

Evaluating Children's Literature: Female characters in STEM roles

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ABSTRACT

This thesis is a research project on lead female characters in STEM roles in children's literature. The growing gender gap of females to males in STEM careers, and limited number of role models and information for young girls is what inspired the project. Specific criteria were established to evaluate the literature to be compiled into an annotated bibliography. Books were found through websites, libraries, and academic journals. It was found that much of the STEM literature had common characteristics among them and were meant to encourage and inspire readers. The female protagonists in the literature were either real life women who contributed to STEM fields in their lifetime, or fictional characters engaging in STEM fields.

INTRODUCTION

Many people do not realize the complexity of children's literature until they study it. Children's books can be just as complex, if not more so, than adult books. The interactions between text and illustrations must always flow together to create a cohesive story. The study of children's literature is something I was introduced to while taking a children's literature class in the summer of 2015. My love for children's literature grew while in that class and I knew that I wanted to find a way to incorporate it into my honors thesis project. With so many possibilities on what to research, I had a hard time narrowing it down to just one topic. I finally choose to focus on the portrayal of females in science, technology, engineering, and mathematics (STEM) in children's literature.

I choose females not to exclude males, but to point out the large gap in the female to male ratio in STEM fields. STEM is one of the hottest topics in education right now. Many schools are shifting a focus to these subjects in their daily routines. STEM is so important in education because these are the fields of jobs in the future. If teachers are supposed to be preparing students for the future, then they should be focusing on these areas. The Science and Engineering Indicators 2016 report done by the National Science Foundation found that women make up half of the total U.S. college-educated workforce, but only 29% of the science and engineering workforce (National Girls Collaborative Project, 2016). Similar gender gaps can be seen in more specific careers: only 22.7% of chemical engineers are women and a miniscule 7.9% of mechanical engineers are women (National Girls Collaborative Project, 2016). If we can teach girls about these jobs at a young age and spark their interest, we can start to close the gender gap.

My objective for this project is to be able to provide a resource for teachers, schools, parents, and young girls that gives them a list of books they can read to learn more about past, present, and even fictional women in STEM. I also would like to fill the gap in research about STEM literature. I am defining STEM literature as nonfiction, novels, biographies, and pictures books that are centered around one or more of the STEM areas. There is not much information about STEM literature and how it can help young readers and I think it is something important considering the importance of STEM to our future. My hope for this project is for people to use the resource I have created to help inspire and encourage young girls' interests in nontraditional roles and to pursue their dreams. Their interests start at a young age so it is important to have a resource of books available to strengthen their passion.

Girls will greatly benefit from reading these books for many reasons. They will be inspired by the strong women in the stories, some fictional and some real. Either way, the characters are easy to relate to as they share their stories of struggle and success. The women also serve as role models to young girls. Seeing them achieve such great things will be an image for girls to look up to. A large majority of the books also introduce new vocabulary related to STEM roles which can serve as a learning experience for the readers. By learning the vocabulary and terms, they will have an overall better understanding of what STEM roles are all about.

I choose to create an annotated bibliography for this project for a few different reasons. The bibliography part provides all of the information readers need to know to find relevant books. But I also wanted to include short summaries and information about the books as well. By having descriptions, readers can get a quick overview and understanding of what the book entails without having to read the entire thing. This will help those who may be looking for a book on a

specific topic. I also split the books into sections based on the grade level they were written for. Specifically, this is to assist teachers and parents who have students and children at particular reading levels. Also included in the annotated bibliography are major awards such as the Newbery Medal or Sibert Award that books have received. Overall, the annotated bibliography is the best way to condense a lot of information and still present it in an orderly form for readers.

CRITERIA

Specific criteria were used to evaluate books to see if they would be a good fit for the annotated bibliography. The criteria were determined by asking questions such as “Does this book have a lead female character?” and by examining if the protagonist is a female that exhibits leadership in the story through confidence and inspiration. Another question that was asked was “How is the book related to a STEM role?”. This was accomplished by looking for the characters’ activities, the theme of the book, the protagonist's career, or something else in the book that relates to STEM. The final criteria that each book was evaluated on were:

1. A female is a lead character in the book
2. The female is engaging, participating, helping, or working in a science, technology, engineering, or mathematics related role.
 - a. This includes but is not limited to careers, interests and hobbies, inventing, volunteering, teaching, and learning.
3. The book must be a novel (fiction or nonfiction), biography, picture book, or any combination of the three.
4. The book must fit into one of the appropriate grade ranges of
 - a. PreK-2nd Grades

- b. 3rd-5th Grades
 - c. 6th-8th Grades
5. The book preferably should be published in the year 2000 or later to avoid outdated information.

Making sure the books fit the criteria was crucial to having a cohesive annotated bibliography while still having a variety of literature. It was important to have the lead character as a female because that is what this project is all about. Women in nontraditional roles to inspire others. In order to do that, they also had to be active in a STEM role. This criterion was the most difficult to assess because it was not specific. There are a multitude of careers and subjects that fall under science, technology, engineering, and mathematics. Splitting the books into grade level ranges helps the organization of the annotated bibliography. It is easier for those using it to find books at a specific grade level for their child. However it is not a 100% accurate guide. Some of the books could have fit into two of the grade categories. They were placed in the category that best aligned with their *Horn Book Guide* suggested reading level. Lastly, books that were published earlier than 2000 were not considered simply because of outdated information. STEM roles are always changing and adapting for the future. It was found that many books published before 2000 had information that was no longer relevant to today's society, or the information was false and outdated. It is important to give readers the most accurate information possible.

