



INNOVATION AND HOUSEHOLD ITEMS

Grade Levels: Grades 6-8

4 Activities/ Duration: from 30 to 90 min

Content Areas

Science, Technology, Engineering

Disciplinary Core Ideas

Defining a Problem; Developing Possible Solutions

Crosscutting Concepts

Influence of Science, Engineering, and Technology on Society and the Natural World

Science and Engineering Practices

Asking Questions and Defining Problems; Analyzing and Interpreting Data; Engaging in Argument from Evidence

Next Generation Science Standards (NGSS)

MS-ETS1-1; MS-ETS1-2; Appendix J; Appendix M

Common Core

SL.8.5; RST.6-8.1; RST.6-8.7; RST.6-8.9; WHST.6-8.7; WHST.6-8.8; WHST.6-8.9

Learning Objectives/Outcomes

- Learners will explore innovation and learn about the United States Trademark Office (USPTO)
- Learners will reflect on invention, innovation and household items. They will interact with a friend or family member
- Learners will cite evidence to support claims about household items
- Learners will compare and contrast household items to historical USPTO patents
- Learners will think about ways to improve or build upon existing inventions.

INTRODUCTION

In this lesson, learners will explore the influences of science, engineering, and technology on society and the natural world through the lens of Innovation and materials created by the **United States Patent and Trademark Office (USPTO) Office of Education and Outreach (OEO)**
<https://www.uspto.gov/learning-and-resources/outreach-and-education>

BACKGROUND

We all experience and interact with the world around us using technology that has been created using advances in Science and Engineering to address human needs and wants. The U.S. Patent and Trademark Office describes innovation as being “truly about a process, a series of steps that begins with human imagination and creativity and results in the creation of something of value for society to enjoy. The creation of intellectual property takes vision, perseverance, and often involves people from different backgrounds and expertise collaborating in order to transform an idea into something that is real and tangible.” In the following activities, learners will reflect on those objects that are real and tangible within their households and consider what innovative steps led to the objects or tools found in their household.

More detailed content on innovation is available at the United States Patent and Trademark Office (USPTO) website

<https://www.uspto.gov/learning-and-resources/outreach-and-education/science-innovation-video-series#overview>



GUIDING QUESTION

What is innovation and how does innovation affect how I interact with the world around me?

SCAFFOLDING THIS LESSON

This lesson includes four activities. The first, “Who are innovators?”, is an introductory guided reflection (30min). The second, “Innovation Timeline”, prompts learners to think about the process of innovation and how a household item may have been innovated overtime, directing learners to interview one other person about the item in order to promote further thinking (1hour). The third activity, “Spot the Invention”, prompts thinking about innovation and patenting by having learners explore common household inventions (1hour). The last activity, “A Claimed Invention: A toy for GearS (GRS), the Robot Cat”, asks learners to design an item using language that one might find in a patent application (1.5 hrs).

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MATERIALS

- 4 Activity Worksheets (provided in this lesson)
- Internet Access (for Videos and to connect to [USPTO.gov/kids](https://www.uspto.gov/kids))
- Digital Camera (optional)
- Drawing supplies
- Variety of Craft Supplies (GRS the Robot Cat). Examples: Markers, Ribbons/String, Soup or Vegetable Cans, Paper Cups, Straws, Paper Towels, Water Bottle, Rubber Bands, Paper Clips, Tape, Balloons, Stickers, Glue, Wood Blocks, Foam Pieces, Foil, Construction Paper, Pipe Cleaners



1 INTRODUCTION - WHO ARE INNOVATORS? (30 min)

TEACHER-LED/ EXTRAORDINARY INNOVATIONS VIDEO

1. Direct instruction that innovation occurs when social needs and wants push the bounds of current technology.
2. This lesson uses an example of extreme sports professions.
3. Guiding Question: Who are the innovators featured in this video?
https://www.youtube.com/watch?v=x6VWOMRHm48&feature=emb_title

LEARNING ACTIVITY/ EXTRAORDINARY INNOVATIONS WORKSHEET

1. Consider who innovators are and how their extreme sport has changed over time.
2. Answer the Extraordinary Innovations Worksheet. It keys learners into who innovators are, innovation ideas, and patents.

SCAFFOLDING/EXTENSION

This activity is an example of extreme sports, but it is important to “prime” learners to cue into the innovators who are responding to athletes needs and wants. The video has closed captioning and can be skipped if the learner does not have internet access. As an extension of this activity, learners could research the companies featured in the video or they could look at one of their own hobbies to see how it has been innovated over the years (e.g. sports equipment, photography, music, apps, etc.).

