

# cobblestone

## THE POWER OF INVENTION

In this issue, students explore how young people across the globe are changing the world through invention.

## CONVERSATION QUESTION

How do inventors impact our everyday lives?

## TEACHING OBJECTIVES

- Students will learn about the qualities inventors possess.
- Students will explain how policies are developed to address public problems.
- Students will illustrate contemporary means of changing societies.
- Students will describe ways in which people benefit from working together.
- Students will conduct research and create a multimedia presentation.
- Students will create a diagram.
- Students will use details from a text to write a summary.



In addition to supplemental materials focused on core Social Studies skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

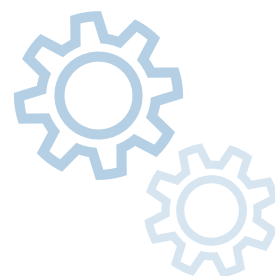
## SELECTIONS

- **Calling All Inventors**  
Expository Nonfiction, ~950L
- **Introducing the FilTurbine Guttering System**  
Expository Nonfiction, ~850L
- **Hooked! Meet Inventor Katelyn M. Sweeney**  
Expository Nonfiction, ~850L

# I CAN INVENT

What are inventions and how can kids invent things that matter?

Inventions are all around us. They solve problems and make our lives easier. **Use this month's magazine to help students learn about the invention process and meet some young inventors through reading about them and their work.** Then, they can try inventing on their own and/or in groups, at school or at home.



*Dear Educator,*

*Your students are invited to use this month's magazine to spark discussion about invention and then share their own invention ideas in the Dr. InBae Yoon Spark!Lab Invention Challenge, an international contest for young inventors sponsored by the Smithsonian and Cricket Media. Students can enter as individuals or teams by submitting a PowerPoint presentation or video outlining their idea. (Your whole class can even participate as a single team!)*

*For 2019, the Challenge is asking students to create entries that enhance the lives of older adults, and we are accepting entries from January 17, 2019–April 5, 2019. Winners can receive prizes, a trip to Washington, DC, to meet other inventors, and an educational session on how to patent their invention!*

*Learn all about [this year's challenge on the website](#), and use this special edition teacher guide to discover how to integrate the magazine into your classroom discussions with Challenge participation!*

*Happy Inventing!*

*The Cricket Media Education Team*



# UNIT OVERVIEW

## Essential Question:

What are inventions and how can kids invent things that matter?

## Supporting Questions:

- How do inventors get their ideas?
- What are some common inventions and what problems do they solve?
- How do inventors impact our everyday lives and make our world a better place?
- What makes an invention successful?
- What special needs might older people have?
- How might I come up with an invention that helps older people stay independent and be mentally, socially and physically active?

## Objectives:

Students will know and be able to:

- describe the steps in the invention process
- engage in the invention process
- participate in a global invention challenge
- explain how inventors use the invention process
- explain the impact of inventions on human society over time
- explore the invention process through articles and by designing and/or inventing an invention
- communicate design ideas using words, drawings and/or models

## Resources:

- February 2019 Invention edition of magazine
- Teacher Resources for leading students in Spark!Lab Invent It Challenge submission: <https://inventitchallenge2019.epals.com/educator-resources/>
- Student Resources for Spark!Lab Invent It Challenge participation: <https://inventitchallenge2019.epals.com/student-resources/>

## Next Generation Science Standards:

- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)
- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria).
- Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1)

See additional standards at the end of the discussion guide.

## Vocabulary

- **invent:** the process of coming up with new ideas or designs to solve problems
- **invention:** a new device or process that's designed to solve a problem
- **inventor:** a person who dreams up, designs, and builds new things that make our lives better
- **invention process:** a series of steps that inventors might follow to come up with a solution to a problem
- **patent:** a legal right given to an inventor by the government that allows the inventor to prevent others from making, selling, or using their invention for a period of time
- **prototype:** a model or practice version of a design that can be tested and checked before an actual version is created
- **senior:** an elderly or aging person, usually retired (also called "senior citizen")
- **sketch:** a drawing (Inventors use sketches to show and explain their ideas and inventions. Sketches are needed to apply for a patent.)
- **user:** a person who will use an invention

Use the following activities to give students opportunities to explore ideas about the topic by participating in both small and large group peer discussions, using the articles they have read and their discussions to support their statements and opinions.