Not only were these criteria established to evaluate the books for this annotated bibliography, but they were also created to help evaluate books in the future. These criteria will be useful to teachers, parents, and librarians if they ever want to be able to provide a child with

good STEM literature. They themselves can evaluate the book and determine if it suits the needs and wants of the child. The only part that might change is the publication cut-off year. As years go on, it is important for those evaluating books to make sure the information is still up to date and beneficial for the reader.

PROCESS

Once the criteria for the books were created, the next step was to find books to evaluate. This happened a few different ways. One of the first resources I came across was AMightyGirl.com. This website is a resource for people to use to look at a “collection of books, toys, and movies for smart, confident, and courageous girls” (A Mighty Girl, 2012, 1). They have a section devoted to books about Science and Technology and I used these recommendations to start a running list of books to read. As I looked up these books online, suggestions for similar books came up on other websites such as Amazon, Barnes and Noble, and Google. I often looked at online previews of the books to get a quick glance at them to see if I felt they were close to what I was looking for. If they were, they were added to my list to read.

Another resource I utilized were the *Horn Book Guide*. These had lists of books that were published in the same year as the guide with a rating and short summary. I looked at the lists under topics such as ‘women’, ‘science’, ‘technology’, ‘engineering’, and ‘mathematics’. The *Horn Book Guide* rates the books from 1-5 with 1 and 2 being the better books. I used the ratings as a guide to pick books to read because I knew they were well written and had been vetted by many people. This was very helpful in doing my own vetting on which books to read because I was able to get an idea of what the book is about and if it would be a good fit for my project.

A majority of the books I came across were biographies or nonfiction books. Therefore, when I would go to pick them up at the library, I would glance at the other books in those sections to see if I could find any other books to read. This proved to be one of the best ways to find books because I often would find two or three on the same topic and I would read all of them and pick the one that fit my criteria the best. Just simply searching the book stacks at libraries gave me many options and introduced me to books I had not found in my online searches.

RESEARCH

A majority of the research is about the characteristics of the STEM literature and similarities and differences in the books. There were also some common characteristics among books that were evaluated, but did not make it on to the annotated bibliography. One common theme among the books is that many start with the woman's story as a young girl and her interests in a STEM field early on in life. Then they follow the story of the woman's education, career, and achievements. This storyline was portrayed in both fiction and nonfiction literature. Multiple books were written like this because it flows well and also targets a young reader. It shows young girls that they too can accomplish great things by providing an excellent example right in the book for them to read about. When the literature is written in simple forms such as picture books, and the beginning of the books start with the woman as a young girl, we see how the story and its lesson can appeal to young female readers.

Among the picture books, there were similarities in the illustrations themselves that contributed to STEM literature characteristics. Many of the books show the characters reading math and science books, working with mechanical parts, observing nature, using new and old

technology, and completing math problems or practicing concepts. Some of the books in which these characteristics were seen in are *Ada Byron Lovelace and the Thinking Machine* (Walmark, 2015), *Ada Twist Scientist* (Beaty, 2016), and *Rachel Carson and Her Book That Changed the World* (2012). Therefore not only did the story incorporate information about STEM roles, but the illustrations did too. This greatly benefits children who cannot read yet but can understand the pictures that go along with the story being read to them. They can see firsthand a character engaging in a STEM role or a related activity.

Other illustrations and photographs included in the books were supplemental to the reading. In *Me...Jane* (2011) and *Amelia Lost: The Life and Disappearance of Amelia Earhart* (2011), there were pictures of the women themselves, writings from their journals, diagrams they had drawn, and other personal photos. Often times the pictures were taken while the woman was working in her STEM career. All of the real life photos help the reader get a better sense of what the women, their life, and their STEM careers were like. Overall, these photos provide more information that young readers can relate to STEM literature and its characteristics.

Not only do the books give readers information, but they do so in the appropriate way. One of the most common similarities between the books was that they used vocabulary related to STEM roles, careers, activities, and people to tell a story or describe something. Many of the nonfiction books included a glossary for readers to learn and clarify terms they did not understand. For example, in *The Evolution of Calpurnia Tate* (2009), author Jacqueline Kelly frequently used the proper scientific names for the organisms Calpurnia was studying. Not only do readers get to learn some scientific names, they get exposure to how the organisms are set up and classified. Readers are enjoying a story while also gaining more knowledge of the STEM

role. Other STEM vocabulary in the books were names of inventions, famous people in the STEM fields, different chemicals, tools women used in their careers, scientific and mathematical concepts, and STEM jobs.

Role models and secondary characters involved in STEM fields was a common occurrence in the literature. Therefore not only was the female lead character involved in STEM roles, but so were the people around them or people they could look up to as role models when they were young. In the book *The Green Glass Sea* (Klages, 2006), the lead character Dewey lives on a military base where scientists are developing the nuclear bomb during World War II. Numerous other characters are women scientists also living on the base. Dewey frequently interacts with them about scientific concepts and experiments she is working on. The role models are important to the characters and the readers because they need to know that they can get support from others around them. If a girl is reading about something she is interested in and has the support of her parents, teacher, friends, or other family, she will be more likely to pursue that interest.

