

Unit 9

Inspiration
and Ingenuity:
**American
Innovation**

Grade 4

Unit 9

Inspiration and Ingenuity: American Innovation

Visual Supports for Teaching

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Oil Lamp



Vintage Icebox



Vacuum Tube TV



Lydia Villa-Komaroff



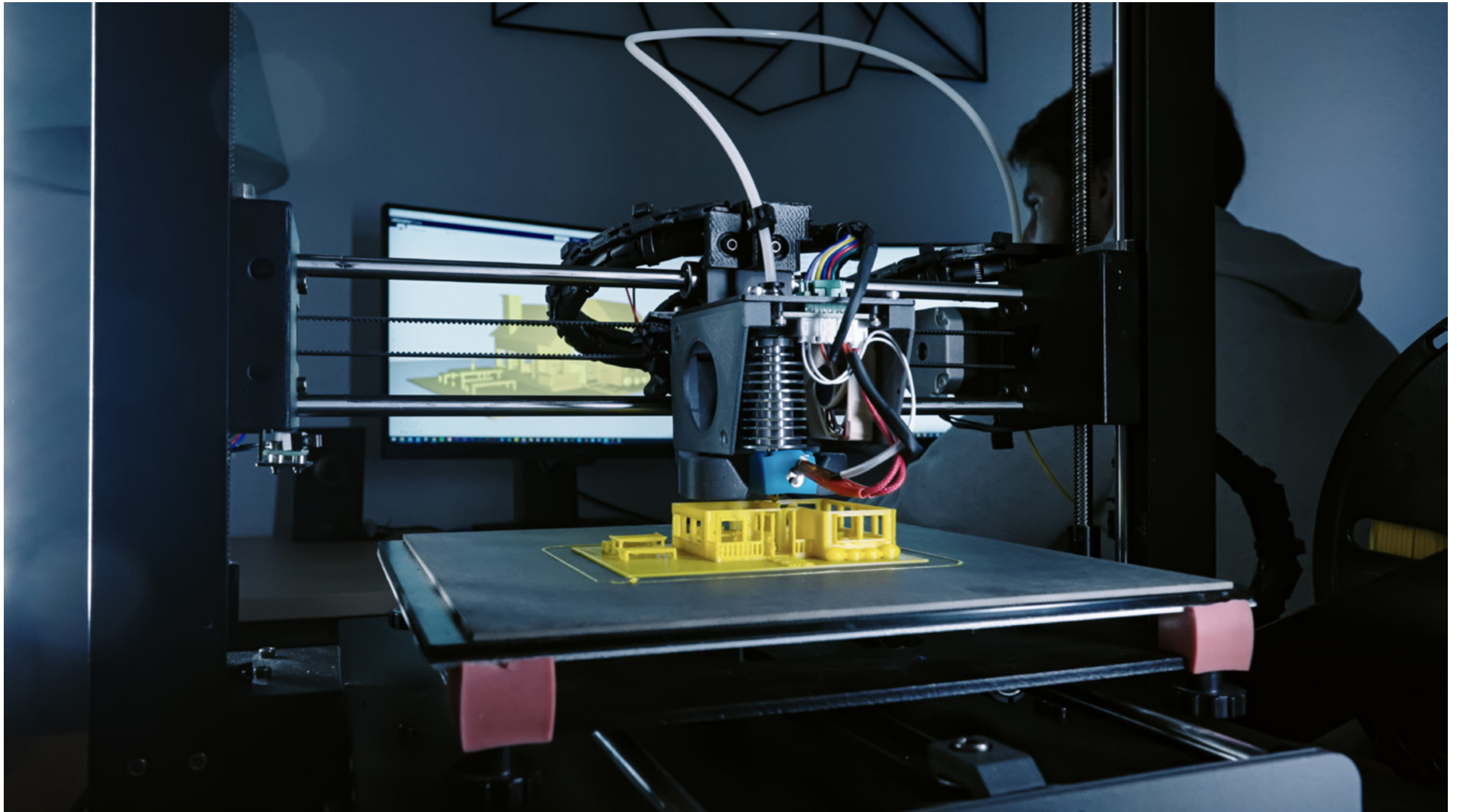
Edison Bulb and LED Bulb



Louis Armstrong and Tito Puente



Industrial 3D Printer



Discussion Prompts

1. What makes someone an inventor?
2. In what ways are innovators different from inventors?
3. How are inventors and innovators similar?
4. Can you think of an example from the text of someone who was both an inventor and an innovator?