## SPARKING COMPREHENSION AND CONVERSATION

### Introduce the Magazine and the Invent It Challenge

1. **Engage: Introduce Inventors.** Start by sharing pictures of the inventors in the articles. What do these kids and adults have in common? They have invented things that make life better.

*In this magazine, we're going to learn about inventors and their inventions. And, if the class is interested, we can try inventing ourselves and participate in the Spark!Lab Invent It Challenge. Winners can receive prizes, a trip to Washington, DC, to meet other inventors, and learn how to patent and sell their inventions!*



2. **Present the Essential Question: *What are inventions and how can kids invent things that matter?*** Ask students to list inventions they have seen or heard about. Who came up with each invention? How did the person or team come up with the idea? What might have been the process? Post the Essential Question and read it aloud, connecting it to the inventions students mentioned. Remind students that this question does not have one right answer and that they should revisit it with each selection they read.

3. **Activate Prior Knowledge.** As a class, start a 3-column *What, How, Why* Chart. Make the chart on paper or a place on a board where you can keep it throughout the discussion. Ask students to fill in an invention they already know about. Have students continue to complete the class chart as they read selections from the magazine, listing inventions they learn about, who came up with them and how they did it, and finally why the invention is important.

<b>What?</b> What is the invention?	<b>How?</b> Who came up with the invention? How did they come up with it?	<b>Why?</b> Why is the invention important?

4. **Build Background:** Teach the Invention Process. Tell students that there are key steps that inventors often use. Read each step aloud as you write it on the board and share with them the [step-by-step videos found here](#), which contains an explanation of each step.

Invention is a process, from creative ideas all the way to successful marketing. Inventors will usually pass through each of the following steps (though not always in the same order!):



Think It - Identify a problem or need



Explore It - Conduct Research



Sketch It - Make sketches



Create It - Build prototypes



Try It - Test the invention



Tweak It - Refine the invention



Sell It - Market the invention Ask students to think about why each step is important. Tell them to think about these steps as they read and discuss the articles. How is the invention process used by inventors in the articles?

5. **Get Students Thinking About The Challenge.** This year's challenge is about helping older people. Sometimes as we get older, it's harder to do things, such as get up out of a chair, fasten a seat belt, or open a jar. Show the [Learn About the Challenge Video](#). Ask students if they have a grandparent or older person in their lives. Can they think of inventions that make these older people's lives easier?

## Use a Read-Aloud to Spark More Discussion

1. **Preview the Read-Aloud.** Introduce and project the Read-Aloud article, "[Helping Seniors Communicate](#)." Tell students this invention was created for the Spark!Lab Invention Challenge.

- Remind students that they will be discussing this and other articles with each other. Encourage students to jot down details or questions to share with each other.
- Encourage students to listen for details that build understanding around the Essential Question, as well as the invention process, and any information they might add to the class *What, How, Why* Chart.





2. **Introduce the Reading Skill: Prereading.** Before you begin reading, tell students that this article contains headings, pictures, and captions that give clues about the text. Invite students to skim the headings and look at the pictures. Invite students to skim the headings and look at the pictures. Then, ask the following questions:
  - What do you think this article is about?
  - What does it mean to invent?
  - What problem does Matías want to solve?
3. **Introduce Vocabulary.** Introduce two topic-specific words that students will encounter in this article:
  - prototype: a working model
  - patent: a legal right given to an inventor by the government that allows the inventor to prevent others from making, selling, or using their invention for a period of timeBefore providing each definition, have students look for these words in the article itself. Ask students to infer the meanings based on the context. Help students look for context clues in the text and refine their definitions.
4. **Read and Model.** Complete the following activities as you read the selection. Using Headings, use “Think-Alouds” to model how the headings help you navigate the text. For example, after the introductory paragraph, point out the first heading and link it to the first step in the diagram of the Invention Process. Then present this Think- Aloud:

