

Teacher's Guide for
Dayton Inventors and Inventions
Volume 2 Issue 1

Students will gain an understanding of the impacts that inventions have made on the lives of others and how new developments led to the growth of Dayton, Ohio, Ohio, and the United States. Dayton, Ohio inventors are responsible for inventions such as airplanes, cash registers, and parachutes. This lesson gives students opportunities to obtain information about Dayton and the State of Ohio inventors primarily by using trade books, encyclopedias, and multimedia/electronic sources.

Ohio Standards Connection:

History

Benchmark C

Explain how new developments led to the growth of the United States.

Indicator 6

Explain the importance of inventors such as the Wright Brothers, Charles Kettering, Garrett Morgan, Granville Woods and Thomas Edison.

Social Studies Skills and Methods

Benchmark A

Obtain information from a variety of primary and secondary sources using the component parts of the source.

Indicator 1

Obtain information about state issues from a variety of print and electronic sources, and determine the relevance of information to a research topic:

- a. Atlases;
- b. Encyclopedias;
- c. Dictionaries;
- d. Newspapers;
- e. Multimedia/Electronic sources.

Pre-Assessment:

- Give each student a worksheet with a total of 10 pictures of inventions. (Attachment A)
- Ask students to circle five inventions that were created by Dayton, Ohio inventors.
- Turn the worksheet over and have students write down at least two ways they would gather information about Dayton, Ohio inventors.

Teacher Tip:

Pictures (photographs or clip art [Attachment A]) may include: folding stepladder, improved Christmas lights, folding crib, life preserver, eye testing device, desk, sofa, telephone, table, lamp (the first five inventions in this list were invented by Dayton, Ohioans).

Scoring Guidelines:

- Use the student responses to guide in differentiating instruction for this indicator. Enrichment opportunities should be provided for any students who are able to work beyond the indicator. (See the Differentiated Instruction section.)
- Use student responses about ways to gather information to determine the types of resources with which students are familiar and experienced. Provide additional instruction, or mini-lessons, if necessary.

Post-Assessment:

Have students conduct research about an Ohio inventor, one of his/her inventions, and how the invention changed people's lives and contributed to the growth of the U.S. Have students produce their final research product in a written form with an accompanying visual aid (i.e., write essay with a visual aid, create a pamphlet, poster, diorama, student made model of invention etc.). See Attachment C for the *Research Product Rubric*.

Scoring Guidelines:

Score each student's research product using the rubric in Attachment C. The research product receives a score of zero, one or two in five categories for a total of 10 points:

- Inventor Information;
- Invention Information;
- Importance;
- Writing Conventions;
- Visual Aid.

Instructional Procedures:

Select one of the following or do your own introduction.

1. Read aloud a biography to introduce a Dayton, Ohio inventor to the class. After the story, have students conduct a think-pair-share session to discuss how the invention mentioned in the story specifically changed lives, as well as how it contributed to the growth of the United States in general.
2. Scripted introduction of Dayton Inventors and Inventions

Teacher: Today we are going to meet some very special people.
When you meet someone new, what questions do you ask to get to know him or her? (students generate name, age, where they live)(Write responses on board.)
Let's meet our first person and see what we can learn about our new neighbor.
(Read the book's title.) Dayton Inventors and Invention These people are from Dayton, Ohio.
What are inventors? What are inventions? What is the same in both words?
(invent) Can you explain what "invent" means? (accept correct answers)
This book is about people who invent things and their inventions.
Let's meet our first inventor. Turn to page 2.
Look at the picture and read the title at the top.
What is the invention? Do you know who the inventor was? How do you know?
Read the paragraph about the invention to yourself. Discuss the paragraph.
Teacher passes out the first worksheet concerning the inventors. (Attachment B)
As we read you will need to keep track of all the information, so you will be filling in this chart.
What is the title of the chart?
What are the categories under the title? (Read the first category.) What should go there? (Repeat for each category.)
Emphasize the importance of the last category. Have them write a sentence for the cash register.
Continue to fill in chart for each inventor. (Children will need 4 worksheets.)
[The children will use these worksheets as a resource in their research project.]

3. Lead a think-pair-share session. Give students one minute to think about how to answer the following guiding questions. Tell students to record their thinking on chart paper. Then have students pair with the person next to them and answer the questions together:
 - Who was the inventor and what did he/she invent?
 - How did the invention change the lives of people?
 - How did the invention contribute to the growth of the nation?