In the biographies that were evaluated, authors would mention other famous people the woman would work with, study under, and who inspired them. Most of these women were the ‘first’ to discover or accomplish something and usually during a time when women were not supposed to be working in STEM fields. However the people who helped them along the way are just important as the woman themselves because they believed in them and supported them. Authors would add small information sections, pictures, quotes, accomplishments, and more about the other scientists, engineers, pilots, mathematicians and others. By being exposed to

additional information, readers are not only learning about the woman in the book, but about other important people in that STEM field as well.

A few of the books evaluated were simply informational books about STEM careers themselves. Books like *Careers for Tech Girls in Math* (2016) and *Cool Careers for Girls Series* (1999-2004) provide readers with profiles of careers, characteristics of the women in the jobs, and daily responsibilities. These types of books were the best at giving the whole picture of a specific STEM career and numerous details about it. Even though a lot of information like this can be found online now, the books give specifics of similar careers so girls can distinguish which career might be best fit for their interests. For example, one book might be all about engineers and each profile would be a different type of engineer such as electrical, mechanical, automotive, computer, etc.

As stated earlier, there were common characteristics of books that did not fit the criteria and make it onto the annotated bibliography. It was interesting to see that these books also had things in common. The most common one was that books written around or before 2000 had outdated information, or the book solely focused on women and inventions from the 1700's-1800's only. It would not be beneficial to readers to provide false information. If parents, librarians and teachers wanted to give young girls a wide range of women in STEM from past to more current history, they would not want to give them a book that focuses only on a specific time frame. This would be more suitable if the reader were interested in early women in STEM.

Some books had STEM concepts present in them, but the information or the story had nothing to do with it. This was seen most commonly in fiction books such as *Interstellar Cinderella* (2015) where the the character liked to fix things like a mechanic, but the story was

focused on the typical Cinderella storyline in space, not the STEM role. It is nice to see females and STEM concepts together in the book but if they are not interacting well, the book does not serve a purpose for this annotated bibliography.

Among the fiction books that were appropriate for 6th-8th graders, it was discovered that many included STEM concepts, but not specifically STEM careers. For example, a female character may have been the result of genetic engineering, but not the engineer themselves. This was found mostly science fiction books. Even though these types of books did not fit the specific criteria for the annotated bibliography, they would be useful as supplemental books to reinforcing some STEM ideas to girls who are interested. They are a great way to see STEM in a creative fictional world.

Lastly, occasionally there would be books that were a mix of fact and fiction. This information can be misleading and confuse readers on what is actually true and what is not. In *Emmy Noether: The Mother of Modern Algebra* (Tent, 2008), the author writes in the preface how there is very little known about Emmy Noether's life and she added fictional elements to write the story. It did not seem like it was beneficial to anyone to include a book like this where there might be possible false information and the reader could form misconceptions.

CONCLUSION

This annotated bibliography is not a list of every available book related to STEM. There are hundreds of other books that could be included on the list. This is just what I came across during my research using the criteria I set. Something else to note is that some of the books are published by smaller publishing houses. These may not be as critical with proofreading and vetting so consideration should be taken before having a child read the books. This annotated

bibliography mostly included nonfiction books and biographies. It was harder to find any books that fit the criteria that are fiction. More research could be done to open it up to fiction books that many not be entirely focused on STEM areas.

ANNOTATED BIBLIOGRAPHY

The annotated bibliography is compiled of books that fit the criteria. Each book has a citation along with a summary of the book and how it relates to STEM. Each citation also notes whether the book is Fiction or Nonfiction, and any awards the book has received. The annotated bibliography is split up into three sections based on the grade level of the book.

PreK-2nd Grades

Beaty, A. (2016). *Ada Twist, scientist*. (Illus. by D. Roberts). New York, NY: Abrams Books.
(Fiction)

Scientists often ask many different questions. This is what Ada Marie Twist, named after Ada Lovelace and Marie Curie, constantly does. Her curious scientific mind is always asking Who? What? Where? When? and Why? about anything she comes across. Ada exemplifies the girls who are quiet and shy, but curious about the world around them. At times she gets a little carried away with her experiments, but that's what great scientists do! References in the pictures to real life scientists and Ada's actions help readers get excited about the world of science. An author's note at the end also educates readers about women scientists across time.

Beaty, A. (2013). *Rosie Revere, engineer*. (Illus. by D. Roberts). New York, NY: Abrams Books.
(Fiction)

Many young girls think that playing with gadgets and gizmos, and building things is something only boys do; but not Rosie Revere. The great-great-niece of Rosie the Riveter is in second grade and has a dream of becoming an engineer. She is always tinkering with things and making new inventions for her family members. Through a couple of failed inventions, Rosie learns that it's

okay to not always get it right, you just have to keep trying. This is a message readers will also understand through the rhyming words and detailed pictures. A short historical note at the end also informs readers about the women who went to work as engineers and factory workers during World War II.

Breen, S. (2008). *Violet the pilot*. (Illus. L. Malcom). New York, NY: Dial Books. (Fiction)

Violet is a young girl who grew up always creating new things with old parts from the junkyard her father manages. She sees a poster for the local air show and sets off on a mission to create a new flying machine for it. On her way to the air show, she rescues a Boy Scout troop that runs into trouble while canoeing, making her miss the air show. Even though her peers and other people in the city did not see her plane, they hear about her rescue and she is awarded a medal of valor. In this uplifting story, readers can understand that it is acceptable to have a hobby that is nontraditional for girls and they can succeed in it as well.