*The heading of this next section is Think It: Describing the Problem. This is the first step in the Invention Process. This helps me know as a reader where I am in the invention process and what happens during the first step. After I read this section, I’ll see if I can describe the first step in the invention process.*
5. **Discuss.** After you read, show students a list of the key steps in the Invention Process. Then discuss each step in the context of Matías’ process.
  - a. Think It: What problem was Matías and his team trying to solve? (They wanted to find a way to help older people communicate with their caregivers.)
  - b. Create It: How did Matías’ team create his invention? (They used a computer program called Flash to create the application.)
  - c. Try It: What did Matías’ team learn from the first round of tests? (The buttons were too small and not all needs could be communicated.)
  - d. Tweak It: How did Matías improve the invention? How could you improve on it? (He made the icons bigger, added more options, and changed the basic words to basic questions.)

## Explore and Discuss the Articles

1. **Preview the Selections.** Tell students it’s now time to read about the process of invention on their own! Direct them to flip through the magazine and preview the articles in this unit. Encourage them to skim each article as they think about which one interests them the most. Explain that while they are encouraged to read all the articles in this magazine, they will be choosing one “focus article” to read closely and discuss with their peers.
2. **Select a Focus Article.** After students have had time to preview the articles, tell them to pick one that they’d like to spend more time on and discuss with their classmates. Have them read a few paragraphs to see if they have any trouble reading it but encourage them to “stretch” their reading skills a little if they like the story.

3. **Read and Take Notes.** Suggest that students track the invention process steps used by the inventor(s) in their focus article. Also remind them to jot down questions they'd like to share with their classmates. When they are finished, encourage students to think about an invention they would like to work on. If they aren't sure, encourage them to read additional articles in the magazine to continue to build their knowledge about inventions and the invention process.
4. **Discuss the Articles.** Have students form small groups based on the article they read. Provide them with the following questions to use as discussion prompts. Tell them that they will be sharing what they learned with the rest of the class, and suggest that one or more students record the answers they come up with. Also, encourage them to add the invention they read about to the class *What, How, Why* Chart.

#### Discussion Prompts

- What problem does each inventor try to solve?
- What solutions does the inventor consider or try?
- How well did the first design or prototype work?
- How did the inventor improve the invention over time?
- Which steps in the invention process did the inventor follow?
- Who is likely to use the invention and how might it help them?

### Reflect and Discuss

1. **Share Ideas.** Bring the small groups together for a whole-class discussion. Ask students to share what they learned from their individual articles with the rest of the class. Move from group to group, asking volunteers to share the summary of the article, and then important ideas from their discussion.
2. **Synthesize.** After small groups have shared their ideas, discuss the following questions as a class. Encourage students to support their answers with details and evidence from the focus article they read.
  - How do inventions help us in our daily lives?
  - What role might invention play in the future?
  - What would life be like without inventions?
3. **Revisit the Essential Question.** Bring the class together to allow students to share what they've learned. Then, return the conversation to the Essential Question: What are inventions and how can kids invent things that matter?

Allow students to share how their understanding around this question has grown based on their reading and discussions.

### Participate in The Spark!Lab Invention Challenge!

Now that students have built their background knowledge about inventors and the invention process, lead your students in engaging in the invention process, using the theme of the Challenge (helping aging people) and help them submit their ideas online to the international competition.

See the [Spark!Lab invention website](http://www.sparklab.org) for additional details and resources to support students in creating and submitting their invention ideas.



# STANDARDS ALIGNMENT

## National Council of Social Studies Standards

- Theme 2: Time, Continuity and Change
- Theme 8: Science, Technology and Society

## CCSS Anchor Standards for Reading

### Key Ideas and Details

- Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence ... to support conclusions drawn from the text.
- Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
- Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
- Interpret words and phrases as they are used in a text. Integration of Knowledge and Ideas
- Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
- Range of Reading and Level of Text Complexity
- Read and comprehend complex literary and informational texts independently and proficiently.

## Anchor Standards for Writing

### Text Types and Purposes

- Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately.
- Write narratives to develop real or imagined experiences or events. Production and Distribution of Writing
- Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
- Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

### Research to Build and Present Knowledge

- Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
- Draw evidence from literary or informational texts to support analysis, reflection, and research.

