

Unit 2: Ideating and Understanding Invention Convention

15 Classes

Rev. September 2023

Essential Questions

- How does brainstorming help people come up with ideas for their inventions?

Enduring Understandings with Unit Goals

EU 1: Inventing is finding a problem and designing a real solution to fix it.

- Brainstorming is a technique used to think of many ideas.

EU 2: SCAMPER is a technique used to look at objects differently and can help an inventor innovate on an existing problem.

- Combining objects can help an inventor innovate on an existing problem.

Standards

Common Core State Standards

- **CCSS.ELA-Literacy.W.8.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- **CCSS.ELA-Literacy.SL.8.1:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
- **CCSS.ELA-LITERACY.CCRA.SL.1:** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- **CCSS.ELA-LITERACY.CCRA.R.7:** Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

Next Generation Science Standards

- **MS-ETS1-1 Engineering Design** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- **MS-ETS1-2 Engineering Design** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

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- **NGSS.SEP.1:** Asking questions and defining problems
- **NGSS.SEP.6:** Constructing explanations (for science) and designing solutions (for engineering)
- **NGSS.SEP.8:** Obtaining, evaluating, and communicating information

ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.

Competency 2: Speak to diverse audiences in an accountable manner.

Competency 3: Develop the behaviors needed to interact and contribute with others on a team.

Competency 4: Analyze and solve problems independently and collaboratively.

Competency 5: Be responsible, creative, and empathetic members of the community.

Unit Content Overview

- The Problem with Inventions
- SCAMPER
- What's The Problem?
- Studious Solutions
- What is brainstorming?
- Make It Easier
- Mystery Bag
- Does my Invention Already Exist?

Daily Learning Objectives with Do Now Activities

Students will be able to...

- Identify problems and develop solutions for problems.
 - Inventors identify problems to solve. How might inventors identify problems? Examples: observing people, talking to people, reading and watching the news, experiencing the problem themselves, etc.
- Describe and apply the brainstorming process to analyze an object and repurpose it, add to it, and subtract from it. **
 - What is brainstorming? How does brainstorming help people come up with ideas

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for their inventions?

- Describe what decision making is. Implement the steps of decision making to choose and record at least one problem for which they would like to design a solution. Identify problems in their classroom, school and or community that they could design an invention to solve. **
 - Think about who and what matters to you. Identify at least one problem to solve in your log book. We'll work on identifying more problems to solve.
- Recognize how inventions can make the daily lives of people with disabilities easier. Invent a device to make the life of a physically challenged person easier. **
 - What kinds of problems do disabled people encounter every day that people without disabilities do not have to worry about? What tools already exist to help people with physical disabilities?
- Translate their brainstorming and modeling solutions experiences into formalized ideas with written language.
 - Let's find out more about your problem(s). How do we find out who and how many are affected by the problem? How would we know where these people are?
- Think critically about what problem their product solves.
- Communicate with each other verbally and through writing about future inventions.
 - Why is it important for inventors to do research and talk to people about their inventions?

Instructional Strategies/Differentiated Instruction

- Daily Warm Up Activities
- Lecture slides with note-taking
- Flexible grouping
- Exit slips
- Graphic Organizers
- Creating authentic connections for students
- Rephrasing and restatement of information and concepts
- Student use of headphones
- Independent reading
- Outlining of text
- Determining central ideas, paraphrasing
- Laboratory Experiences

Assessments

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FORMATIVE ASSESSMENTS:

- Exit slips
- Do Now Activities
- SCAMPER worksheets
- Problem solving process worksheet
- The Problem with Inventions worksheet
- Make it Easier reflection

SUMMATIVE ASSESSMENTS:

- Log Books
- EU Quizzes
- Unit Task - Invention Process Rubric Identifying & Understanding and Ideating Dimension
- Unit Test

Unit Task

Unit Task Name: SCAMPER the Penguin

Description: Students will take apart a wind up toy penguin (take apart workshop) and use the techniques of SCAMPER (EU 1 & 2) to improve or repurpose the product.

Unit Resources

- Chromebook
- Internet Access
- PowerPoint
- Invention Logs for each student
- Connecticut Invention Convention Website