Expert Pack: Inventors

Lexile Range: 630-1070

Topic/Subject: Inventors

Texts/Resources

Articles

1. "Eureka: How the Invention of Everyday Objects Changed the World"
2. "Franklin, Benjamin"
3. "Invention"
4. "Jobs, Steve"
5. "The 20 Most Fascinating Accidental Inventions"

Video

1. "Kid President: How to be an Inventor"

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 an article, "Invention," that explains what an invention is and how it is different than "discovery." The article also briefly touches on the importance of inventions to help people, which is the big idea we want students to understand from this expert pack. Additionally, students learn about a few famous inventors and their inventions.

The next resource, "Eureka: How the Invention of Everyday Objects Changed the World," builds on students' understanding about what an invention is by explaining how several inventions affect everyday lives. The next two resources are all informative texts about specific inventors. The two articles, "Franklin, Benjamin," and "Jobs, Steve," will provide information on specific inventors, why they made the invention, and some interesting information about these inventors. The last article, "The 20 Most Fascinating Accidental Inventions" will hopefully engage students in how fun inventors can have and what they can stumble upon by trying to create something. The goal for this final article is to provide students interesting information in order to build engagement and interest in researching other inventions or inventors after finishing this research set.

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

College and Career Readiness Anchor Standards for Reading Literary and/or Informational Texts

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

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". Retrieved from https://www.youtube.com/watch?v=75okexRzWMk

Recommended Student Activities: Wonderings

890L "Invention"

Author: World Book

Genre: Informational Article

Length: 1 page

Synopsis: This short informational article introduces students to what an invention is and the purpose for inventions as well as explains a few specific inventions.

Citation: Invention. (2016). In World Book Kids. Retrieved from http://worldbookonline.com/kids/home#article/ar831041 ; Search for "Invention" if article does not automatically populate.

Recommended Student Activities: Pop Quiz

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%2Fn gexplorer.cengage.com%2Fpathfinder%2F1301%2Fteachers.html

Recommended Student Activities: 4 Corners

650L "Franklin, Benjamin"

Author: World Book

Genre: Informational text

Length: 1 page

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

Citation: Franklin, Benjamin. (2016). In World Book Kids. Retrieved from http://worldbookonline.com/kids/home#article/ar830811

Recommended Student Activities: Quiz Maker

1070L Jobs, Steve

Author: Jarice Hanson

Genre: Informational text

Length: 1 page

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

Citation: Hanson, J. (2016). Jobs, Steve. In *World Book student*. Retrieved from http://worldbookonline.com/student/article?id=ar725684

Recommended Student Activities: Quiz Maker

790L "The 20 Most Fascinating Accidental Inventions"

Author: Pamela Cyran and Chris Gaylord

Genre: Article

Length: 2 pages

Synopsis: Most inventors strive for weeks, months, or years to perfect their products, but sometimes, brilliance strikes by accident. This article is a salute to the scientists, chefs, and everyday folk who stumbled upon greatness – and, more important, shared their mistakes with the world.

Citation: Cyran, P. & Gaylor, C. (2012). "The 20 Most Fascinating Accidental Inventions", retrieved from http://www.csmonitor.com/Technology/2012/1005/The-20-most-fascinating-accidental-inventions/Matches

Recommended Student Activities: 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.
- Use Expert Packs as the **resources for Guided Reading** with a small group of students

Why Text Sets Support English Language Learners

Those acquiring English as a second language have to learn many words in English to catch up with their English-only peers. Vocabulary builds at a much quicker pace when reading a set of connected texts. Text sets are an adaptable resource perfect for building knowledge and vocabulary. Student use of text sets can vary in terms of independence or teacher supports based on the individual needs of the students in the room. Activities found within the text set resources reflect several best practices for English Language Learner instruction including:

- Providing brief, engaging texts that provide a high volume of reading on a topic.
- Providing web-based resources and/or videos that are tied to the content of the texts students are reading.
- Providing opportunities for students to learn new vocabulary through the use of student-friendly definitions in resource-specific glossaries.
- Allowing for options to reinforce newly learned vocabulary and/or content through graphic organizers.
- Providing opportunities for students to reinforce new vocabulary through multi-modal activities including written work, group discussion, viewing visual content, and reading texts that feature the vocabulary.