Innovation Exhibition Task

Fourth Grade Writing Rubric: Informative/Explanatory Writing

Writing Prompt: Choose an American innovator who inspires you from history. Find someone whose story stands out to you or whose work you find fascinating. Learn about your innovator's background, the problem they addressed, and their innovations. Discover the impact of their work. Then, write an informative essay to share your findings and what you learned.

Write informative/explanatory texts to examine a topic and convey ideas and information clearly

- a) Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
- b) Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
- c) Link ideas within categories of information using words and phrases (e.g., *another*, *for example*, *also*, *because*).
- d) Use precise language and domain-specific vocabulary to inform about or explain the topic.
- e) Provide a concluding statement or section related to the information or explanation presented.

Innovation Exhibition Task

	Advanced	Proficient	Basic
Ideas	The composition - examines a topic - develops the topic with a combination of relevant facts, accurate definitions, concrete and specific details, quotations from multiple sources, or other nuanced information and examples - makes sophisticated connections between ideas - demonstrates awareness of audience and purpose	The composition - examines a topic - develops the topic with facts, definitions, concrete details, quotations, or other information and examples	The composition does not do one or more of the following: - examine a topic - develop the topic with facts, definitions, concrete details, quotations, or other information and examples
Organization	The composition - introduces a topic clearly and in an engaging fashion - groups related information in paragraphs or sections and explains connections between groups - includes a combination of formatting, illustrations, and multimedia that explain the ideas - provides a concluding statement that connects the topic to a big question or the purpose for writing	The composition - introduces a topic clearly - groups related information in paragraphs and sections - includes formatting, illustrations, and multimedia when useful - provides a concluding statement	The composition does not do one or more of the following: - introduce a topic clearly - group related information in paragraphs and sections - include formatting, illustrations, and multimedia when useful - provide a concluding statement

Innovation Exhibition Task

	Advanced	Proficient	Basic
Conventions	The composition - links ideas within categories of information using words and phrases - uses precise language and domain-specific vocabulary - uses language to add subtlety through connotative meanings	The composition - links ideas within categories of information using words and phrases - uses precise language and domain-specific vocabulary	The composition does not do one or more of the following: - link ideas within categories of information using words and phrases - use precise language and domain-specific vocabulary

Madam C.J. Walker



Annie T. Malone



Copper Sulfur Crystals



C.J. Walker in Car



Excerpt from Innovators as Entrepreneurs:

Madam C. J. Walker

“The woman who became Madam C. J. Walker was born on December 23, 1867, on a plantation in Louisiana. Her parents named her Sarah Breedlove. Sarah was the youngest of six children, as well as the first child in her family born after the Thirteenth Amendment, which abolished slavery. Orphaned at the age of seven, Sarah went to live with her older sister, Louvenia. As time went on, she got married, had a daughter, and moved around the country to different places. By the early 1900s, she was working as a laundress, or someone who washes clothes, to support her family. It was a difficult struggle, but Sarah was a resilient person. She did not give up, no matter how tough it got.”

