Expert Pack: Inventors

Submitted by: South Tippah School District, Mississippi
Grade: 2 Date: February 2016

Topic/Subject
Inventors

Texts/Resources

Books
1. *Oh, The Things They Invented!*
2. *Who Was Ben Franklin?*

Articles
3. "Building a Better Bicycle"
4. "Ben's Bright Ideas"
5. "Eureka: How the Invention of Everyday Objects Changed the World"

Video
6. "Kid President: How to be an Inventor"

Each expert pack contains a variety of selections grouped to create as coherent and gradual a learning process for students as possible, generally beginning with lower levels as measured by quantitative and qualitative measures, and moving to more complex levels in the latter selections. This gradated approach helps support students' ability to read the next selection and to become 'experts' on the topic they are reading about.
Refer to annotated bibliography on the following pages for the suggested sequence of readings.

Rationale and suggested sequence for reading:

This Expert Pack begins with the engaging video, "Kid President: How to be an Inventor" to hook students into the world of inventions. This will make students excited about the process of inventing and may lead them to think that anyone can become an inventor. This video also shows that inventors are not just historical figures, but also living in today's world. Next, is the read aloud of *Oh, The Things They Invented!* This exposes students to a variety of inventors and inventions from 1439 to present day, as it informs students about how different inventors have made the world a better place. It also allows students to see that inventors were ordinary people with curious minds and creative spirits.

Next the article "Building a Better Bicycle" will be used in order to hone in on a specific invention students can understand. It is important for a young learner to digest how inventions like the improvement of the bicycle have impacted their lives. The next resource will be used in multiple readings: "Eureka: How the Invention of Everyday Objects Changed the World." This resource is at an appropriate reading level, but the volume is too much for an emerging reader. The content, however, is viable. Students have previously related the problem-solving of the bicycle and now this article will help them understand that inventors do not always know what will come from their work.

The next article "Ben's Bright Ideas" causes students to look at people who met a need for something with a creative solution. At the same time, it gives a brief introduction to some of the inventions of Benjamin Franklin, which is the source of the next resource. It highlights Franklin, but also shows some kid inventors, which will hopefully inspire students.

The final resource is the book, *Who Was Ben Franklin?* This text will act as a culminating study of inventors with the great contributions of a mighty man in history. Students will gain an overview of many inventions that have

made an impact on our American lives with this fun and exciting illustrated biography. The previous resources are necessary to buildcontent knowledge about inventing and inventions in order to understand Franklin's innovations.

The Common Core Shifts for ELA/Literacy:

1. Regular practice with complex text and its academic language
2. Reading, writing and speaking grounded in evidence from text, both literary and informational
3. *Building knowledge through content-rich nonfiction*

Though use of these expert packs will enhance student proficiency with most or all of the Common Core Standards, they focus primarily on Shift 3, and the highlighted portions of the standards below.

College and Career Readiness Anchor Standards for Reading Literary and/or Informational Texts *(the darkened sections of the standards are the focus of the Expert Pack learning for students)***:**

1. ***Read closely to determine what the text says explicitly and to make logical inferences from it*****;** cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. ***Determine central ideas or themes of a text*** *and analyze their development*; summarize the key supporting details and ideas.

10. **Read and comprehend complex literary and informational texts independently and proficiently**

Annotated Bibliography
and suggested sequence for reading

N/A "Kid President: How to be an Inventor"

Author: Unknown

Genre: Video

Length: 5 minutes

Synopsis: This video gives students an idea about what an inventor does through the view of a young person who wants to create a vacuum cleaner that does not scare his cat. Kid President shows the process that an inventor goes through-from an idea- to implementation of the idea-to the creation of a product.

Citation: "Kid President: How to be an Inventor" (n.d.) Retrieved September 10, 2015 from https://www.youtube.com/watch?v=75okexRzWMk

Cost/Access: $0.00 https://www.youtube.com/watch?v=75okexRzWMk

Recommended Student Activities: Wonderings

NC900L *Oh, The Things They Invented!* (Adult-assisted read aloud)

Author: Bonnie Worth

Genre: Informational, rhyming text

Length: 42 pages

Synopsis: This Dr. Seuss-inspired rhyming text gives a history of various inventors in a fun, unique way, including drawings of the inventions and the inventors.

Citation: Worth, B. (2015). *Oh, the things they invented*. New York, NY: Random House.