Teachers of ELLs may use the protocols on the following pages to provide additional support to students who are struggling to access the content within text sets because they are new to English.

ELL Text Set Protocol Grades 3-12

The goal of text sets is to help students build knowledge through a volume of independent reading, and it is important that educators provide scaffolds to allow English Language Learners to be successful in engaging meaningfully with the texts, even as students are still developing English language skills. The protocol below can be used for teaching with text set resources as a full class. Students can also be trained on the protocol so that they can utilize text sets in small groups or partnerships as a resource for independent or reciprocal reading and study.

Please note that this protocol includes options for teachers. Individual decisions should be made considering the needs of the students and the demands of the content, keeping in mind that the goal of each scaffold is to allow students to meaningfully access the text and move toward independent, knowledge-building reading.

Step one: Build knowledge and vocabulary.

Introduce students to the overall topic/content of the text set, including knowledge demands needed to engage in the content, and domain-specific vocabulary necessary for comprehension. This should be done prior to engaging with the texts themselves; time allotted to this activity should reflect student needs (anywhere from 5 minutes prior to reading, to a full day's lesson is appropriate).

Options for this step include:

- Engage students in reading and discussing auxiliary texts (of lesser complexity) and resources (illustrations, photographs, video clips) on the topic of the text set.
- Pre-teach a few key content-specific terms prior to students engaging with a text set. (Ideas for text-focused vocabulary instruction can be found here.)
- Provide the student-friendly glossary included in the text set prior to reading each text.
- When possible, allow students to read texts in their home language about the topic under study.

Step two: Read text orally.

Focusing on one resource at a time, allow students to listen to a fluent read of the resource, while following along with their own copy of the text.

Options for this step include:

- Have a fluent reader model the first read of a text or resource.
- Have students engage in a buddy/partner read.
- Use recordings of the text to provide additional opportunities to hear expert reading.

Step three: Engage in group discussion about the content.

Allow students time in partnerships or small groups to discuss the content of the resource.

Options for this step include:

- Allow for discussion/conversation (in the students' home language if possible) with a small group of students reading the same text set prior to writing or provide heterogeneous language groupings to talk about content and discuss what students are learning.
- Have students refer to the student-friendly glossary included with each text set to identify meanings for new vocabulary necessary for comprehension.

Step four: Write about what was read.

Options for this step include:

- Use the "Rolling Knowledge Journal" and/or "Rolling Vocabulary Journal" as a shared writing routine/graphic organizer to help to scaffold the writing process and capture student knowledge over time.

- Provide students with several supports to help students engage in writing/drawing about what they read:
    - Use mentor texts about which students can pattern their writing.
    - Allow them to write collaboratively.
    - Show students visual resources as prompts, etc.
    - Provide language supports such as strategically chosen sentence starters.

Repeat steps one through four with each resource in the text set as appropriate.

Expert Pack: Inventors

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 expert pack. *It is recommended that students are **required** to complete one of the Cumulative Activities (Rolling Knowledge Journal or Rolling Vocabulary) for this Expert Pack.*

1. Rolling Knowledge Journal

- Read/view each selection in the set, one at a time.
- 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 or list what you learned from the text about the topic.
- Then write or list how this new resource added to what you learned from the last resource(s).

Sample Student Response

Title	Write 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. " Invention"	The difference between a discovery and an invention as well as some items that have been invented and by whom.	An invention is something that is created rather than found. An inventor has to come up with the idea. Inventors create things to solve a problem.
3. "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 the potential impact.
4. "Franklin, Benjamin"	He invented the lighting rod to protect buildings from lightning.	Ben Franklin knew there was a problem so he created something that protected people.

5. "Jobs, Steve"	He created a steady stream of revolutionary electronic devices. These inventions included a computer, iPod, iPhone and iPad.	He created something that was revolutionary and helped people communicate more effectively and quickly.
6. "The 20 Most Fascinating Accidental Inventions"	Many people have created different things and are famous for these items, some of them are by accident.	These are examples of inventions that have helped people in some way although they were found in crazy ways.