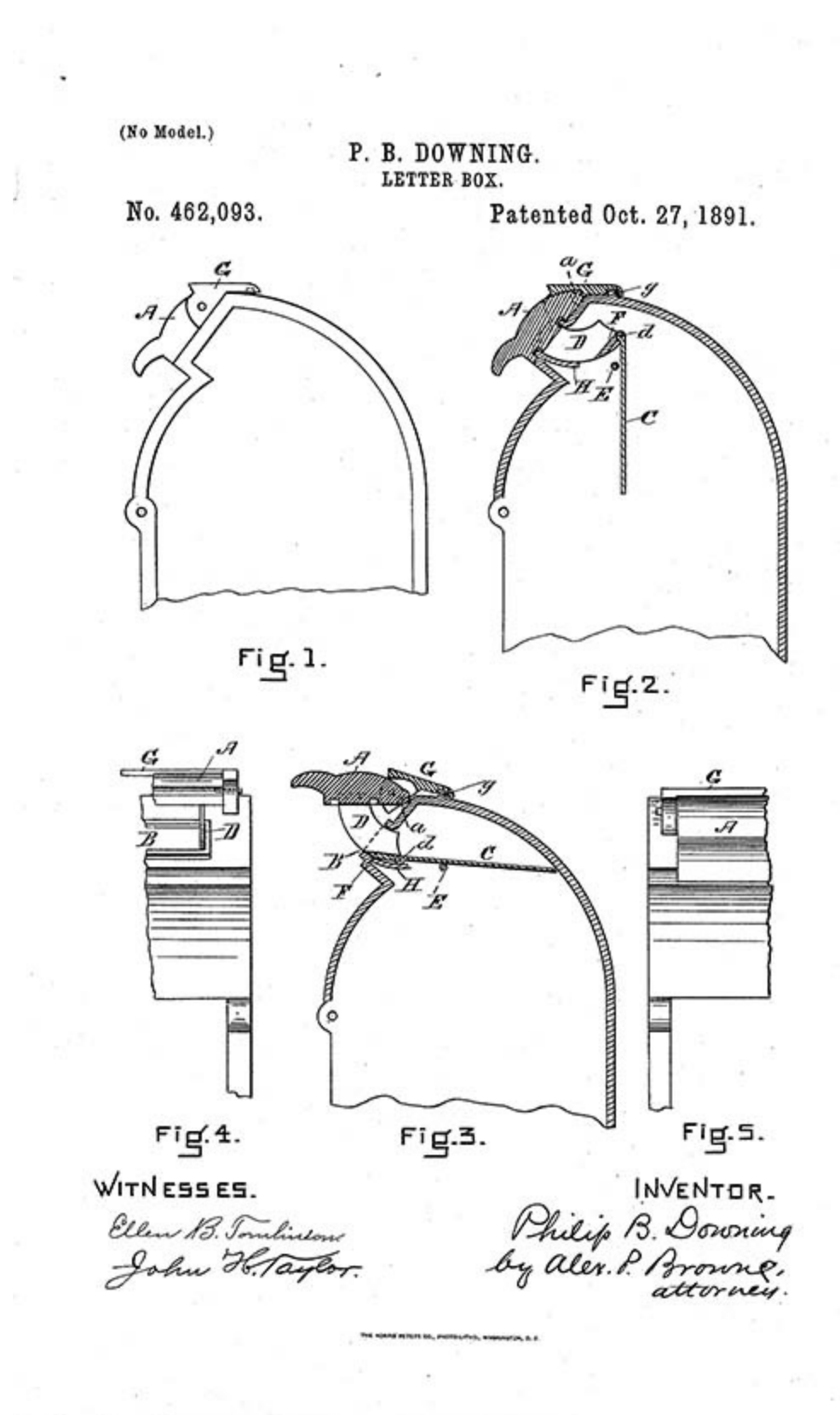
Paraphrasing Text

DIRECT QUOTE from Text (use quotation marks)	PARAPHRASED Text (your own words)
“... Sarah came up with a formula that included many different ingredients. Her formula combined a very pure form of a chemical called sulfur , as well as beeswax , coconut oil, and a bright, blue crystal called copper sulfate. The sulfur in the formula had a strong odor, so Sarah added a violet perfume to make it smell sweet.”	
	Show plagiarism example here: Sarah devised a formula that included many different ingredients. Her formula combined a very pure form of a chemical called sulfur, as well as beeswax, coconut oil, and a bright, blue crystal called copper sulfate. Due to the strong order of the sulfur, Sarah decided to add a violet perfume to make it smell sweet.