Brown, D. (1999). *Rare treasure: Mary Anning and her remarkable discoveries*. (Illus. By author). New York, NY: Houghton Mifflin Company. (Non-Fiction)

Paleontologist Mary Anning got a very early start to hunting for fossils. She and her brother and father would search the coast and cliffs of their town for any fossils they could find. They sold the fossils to tourists visiting the popular shore to make money for the family. When Mary's father died, the family went into deep poverty. Mary and her brother continued to hunt for fossils and one day it payed off. In 1811, when Mary was only 12, she found her first fossilized skeleton. This discovery inspired her to continue looking for the rest of her life. Other fossils she came across were a plesiosaur and pterodactyl. She often worked in very dangerous conditions

close to the water's tide or the falling boulders by the cliffs. Mary's story is a true example of how a love for science at a young age can guide someone to remarkable discoveries in their life.

Burleigh, R. (2013). *Look up!: Henrietta Leavitt, pioneering woman astronomer*. (Illus. By R.Colon). New York, NY: Simon & Schuster Books. (Non-Fiction)

Henrietta Leavitt was inspired by the stars in the sky as a young girl and it led her to become one of the most memorable early women astronomers. She wanted to know everything she could about space and eventually went to work at an observatory. She studied photographs of stars day after day and discovered a specific pattern in their brightness in 1902. Her small observation helped to discover the first accurate way to measure large distances in space. Leavitt is an exceptional role model for young girls because she shows how a small observation can lead to a great discovery, and that women have been able to succeed in non-traditional roles for hundreds of years.

Burleigh, Robert. (2016). *Solving the puzzle under the sea: Marie Tharp maps the ocean floor*. (Illus. by R. Colon). New York, NY: Simon & Schuster. (Non-Fiction)

Marie Tharp's love for maps started at a young age when she would watch her father create maps for farmers for a living. Tharp went to college in the 1940's and graduated to become a scientist. She started working at an ocean-studies lab where she first had the idea to map the ocean floor. Tharp went on to work with Bruce Heezen and together they discovered the Mid-Atlantic Ridge. This discovery changed the way scientists looked at the Earth and how it was changing. Through a first person narrative of Tharp, author Robert Burleigh takes readers through Marie's discoveries and process as she maps the ocean floor. This book is a good reference for young girls interested in mapping, the ocean, and tectonic plates.

Buzzeo, T. (2015). *A passion for elephants: The real life adventure of field scientist*

Cynthia Moss. (Illus. By H. Berry). New York, NY: Dial Books for Young Readers.

(Non-Fiction)

This book follows the career of Cynthia Moss who starts out photographing elephants in a national park and goes on to spend over 40 years researching them. She was inspired to move to Africa after reading letters about Africa from a friend in college who was there. While observing and studying the elephants, she learned about how they live in families, and even help each other survive in droughts. Moss also spoke out about the killing of elephants for their ivory tusks and helped develop the ban on the sale of ivory. Young readers can look up to Moss and see how she was an advocate for elephants, while also being an accomplished woman animal researcher.

Calukhoven, L. (2016). *Women who launched the computer age*. (Illus. by A. Petersen). New

York, NY: Simon & Schuster. (Non-Fiction)

The story of 6 women who worked on the first computer during World War II is told in a beginners chapter book. Readers learn how the woman became the first computer programmers by creating a program that would predict missile landing locations through mathematical computations. The story also touches on how this was an untraditional job for women at the time and how the woman were not recognized for their success until almost 40 years later. It is a good book for young females who are just starting to understand the uses of computers and the ideas behind them.

Gilliland, J.H. (2000). *Steamboat! The story of captain Blanche Leathers*. (Illus. by H. Meade).

New York, NY: Dorling Kindersley Publishing. (Non-Fiction)

The steamboat was considered modern technology in the nineteenth century. It transported goods, produce, and even people up and down rivers throughout the country. At the young age of 12 years old, Blanche Leathers declared someday she would become a steamboat captain. She would always watch the steamboats float by from the riverbanks. Leathers married the captain of the *Natchez*, a steamboat on the Mississippi River. She studied the river and the boat as it carefully maneuvered around islands, sandbars, and debris in the rivers. After passing a tough exam, Blanche Leathers became a steamboat captain in 1894. Her story of success demonstrates that passion and drive can help you reach your dreams, even when others don't think you can.

Kulling, M. (2011). *In the bag! Margaret Knight wraps it up.* (Illus. by D.

Parkins). Toronto, Ontario: Tundra Books. (Non-Fiction)

Margaret Knight worked in a cotton mill from a young age and her first invention was a stop-motion device for the looms to reduce the risk of injury. She was easily inspired by simple problems or questions she had. Her most famous invention was a machine to make brown paper bags. Knight went to patent her machine but a man had stolen her idea and already created one. She took the case to court and proved she had been working on the machine for two years, and won the case. She went on to establish the Eastern Paper Bag Company, and had created over 90 inventions at the time of her death. Readers will be encouraged by this book because it shows how successful a woman can be if she believes in her work and doesn't care about what others say about her.

Kulling, M. (2014). *Spic-and-span!: Lillian Gilbreth's wonder kitchen.* (Illus. By

D. Parkins). Toronto, Ontario: Tundra Books. (Non-Fiction)

Lillian Gilbreth was an industrial engineer who worked alongside her husband as ‘efficiency experts’ both on the job and at home to manage their 11 children. When her husband suddenly died, she had to find a way to provide for her family. She was hired by the Brooklyn Borough Gas Company as an industrial engineer to help improve kitchen designs. She also came up with multiple inventions of tools to be used while cooking. Gilbreth’s story is a good example of how problems can be solved simply by observation and asking yourself questions. That habit led to her lifetime of success.

