



## Electric Vehicles Toolkit

# ROAD TRIP!

### MIDDLE SCHOOL EARTH SCIENCE / MATH

For more information on Ignited, visit:  
<https://igniteducation.org>

For more information on RAFT visit:  
<https://www.raft.net>

For more information on Acterra visit:  
<https://www.acterra.org>





## Road Trip!

### Planning a summer road trip in an electric vehicle

Lesson Overview	Career Highlight
Students will design their own summer road trip including the electric vehicle that they will drive, the distance between charges, charging locations, and overall cost.	Urban and Regional Planners

STEM Course Connections	21st Century Skills	CTE Alignment
Math (7th Grade/Algebra 1) Middle School Earth Science High School Earth Science High School Physical Science High School Engineering	Problem Solving	Career Readiness

Engineering Activity	
<b>Science and Engineering Practice #5 and 6</b>	Students will research, analyze, and select road trip options including type of rental car, destination, lodging, activities, and electric vehicle charging stations along the route.

Materials
<ul style="list-style-type: none"><li>• <a href="#">Road Trip Student Handout</a></li><li>• Device with internet access</li></ul>

Essential Questions
<ol style="list-style-type: none"><li>1. How far can an electric car travel?</li><li>2. Where are charging stations located across the U.S.?</li><li>3. How much will it cost to take a road trip in an electric vehicle?</li></ol>

Mission Prep
<b>Engage ( 5 mins)</b> <ol style="list-style-type: none"><li>1. Ask students to imagine their perfect summer break road trip in the United States. Ask them to journal in <a href="#">the student handout</a> about the following:<ol style="list-style-type: none"><li>a. Where would you go on your road trip?</li><li>b. For how long would you go?</li><li>c. Who would go with you?</li></ol></li></ol>

## Explore (10 mins)

### 1. Fuel Station Locator Exploration

Have students navigate to the Alternative Fuels Data Center's [Fueling Station Locator](#) and record in their [student handout](#).

- a. Confirm the settings (Fuel type: Electric, Charge type: Level 2/DC Fast)
- b. Explore the map. Are there electric charging stations near your destination? Along the route?

Additional resource:

If you have students interested in extending this U.S. road trip into Mexico, here is [another website](#) for charging station information in Mexico.

## Launch

## Elaborate (20 mins)

### 1. Read and Respond

Have students read [Electric Car Road Trip: Northern California to Ashland, Oregon](#)

As they read, they can collect information about driving range, charging types, and associated costs by responding to these article questions in [the student handout](#).

## Exploration

## Evaluate (55 mins)

### 1. Road Trip Project

Students will “rent” an electric vehicle, plan their road trip stops including charging car details, and calculate the cost of the road trip.

#### a. Part 1: Car Choice

In Part 1, students will choose between a set of rental car options, evaluate the benefits, and calculate the cost.

#### b. Part 2: Destination

In Part 2, students will identify where they want to go on their summer road trip, research the location and how to get there.

#### c. Part 3: Planning the Trip

In Part 3, students will plan each of their 5 days, specifically how far they will drive, where they will charge, and what activities they will do.

#### d. Part 4: Trip Costs

In Part 4, students will calculate the costs for lodging and rental car costs.

## Extend (10 mins)

### 1. Urban Planning

Now that students have planned their road trip, ask small groups to discuss:

- a. What obstacles did you run into when trying to plan your summer road trip stops?
- b. As more charging stations are installed and electric vehicles develop longer driving ranges, will these obstacles lessen? Will they shift to new obstacles?

- c. One career that involves planning and predicting what cities and towns will need is Urban Planning. How do you think that urban planning is being affected by the influx of electric vehicles? (Show the Roadtrip Nation Career Profile [video](#) for the Senior Urban Planner, Cecilia LaVariega Salvans.)
- d. What skills would you need to be an urban planner? Are these skills that you are interested in developing?

### CA NGSS Standards

- MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
- 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-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems

### CA CSS Math Alignment

- 7-RP. Analyze proportional relationships and use them to solve real-world and mathematical problems.
- Algebra N-Q Reason quantitatively and use units to solve problems.

### CTE Alignment

**C1.0** Understand historical and current events related to engineering design and their effects on society

**D3.0** Understand the fundamentals of earth science as they relate to environmental engineering

### Resources

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<https://www.electromaps.com/en/charging-stations/mexico>

Halvorson, B. (2020, November 14). *Green Beret: Affordable renauld zoe ev blasts past leaf in driving range*. Car and Driver.

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Roadtrip Nation. (2023). *Cecilia LaVariega Salvans - Roadtrip Nation*. Roadtrip Nation.

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<https://www.investopedia.com/cost-to-charge-ev-road-trip-5219817>