Blue Modern Mailbox



Downing's Patent Design



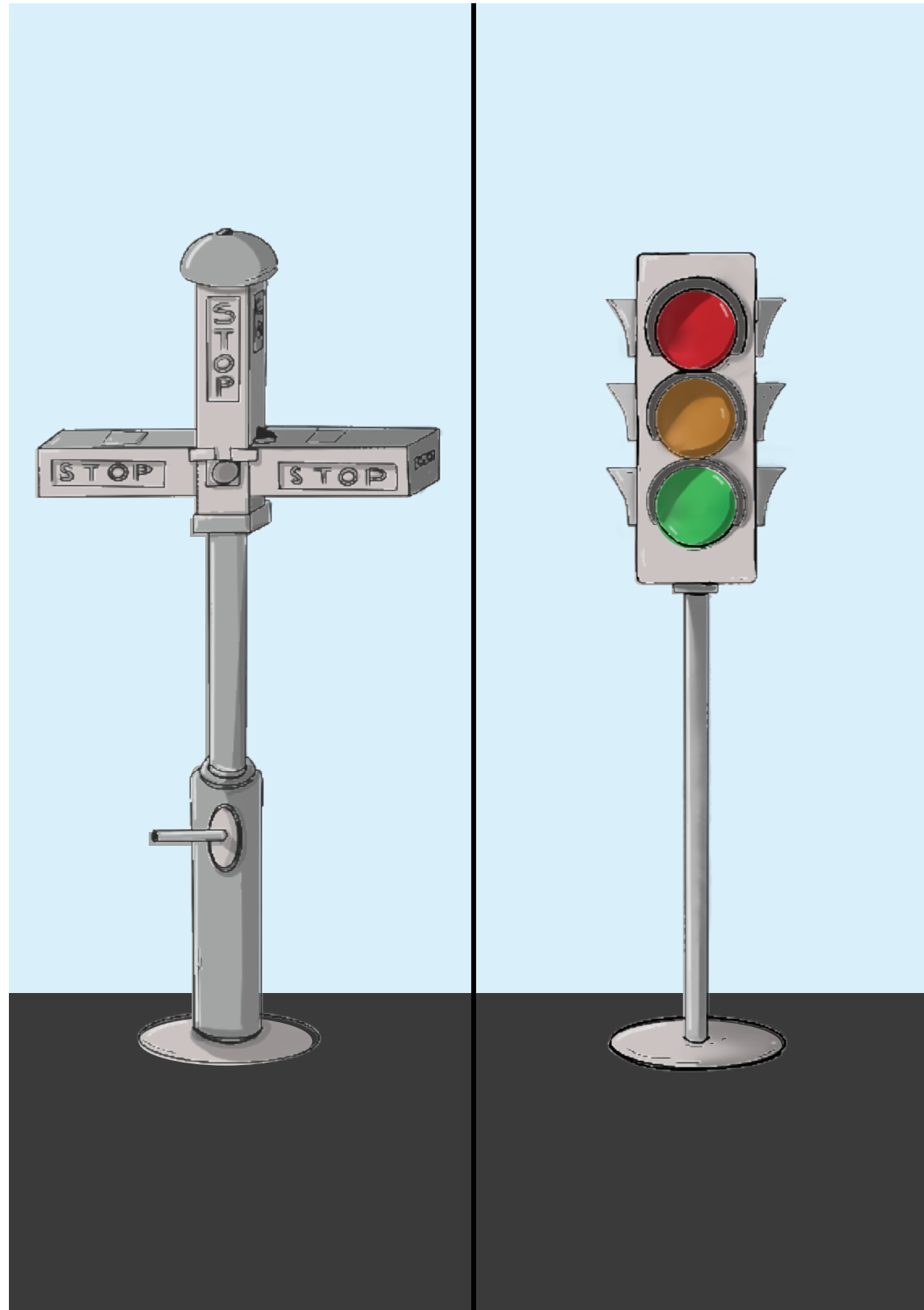
Old Mechanical Street Sign



Garrett Morgan



Morgan's T-Shaped Signal



Josephine Cochrane



Florence Parpart



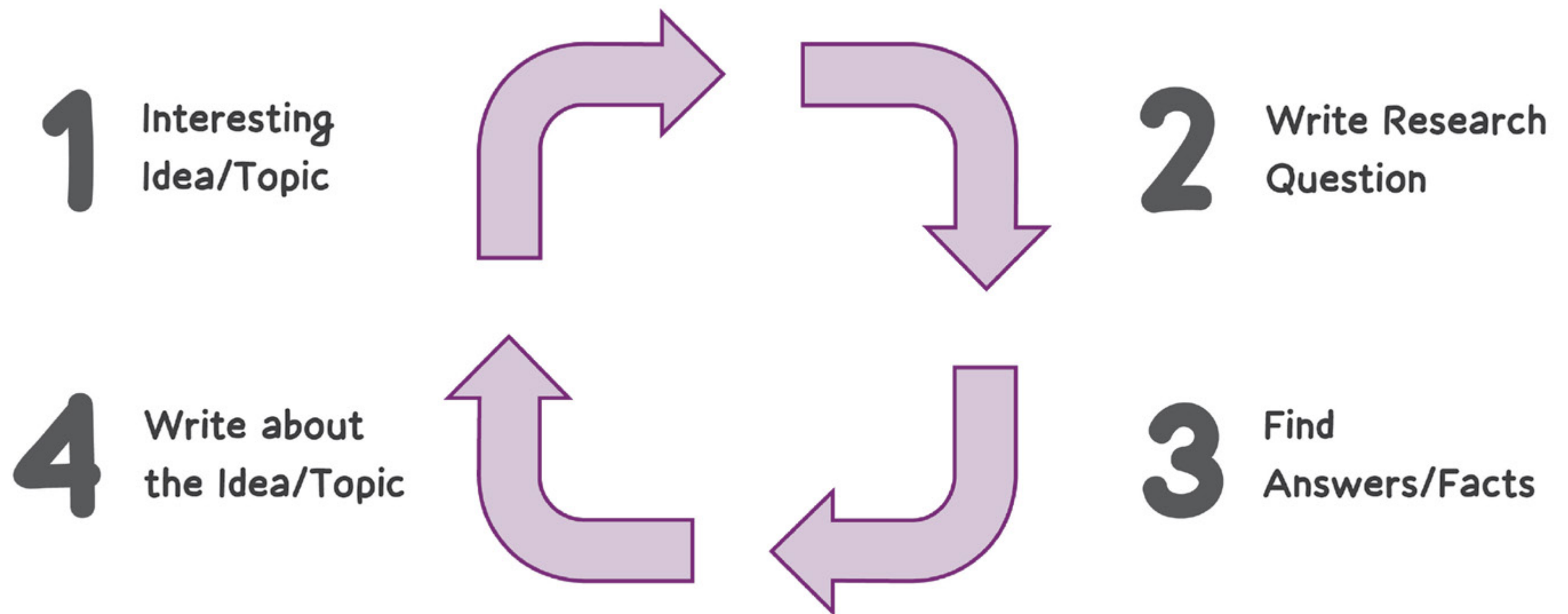
Icebox



Early Refrigerator



The Research Process



Oil Lamp



Edison as a Kid



Edison at Menlo Park with Associates



Lewis Latimer



Latimer's Drawing of the Light Bulb

INCANDESCENT ELECTRIC LIGHTING.

A Practical Description of the
Edison System.

BY
L. H. LATIMER.