Laurie, L. (2012). *Rachel Carson and her book that changed the world*. (Illus. by L. Beingessner). New York, NY: Holiday House. (Non-Fiction)

This book tells the story of Rachel Carson, a biologist and writer who wrote best-selling books about pollution and how it affects our world. She grew up on many acres of land that allowed her to roam freely and discover much about the wildlife around her. Her mother who also loved nature inspired her and instilled her love in her daughter. Times were tough in their family but they found the money to send Rachel off to college where she decided to become a biologist. After she received her master's degree, she had a very hard time finding a job because no one wanted to hire a female biologist at that time. She started writing about the sea and landed a job at the Bureau of Fisheries. She had some of her writing published and then began writing books. It was her books that Rachel was known for. Her book *Silent Spring* about the dangers of insecticides was a bestseller and started a country-wide discussion about the bad effects chemical industries had on the environment. Congress even held hearings with some of the companies. Rachel Carson’s story is one that shows young girls that even if you are struggling, you can accomplish great things. You just need to have the passion and drive for what you believe in.

Liukas, Linda. (2015). *Hello Ruby: Adventures in coding*. (Illus. by author). New York, NY: Feiwel and Friends. (Fiction)

Ruby is a young and fierce girl whose interests include maps secret codes. Author Linda Liukas sets up the perfect character to guide readers through the complex world known as coding.

Ruby's dad sets her off on an adventure to find gems with no directions so Ruby uses techniques similar to what you would use while coding. Each chapter has accompanying activities, meant to be done with an adult, that introduce readers to coding vocabulary and how to relate the techniques to real life. Though the book does not teach any programming, it introduces the fundamentals to readers at a young age in a way they can still grasp the concepts.

Mannis, C. D. (2006). *Julia Morgan builds a castle*. (Illus. By M. Hyman). New York, NY: Penguin Books. (Non-Fiction)

Julia Morgan loved to build things as a young child. She was inspired by the puzzle-like characteristics of buildings her father, an engineer, had built. She enrolled in a local college that did not have an architecture program so she took engineering classes. By being the only woman in her class, she dreamed of attending an architecture school in Paris but they did not accept women. When it was rumored the school might let in women, she packed her bags and moved to Paris. She studied the architecture of the city for over a year and was finally able to enroll at the school. When she graduated, she was the first woman to graduate with a certificate in architecture. She helped rebuild San Francisco after the great earthquake and fire of 1906.

William Randolph Hearst approached Morgan to build him a house. She worked on building him a grand castle, La CasaGrande, for twenty eight years, over half of her career. In between working on the castle she finished hundreds of other projects as well. Morgan is wonderful

example of how perseverance can get you to your goals. In her case, it was attending architecture school. She accomplished this goal and went on to be one of the most well known women architects of all time.

McCarthy, M. (2013). *Daredevil: The daring life of Betty Skelton*. (Illus. by the author). New York, NY: Simon & Schuster Books. (Non-Fiction)

Born in a time where most pilots were men, Betty Skelton defied odds and received her pilot's license at only sixteen years old. Betty grew up near a large military base where she always watched planes fly above her house. She even got to go see them up close on the weekends. She became a stunt pilot, performing daring acts in front of large crowds. She even had her own signature move, the inverted ribbon cut. After she retired from flying in the 1950s, she continued a life full of adventure. Skelton took up racing cars and then became the first female boat jumper. She was asked to train with the 'Mercury 7', a group of men training to go into outer space for the first time. Although she did not end up going into space, she proved that women could do the same training as the men. There are more facts about Betty and a timeline of her life at the end of the book for readers to get more information. This book leaves young females wondering what adventures they could go on to accomplish in their life.

McDonnell, P. (2011). *Me...Jane*. (Illus. by the author). New York, NY: Little Brown.

(Non-Fiction, Caldecott Honor Award)

Me...Jane is the story of how zoologist Jane Goodall became interested in studying chimpanzees as a child. While reading about her adventures, readers can see real photographs of Jane and sketches she made while studying animals as a young girl. This book also provides a biographical note at the end about Goodall's work during her lifetime. This book is fitting for

young girls interested in zoology or animals in general because it shows how she worked towards her dream even as a child.

Nivola, C. A. (2012). *Life in the ocean: The story of oceanographer Sylvia Earle*. (Illus. By author). New York, NY: Frances Foster Books. (Non-Fiction)

Oceanographer Sylvia Earle has accomplished many great things in her life. From using diving gear for the first time when she was only sixteen, to leading a team of divers at a deep-sea laboratory for two weeks. She is an inspiration to young girls who are also interested in the ocean and ocean life. Her story starts off when she was a child living in New Jersey. She lived on a large farm where she always would go out on ‘investigations’. Sylvia would record her findings and observations of the world around her. Her family later moved to Florida where she fell in love with the ocean. She now had all new ‘investigations’ to do and discovered so much more. This book encompasses all of her successful moments in life while still describing the amazing creatures she would see underwater. Sylvia’s professional life is told in further detail in an author's note at the end of the book. Readers can learn about the numerous organizations she started, as well as her story about testifying before Congress about using toxic dispersants in the Gulf of Mexico.

