

Can Electric Vehicles Serve Rural Areas?

Students analyze the impact of electric vehicles on rural communities. For grades 9-12.

INTRODUCTION

Culminating Activity:

You are a consultant engineer at a transportation engineering firm. Residents of a local village suffer from walking long distances in very hot weather most of the year because the village lacks public transportation. Daily tasks require residents to commute to work, markets, and other facilities, all within a 15 mile-range. The mayor of the village wants to introduce simple electric cars to the village. Energy for the village is provided by a coal-burning power plant about 20 miles away. As a consultant, present a letter to the mayor that details problems with the idea and potential solutions.

Checking for Understanding & Engagement

- What role have you been placed in today?
- What is the problem statement?
- What is your mission in this lesson?

Objectives (Students Will Be Able To...)

- Students will describe the impact of electric vehicles.

ACTIVITIES IN THIS LESSON

Career Interests

Hooks/Set

Activity

Students explore the transportation engineering field by first reading the [article](#) “What is Transportation Engineering?”

Checking for Understanding & Engagement

- What does a transportation engineer do?

- Who hires transportation engineers?
- What kind of skills do transportation engineers need?
- How much do transportation engineers make?
- Does this job sound interesting to you? Why?

Impact of Electric Cars

Guided Practice

Activity

This activity begins with students reading the online articles and writing down in their notebooks (or using online markup) important points they encounter:

- [“Toyota is Working on Innovating a Solar-powered Electric Car that Can ‘Run Forever’ and Never Needs Charging”](#)
- [“Can EVs find allies in rural America? Look at North Dakota”](#)
- [“Union of Concerned Scientists: Rural Drivers Have Most to Gain from Clean Vehicles”](#)

Checking for Understanding & Engagement

- What is the main point of each article? What is the conclusion of each article?
- State an important fact that you learned in each article.
- What do you think is the most profound idea expressed in each article?
- Was there something in the article you found surprising?
- Which of the articles do you think is the most informative and why?

Socratic Seminar

Guided Practice

Activity

To flesh out and synthesize important ideas uncovered in the reading, the teacher leads students through a Socratic seminar, with the following questions guiding the discussion:

- Overall, do you think electric cars are worth the expense and trouble?

- What are some obstacles to using electric cars in rural areas?
- Can having too many electric cars harm the environment?
- Do you think cars should be provided to rural residents at reduced costs?
- If you live in a rural town, what would concern about the push to using electric vehicles?

Checking for Understanding & Engagement

- List one advantage of using electric cars in the country and explain why.
- List one disadvantage of using electric cars in the country and explain why.
- Overall, do you think electric cars are worth the expense and trouble?

Graphic Organizer Completion

Guided Practice

Activity

The instructor teaches students how to use the concepts uncovered in the Socratic seminar to complete a graphic organizer using the I Do, We Do, You Do method. The teacher uses a think-aloud to fill in one element for each portion of the graphic organizer and then guides the students to complete the rest independently.

Checking for Understanding & Engagement

- Show me your completed graphic organizers for me to check its contents and structure.
- What did you find hardest about completing the graphic organizer and why?

Writing Instruction

Group Work

Activity

The instructor describes the modified block format for letters, describing when and why it is appropriate to use such a format, and its features including (a) spacing, (b) indenting, and (c) structure.

Vocabulary development involves the use of the Frayer model on the terms *salutation* and *valediction*. To elaborate on their definitions, the instructor provides examples of each.

Checking for Understanding & Engagement

- Why is it important to know how to format a letter in a modified block format?
- Say the word *salutation* out loud.
- Write the words *salutation* and *valediction* and practice saying them aloud.
- What is a salutation? What is a valediction?
- Point out the salutation and valediction in an example letter.
- What is another word for salutation? (Answer: greeting.)
- What is another term for valediction? (Answer: complimentary closing.)
- Can you think of a situation where using the wrong salutation or valediction can produce an undesirable effect?

SUMMATIVE ASSESSMENT

Assessment Type: Writing Samples

Students write letters to the mayor from their completed graphic organizer and using a modified block template. Letters are scored according to their

- Content—Does the letter exhibit a thorough understanding of the problem and potential solutions?
- Structure—Are the contents of the letter reasonably organized?
- Format—Does the letter exhibit the proper modified block format?

Low-level grammar and sentence structure do not form a part of the Knowledge Dimension of this lesson and should *not* be scored, or scored at a low point value. To raise awareness among the students of their need to improve in this area, the instructor can use the Writing Across the Curriculum guide (i.e., correcting low-level mistakes only to the sixth line of the letter).

Industries / Subjects / Grades

K-12 Subjects

- English-Language Arts

Industries / Pathways

- Systems Diagnostics, Service, and Repair

Grade Levels

- 9, 10, 11, 12

Standards and Objectives**Standards****California's 2013 CTE Standards**

- **CTE.T.C.3.4** Describe the applications of alternative power sources

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