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" (Video)	Words: inventor, problem-solver, goal, safety, magnifying, owners 1. The inventor makes something new that helps with a problem we have. 2. In that way he/she is a problem-solver, fixing problems that we have in our daily lives. 3. The inventor first sets a goal about what he/she wants to invent. 4. While working on this project, safety is a big concern. 5. In some cases, magnifying glasses are worn to make objects seem bigger than they are. 6. At the end, when the invention is finished, the inventions is sold or given to people who then become the owners of that invention.
"Invention"	Words: creation, discovery, existed, economic, military, social 1. Inventions are a creation of something new. 2. It is different than a discovery because it has not been around before. 3. Something that has never existed before would be a creation. 4. An invention is created to help people and to fill the needs of

	people which can be economic. 5. A military need can also be one, where something may need to be created to protect a country. 6. Another could be a social need and if any of these needs are not met than the invention is not solving the problem.
"Eureka: How the Invention of Everyday Objects Changed the World"	Words: create, need, discovery, patience, simple, complex 1 . Inventors create products that make our lives easier. 2. A lot of times inventors look for a need that people have and try to fulfill that need. 3 . Sometimes an accidental discovery can help create a project that changes people's lives. 4 . Most times, however, an inventor needs patience to work on projects for long periods of time. 5. Some inventions are simple machines that require very little work or effort. 6. Others are more complex and difficult to understand how they work.
"Franklin, Benjamin"	Words: leader, success, interested, prove, protect, Constitution of the United States 1. Benjamin Franklin was a great leader in American History. 2. Franklin wanted to show success in his life. 3. He was interested in many different things including government and helping others. 4. He wanted to prove that lightning was electricity. 5. To do so he invented the lightning rod to protect buildings from lightning. 6. Later in life he was also a leader who signed a very important document, the Constitution of the United States.
"Jobs, Steve"	Words: co-founded, revolutionary, devices, engineering, innovation, reputation 1. Steve Jobs was co-founder of Apple computer. 2. He had a reputation for being a master at inventing electronic products. 3. These products, or devices, included all Apple products like the iPad, iPod, and iPhone. 4. His inventions were revolutionary and continue to be today. 5. Apple is still engineering devices. 6. Even though Steve Jobs is no longer alive, Apple continues innovating new devices.
"The 20 Most	Words: experiment, accident, discover, skill, products, creation

Fascinating Accidental Inventions"	1. Sometimes when doing an experiment, things do not go smoothly. 2. When it is not smooth, this is called an accident. 3. This accident can lead into discovering something new. 4. It takes a certain skill set to try to become an inventor. 5. Inventors can come up with different products or one product that can be them success. 6. You do not have to be an inventor can randomly come up with a new creation.
Sensational Six	Words: inventor, create, need, problem, discovery, succeeded 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. First the inventor needs to **discover** the problem, then solve the **problem** and to then see how this invention helps the **need** of people. After the need is solved and the invention is created, the inventor has proved a **success** in helping people.

Student Copy

1. Rolling Knowledge Journal

- Read each selection in the set, one at a time.
- After you read *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 or list what you learned from the text.
- Then write or list how this new resource added to what you learned from the last resource(s).

Sample Response

Title	Write or List	
	New and important learning about the topic	**How does this resource add to what I learned already?**

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.

Sample Response

Title:	**Six Vocabulary Words & Sentences**
Sensational Six	Words:

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")

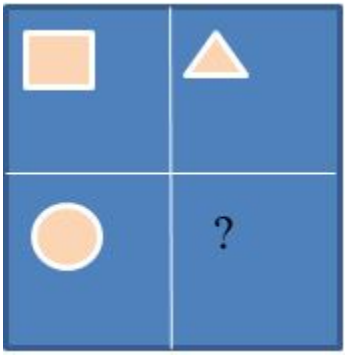
I'm a little confused about:	This made me wonder:
On the left, track things you don't understand from the video and the article. **I am confused about or do not understand….**	On the right side, list some things you still wonder (or wonder now) about this topic. **I wonder or would like to learn more about….**

2. A Picture of Knowledge (Recommended for "The 20 Most Fascinating Accidental Inventions"*)*

- 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.

- Draw these shapes in the corner of each quadrant.

1. Square
2. Triangle
3. Circle
4. Question Mark



- 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?
  Question Mark: What is still confusing to you? What do you still wonder about?

- 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 "Invention"*)*

Answer the following questions. *An example is given for you.*

Question	**Possible Answer**
1. What is the difference between a discovery and an invention?	A discovery is something that exists in nature for the first time and an invention is something that is created that has never existed before.
2.	
3.	
4.	