Spires, A. (2014). *The most magnificent thing*. (Illus. by author). Ontario, Canada: Kids Can Press. (Fiction)

This is the story of a young girl who has set out to create the most magnificent thing. The reader does not know what this thing is because the girl has trouble explaining what exactly it will be. The girl’s thoughts and procedures are shown throughout the book. It shows her confusion, doubts, anger, and eventually success. This book’s only link to STEM is that the girl is tinkering

around with multiple parts and tools which, could be considered early engineering. However, it is still a good story for girls to read because it shows that sometimes you might not get something right the first time, but if you keep trying, you will succeed. This is a common theme among other books in this bibliography. It is a funny and realistic story that even adults can relate too.

Stone, T. L. (2013). *Who says women can't be doctors?: The story of Elizabeth Blackwell*. (Illus. by M. Priceman). New York, NY: Henry Holt. (Non-fiction)

The story of Elizabeth Blackwell helps readers get a better understanding of how far women's rights have come while also being inspired by the story of the first female doctor in America. However, it was not easy for Elizabeth to become a physician. The idea of becoming a doctor was not her own. A friend who was ill told Elizabeth that she would much rather be examined by a woman doctor and that Elizabeth should consider becoming one. Elizabeth couldn't stop thinking about the idea and eventually agreed to become a doctor. She was rejected 28 times from multiple schools. She finally was accepted into the Geneva Medical School in upstate New York. Again she faced ridicule and the townspeople and students made it clear that they did not want her there. She proved she was just as smart as the boys and graduated top of her class in 1849. Elizabeth went on to start her own hospital just for women and children in 1857. She also opened two medical schools just for women. This story tells readers what it was like to be a woman at a time they had very little rights and how Blackwell overcame them. Readers get a better understanding of how far women's rights have come while also being inspired by the story of Elizabeth Blackwell.

Wallmark, L. (2015). *Ada Byron Lovelace and the thinking machine*. (Illus. by A. Chu).

Berkeley, CA: Creston Books. (Non-Fiction)

This short, but detailed biography of Ada Byron Lovelace shows her love for machines and mathematics from a young age. She grew up always learning new math skills because equations were always the one thing that stayed the same, even when she became ill as a teenager. She was tutored by many famous scientists and mathematicians, and was introduced to Charles Babbage. She studied his Analytical Engine for months and eventually wrote an algorithm for it. In today's world, this is known as computer programming. The author provides numerous details about Lovelace's interests including vocabulary words, names, and an author's note at the end. All of this information greatly benefits readers and encourages them to enjoy mathematics and computer programming.

3rd-5th Grades

Atkins, Jeannine. (2016). *Finding wonders: Three girls who changed science*. New York, NY:

Atheneum Books. (Non-Fiction information with some fictional elements)

At a time when girls were discouraged from being curious about science, three women all pursued their interests ignoring what others said about them. Maria Sibylla Merian, Mary Anning, and Maria Mitchell all were brought up in religious households but still focused on their scientific findings, even if they were talked about and ridiculed among the townspeople and their own family. Maria Sibylla Merian was even suspected of being a witch a few times. Their discoveries of the origins of caterpillars, the earth's history, and the mysteries of stars and comets have greatly attributed to science. Unfortunately women do not always get the credit they deserve when men make the same or similar discoveries around the same time. This book is

written in a series of short poems to allow the author to fill in gaps of information about the women's lives. It allows the reader to picture what exactly life was like when these women were making their discoveries, and encourage them to find their own.

Cummings, J. (2001). *Tomboy of the air: Daredevil pilot Blanche Stuart Scott*. New York, NY: HarperCollins Publishers. (Non-Fiction)

At a time where American women were expected to get married, have kids, and stay at home all day, Blanche Stuart Scott was paving the way for women in the air. She had always been a daredevil and never let anything or anyone stop her. Before she became interested in flying, Blanche was a spokesperson for Willys-Overland Motor Company and drove a car across the country. This was her first act as a women's activists because the purpose of the trip was to educate women about cars and interest them in them. Blanche then went on to start learning how to fly a plane. She was the first woman to fly a plane in public in America. She was known for her death defying tricks and risky moves so close to the ground. In 1913, Blanche crashed her plane breaking over 41 bones in her body and just a few years later, she decided to retire from active flying. Although her flying career was short, she helped pave the way for women during a time when they had very few rights. Her strength and determination is evident in her story which can make readers proud and inspired.

Fleming, C. (2011). *Amelia lost: The life and disappearance of Amelia Earhart*. New York, NY: Schwartz & Wade Books. (Non-Fiction)

In this book, readers get different views on Amelia Earhart and her life. The book alternates between chronological chapters about her life and short stories about her disappearance. When Amelia was a young girl, she would often question why girls had to do things differently than

boys. Her dream was to become a pilot when she was a young girl but at that time, women were not allowed. Thankfully, she had her parents there to encourage her love for things like playing sports, exploring bugs, and even using a rifle. These were all things young girls never did in Amelia's time. Even though the ending to Amelia's life is a tragedy, the author does a wonderful job at also talking about all of Amelia's successful moments in life. The real photographs of Amelia and her planes, and the small sections of additional information throughout the book will give readers a wealth of information and reassure them that they can be whatever they want to be.