Cost/Access: $9.99

Recommended Student Activities: A Picture of Knowledge

560L "Building a Better Bicycle"

Author: Linda Ruggieri

Genre: Informational text

Length: 1 page

Synopsis: This brief article gives a history of how the bicycle evolved over 200 years from an uncomfortable invention to today's modern, popular mode of transportation.

Citation: Building a Better Bicycle. (n.d.) Retrieved September 9, 2015, from http://www.readworks.org/passages/building-better-bicycle

Cost/Access: $0.00 Read Works http://www.readworks.org/passages/building-better-bicycle

Recommended Student Activities: Quiz at the end of the selection

630L "Eureka: How the Invention of Everyday Objects Changed the World"

Author: Brenna Maloney

Genre: Informational text

Length: 4 pages (Starts on page 10 of the publication linked below)

Synopsis: This informational text explores how inventors have tried and failed to create new innovations. It highlights how these inventions have improved the lives of Americans.

Citation: Maloney, B. (2013, Jan/Feb). Eureka: How the Invention of Everyday Objects Changed the World. *National Geographic Explorer*. Retrieved from http://content.yudu.com/A200by/NGXPFJanFeb2013/resources/index.htm?referrerUrl=http%3A%2F%2Fngexplorer.cengage.com%2Fpathfinder%2F1301%2Fteachers.html

Cost/Access: $0.00
http://content.yudu.com/A200by/NGXPFJanFeb2013/resources/index.htm?referrerUrl=http%3A%2F%2Fngexplorer.cengage.com%2Fpathfinder%2F1301%2Fteachers.html

Recommended Student Activities: 4 Corners

800L "Ben's Bright Ideas"

Author: Unknown

Genre: Informational text

Length: ½ page

Synopsis: This article gives a brief introduction to some of Benjamin Franklin's most important inventions.

Citation: Ben's Bright Ideas. *Scholastic Scope* (2006) 54.9: 15. Middle Search Plus. Web 20 Aug 2015.

Cost/Access: $0.00

Recommended Student Activities: Quiz Maker

540L ***Who Was Ben Franklin?***

Author: Dennis Brindell Fradin

Genre: Informational text

Length: 105 pages

Synopsis: This book is a funny and engaging look at Benjamin Franklin's life and career, including his inventions and timeline of his life.

Citation: Fradin, D., & Brien, J. (2002). *Who was Ben Franklin?* New York: Grosset & Dunlap.

Cost/Access: $5.99

Recommended Student Activities: A Picture of Knowledge

Supports for Struggling Students

By design, the **gradation of complexity** within each Expert Pack is a technique that provides struggling readers the opportunity to read more complex texts. Listed below are other measures of support that can be used when necessary.

- Provide a brief **student-friendly glossary** of some of the academic vocabulary (tier 2) and domain vocabulary (tier 3) essential to understanding the text

- Download the Wordsmyth widget to classroom computers/tablets for students to access student-friendly definitions for unknown words. http://www.wordsmyth.net/?mode=widget

- Provide brief **student friendly explanations** of necessary background knowledge

- Include **pictures or videos** related to the topic within and in addition to the set of resources in the pack

- Select a small number of texts to **read aloud** with some discussion about vocabulary work and background knowledge

- Provide **audio recordings** of the texts being read by a strong reader (teacher, parent, etc.)

- **Chunk the text** and provide brief questions for each chunk of text to be answered *before* students go on to the next chunk of text

- Pre-reading activities that focus on the **structure and graphic elements** of the text

- Provide **volunteer helpers** from the school community during independent reading time.

Text Complexity Guide

"Building a Better Bicycle" by Linda Ruggieri

1. **Quantitative Measure**

   Go to http://www.lexile.com/ and enter the title of the text in the Quick Book Search in the upper right of home page. Most texts will have a Lexile measure in this database. You can also copy and paste a selection of text using the Lexile analyzer.

560L

2-3 band	420 -820L
4-5 band	740 -1010L
6-8 band	925 - 1185L
9 -10 band	1050 – 1335L
11 – CCR	1185 - 1385

2. **Qualitative Features**

   Consider the four dimensions of text complexity below. For each dimension*, note specific examples from the text that make it more or less complex.

The purpose of the article is to highlight the major points in the history of the creation of the bicycle from being constructed of wood to today's version of bicycles. The article also discusses the safety features of old versus modern bicycles. **Meaning/Purpose**	The article is extremely well organized chronologically for students. It begins with the first bicycle created and follows through, using language specific transition words, to examine the changes that have occurred over time. Short paragraphs add to the ease of the structure. **Structure**
Language The text is fairly short, but some sentences are wordy for second graders. Transition words are used, which help students see the change in time chronologically. The vocabulary overall is simple, however, the students might find a few words (boneshaker, comfortable, reflectors) to be troublesome.	The subject matter should be familiar to students. Bicycles, for the most part, are universal. Students will have to use their imaginations to picture what earlier bicycles would have looked like, although teachers may also find examples to show. **Knowledge Demands**

3. **Reader and Task Considerations**

   What will challenge students most in this text? What supports can be provided?