4. Have each pair of students take one minute to share and discuss their answers with the rest of the class. If time does not allow each pair to share, then randomly pick pairs to share or have them volunteer. You may want to have these questions and the response papers posted in order for students to be able to refer to them throughout the lesson.
5. Find photos from the past (late 1800s/early 1900s) that show scenes such as a city street, school room, retail store, farm or household. Internet resources can be located by using a search engine and typing keywords for the types of pictures you are seeking.
 - A. Divide students into groups of four and give each group one of the photos. Have each group list all inventions found in the photo.
 - B. Show the class one scene from the past by projecting it if possible. Ask students for their observations. Record and discuss the list of inventions students found in the scene.
 - C. In their groups, have the students use the list of inventions they generated and answer the questions:
 - a. How did the invention change the lives of people?
 - b. How did the invention contribute to the growth of the nation?
 - D. Record the groups' responses.
 - E. Repeat the previous two steps for each photo. Guide students to an understanding of the importance of these inventions.
6. Have students choose an Ohio inventor and conduct research using textbooks, library resources, and the Internet. Have students use a graphic organizer (Attachment D) to record the information about the selected inventor:
 - Inventor's name and invention;
 - Background information (hometown, family life, education, etc.);
 - How the invention has changed people's lives and contributed to the growth of the U.S.Students may identify positive and negative impacts of the invention.
7. Have students produce their final research product in written form with an accompanying visual aid. Brainstorm ideas with students (i.e., write an essay with a visual aid, create a book, etc.).
8. Give students an opportunity to share their information with the entire class and display their work.

Instructional Tip:

Work with the school librarian to identify available resources about Ohio inventors and their inventions. Public libraries (Attachment E) and historical societies are also good sources for this information. Some Dayton, Ohio and Ohio inventors to consider are:

- Orville and Wilbur Wright: first airplane;
- James J. Ritty: cash register;
- Charles Kettering: held 140 patents for his inventions including an electric starter for the modern automobile;
- Garrett Morgan: first electronic traffic signal

Differentiated Instructional Support:

Instruction is differentiated according to learner needs, to help all learners either meet the intent of the specified indicator(s) or, if the indicator is already met, to advance beyond the specified indicator(s).

- Provide assistance with research resources: by having students listen to materials on audiotapes/compact discs, access materials electronically and supply resource materials that meet a wide range of reading abilities.
- Have students use the computer (if available) to generate the written form of the research product.
- Have students use computer graphics software (if available) to create visual aids.
- Have students meet in small groups for mini-lessons that target specific research skills that may need remediation.

Extensions:

1. Have students research more than one invention by an Ohio inventor. Have them choose a product (brochure, model, poster, diorama, etc.) and process (Internet research, biographical study, etc.) to complete this research.
2. Have students research one invention and show how the invention has changed over time to meet people's needs or desires (e.g., follow the invention of the phonograph to today's compact disc player).
3. Have students illustrate an essay about their inventor/invention and make a class book, Ohio Inventors.
4. Have students create multi-tier timelines based on Ohio inventions/inventors, Ohio events, etc.
5. Have students create multimedia presentations.
6. Have students research how an invention is patented (may include: interviewing a patent attorney, visiting a patent office, researching the number of patents pending, etc.) and create a product of their own.

Homework Options and Home Connections:

- Have students make a list of items at home that are directly or indirectly related to Ohio inventors and their inventions.
- Have students make a concentration type card game with Dayton, Ohio inventors and inventions.
- Have students work with family members to create an inventor trivia game.

Example: I lived in Dayton, Ohio.
I owned my own business.
I had a brother and a sister.
I loved to figure out puzzles when I was young.
I was taught by my mother.
I traveled to Kitty Hawk, NC to test my invention.
Who am I? (Orville or Wilbur Wright)

Interdisciplinary Connections:

English Language Arts

- **Reading Process**

Benchmark B: Apply effective reading comprehension strategies, including summarizing and making predictions, and comparisons, using information in text, between text and across subject areas.

Indicator 3: Compare and contrast information on a single topic or theme across different text and non-text resources.