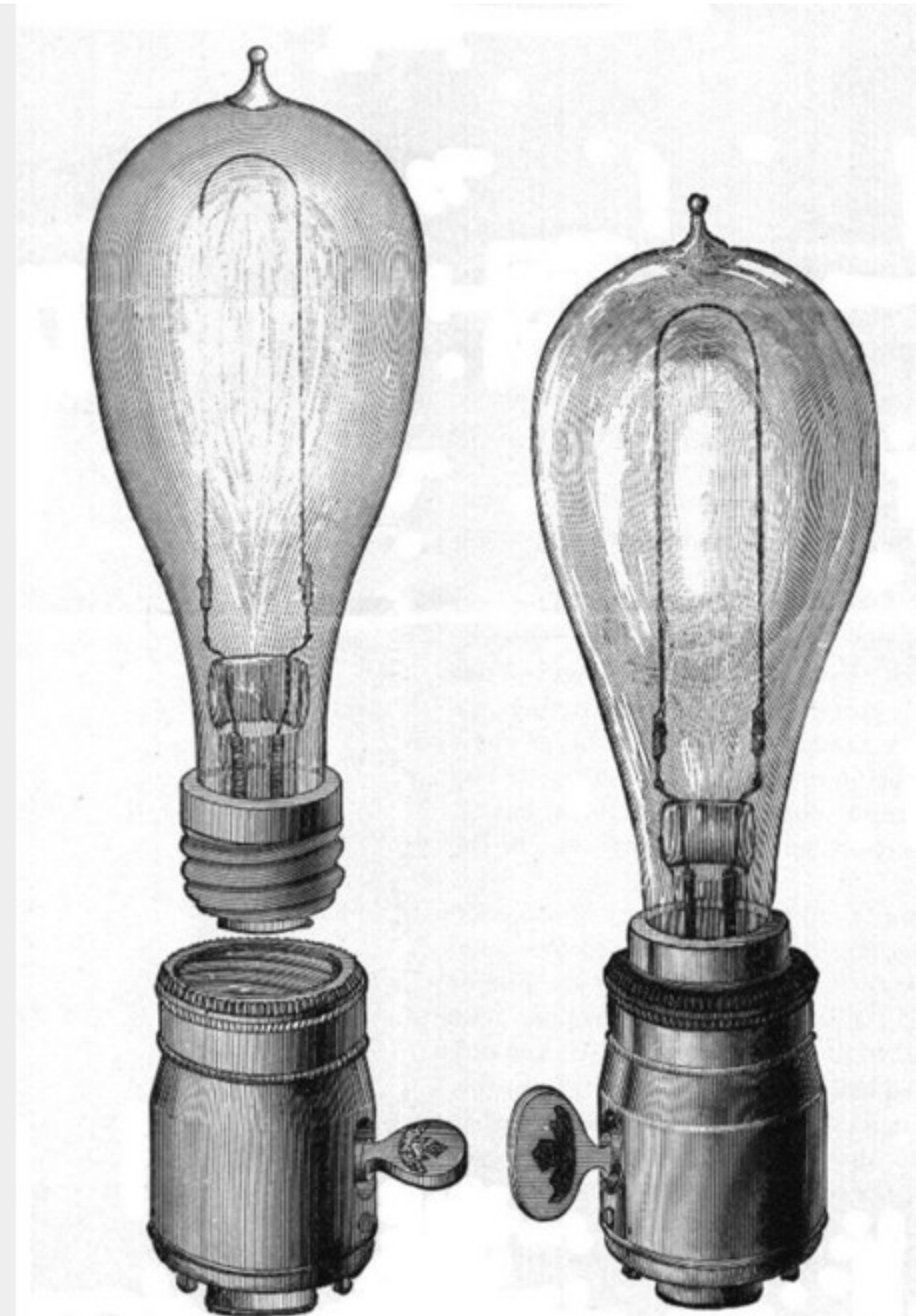
TO WHICH IS ADDED THE
DESIGN AND OPERATION OF INCANDESCENT
STATIONS.

By C. J. FIELD.

AND A PAPER ON
THE MAXIMUM EFFICIENCY OF INCANDESCENT
LAMPS.

By JOHN W. HOWELL.