- Having students chunk the sentences in the passage and then place them back together to create the chronological order will help with chronology and transition word organization.
- Imagining and drawing or discussing what previous bicycles may have looked like will help with the cognitive processes and article comprehension.
- Examining pictures and matching them with their statements in the text will help with description. Students could then use the pictures to put the creation of the bicycle in order from the first bicycle to the modern one.
- Encouraging students to make connections to the other texts in the set could support and deepen understanding.

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Learning Worth Remembering

Cumulative Activities—The following activities should be completed and updated after reading each resource in the set. The purpose of these activities is to capture knowledge building from one resource to the next, and to provide a holistic snapshot of central ideas of the content covered in the

1. Rolling Knowledge Journal

1. Read/view each selection in the set, one at a time.

2. After you read/view each resource, stop and think what the big learning was. What did you learn that was new and important about the topic from this resource? Write, draw, or list what you learned from the text about the topic.

3. Then write, draw, or list how this new resource added to what you learned from the last resource(s).

Sample Student Response

Title	Write, Draw, or List	
	New and important learning about the topic	**How does this resource add to what I learned already?**
1. "Kid President: How to Be an Inventor" (Video)	What an inventor is supposed to do; the job of the inventor.	
2. *Oh the Things They Invented!*	There are a lot of different inventors and inventions that have been created	Gives an idea about specific inventors like Eli Whitney's creation of the cotton gin and how these inventions changed our lives.
3. "Building a Better Bicycle"	The first bicycles were a lot different than they have become. They were unsafe and poorly made.	Items we like and use have been tinkered with over the years to make the items better.
4. "Eureka: How the Invention of Everyday Objects Changed the World"	There is a story behind every invention including accidents that create inventions.	Inventions have changed the world even when they did not intend to. Sometimes inventors do so without knowing.

5. "Ben's Bright Ideas"	Benjamin Franklin invented glasses, an odometer, a hand-reacher, and a stove.	Franklin's creations have been improved upon throughout the years. He kicked off several ideas.
6. *Who Was Ben Franklin?*	Benjamin Franklin created many inventions that have improved our lives.	A lot of the purposes behind inventions are the improvement of every day lives, including our own.

2. Rolling Vocabulary: "Sensational Six"

- Read each resource then determine the 6 words from each text that most exemplify the central idea of the text.
- Next use your 6 words to write about the most important idea of the text. You should have as many sentences as you do words.
- Continue this activity with EACH selection in the Expert Pack.
- After reading all the selections in the Expert Pack, go back and review your words.
- Now select the "Sensational Six" words from ALL the word lists.
- Use the "Sensational Six" words to summarize the most important learning from this Expert Pack.

Title	Six Vocabulary Words & Sentences
"Kid President: How to be an Inventor"	**Words: Inventor, Problem-Solver, Goal, Safety, Magnifying, Owners** The **inventor** makes something new that helps with a problem we have. In that way he/she is a **problem-solver**, fixing problems that we have in our daily lives. The inventor first sets a **goal** about what he/she wants to invent. While working on this project, **safety** is a big concern. That is why safety glasses are worn. In some cases, **magnifying** glasses are worn to make objects seem bigger than they are. At the end, when the invention is finished, the inventions is sold or given to people, who then become the **owners** of that invention.
Oh The Things They Invented!	**Words: Contributor, Adjust, Process, Deflect, Stock, Transmit,** An inventor is a **contributor** to the world's solutions. He/she will **adjust** or fix problems that seem difficult to most individuals. The inventor uses a **process**, a fixed way of doing things, to create his/her invention. If the invention is not going the way the inventor wants, he/she may **deflect** from the direction he/she is taking while working on the project. Once the project is complete and successful, a company will produce a large **stock** of the invention to sell to different groups. Some inventions **transmit** waves of information through various techniques.

