



Electric Vehicles Toolkit

VROOM VS. ZOOM: ANALYZING CAR COSTS

**HIGH SCHOOL PHYSICS /
ENVIRONMENTAL SCIENCE**

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Vroom vs. Zoom: Analyzing Car Costs
What to consider while buying a car?

Lesson Overview	Career Highlight
Students will identify costs associated with buying and maintaining a vehicle, complete a cost-analysis of specific cars, and develop a choose your own adventure Google form for other students to use.	Market Research Analyst

STEM Course Connections	21st Century Skills	CTE Alignment
High School Algebra High School Earth/Environmental Science	Creativity Innovation	Environmental Engineering

Engineering Activity	
Science and Engineering Practice #4 & 5	Students will calculate costs over 5 years of vehicle use and design a car buying tool for prospective car buyers to use.

Materials
<ul style="list-style-type: none"> Student Handout Car Buying Tool Brainstorm Template Device with internet access

Essential Questions
<ol style="list-style-type: none"> 1. What costs are associated with buying and maintaining a new vehicle? 2. What tax credits are available for buyers? 3. What are the benefits of purchasing an electric vehicle?

Mission Prep
<p>Engage (10 mins)</p> <ol style="list-style-type: none"> 1. Choose Your Own Dream Car Have students complete this Travel in Style (Choose your own adventure story) 2. Pair-Share Have students share with their partner/table what dream car they ended up with and the choices that led them to that result.

Explore (10 mins)

1. Gas vs. Electric Vehicle Cost Comparison Exercise
Using the [student handout](#), and the Alternative Fuel Data Center's [Vehicle Cost Calculator](#), students will compare the costs associated with a gas-powered vehicle and an electric vehicle.

Launch

Explain (15 mins)

1. Personalized Car Options
Continuing with the [Vehicle Cost Calculator](#) , students will now input their own driving needs, state, and car preferences to complete a more personalized cost analysis and record responses in the [student handout](#).

Elaborate (45 mins)

1. Car Buying Tool Introduction
Students will create a Car Buying Tool using the Choose Your Own Adventure Google Form template for future buyers to use. They will need to incorporate gas and electric vehicles for each type of vehicle. Here is a short [how-to guide](#) for using Google Forms to make a Choose Your Own Adventure.
2. Choose Your Own Adventure Template
Once introduced, students can use [this template](#) to brainstorm and map out their car buying tool paths. Students can adjust the template and add in additional boxes and pathways as needed. At this stage, students should have identified at least 6 different specific cars, pulled details about each of those 6 cars, and images to use in their Car Buying Tool.
3. Final Draft
Students create their final draft using the [Choose Your Own Adventure Google Form template](#).

Exploration

Evaluate (15 mins)

1. Share Out
Students should exchange their Car Buying Tool with a partner.
As they use their partner's Car Buying Tool, they can complete the reflection in the [student handout](#).

Extend (optional)

1. Car Buying Tool 2.0
Have students expand their Car Buying Tool to incorporate additional features (cost, fuel efficiency, etc.)
2. Career Exploration
For students that show interest in this activity, direct them to explore the Market Research Analyst career path. Here is a [video](#) describing the role of Market Research Analysts.
Ask them: How does the Car Buying Tool activity model being a market research analyst? How could you use this data to inform product development of future electric vehicles?

CA NGSS Standards

- HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
- HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
- HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
- HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

CTE Alignment

- D2.3 Choose between alternate solutions in solving a problem and be able to justify choices in determining a solution.
- D2.4 Understand the process of developing multiple details into a single solution.
- D2.5 Translate word problems into mathematical statements when appropriate.
- D12.3 Compare costs of alternate/renewable energy sources, systems, and appliances and traditional energy sources, systems, and appliances.

Resources

CareerOneStop. (2023). *Market Research Analysts and Marketing Specialists Career Video* | CareerOneStop. [careeronestop.org. https://www.careeronestop.org/Videos/careeronestop-videos.aspx?videocode=13116100](https://www.careeronestop.org/Videos/careeronestop-videos.aspx?videocode=13116100)

Google for Education, & Braun, M. (2020). *How to Use Google Forms to Create "Choose Your Own Adventure" Activities* [YouTube Video]. In YouTube. <https://www.youtube.com/watch?v=uzAc7Dywpz4>

"How Do Electric Cars Work? | Made in Germany." YouTube, 10 Aug. 2016, www.youtube.com/watch?v=x1ystf-nnE8&feature=youtu.be&ab_channel=DWNews

"How Electric Vehicles Work." Sustainable Energy Authority Of Ireland, www.seai.ie/technologies/electric-vehicles/what-is-an-electric-vehicle/how-electric-vehicles-work/

"How Do All-Electric Cars Work?" Alternative Fuels Data Center: How Do All-Electric Cars Work?, afdc.energy.gov/vehicles/how-do-all-electric-cars-work

Hydro, BC. "Inside an EV: Grade 6-8." BCHydro Power Smart for Schools, schools.bchydro.com/activities/sustainability/inside-an-ev.

Padia, Nicole. "Parts of an Electric Vehicle Matching Activity." Desmos Classroom Activities, teacher.desmos.com/activitybuilder/custom/648b5c477aef886296570006