- **Reading Applications: Informational Text**

Benchmark C: Explain how main ideas connect to each other in a variety of sources

Indicator 3: Locate important details about a topic using different sources of information including books, magazines, newspapers and online resources.

- **Writing Process**

Benchmark C: Apply knowledge of graphic or other organizers to clarify ideas of writing assessments.

Indicator 4: Use organizational strategies (e.g., brainstorming, lists, webs and Venn diagrams) to plan writing.

Benchmark I: Prepare writing for publication that is legible, follows an appropriate format and uses techniques such as electronic resources and graphics.

Indicator 16: Prepare for publication (e.g., for display or for sharing with others) writing that follows a format appropriate to the purpose using techniques such as electronic resources and graphics to enhance the final product.

- **Research**

Benchmark A: Identify a topic of study, construct questions and determine appropriate sources for gathering information.

Indicator 2: Locate sources and collect relevant information from multiple sources (e.g., school library catalogs, online databases, electronic resources and Internet-based resources).

Benchmark B: Select and summarize important information and sort key findings into categories about a topic.

Indicator 3: Identify important information found in the sources and summarize important findings.

Benchmark D: Communicate findings orally, visually and in writing or through multimedia.

Indicator 6: Use a variety of communication techniques, including oral, visual, written or multimedia reports, to present information gathered.

Science

- **Science and Technology**

Benchmark A: Describe how technology affects human life.

Indicator 1: Explain how technology from different areas (e.g., transportation, communication, nutrition, healthcare, agriculture, entertainment and manufacturing) has improved human lives.

Indicator 2: Investigate how technology and inventions change to meet peoples' needs and wants.

Materials and Resources:

For the teacher: Dayton, Ohio inventor resources, photos of city scene, farm scene, store scene, household scene and school scene from late 1800s/ early 1900s, overhead projector, chart paper, markers.

For the students: Pencils, notebook paper, 1 copy of Attachment A, 4 copies of Attachment B, chart paper, markers, research materials, a copy of graphic organizer (Attachment D) and resources.

Vocabulary:

invent	inventor	invention	patent	handkerchief
stepladder	rungs	improvement	electric	holiday
radiovision	radio waves	television	magical	fabric
shrink(age)	carpenter	crib	repaired	portable
potty chair	letter chute	elevator	propellers	turbojets
friction	reconnect	attendants	safety vest	life preserver
several	experience	device	physically-challenged	wheelchair
altitude	space shuttle	helmets	oxygen mask	radio compass
space capsule	astronaut	breathe		

Technology Connections:

- Use the Internet for Web sites to obtain photos for the lesson and for research.
- Use multimedia software for presentations.
- Use time line software programs to have students create time lines of inventions.

General Tips:

- Work with the public or school librarian to identify available resources on Ohio inventors. The librarian can identify a variety of resources about Ohio inventors and inventions.
- Allow plenty of time to do the research and copying of the pictures needed for the lesson.
- Vocabulary will vary depending on the inventors and inventions researched.

Attachments:

Attachment A, *Pictures of Inventions*

Attachment B, *Dayton, Ohio Inventors Gathering Grid*

Attachment C, *Research Product Rubric*

Attachment D, *Graphic Organizer*

Attachment E, *List of books from Dayton Metro Library on inventors and inventions*

Attachment F, *List of web sites about inventors for teachers and students*

Attachment G, *Books available for purchase on Amazon.com*

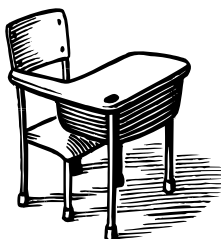
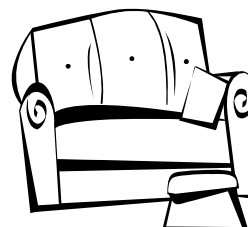
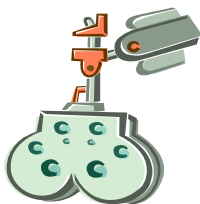
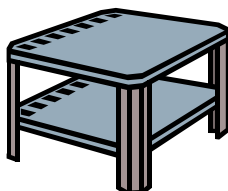
Attachment H, *Alternate Dayton, Ohio Inventors Gathering Grid*

Attachment I, *Questions on materials in Dayton Inventors and Inventions Vol. 2 Issue 1*

Attachment A

Name _____ Date _____

Circle the five (5) items invented in Dayton.