**Range of Writing** - Write routinely over extended time frames and shorter time frames for a range of tasks, purposes, and audiences.

## Anchor Standards for Speaking and Listening

- **Comprehension and Collaboration** - Prepare for and participate effectively in a range of conversations and collaborations with diverse partners
- **Presentation of Knowledge and Ideas** - Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.



# Cobblestone® Teacher Guide: February 2019

## Calling All Inventors

pp. 2–5, Expository Nonfiction

Explore the types of knowledge and skillsets used by inventors to solve challenging problems.



## RESOURCES

- Developing Policies

## OBJECTIVES

- Students will read and analyze a nonfiction article.
- Students will learn about the qualities inventors possess.
- Students will explain how policies are developed to address public problems.
- Students will conduct research and create a multimedia presentation.

## KEY VOCABULARY

- federal programs (p. 3)** projects, services, or activities provided by the federal government that directly assist individuals or groups in areas benefiting people socially or economically
- STEM (p. 3)** an acronym for the fields of science, technology, education, and mathematics
- foundation (p. 5)** underlying support for ideas

## ENGAGE

**Conversation Question:** How do inventors impact our everyday lives?

Ask students to share what comes to mind when they hear the word *inventor*. Discuss the skills and knowledge they think inventors need to have. Then ask students if there are any specific school or community programs (such as clubs, activities, or groups) that help young people develop these skills and knowledge.

## INTRODUCE VOCABULARY

Read aloud the vocabulary words and definitions. Then display the sentences below. Have students use the vocabulary words to correctly complete the sentences. Then remind students to look for the vocabulary words as they read the article.

- \_\_\_\_\_ activities provide a \_\_\_\_\_ that young people can build on to become successful inventors.
- Certain \_\_\_\_\_ were developed to assist young people in pursuing \_\_\_\_\_-related careers.

## READ & DISCUSS

Have students read the article with a partner. Then use these prompts for discussion:

- What federal programs were developed to help people pursue STEM-related careers?
- What public problems might STEM-related education help to solve?
- How have young inventors used STEM-related skills to solve problems in the world?

## SKILL FOCUS: Explain Policies

**INSTRUCT:** Explain that the article mentions two different federal programs that were designed to assist people in pursuing new careers, especially those related to STEM. Also explain that the article describes the problems or needs that these programs aimed to solve or meet.

**ASSESS:** Distribute the *Developing Policies* worksheet. Have students work independently to reread the article and record on their worksheets the problem or need that led to the development of each program. Then have students work in small groups to create a new policy that could help young people acquire STEM skills and knowledge.

## EXTEND

**English Language Arts** Have students conduct research to learn about a current government program (federal, state, or local) or a privately sponsored program that helps young people acquire STEM skills and knowledge. Then have students create and give a multimedia presentation describing how the program works.

## Developing Policies

In the first column below, record the titles of the two federal programs described in the article. In the second column, use details from the article to explain why each program was created.

Title of Federal Program	What problem or need does it solve or meet?

## Imagining the Future

Think of a problem or need in our society today that could be solved or met by people who possess STEM skills and knowledge. Come up with a federal government program that could support the acquisition of the necessary STEM skills and knowledge. Describe your program below. Be sure to include this information:

- Why you created your program
- What your program provides
- Who benefits from your program

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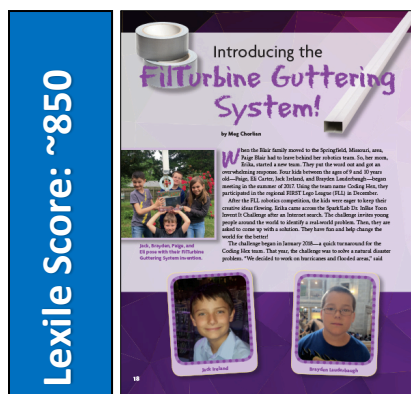
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# Cobblestone® Teacher Guide: February 2019

## Introducing the FilTurbine Guttering System

### pp. 18–21, Expository Nonfiction

Learn how a group of students from Missouri created a problem-solving system that filters rainwater and creates electricity.