"Building a Better Bicycle"	**Words: History, Interesting, Developed, Comfortable, Problem, Solution** The **history** of the creation of the bicycle is very **interesting**. It took many years to get to what a modern bicycle looks like today. Over time, the bicycle **developed** from an uncomfortable wooden machine to a more **comfortable** ride. The **problem** was that the old bicycles were made in such a way that they were dangerous to ride and were too bumpy. The **solution** to that problem has helped thousands of kids enjoy the bicycle.
"Eureka: How the Invention of Everyday Objects Changed the World"	**Words: Create, Need, Discovery, Patience, Simple, Complex** Inventors **create** products that make our lives easier. A lot of times inventors look for a **need** that people have and try to fulfill that need. Sometimes an accidental **discovery** can help create a project that changes people's lives. Most times, however, an inventor needs **patience** to work on projects for long periods of time. Some inventions are **simple** machines that require very little work or effort and others are more **complex** and difficult to understand how they work.
"Ben's Bright Ideas"	**Words: Constantly, Situation, Efficiently, Designs, Remains, Often** Inventors are **constantly** working on projects to make the world a better place. They try to take a bad **situation** and turn it around for the good. They **efficiently** draw up various **designs** for their projects to see which one will work the best. While the work can be rewarding, it **remains** a frustrating job when the invention does not work. **Often** it takes many tries to create a single product.
Who Was Ben Franklin?	**Words: Founding, Scientists, Experiment, Invention, Findings, Conductor** Benjamin Franklin was one of our greatest **founding** fathers of our nation. But even more than that, he was one of our first great **scientists**. He would **experiment** with all types of materials to come up with one single **invention**, like the franklin stove. He would write down his **findings** in a journal to keep up with how a project worked and how it needed to be fixed. He even discovered how certain elements can act as a **conductor** to produce electricity.
Sensational Six	**Inventor, Create, Process, Experiment, Problem, Solution**
Summary: An **inventor** spends a great deal of time in a lab tinkering on various objects, trying to come up with an invention that will better our lives. To **create** this invention, the inventor must go through several steps called a **process** to see if his **experiment** will work. He/she must first discover what the **problem** is that needs to be fixed. After that, the inventor will work towards a **solution** and will **experiment** with different materials to invent a single product.	

Learning Worth Remembering

Singular Activities—the following activities can be assigned for each resource in the set. The purpose of these activities is to check for understanding, capture knowledge gained, and provide variety of ways for students to interact with each individual resource. Students may complete some or none of the suggested singular activities for each text. Singular activities should be assigned at the discretion of the teacher.

1. Wonderings (Recommended for the Video "Kid President: How to Be an Inventor")

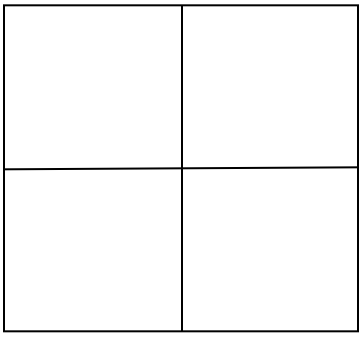
On the left, track things you don't understand from the video as you watch.

On the right side, list some things you still wonder (or wonder now) about this topic.

I'm a little confused about:	This made me wonder:

2. A Picture of Knowledge (Recommended for *Oh the Things They Invented!* and *Who Was Ben Franklin?*

A. Take a piece of paper and fold it two times: once across and once top to bottom so that it is divided into 4 quadrants.



B. Draw these shapes in the corner of each quadrant.

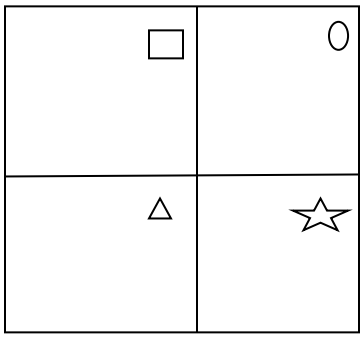
1. Square

2. Triangle

3. Circle

4. Star

C. Write!



Square: What one thing did you read that was interesting to you?
Triangle: What one thing did you read that taught you something new?
Circle: What did you read that made you want to learn more?
Star: What is still confusing to you? What do you still wonder about?

D. Find at least one classmate who has read [selection] and talk to each other about what you put in each quadrant

3. Pop Quiz (Recommended for "Building a Better Bicycle")

Use the quiz at the end of the selection.

4. Four Corners (Recommended for "Eureka: How the Invention of Everyday Objects Changed the World"

1. There will be four letters in four different corners of the room (A, B, C, and D).
2. Students will then be posed four different statements and asked to go to which corner they agree with most.
    A. I would like to invent something that is very simple, but useful.
    B. I would like to invent something that is very complex and might or might not be useful.
    C. I want to change the world with my invention.
    D. I am willing to keep trying over and over again until my invention is perfected.