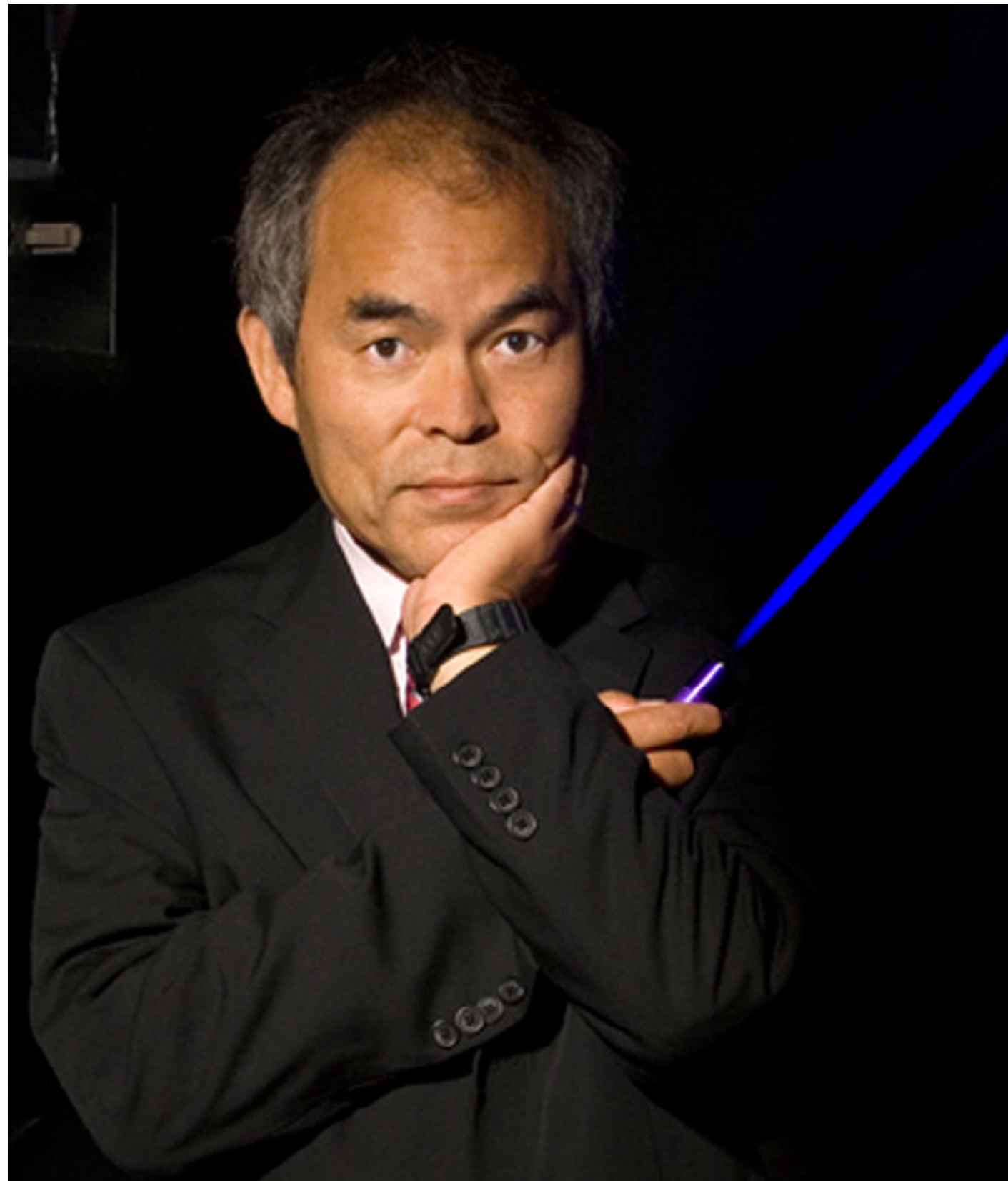
NEW YORK :
D. VAN NOSTRAND COMPANY,
23 MURRAY AND 27 WARREN STREET,
1890.