## OBJECTIVES

- Students will read and analyze a nonfiction article.
- Students will learn about the qualities inventors possess.
- Students will illustrate contemporary means of changing societies.
- Students will create a diagram.

## KEY VOCABULARY

- **prototype (p. 19)** a first model of something, such as a machine, made to be copied later
- **tangible (p. 21)** used to describe something that can be touched or felt; physical

## ENGAGE

**Conversation Question:** How do inventors impact our everyday lives?

Ask students what needs people have after a natural disaster. Guide them to understand the importance of having a source of clean water and a source of energy. Then have them hypothesize what kinds of inventions (existing or not-yet-made) could help meet those needs.

## INTRODUCE VOCABULARY

Read aloud the vocabulary words and definitions. Then have students make predictions about the topic of the article based on the vocabulary words. If necessary, help students guess the topic by revealing the title of the article. Remind students to look for the vocabulary words as they read the article.

## READ & DISCUSS

Have students read the article with a partner. Then use these prompts for discussion:

1. What problem did the team's invention help solve?
2. How did the team come up with its idea?
3. Think about the way the kids on this team worked together. What attitudes and behaviors helped them become successful inventors?

## SKILL FOCUS: Illustrate Examples

**INSTRUCT:** Explain that to "illustrate contemporary means of changing societies" means to explain how a specific contemporary event or development occurred. Continue by telling students that the explanation may be communicated orally, visually, or in writing. Remind students that the theme they've been focusing on in this article is "how to improve people's lives through invention."

**ASSESS:** Display this question: "How did the student team from Missouri change the way people could obtain water and energy during and after a hurricane?" Have students work in pairs to answer the question, using facts and information from the article. Then have students summarize their findings—orally, visually, or in writing—and present them to the class.

## EXTEND

**Science** Point out that the physical characteristics of the FilTurbine invention are described in the second and third paragraphs on page 19 of the article. Have students reread this section of the article and use details from the text to help them draw a diagram of the FilTurbine Guttering System. Have students label the parts of the system.

# Cobblestone® Teacher Guide: February 2019

## Hooked! Meet Inventor Katelyn M. Sweeney

pp. 34–37, Expository Nonfiction

Discover how a young girl who once wanted to become an actor got hooked on inventing!



### OBJECTIVES

- Students will read and analyze a nonfiction article.
- Students will learn about the qualities inventors possess.
- Students will describe ways in which people benefit from working together.
- Students will use details from a text to write a summary.

### KEY VOCABULARY

- **mechanical engineering** (p. 34) the branch of engineering dealing with the design, construction, and use of machines
- **technical** (p. 35) having to do with the use of science
- **resourcefulness** (p. 37) the ability to find clever ways to deal skillfully with new situations and challenges

### ENGAGE

**Conversation Question:** How do inventors impact our everyday lives?

Ask students to think about the qualities that successful inventors must possess. Then ask them to hypothesize why working in groups might assist inventors in accomplishing their goals.

### INTRODUCE VOCABULARY

Review the vocabulary words and their definitions. Then have students work in small groups to create a single sentence that uses all three words correctly. Invite groups to share their sentences. Finally, tell students to look for the vocabulary words as they read the story.

### READ & DISCUSS

Have students read the article with a partner. Then use these prompts for discussion:

1. How did Katelyn become interested in inventing, and what does she want to do in the future?
2. What qualities does Katelyn believe make a good inventor?
3. Why might being a mechanical engineer require Katelyn to work on teams with others?

### SKILL FOCUS: Describe Benefits

**INSTRUCT:** Point out that inventors often work in teams to accomplish specific goals. Then read aloud the following quote from the article: “When you try to invent by yourself it’s too easy to get stuck on one idea or to hit a roadblock and run out of ideas.” Ask students to share examples of when this statement was true for them.

**ASSESS:** Have students work in pairs to reread page 35. Ask partners to make inferences about why working on a team helped Katelyn and the others accomplish their goal of creating a comfortable prosthetic socket.

### EXTEND

**English Language Arts** Remind students that the article discusses the path Katelyn M. Sweeney took to become an engineer who works on technical inventions. Ask students to use details from the text to write a summary of Sweeney’s life, beliefs, and accomplishments.