Ignotofsky, R. (2016). *Women in science: 50 fearless pioneers who changed the world*. (Illus. By author). Berkley, CA: Ten Speed Press. (Non-Fiction)

Newly released this year, this book encompasses many of the women included in this bibliography. Author Rachel Ignotofsky captures 50 different women's life stories and accomplishments in one page biographies. She also includes an illustration, quote, short excerpts that state the woman's accomplishments, and fun facts about the woman with each biography. Other information included in the book is a timeline of woman in history, pictures and labels of over 50 lab tools, statistics of women in the STEM workforce, and a glossary of words that young readers might not know that are in the biographies. The contrast of the bright colors against black pages and detailed illustrations pulls the reader into a world filled with STEM and women. Girls can learn a lot about past and present women in STEM fields, and be inspired to be the next generation.

Krull, K. (2007). *Marie Curie*. (Illus. by B. Kulikov). New York, NY: Penguin. (Non-Fiction)

Marie Curie's life is unveiled for readers as they get a look at her triumphs and struggles as a woman scientist during a time women were not allowed to attend most universities. She risked her life everyday while working with the dangerous element radium, alongside her husband fellow scientist Pierre Curie. Marie was the recipient of two Nobel Peace Prizes during her lifetime. Many say that when she won them, most people did not even know the significance of winning this award yet. Author Kathleen Krull writes about Curie's struggles with her sudden fame and depression throughout her life and how science helped bring her out of it. This deep look into not only Curie's discoveries but her personal life will help girls see how difficult it once was to be a woman scientist. Readers will be inspired by Curie's determination and her passion for science. This is a good book for middle schoolers interested in chemistry because of the detailed descriptions of Curie's procedures and findings.

Paul, Caroline. (2016). *The gutsy girl: Escapades for your life of epic adventure*. (Illus. by W. Macnaughton). New York, NY: Bloomsbury Publishing. (Non-Fiction)

This book is a combination of many different things. It is a story about the author's life of adventures, some dangerous and some not, but it also teaches the reader some important lessons. The author uses her experiences to teach young girls about failure, success, adventure, and being different from others. She also includes activities for readers to take part in such as journal prompts to get the reader thinking about their adventurous life, and "derring-do's" which, are things readers can learn to do for their life full of adventure. These derring-do's include how to do a figure eight knot, recognize animal tracks, brain games, and more. The reason this book is included in this bibliography is because throughout the book, there are short paragraphs about women in STEM roles that are related to the adventure story in that chapter. These are women

who were often the ‘first’ to do something or discover something in their field. Therefore, it still pertains to the criteria for this bibliography. This book serves as a motivational read for young girls who want to be more adventurous in their life but may be shy.

Thimmesh, C. (2000). *Girls think of everything: Stories of ingenious inventions by women*. (Illus. by M. Sweet). New York, NY: Houghton Mifflin. (Non-Fiction)

This book includes many short biographies of women and the inventions they came up with. It includes inventions like the complex Space Bumper, to simple things like the chocolate chip cookie. The story of the first female to ever receive a patent is also included. This book is a good source because it covers inventions from all different types of STEM roles, while still focusing on the fact that these were women who came up with the ideas.

Thimmesh, C. (2002). *The sky’s the limit: Stories of discovery by women and girls*. (Illus. by M. Sweet). New York, NY: Houghton Mifflin. (Non-Fiction)

The same author who wrote *Girls Think of Everything* (2000) has written another book that focuses more on the discoveries that women—and even young girls—have made throughout history. Thimmesh writes, “Discovery, in its simplest terms, requires a sense of awareness and the ability to distinguish the new and noteworthy. Discoveries happen in myriad ways” (p. 7). All of the discoveries featured in the book have greatly contributed to our life and history. From the discovery of the origins of writing and counting, to finding prehistoric sea monsters in 1823, readers will be captivated and inspired by the women. Sweet’s unique collage-style illustrations and Thimmesh’s storytelling style will influence readers and prepare them to make their own discoveries.

Wyatt, V. (2000). *The math book for girls and other being who count*. (Illus. by P. Cupples).

Toronto, ON: Kids Can Press. (Fiction)

This interactive book takes readers on a journey through multiple math concepts with a fictional character named Nora. Nora stands for Natural Observation Research Activator and she is a miniature person who teaches the math concepts in the book and how to use them in real life. The book includes math experiments and activities to do and highlights women who use math in their careers. All of the activities relate to everyday life occurrences so young girls can understand that math is all around them. The end of the book offers a note to parents and teachers about how to encourage young girls to become interested in mathematics and things they can do to help at home or in school. Although the book is a picture book, it more suited for 3rd grade-5th grade readers because of the level of difficulty and understanding of the math activities.

6th-8th Grades

Hagler, G. (2016) *Careers for tech girls in math*. New York, NY: Rosen. (Non-Fiction)

Mathematics is typically a male-dominated field, but this book helps break that stereotype and to educate and inspire girls about careers in math as well. It highlights many math-related careers by describing some current jobs and featuring real women in these jobs. There is even an entire chapter on how to successfully build a resume, interview tips, and other things that will help readers secure a job. Pictures throughout the book focus on women doing their work both alone and with others. This book is part of a series that includes information on careers in computer science, engineering, gaming and video game development, science, and technology.

