OVERVIEW

Grades: Grades 2 – 3; adaptable to all grade levels (See Adaptation Suggestions)

Subjects: Visual Art, Science, History – Social Science

Duration: Allow two, 45-minute sessions from start to completion.

Lesson synopsis: What would a car of the future look like? Use recyclable materials to construct a car of the future whose features directly solve an identified problem.

Museum Connection: The Garden Project’s “Green Car”

This lesson was inspired by The Garden Project’s “Green Car,” funded in part by SDG&E’s Power Your Drive campaign. This space, located in the Museum Park, focuses on the importance of renewable energy sources in support of the natural environment and the inclusion of clean energy alternatives, such as electric vehicles. With this piece, we ask students to explore the relationship between man-made and nature and the positive and negative impacts that technology can have on the environment and their life. In this lesson, students will be asked to consider the contributions that they can make for the future (e.g. preserving the environment) through the use of their own creative ideas and problem solving as it relates to car design. Students will have the opportunity to design a unique car considering what it might take to make it fit for the future.

LEARNING OBJECTIVES

Students will:

- look at and discuss the evolution of cars over time.
- consider specific innovations that have been made in cars and what might be done in the future.
- critically think about the needs for a car in the future.
- identify at least one challenge of today’s cars, and come up with a solution for it in their future car design.
Vocabulary:

- **alternative fuel vehicle** – a vehicle that runs on a fuel other than traditional petroleum fuels (petrol or Diesel fuel); and also refers to any technology of powering an engine that does not involve solely petroleum (e.g. electric car, hybrid electric vehicles, solar powered).
- **design** – a plan or drawing produced to show the look and function or workings of an object before it is built or made
- **model** – a three-dimensional representation of a person or thing or of a proposed structure, typically on a smaller scale than the original
- **two-dimensional** – having or appearing to have length and breadth but no depth
- **three-dimensional** – having or appearing to have length, breadth, and depth
- **renewable** – from a natural resource or source of energy that is not depleted when used
- **sketch** – a planning drawing done as preliminary layout

**HOW-TO**

**STEPS**

**Materials Needed:**

- Gray lead pencils *(one per student)*
- Black markers *(one per student)*
- Erasers *(one per student)*
- Rulers *(one per student)*
- White paper *(one 8 ½” sheet per student)*
- Images of cars from the past, present, and future *(See Resources).*

**Pre-Class Prep:**

- Arrange a visit to The New Children’s Museum to view the installation The Garden Project’s “Green Car” by SDG&E’s Power Your Drive campaign.
- Set up a collection for all recyclable materials. It is recommended that one do this well in advance of the project. Encourage students and colleagues to bring in supplies such cereal boxes, paper tubes, plastic containers, etc.
- Locate images of past, present, and future cars to share with the class.
- Preview the Car Sketch and Design YouTube video *(See Resources).*

**SESSION ONE**

**Motivation:**

While viewing images of cars from the past and present, discuss the features visible on each car and compare their differences and similarities. What changes have been made and why? Some features for discussion may be the use of seat belts, electric windows, cameras used to view behind the car while driving backwards, innovations with music players, etc.

What will cars be like in the future? Today designers are thinking about how they can make cars better. For example, cars move by burning fossil fuels, but we have discovered that they
are harmful to the environment and the world is running out of them. Now, engineers are exploring alternative fuel vehicles that run on non-petroleum fuels (e.g. electricity) as well as renewable alternatives such as solar power.

Discussion points
- What would you add/change if you could design your own car?
- What would you like it to do?
- What will people need in the future? Why?
- How might your design protect or preserve the natural environment?

As a class, brainstorm other challenges and potential solutions. Record these ideas for students to reference when designing their cars.

Introduce related vocabulary words.

**Process:**

**Step One of Car Design Process: Rendering**

When designers think about making a new car, they begin by drawing it. This process begins with a simple sketch or series of sketches by a single designer with an idea.

1. Introduce students to a variety of recycled materials that they can choose from to make a model of their car. Remind students to consider how their car would look from all angles.
2. Instruct students to use paper, pencil, ruler, and eraser to design their future car. The design should fill the entire paper and include at least one (or more) features which directly solve an identified challenge with modern cars. As students work on their drawings, have them label these features in their drawing.
3. Instruct students, when ready, to finalize their designs using black marker.
4. Have students label the back of their papers with their names and collect their designs.

