

Automobiles and the Environment

Without automobiles, the last 116 years would have been very different for people around the world, particularly in the United States. Now, the average citizen had a tool at their hands that allowed them to travel far distances in a short amount of time. The automobile industry began with creativity and **innovation** and has been an important part of the United States' economy, jobs, manufacturing, and trade around the world. The future of the automobile industry is dependent on three areas: improvement in safety, better **efficiency** in energy and reducing greenhouse gases which can be damaging to the environment.

There are many traffic accidents each year, therefore in order to help people feel more secure, automobile companies will continue to add and improve safety **features** to their products. The most recent examples of new safety features are back-up cameras, which allow the driver to see behind the car while sitting in the driver's seat and forward collision avoidance, which uses radar or cameras to warn the driver of a collision ahead or assist with the braking and steering systems.

To increase energy efficiency there has been a return to owning and driving smaller cars such as the Smart car or Fiat, which use less fuel for traveling. There are even automobiles that have been designed to run on **photovoltaic cells** or hydrogen eliminating the use of gasoline. There are many innovative designs for new automobiles on the market such as electric and hybrid cars.

Hybrid cars help the environment by getting better gas mileage because they have two engines, a gasoline and an electric engine or sometimes a **hydrogen** engine. When the car is not moving, but rather sitting still at a traffic light, the car will turn on its electric engine and stop burning gasoline. This is particularly effective for car owners who live in big cities and are

involved in driving through heavy traffic that includes many stops at long traffic lights. The hybrid car owner does not have to fill up their fuel tank as often as the gasoline powered car owner does. When less gasoline is burned this allows for fewer **carbon emissions** to be produced, thereby reducing air pollution, which protects the environment. As hybrid cars become more **prevalent** in our country and others, there will be less need for gasoline, which is created from oil. Oil comes from drilling under the ground or ocean, which can be **destructive** to nature and wildlife in the area where it occurs. Owning and using a hybrid car ultimately protects our wildlife. Finally, a hybrid car has a quieter engine and reduces noise pollution in the area where it is being used. Noise pollution can be very **prominent** in large cities or near interstates and highways.

In order to help the environment, greenhouse gases need to be reduced. These gases trap heat in the atmosphere and do not allow heat to escape into space, eventually this **contributes** to increasing the temperature of our planet. According to the Environmental Protection Agency, transportation in the United States produced approximately twenty-seven percent of the total U.S. greenhouse gas emissions (Transportation and Climate www.epa.gov). Forty-three percent of those greenhouse gas emissions were from passenger cars. This fact is why many automotive **manufacturers** are involved in designing new types of automobiles that run on fuels that will help reduce these gases, which create some of the pollution in our environment.

To learn more about how the automobile contributes to greenhouse gases visit the Environmental Protection Agency's website at www3.epa.gov and click on the Transportation and Climate Change tab. Under this tab on the EPA's website, there is information about why the climate is changing, what can we do about it and the impact climate change has on the area in which you live. Knowing about our **impact** on the environment and from the effects of

transportation pollution, will inspire future generations to continue designing innovative automobiles that are **beneficial** to protecting our environment and the human population.

Complete the assignment below:

Part I. After reading the article above, choose at least four of the thirteen words in bold print that you do not know the correct definition for and write their name and definition below. Use your classroom dictionary or dictionary.com on the Internet.

Word 1: _____ Definition: _____

Word 2: _____ Definition: _____

Word 3: _____ Definition: _____

Word 4: _____ Definition: _____

Part II. Visit the website <https://www3.epa.gov/climatechange/kids>, a Student's Guide to Global Climate Change, and click on the **Calculate your Emissions Tab**. See how many pounds of carbon dioxide you produce as an individual. Answer the questions and record your total here: _____lbs. My approximate yearly contribution of carbon dioxide emissions in pounds.

Teacher Instructions

1. Teachers can assign this piece in a science or technology education course. It is ideal for 5-7th grade students and can be a reflection piece for these subject areas after visiting the AACA Museum. It can also be an assignment to give on Earth Day in April.
2. Point values can be assigned to each of the five sections and used as a graded activity within these subject areas.
3. Students will need access to computers and the Internet.
4. Teachers should monitor student use of the EPA website and give a quick intro to the webpage, A Student's Guide to Global Climate Change in class.
5. Parts I-III can be assigned to complete at home and parts IV and V completed in class, to save class time.

PA Common Core Standards for Reading and Writing of Science and Technical Subjects

Reading in Science

CC.3.5.6-8. B. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

CC.3.5.6-8. D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

CC.3.5.6-8. E. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

CC.3.5.6-8. F. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

CC.3.5.6-8. H. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

CC.3.5.6-8. I. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

Writing in Science

CC.3.6.6-8. E. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

CC.3.6.6-8. H. Draw evidence from informational texts to support analysis reflection, and research.

Science Standards in Technology and Engineering Education

Technology Connections

3.4.5. B1. Explain how the use of technology can have unintended consequences.

3.4.7. B1. Explain how the use of technology can have consequences that affect humans in many ways.

3.4.8. B1. Evaluate the societal implications of the management of waste produced by technology.

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3.4.3. B2. Explain how materials are reused or recycled.

3.4.4. B2. Explain how the use of technology affects the environment in good and bad ways.

3.4.5. B2. Describe how waste may be appropriately recycled or disposed of to prevent unnecessary harm to the environment.

3.4.6. B2. Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems.

3.4.7. B2. Explain how decisions to develop and use technologies may be influenced by environmental and economic concerns.

3.4.8. B2. Compare and contrast decisions to develop and use technologies as related to environmental and economic concerns.

Engineering Design

3.4.7. D1. Identify and collect information about everyday problems that can be solved by technology and generate ideas and requirements for solving a problem.

Using and Maintaining Technological Systems

3.4.6. D2. Use computers appropriately to access and organize and apply information.

3.4.4. D3. Investigate and assess the influence of a specific technology or system on the individual, family, community, and environment.

3.4.5. D3. Determine if the human use of a product or system creates positive or negative results.

3.4.7. D3. Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology.

3.4.8. D3. Interpret and evaluate the accuracy of the information obtained and determine its usefulness.

References

Farrar-Hunter, P. A. Johnson, S.R. (2000). *Exploring transportation*. Tinley Park, IL: The Goodheart-Wilcox Company.

United States Environmental Protection Agency. (2016). A student's guide to global climate change. *Author*. Retrieved from <https://www3.epa.gov/climatechange/kids/>

United States Environmental Protection Agency. (2016). Transportation and climate change. *Author*. Retrieved from <https://www3.epa.gov/otaq/climate/basicinfo.htm>