2 INNOVATION TIMELINE ACTIVITY (1 hour)

TEACHER-LED/ SCIENCE OF INNOVATION VIDEO

1. Direct Instruction on parts of the patent that students can explore and match items in their house.
2. Learners choose a household item and explore its patent.
3. Guiding Question: What household items have value to me and how are they products of innovation?
4. Can use Science of Innovation Video (or others)
 1. <https://www.uspto.gov/kids/videos.html>
 2. <https://youtu.be/3T-NBDGovno>

LEARNING ACTIVITY/ INNOVATION TIMELINE WORKSHEET

1. Consider a piece of technology or tool in the household that has been changed through innovation over time. Take a picture and answer prompts.
2. Answer the Innovation Timeline Worksheet. To complete the timeline, learners do not need access to the internet.

SCAFFOLDING/EXTENSION

This activity prompts learners to think deeply about a household item and how it may have been innovated over time. To support their learning they will need to interview one other person who has interacted with that item. A good person to interview would be a mature individual who has seen that item change over time. Good household items could be an appliance, a mode of transportation, sports equipment, tools for home repair, or something they use for entertainment (e.g. phone, TV, etc.). If they have access to the internet, learners should view the “Science of Innovation” video provided by the USPTO. They can share their timeline with the class, teachers, or discuss with classmates. Learners can also do a web-based search and look up the “History of” their item or lookup a name brand company to see how they created, innovated, or marketed that item in the past.

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MORE EXTRAORDINARY INVENTIONS

The USPTO has developed lessons around extreme sports and extreme innovations. Lessons build on the tools shown in the Extraordinary Inventions video in our introduction activity. They are designed for middle school youth, require minimal internet connection, and help build the vocabulary related to USPTO, invention, innovation, patenting, and trademarks learners encountered in activities 1-3 of our lesson.

Find additional USPTO Extreme Innovation Activities here: <https://www.uspto.gov/kids/MiddleSchool-ExtraordinaryInnovations.pdf>



WRAP-UP

Wrap-ups and debriefs can be done online or over the phone. Teachers may want to ask learners to share if they are “innovators or can be innovators”, why they chose their particular household item, how their household item matched the historical patents they found, and how similar or different each learner's GRS toy was. Were they able to meet the claims? Many of the toys learners make will look different but can still meet the claims.

RESOURCES

This lesson was adapted using web-based resources developed by the USPTO Office of Education and Outreach.

<https://www.uspto.gov/learning-and-resources/outreach-and-education>

<https://www.uspto.gov/kids/>

ACKNOWLEDGMENT

Oregon State Precollege Programs would like to thank the Office of Education and Outreach at the USPTO for their amazing guidance and resources that made this lesson possible.

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SPOT THE INVENTION ACTIVITY (1 hour)

TEACHER-LED

1. Direct Instruction on parts of the patent that learners can explore and match items in their house too.
2. Learners decide on an item and explore the related patent.
3. Guiding Question: What household items have value to me and how are they products of innovation? Internet required to access <https://www.uspto.gov/kids/spot.html>

LEARNING ACTIVITY/ SPOT THE INVENTION WORKSHEET

1. Explore a patent of a household item and compare/contrast it to a U.S. Patent and Trademark Office patent online using Claims, Evidence, Reasoning.
2. Complete the Spot the Invention Scavenger Hunt worksheet.

SCAFFOLDING/EXTENSION

Learners may be intimidated by the appearance of a patent. It may be worth it to go step-by-step with them to go over one patent before starting the activity. If it is possible, learners may enjoy looking up the same item that was used in their Innovation Timeline to see an actual related patent.

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THE CLAIMED INVENTION: (1.5 hours)

A COMPANION FOR GeARS (GRS) THE ROBOT CAT

TEACHER-LED/ EXTRAORDINARY INNOVATIONS VIDEO

1. Direct Instruction on the major claim and sub claims of the cat toy learners will be making.
2. Learners gather household items to create a cat toy for GRS.
3. Guiding Question: How does my cat toy meet the claims of the invention?
4. No internet required to complete the activity.

LEARNING ACTIVITY/CLAIMS, EVIDENCE AND REASONING WORKSHEET

1. Complete the Claimed Invention activity by creating a toy for GRS the Robot Cat, showing how your toy meets the claims by providing evidence and reasoning.
2. Complete the GRS Claims, Evidence, Reasoning worksheet.



SCAFFOLDING/EXTENSION

There are many words in a patent and related to patenting that learners may not know. You can have them write down what they think such words mean and share it online or with you over the phone. Link to USPTO glossary:

<https://www.uspto.gov/learning-and-resources/glossary>

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