3. Teachers will facilitate a discussion with students over their choices. Students will need to cite information from the text.

5. Quiz Maker (Recommended for "Ben's Bright Ideas")

- Make a list of # of questions that would make sure another student understood the information.
- Your classmates should be able to find the answer to the question from the resource.

- Include answers for each question.
- Include the where you can find the answer in the resource.

Question	Answer	Where It Is Found?
1.		
2.		
3.		
4.		

Expert Pack: Inventors

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Expert Pack Glossary

"Kid President: How to be an Inventor"

Word	*Student-Friendly Definition*
Goal	A goal is a result that a person desires. A student's goal may be to have an all "A" report card.
Safety	Safety means being protected from danger. Bicyclists wear helmets to protect their heads to keep them safe in case of a crash.

Oh The Things They Invented!

Word	*Student-Friendly Definition*
Adjust	Adjust means to change like when the wind is blowing too hard through a window, you can adjust the window by closing it.
Contributors	Contributors are persons or things that give or add something. A person who is a contributor may add glitter to your project to make it sparkle.
Deflect	Deflect means to change direction. When a baseball is hit by a bat it is deflected and sent in another direction.
Fumes	Fumes are gas or smoke and some can be seen from the exhaust pipe at the bake of a car on a winter's day.
Impaired	Impaired means something is damaged. When something is damaged it has less strength or ability. If a car's tire is damaged, the car cannot drive.

Input	Input is information fed into a computer, usually by a person typing up that information.
Output	Output is information that comes out of a computer. Output can be in the form of a question we needed answered, that the computer gave us.
Process	Process is a series of steps that a person takes when trying to tackle a project. There is a process for baking a cake like when to add eggs and milk and flour, when to mix, and when to bake.
Stock	Stock is a supply of items. A grocery store has a stock of supplies like eggs, milk, and orange juice.
Transmit	Transmit means to send information in various ways. Babies transmit information by the way they cry. They may be hungry, upset, or need a new diaper.
Vibrations	Vibrations are shaking motions, like when a hummingbird flies near you; his wings make vibrating noises because the wings are beating against each other so fast.

"Building a Better Bicycle"

Word	*Student-Friendly Definition*
Comfortable	Comfortable means providing something that is physically relaxing or pleasant. A bed or recliner may be comfortable or an old quilt that keeps you warm may make you feel relaxed.
Boneshaker	Boneshaker means something that is bumpy like when riding along a road with many hills and twists and turns, your body might begin to shake!
Reflectors	Reflectors have light bounce off of them so they can be seen in the dark. People wear reflectors in the dark so they show up when cars (with their lights) come close to them.

"Eureka: How the Invention of Everyday Objects Changed the World"

Word	*Student-Friendly Definition*

Complex	Complex means something that is not simple; more difficult to put together. A 5000 piece puzzle is complex.
Chaotic	Chaotic means that there is no order involved like when an anthill is destroyed, the ants are moving all over the place in a chaotic manner.
Model	A model is an example of an invention in a smaller form. Before building a space rocket, scientists will build a smaller version that people can actually carry in order to make sure the rocket will work properly.
Patent	A patent is a piece of paper showing that the inventor has created a particular invention.
Prototypes	A prototype is an early version of an invention where scientists and inventors are trying to fix the problems with the project.

"Ben's Bright Ideas"

Word	*Student-Friendly Definition*
Spectacles	Spectacles are eye-glasses, which help people see more clear.
Efficiently	Something that is done quickly and without much waste. To be efficient, a baker wants to measure all ingredients to not waste any and bake as many items as possible, as quickly as possible.
Routes	Routes are roads or ways to travel from one place to another. You travel a route to get from your house to the school each day.
Circulating	Things move in and out of a certain place, like a library or the human heart.

Who Was Ben Franklin?

Word	*Student –Friendly Definition*
Inventor	Someone who is the first to think of or make something. There was an inventor to the computer and for the TV.

Inventions	The outcome of inventing something is a product. That product is called an invention.
Experiment	A test used to discover something not known. Scientists often use experiments to learn new things and make discoveries.
Solution	A way of solving a problem or dealing with a tough situation. The solution to bad grades is to work harder and listen more in class.
Electricity	A kind of energy that is used for light and heat and for making things work. Electricity makes the lights come on in the house and make the washer and dryer clean our clothes.
Conductor	Anything that carries or allows heat, electricity, or sound to pass through it. Metals like copper act as conductors of electricity to help our houses have power.