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 "Jobs, Steve" and "Franklin, Ben")

- 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

Expert Pack Glossary

"Kid President: How to be an Inventor"

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

"Invention"

Word	*Student-Friendly Definition*
exists	To have actual being or continue to live. *A plant exists because of water and sun.*
economic	To have a practical or industrial use. *Economic needs are those of things on a farm, factory or business.*
military	Part of the armed forces that are made up of soldiers, arms or war. *Military needs include weapons for war.*
social	Social means relating on the human society or relationship with others. *Social needs consist of the invention of tools for doctors and items for a home.*
modern	Present, new. *Something that is modern happens at the present time.*

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

Word	*Student-Friendly Definition*
complex	Something that is not simple; more difficult to put together. *A 5000-piece puzzle is complex.*
chaotic	There is no order involved. *When an ant hill is destroyed, the ants are moving all over the place in a chaotic manner.*
model	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	Piece of paper showing that the inventor has created a particular invention. *Steve Jobs submitted a patent for his Apple products.*
prototypes	An early version of an invention where scientists and inventors are trying to fix the problems with the project. *The builders created a prototype for how the house would look like.*

"Franklin, Benjamin"

Word	*Student-Friendly Definition*
scientist	A person who works in some branch of science. *A scientist does different experiments.*
almanac	A book of interesting and useful facts about many different subjects. *The almanac was written for people to enjoy and learn about the wise sayings from Benjamin Franklin.*
government (govern)	The group of people that has this power and authority. *The city government decided to build a public skate park.*
Revolutionary War	The war of 1775-83 in which the American colonies won their independence from Great Britain. *The Revolutionary War was a turning point in American history.*
Declaration of Independence	The public document by which the thirteen American colonies declared their independence from England in 1776. *The Declaration of Independence officially separated the colonies from England.*
colonies	A place where a group of people come to settle which is under the control of their home country. *America was a colony of England before it became independent.*

"Jobs, Steve"

Word	*Student-Friendly Definition*
revolutionary	Creating or leading to great change. *The new invention was revolutionary.*
engineering	The study and practice of using scientific and mathematical knowledge to

	do practical things. *Knowledge of engineering is needed to design and build roads, bridges, tools, and machines.*
innovation	A new idea, product, or way to do something. *Thanks to innovations in technology, many people can now make use of a computer.*
awestruck	Overpowered by a feeling of wonder, fear, or admiration. *I was awe-struck by the sight of the erupting volcano*
circuits	The closed path followed by an electric current. *Blowing a circuit causes the electricity to go out.*
infancy	The earliest period in the life or development of anything. *The infancy of aviation began with an idea in its infancy.*
hobbyist	A person that has an interest or activity for pleasure in one's spare time. *His favorite hobby is taking pictures with an old camera.*
popularize	To make generally known, liked, or understandable. *Celebrities popularize clothes and other items.*
iconic	A person or thing that is an object of great respect and admiration. *Michael Jackson is a pop icon. Einstein was an icon of twentieth-century physics.*

"The 20 Most Fascinating Accidental Inventions"

Word	*Student-Friendly Definition*
ignite	What causes something to start burning. *Great heat can ignite almost any dry object.*
patenting	Set of exclusive rights granted by the government to an inventor for a limited amount of time. *When a new invention is created, you must obtain a patent.*
adhesive	A compound, also known as glue, that bonds two items together. *The adhesive was used to bond the decorations to the hat.*
sanitary	The state of sanitation (clean or dirty). *The hospital was sanitary so that people would not get sick.*
concoction	The act of creating something (a medicine or drink or soup etc.) by compounding or mixing a variety of components an occurrence of an unusual mixture. *It suddenly spewed out a thick green concoction.*

undeterred	Something that pursues its own path. *The boy was undeterred by what his friends kept telling him to invent.*
cockleburs	Any coarse weed having spiny burrs. *After hiking in the woods, my pants had cockleburs stuck all over them.*
epiphany	A divine manifestation or thought/idea. *The inventor had an epiphany of what he wanted to create.*
persnickety	A person that is characterized by excessive precision and attention to trivial details. *The little boy was very persnickety about what he wanted to eat.*