

Beginning with this activity, students investigate several types of energy transformations between the following energy forms: chemical, mechanical, and electrical. In each of these activities students working in teams of four students will record each energy transformation in their design log.

RATIONALE

The overall goal of this design challenge is to use an PEM fuel cell to power the motor of a student-designed model car. The vehicle has two main components: a PEM fuel cell and a DC motor mounted in a gear box. The PEM fuel cell is reversible; that is, it can function as an electrolyser and as a fuel cell.



Making Connections:

This activity can serve as an introduction to some of the materials that will be available to students as they respond to the RFP.



Teacher Tip:

Refer to the Electrolysis section in the Appendix for additional information.



Making Connections:

Beginning with this activity students experience energy transformations. This activity can serve as a reference point as students begin to explore the concept of energy transformation over the next several activities. In the activities following this lesson, students explore new energy transformations, and/or revisit some of the earlier energy transfers.