

# FUEL OUR FUTURE NOW

G6–8

## MODULE OVERVIEW – Designing a Vehicle for the Year 2020

### MODULE OVERVIEW

**Module Description:** Students learn about natural resources, human effect on the environment and engineering design through this brief module on vehicle transportation. They study how vehicles of today are designed and how vehicles could be improved for the future. Using real world scientific data and science reasoning skills, they investigate both existing and emerging energy sources and designs for vehicles. They take a realistic look at existing energy and fuel infrastructure and consider how that infrastructure will change, or need to change, by 2020. Students conduct investigations into vehicle design, and use content from videos and online resources. Finally, they apply this knowledge to realistically design their own “vehicles of the future” and to create multimedia presentations of their ideas for classmates.

**Module Project:** Students consider how fuel-efficient and environmentally friendly technologies will impact the kinds of vehicles available in the year 2020. They use videos, multimedia presentations, or pamphlets to design and advertise their “cars of the future.”

#### **Module Objectives:**

- Students will work in teams to research and investigate vehicles using interactive online materials, videos, and hands-on experiments.
- Students will demonstrate their understanding of vehicle design, energy, and alternative fuels by brainstorming improvements for a vehicle.
- Students will work collaboratively to create an informative and engaging advertisement for a vehicle.

#### **Relevant STEM Topics:**

- Fuel Efficiency
- “Green” Technologies
- Engineering Design
- Collecting and Recording Data
- Conducting Research

- Performing Experiments
- Making Calculations

Please see *Standards Addressed in G6-8* for a list of the applicable science, technology, engineering, and math standards, as well as the 21<sup>st</sup> Century Skills.

**Total Time:** 2–3 weeks

## LESSON PLANS

### ***Lesson 1 – How Green Is Your Vehicle?***

Before students can investigate ways to improve a vehicle for the year 2020, they must determine the impact of vehicles on the environment today. In this lesson, students select a vehicle to investigate and conduct research to discover that vehicle’s past and current impact on the environment.

### ***Lesson 2 – What’s the Deal with Oil?***

Students conduct research to discover the specific kinds of alternative energy sources that will likely be available in 2020. They then decide which of these alternative sources will be most efficient to use in their “cars of the future.”

### ***Lesson 3 – What’s the Deal with Emissions?***

Students continue to investigate alternative energy sources by focusing on the emissions released into the environment. They apply what they learn to their designs in order to minimize the negative impact of their vehicles on the environment.

### ***Lesson 4 – A Weighty Decision***

Students conduct an experiment involving balloon-powered cars in order to determine how different materials affect a vehicle’s weight. They then make connections between vehicle weight, fuel efficiency, and eco-friendliness.

### ***Lesson 5 – Restructuring Infrastructure***

Students investigate the ways that people produce, transport, and store energy in order to identify how these structures and processes must change before their “cars of the future” can become a reality.

### ***Lesson 6 – A Problem of Design***

Students investigate a variety of additional technologies, such as hybrid gas-electric cars and hydrogen fuel, which will likely impact vehicle design in the year 2020.

## **Lesson 7 – Can You Create a Better Vehicle?**

After reviewing the main concepts developed in the first six lessons of this module, students work together to design and advertise their “cars of the future.”

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