Hoyt, B. C., & Ritter, E. (2003). *The ultimate girls' guide to science*. Hillsboro, OR: Beyond Words Publishing. (Non-Fiction)

The introduction of this book mentions how girls tend to lose interest in science during middle school. Therefore, the authors have created a guide to help girls' interest in science continue by giving detailed information about the diverse science fields. Each chapter is dedicated to a different subject. These include earth sciences, animal biology, computer sciences, the environment, chemistry, space, physics and engineering, and inventions. Each chapter is equipped with a 'quiz' to help readers determine if that field is something they are interested in. There are also many short biographies of women scientists and how they have contributed to the field. All of this information is positioned to provide young women with more knowledge about the sciences and inspire them to pursue their interests.

Kelly, J. (2009). *The evolution of Calpurnia Tate*. New York, NY: Square Fish. (Fiction, Newbery Medal)

Calpurnia is a young girl living in the year 1899 and struggling to find her identity. Society and her own mother are pushing her to become a housewife, but her heart is telling her to follow her dream of becoming a naturalist. Calpurnia's love of science and discovery is fueled by her special relationship with her grandfather, who is a naturalist. They go out collecting different plants and bugs, and make observations about the outdoors. Calpurnia and her Granddaddy come across a new plant they have never seen before and send their observations and pictures to the Smithsonian Museum for evaluation. Many months later, they find out they have discovered a new species of plant. Throughout the story, readers see how Calpurnia interacts with her many brothers and what it is like to be the only daughter, as well as what life was like at the turn of the century. Young girls also struggling with finding their way in life will easily relate to Calpurnia even though her story takes place hundreds of years ago. Names of famous women scientists,

proper scientific names of species, and Calpurnia's scientific process' are woven through the story to give readers knowledge and understanding of those science topics. Even the epigraphs of the chapters are quotes from *The Origin of Species* by Charles Darwin, a book very important to Calpurnia during this story. This book is part of a series which includes *The Curious World of Calpurnia Tate*, *Skunked: Calpurnia Tate Animal Doctor in Training*, and *Counting Sheep: Calpurnia Tate Girl Vet*.

Klages, E. (2006). *The green glass sea*. New York, NY: Penguin Books. (Fiction, Scott O'Dell Award)

The Green Glass Sea is a historical fiction book about life on a secret military base during World War II. It follows the main character Dewey's time on 'the hill' as she tries to adjust to being in a new place. She is very interested in math and building trinkets. Many of the other characters are women scientists and mathematicians that work on the base helping develop the atomic bomb. Dewey is inspired by these other women and is always engaging in scientific conversation with them. Klages also mentions real world scientists such as Dorothy McKibbin, Robert Oppenheimer, and Richard Feynman who were all contributors to The Manhattan Project. Young female readers who are interested in STEM fields can easily relate to Dewey's feeling of being the 'odd girl' in her class simply because she is not interested in typical girl hobbies.

Lewis, A. (2014). *Women of steel and stone: 22 inspirational architects, engineers, and landscape designers*. Chicago, IL: Chicago Review Press. (Non-Fiction)

This book is made up of three parts, each one focusing on multiple women in either architecture, engineering, or landscape design. The women's lifetimes range from the 1800's to present time. Each mini biography is packed with facts about the women's careers, accomplishments, and

personal life. Many pictures of their famous work is also included. The author adds general information about the STEM fields as well as the best colleges and universities to attend if readers wish to pursue degrees in these fields. Her data is based on various resources from 2013.

This book is very helpful for middle school girls who are interested in engineering and architecture jobs because of the large amount of information and numerous role model figures.

Noyce, P.E. (2015). *Remarkable minds: 17 more pioneering women in science & medicine*.

Boston, MA: Thumblehome. (Non-Fiction)

In this companion book to author Pendred E. Noyce's *Magnificent Minds*, the author once again fills readers' minds with stories of women scientists from over three centuries and seven different countries. Noyce categorizes the profiles of the 17 women into the subjects of medical sciences, astronomy, physics, chemistry, and mathematics. Readers can learn about a granddaughter of slaves who went on to accomplish groundbreaking research on chemotherapy, to a woman in England doing research on electricity and carbon arcs in 1902. Each profile is complete with a visual timeline of the woman's life, as well as an in-depth description of her home and work life and lifetime accomplishments. Noyce also takes the time to explain mathematical and scientific concepts for readers using diagrams to help them understand better. Although it is a lengthy and dense book, young girls pursuing careers in science and medicine will be encouraged and motivated.

Pasternak, C., & Thornburg, L. (1999-2004). *Cool careers for girls*. Manassas Park, VA: Impact

Publications. (Non-Fiction)

Books in this series are focused on many areas of work such as air & space, animals, computers, engineering, health, and many more. Each book profiles 10 or more women who have jobs in

these fields giving young girls role models to look up to. The profiles talk about a typical day in the job, as well as common characteristics of those who work in the profession. These books are a great way to give any reader interested in STEM careers multiple jobs to explore and learn about.

Stone, T. L. (2009). *Almost astronauts: 13 women who dared to dream*. Somerville, MA:

Candlewick Press. (Non-Fiction, Sibert Award)

A collective biography about 13 women who wanted to be astronauts in the 1960's but faced many obstacles that prevented it. It shows how even though the women took and passed all of the physical and psychological tests as the men who were considered, they were not chosen simply because they were women. Through interviews, photos, and even documents, this story takes its readers through the history of the Mercury 13 experiment to see if women could pass the same strenuous tests as men. It empowers young girls to believe that they can do whatever they want in life if they just keep on trying. They may even pave the way for future generations.

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