Motion and Design: Automobile Patents

Grade Level: For grades 4-5; adaptable for older students

Background: Many give credit for the first automobile patent to Carl Benz, who filed his patent in Germany for the “Self-Propelling Vehicle” in 1886. In this lesson, students explore what intellectual property is by examining patents. By exploring early automobile patents, students will learn what a patent includes and what can be learned about an invention from a patent. They can then compare the patent with the actual vehicle (either through images or a visit to the museum). To take their learning a step further there are two additional activities: Be an Inventor and Design Challenge that have students work individually or in small groups to explore the steps it takes to be an inventor.

Primary Sources (click to access patents):
- Photograph 1886 Benz Automobile
- **1900 Patent No. 657,711**: Motor Vehicle by F.E. & F.O. Stanley
- 1901 Mobile Images (employed Stanley chain-drive design)
- **1903 Patent No. 730,307**: Steam Motor Vehicle by F.E. Stanley
- 1905 Stanley Model CX Images (employed Stanley rear engine design)

Secondary Sources (click source to access):
  - Kid’s Section: http://www.uspto.gov/kids/kids.html
- Google Patents www.google.com/patents

Vocabulary

<table>
<thead>
<tr>
<th>patent</th>
<th>trademark</th>
<th>copyright</th>
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<tbody>
<tr>
<td>intellectual property</td>
<td>brand</td>
<td>trade secret</td>
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<tr>
<td>invention</td>
<td>inventor</td>
<td>utility patent</td>
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Lesson
1. Have students investigate the vocabulary above individually or as a group.
2. Break students into groups and give each group one of the patents provided above. You can decide to use only the patent images or the descriptions as well. In each group have the students analyze their patent:
   a. What is it for?
   b. Who is the inventor?
   c. When is the patent from?
   d. What are the main parts of the patent?
   e. What information does the patent provide?
   f. What questions do you have about the invention that the patent does not answer?
3. As a class, have each group present their patent and their findings.
4. As a class, compare and contrast the patents.
5. Give each group the photograph of the automobile that corresponds to their patent.
   a. What can they learn about their invention from the photograph that they cannot learn from the patent?

Take it a Step Further: Be an Inventor

Have students think about an everyday problem they want to solve. It could be a machine that cleans their room, a car of the future, an entirely new form of transportation, a better mousetrap – the sky is the limit. Have students walk through the steps of being an inventor by designing their own invention.

Lesson
1. **Brainstorm:** What is the problem they want to solve? Example: A better way to travel.
2. **Design:** How would they solve that problem? What could it look like? What would it do? What materials would they use to build it?
3. **Build:** Draw detailed designs for the invention, including explanations for how it works, how it is different, and how it will solve the initial problem they posed.
4. **Evaluation:** Have students share their designs with the class or in smaller groups. Have classmates help each other improve their designs.
5. **Redesign:** Using the feedback from their classmates, have students redesign their inventions.
6. **Presentation**
   a. **Invention Convention:** Have students share their final designs with each other. Students can design their presentation as if it was a sales pitch to a company.
b. **Inventor’s Journal:** Instead of a presentation students can create an Inventor’s Journal that documents each of the steps above and provides a final report on their invention.

c. **Patent:** Have students present their final design in the form of a patent. Make sure that it includes the same main features as the patents they analyzed in class.

**Take it a Step Further: Design Challenge**

Have students work in small groups or individually to build a design that will solve a particular challenge.

**Lesson**

1. Possible challenges include:
   a. Build a catapult
   b. Build a car out of recycled materials
   c. Build a container for an egg drop
   d. Have a ping pong ball or golf ball get from Point A to Point B in a certain number of steps

2. Have students follow these steps for solving their challenge and document each step as they complete it:
   a. Brainstorming
   b. Design
   c. Build
   d. Test
   e. Re-design

3. Have students present their designs to the class. Classmates can offer feedback and suggest improvements.

4. Have students submit a final written report that documents how they completed the assignment.

**Research Project Extension**

Have students investigate important American inventors and their inventions. Have students compose a brief biography of their inventor and identify the one invention they believe had the biggest impact. Students should provide clear arguments and evidence for their choice.
1886 Benz Patent Motor Car
Source: Daimler Company History
Runabout with Solid Seat.

Length of wheel base, 78 inches. Width of wheel base, 52 inches.
Delaware Standards

- **History 2, 4-5b**: Students will examine historical materials relating to a particular region, society, or theme; chronologically arrange them, and analyze change over time.
- **History 4, 4-5a**: Students will develop an understanding of Delaware history and its connections with United States history, including: *Growth of commerce, industry, transportation, and agriculture (1865-1945)*
- **History 4, 4-5b**: Students will develop an understanding of selected themes in United States history, including: *How have advances in technology changed our lives? Important people in American history*
- **Science Grade 5: Motion and Design**: Students explore motion and how it relates to technological design.

Common Core: English and Language Arts

**Grade 4**

- **RI.4.1**: Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- **RI.4.2**: Determine the main idea of a text and explain how it is supported by key details; summarize the text.
- **RI.4.3**: Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- **RI.4.7**: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- **SL.4.1A-D**: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others’ ideas and expressing their own clearly.
- **SL.4.2**: Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- **SL.4.4**: Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

**Grade 5**

- **RI.5.1**: Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
• **RI.5.2:** Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

• **RI.5.3:** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

• **SL.5.1A-D:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.

• **SL.5.2:** Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

• **SL.5.4:** Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

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**Next Generation Science Standards**

**Engineering Design**

• **3-5-ETS1-1:** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

• **3-5-ETS1-2:** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

• **3-5-ETS1-3:** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.