**SESSION TWO**

**Step Two of Car Design Process: Modeling**

For this lesson, students will use a variety of recyclable materials to create a three-dimensional version of their future car as laid out in their two-dimensional drawing.
Sharing Session:
Have students display their work and try to market it to the other students by describing their features and why they are important. Encourage students time to describe their own decision making process and the successes and challenges they experienced.

ADAPTATION SUGGESTIONS
For older students (Grades 4 – 5):
Consider offering students fewer material options to further challenge them in creating their cars in three-dimensional form. Encourage them to try using and manipulating the materials in creative ways.

For middle and high school students (Grades 6 -12):
Instruct students to draw their cars from varying perspectives (e.g. from the top, side, and front). Introduce more sophisticated materials for building their three-dimensional models – e.g. clay, wood, or other building materials.

For student with special needs:
Consider working with larger-sized papers. Encourage students to work together in teams to design and build their cars together. Help students keep track of the remaining time that they have to work on their project.

EXTENSION ACTIVITY
Car Advertisement Poster Project
Have students create a poster advertisement for their car highlighting what they feel are its best features. What would make people want to buy their car? How would they chose to advertise it? Encourage students to look through car advertisements for inspiration.

STANDARDS
CALIFORNIA STATE STANDARDS
Visual Arts Standards
Grade 2
3.1 Explain how artists use their work to share experiences or communicate ideas.
2.3 Depict the illusion of depth (space) in a work of art, using overlapping shapes, relative size, and placement within the picture.
4.1 Compare ideas expressed through their own works of art with ideas expressed in the work of others.
4.3 Use the vocabulary of art to talk about what they wanted to do in their own works of art and how they succeeded.
5.4 Discuss artists in the community who create different kinds of art (e.g., prints, ceramics, paintings, sculpture).

Grade 3
1.4 Compare and contrast two works of art made by the use of different art tools and media (e.g., watercolor, tempera, computer).
1.5 Identify and describe elements of art in works of art, emphasizing line, color, shape/form, texture, space, and value.
3.1 Compare and describe various works of art that have a similar theme and were created at different time periods.
5.4 Describe how artists (e.g., architects, book illustrators, muralists, industrial designers) have affected people’s lives.

Next Generation Science Standards
Grade 2
K–2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
2-LS2-2 Develop a simple model based on evidence to represent a proposed object or tool.

Grade 3
3-LS1-1. Build and revise simple models and use models to represent events and design solutions.
3-LS3-2 Cause and effect relationships are routinely identified and used to explain change.
3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

History-Social Science Standards
Grade 2
Students differentiate between things that happened long ago and things that happened yesterday.

COMMON CORE STANDARDS
SL: 2.3: Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.
SL: 3.1: Engage effectively in collaborative discussions (one-on-one, in groups, and teacher-led) building on others’ ideas and expressing their own clearly.
SL: 3.1d: Explain their own ideas and understanding in light of the discussion.
RI 2.7 7. Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
RESOURCES

RESOURCES FROM THE SAN DIEGO PUBLIC LIBRARY

Our Earth: Clean Energy (2009), by Peggy Hock
333.794/HOCK
Using solar power helps keep Earth clean. Look inside to learn more about solar power, and other kinds of clean energy.

Car (2005), by Richard Sutton
J 629.222 SUT
A photo essay about the history, development, and impact of automobiles from horseless carriages and Model T Fords to today’s high-performance racing cars.

New Car Design (2010), by Peter Economy
J 629.222 ECO
"What do you think new cars will be like in the future? See what it takes to create a new car—beginning with the first drawing and ending with new cars rolling off the assembly line and onto the street.

WEB RESOURCES

Information about SDG&E’s Power Your Drive Campaign:
http://www.sdge.com/clean-energy/electric-vehicles/poweryourdrive
Power Your Drive is an exciting new pilot program that authorizes SDG&E® to install 3,500 electric vehicle (EV) charging stations across in apartments, condos and businesses within their service area. At least 10% of the charging stations will be installed in disadvantaged communities.

Information on The Garden Project, currently installed at The New Children’s Museum:
https://thinkplaycreate.org/explore/art-studios/the-garden-project/

Car Sketch and Design video (YouTube; total video is 10:48 minutes in length):
https://www.youtube.com/watch?v=GGL4TE2eVSk

Article related to Google’s self-driving car of the future:

San Diego Automotive Museum website:
http://sdautomuseum.org/