Attachment B

Dayton, Ohio Inventors Gathering Grid

Inventor and Invention	Date	How the Invention Changed Lives	How the Invention Contributed to Growth of the U.S.

Attachment C
Research Product Rubric

You are to produce your final research product in a written form with an accompanying visual aid. Your research product will be scored according to the following rubric:

	2	1	0
Inventor Information	Accurate and complete information regarding the inventor is included.	Some information regarding the inventor is included.	Incomplete or missing information regarding the inventor.
Invention Information	Accurate and complete information regarding an invention is included.	Some information regarding an invention is included.	Incomplete or missing information regarding an invention.
Importance (How the invention changed lives and contributed to the growth of the U.S.)	The importance of the inventor/ invention is clearly identified, explaining how it changed lives and contributed to the growth of the U.S.	The importance of the inventor/ invention is somewhat identified, vaguely explaining how it changed lives and contributed to the growth of the U.S.	The importance of the inventor/ invention is not identified.
Writing Conventions	Good sentence structure, spelling, grammar and punctuation.	Fair sentence structure, spelling, grammar and punctuation.	Poor sentence structure, spelling, grammar and punctuation.
Visual Aid	Good visual aid provided, neat, appealing and relevant to the topic.	Fair visual aid provided, fairly neat and appealing and close to the topic.	Poor visual aid provided, lacking in neatness and appeal, vaguely on topic or off topic.

Attachment D

Graphic Organizer for Dayton, Ohio or Ohio Inventor Research

INVENTOR _____

INVENTOR'S EARLY BACKGROUND _____

INVENTION – It's importance

INVENTION – How it changed lives

INVENTION – How it contributed to the growth of the United States

Attachment E

Books on Inventors and Inventions available at Dayton Metro Library

Alexander Graham Bell and the story of the telephone. Bankston, John.

Garrett Morgan : inventor of the traffic light and gas mask. Murphy, Patricia J.

Robert Fulton : the steamboat man. Ford, Carin T.

Invention. Bingham, Caroline.

Patently female : from AZT to TV dinners, stories of women inventors and their breakthrough ideas. Vare, Ethlie Ann.

Mothers of invention : from the bra to the bomb : forgotten women & their unforgettable ideas. Vare, Ethlie Ann.

Women inventors. Currie, Stephen

Girls think of everything : stories of ingenious inventions by women. Thimmesh, Catherine.

Women inventors. 1, Margaret Knight, Cynthia Westover, Elizabeth Hazen and Rachel Brown, Ruth Handler. Blashfield, Jean F.

Women inventors. 2, Amanda Jones, Mary Anderson, Bette Nesmith Graham, Dr. Ruth Benerito, Becky Schroeder. Blashfield, Jean F.

Women inventors. 3, Catherine Greene, Madame C.J. Walker, Harriet Hosmer, Yvonne Brill, Nancy Perkins. Blashfield, Jean F.

Women inventors. 4, Sybilla Masters, Mary Beatrice Davidson Kenner and Mildred Davidson Austin Smith, Stephanie Kwolek, Frances Gabe. Blashfield, Jean F.

Women inventors & their discoveries. Vare, Ethlie Ann.

The retrieval of a legacy : nineteenth-century American women inventors. Pilato, Denise E.

So you want to be an inventor? St. George, Judith.

The light bulb. Fandel, Jennifer.

George Eastman and the story of photographic film. Mattern, Joanne.

The Wright brothers : heroes of flight. Ford, Carin T.

Eureka! : great inventions and how they happened. Platt, Richard.

Whose crazy idea was that? Craig, Claire.

Attachment F

List of Web Sites about Inventors for Teachers and Students

Aviation.org

Factmonster.com – Click inventions

http://invention.smithsonian.org/resources/sites_teachers - Click Web Site

Invent.org/hall_of_fame

World almanac for kids.com

www.armchair.com/warp/win.html

www.discoveryschool.com Lesson Plan Inventors and Inventions 1

www.EnchantedLearning.com (Fee of \$20.00)

www.GirlTeachInventions.com

www.InventionActivities.com

www.Inventors.about.com – Click - Find: A to Z Inventions or Find: A to Z Inventors

