# K-12 Lesson Plan: Car Design

## Materials

<table>
<thead>
<tr>
<th>+ Art Supplies</th>
<th>Colored pencils, pens, watercolors, markers</th>
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<tbody>
<tr>
<td>+ Paper</td>
<td>White drawing paper (11”x17” or smaller), construction paper of various colors</td>
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| + Computer Applications | Download free versions of software such as:  
• Morphi (www.morphiapp.com)  
• Wind Tunnel (www.algorizk.com). |
| + Samples of Car Designs | Artwork of concept cars by youth and car designers |
| + Estimated Time:  | Four (4) to six (6) class periods |

## Essential Questions for Students

- What do you gain from taking a risk?
- When designing a car, can the change of a line give the vehicle more function?
- What makes a car faster than another?
- How can you empathize with the needs of those who will use the car?
- How will cars evolve in the future?

## Advanced, Adaptations, and Modifications

- Advanced: Evident in students through acceleration or enrichment of content.
- Adaptations: True access for students to the general education curriculum.
- Modifications: Changes to what students are taught or expected to learn.

## Transfer Goals & Student-Centered Challenges

Students will:
- Use the design cycle to create an original vehicle.
- Gain feedback on the ideation and design process used to create a car.
- Test and improve the student’s design.
- Publish/share a dream car design.

## National Arts Standards Addressed

### Creating

- Anchor Standard 1: Generate and conceptualize artistic ideas and work.
- Anchor Standard 2: Organize and develop artistic ideas and work.
- Anchor Standard 3: Refine and complete artistic work.

### Presenting

- Anchor Standard 6: Convey meaning through the presentation of artistic work.

### Responding

- Anchor Standard 9: Apply criteria to evaluate artistic work.

### Connecting

- Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.
- Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.

## Studio Habits of Mind Incorporated

Students will be focusing on the habits of envisioning, expression, as they will create a vehicle from the future with a purpose to impact their community.
STATE STANDARDS ADDRESSED

TEKS (Texas Essential Knowledge and Skills)

Creative Expression. The student communicates ideas through original artworks using a variety of media with appropriate skills. The student expresses thoughts and ideas creatively while challenging the imagination, fostering reflective thinking, and developing disciplined effort and progressive problem-solving skills.

Observation and Perception. The student develops and expands visual literacy skills using critical thinking, imagination, and the senses to observe and explore the world by learning, understanding, and applying the elements of art and principles of design. The student uses what the student sees, knows, and has experienced as sources for examining, understanding, and creating artworks.

LESSON PLAN PROCEDURES

DAILY TARGET #1: Distinguish Perspectives
Procedure for Daily Target #1:
1. Practice one- and two-point perspectives.
2. Practice foreshortening.

DAILY TARGET #2: History of Car Design
Procedure for Daily Target #2:
1. Begin with the Design Thinking model and reinforce the importance of the purpose of design.
2. Have students discuss what they dislike about certain car styles. Use "Car Time Line" chart for reference.
3. After thinking and writing down thoughts, break into small groups of 3-4 students to discuss.
4. Have groups discuss improvements.
5. While in groups, students draw out their ideas and get feedback from peers on how to improve their dream concept cars.

DAILY TARGET #3: Learning Design Software
Procedure for Daily Target #3: Students return to their groups and take their ideas into the digital realm using design software like Morphi to help students envision their cars in three-dimensional models. This may take two different class periods for students to use the software to create their dream concept cars.

DAILY TARGET #4: Final Test and Feedback
Procedure for Daily Target #4: Once designs are finalized, students can test their prototypes using free software like Wind Tunnel. Using this digital tool, they can test their car's overall shape and see how its aerodynamics are impacted by doing "virtual test drives" of their vehicles. Then, they can do a hand rendering of their final design.

DAILY TARGET #5: Final Presentation
Procedure for Daily Target 5: After seeing how their car works in the testing phase, they can document their findings using screen recordings to capture how they can change their vehicles and do voiceovers to their videos to help showcase and explain their findings.
RESOURCES LINKS

+ **Toyota Dream Car Art Contest**
  For artwork submission dates, entry form, and official rules, visit: www.ToyotaDreamCarUSA.com

+ **See Artwork by Past Dream Car Art Contest Winners!**
  - FY19 Winners
  - FY18 Winners
  - FY17 Winners

+ **Video for 50th Anniversary of Hot Wheels**
  https://youtu.be/27kYBQewJ5E

+ **Design Thinking Presentation**

+ **Evolution of Car Design by Hot Wheels**
  https://youtu.be/27kYBQewJ5E

+ **Using Non-Traditional Materials for Car Design**
  https://youtu.be/3F7DnWAhox8

+ **Houston Art Car Parade**
  www.thehoustonartcarparade.com

+ **Design**: This is the purpose, planning, or intention that exists or is thought to exist behind an action, fact, or material object.

+ **Design Thinking**: This is the process for creative problem solving that utilizes empathy and experimentation to arrive at innovative solutions.

+ **One Point and Two Point Perspective**: This is a drawing method that shows how things appear to get smaller as they get further away, converging towards a single vanishing point on the horizon line.

+ **Vanishing Point**: This is the spot on the horizon line at which the receding parallel lines diminish.

+ **Horizon Line**: This is a physical/visual boundary where sky separates from land or water.

+ **Parallel Lines**: These types of lines are on a plane that never meet. They are always the same distance apart. Perpendicular Lines: These are two lines that meet at a right angle (90 degrees).

+ **Empathy**: This is the ability to understand and share the feelings of another.

+ **Prototype**: This is the first preliminary model of something, especially a machine, from which other forms are developed or copied.

+ **Feedback**: This is information about reactions to a product, a person’s performance of a task and used as a basis for improvement.

This lesson plan was published by Laura and Matthew Grundler of Grundler Art for K-12 teachers to download and use at no charge. Toyota — through its Toyota Dream Car Art Contest in the United States — is a sponsor of this lesson plan solely to support teachers and assumes no liability for any use of the information.

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