www.si.edu/resource/faq/nmah/afinvent.html

www.wcpo.com/specials/2003/blackhistorymonth/americaninnovation.html

www.whoinventedit.com

www.women-inventors.com/Inventor-Resources.asp

www.WrightLibraries.com

Attachment G

Books Available for Purchase at Amazon.com

African American Inventors (Black Stars) by Otha Richard Sullivan
American Women Inventors (Collective Biographies) by Carole Ann Camp
B Is for Buckeye: An Ohio Alphabet (Discover America State By State. Alphabet Series) by Marcia Schonberg, et al
Brainstorm! : The Stories of Twenty American Kid Inventors by Tom Tucker
From Indian Corn to Outer Space: Women Invent in America by Ellen H. Showell and Fred M.B. Amram
Garrett Morgan: Inventor (Jackson, Garnet. Beginning Biographies.) by Garnet Jackson
Girls think of everything : stories of ingenious inventions by women. Thimmesh, Catherine.
Great Black Heroes : Five Notable Inventors (level 4) (Hello Reader) by Wade Hudson
Hooray For Inventors by Marcia Williams
Invention (DK Eyewitness Book) by DK Publishing
Inventions, Inventors and You by Dianne Drazo
Inventors (Famous Lives Series) by Struan Reid
Kids Inventing! a Handbook for Young Inventors by Susan Casey
Mothers of invention : from the bra to the bomb : forgotten women & their unforgettable ideas. Vare, Ethlie Ann.
Patently female : from AZT to TV dinners, stories of women inventors and their breakthrough ideas. Vare, Ethlie Ann.
So You Want to Be an Inventor? -- by Judith St. George
The Kid who Invented the Popsicle and Other Surprising Stories about Inventions by Don Wulffson
The Picture History of Great Inventors by Gillian Clements
The retrieval of a legacy : nineteenth-century American women inventors. Pilato, Denise E.
They All Laughed... From Light Bulbs to Lasers: The Fascinating Stories Behind the Great Inventions
Thomas Edison : Young Inventor (Childhood Of Famous Americans) by Sue Guthridge
Women inventors & their discoveries. by Vare, Ethlie Ann.
Women inventors. Currie, Stephen
Women inventors. 1, Margaret Knight, Cynthia Westover, Elizabeth Hazen and Rachel Brown, Ruth Handler. by Blashfield, Jean F.
Women inventors. 2, Amanda Jones, Mary Anderson, Bette Nesmith Graham, Dr. Ruth Benerito, Becky Schroeder. by Blashfield, Jean F.
Women inventors. 3, Catherine Greene, Madame C.J. Walker, Harriet Hosmer, Yvonne Brill, Nancy Perkins. by Blashfield, Jean F.
Women inventors. 4, Sybilla Masters, Mary Beatrice Davidson Kenner and Mildred Davidson Austin Smith, Stephanie Kwolek, Frances Gabe. by Blashfield, Jean F.

Attachment I Questions/thoughts on materials in Dayton Inventors and Inventions Vol. 2 Issue 1

- P. 3 How was Balsley's stepladder different from other ladders?
When (Where) might someone choose to use a stepladder instead of a ladder?
- P. 4 What happened to the string of Christmas lights before Janning improved them?
- P. 5 Research how television has changed.
- P. 6 How does the washing machine in your house agitate the clothes?
Graph results for your class.
- P. 7 Where is the Biltmore Hotel located?
How did the crib fold?
- P. 8 How did it work? Where was the "potty"?
- p. 9 Where is the Kuhn's' Building located?
How was mail delivered to the first floor before 1884?
What happened to the mail after reaching the first floor lobby?
- p. 10 Why do you think we have never seen a "flying" train in operation?
What would be the advantage over other trains or an airplane?
- p. 11 What is the advantage over already inflated life preservers?
- p. 12 Is Mr. Leland's device still being used? How does it work?
Has it changed since 1935?
- p. 13 How does an electric wheelchair make a person more independent?
- p. 14 Research how the oxygen mask has changed since 1947.
- p. 15 How do you think this works? (teacher might need more information)
- p. 16 Who was Buck Rogers?
Can this space suit be seen at the Air Force Museum?

Dayton, Ohio Inventors Gathering Grid

Inventor and Invention	Date	How the Invention Changed Lives	How the Invention Contributed to Growth of the U.S.