LED-Sign Digital Clock



Shuji Nakamura



LED Bulb



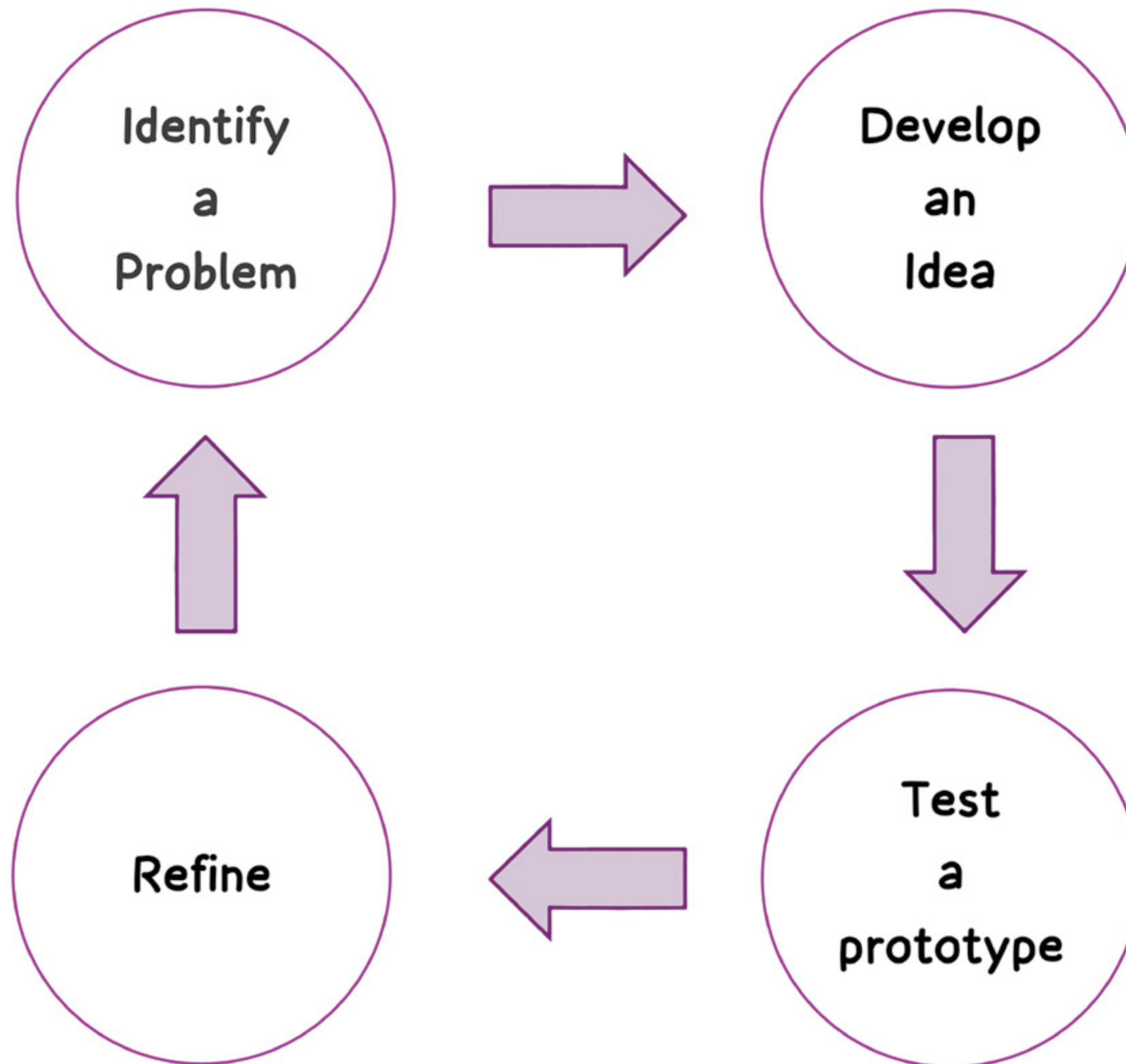
Main Idea and Key Details

Main Idea:					
Key Detail: Before electricity, people used candles, fireplaces, and oil lamps for light.	Key Detail:	Key Detail:	Key Detail:	Key Detail:	Key Detail:

Chart: Mixing Colors on Paper vs. Mixing Colored Lights

	Mixing on Paper	Mixing Colored Lights
Primary Colors	Red, Blue, Yellow	Red, Blue, Green
Secondary Colors	Blue + Yellow = Green Blue + Red = Purple	Blue + Green = Turquoise Red + Blue = Magenta
Combining all the Colors	Makes a dark color, almost black	Makes white light
Blue’s Role	Mixing blue makes colors darker and cooler.	Blue helps make different shades of red, green, and blue lights.

The Innovation Cycle



Body Paragraph Example

A 3D printer has important parts that work together to make cool things! One key part is the “extruder,” like a magical pen that pushes out melted plastic. The “bed” is where the object is made, and it helps the plastic stick and take shape. The “filament” is the special ink for the printer, and the “nozzle” is where the melted plastic comes out. All these parts team up: the extruder draws, the bed holds, and together they create awesome 3D prints!

Primary and Secondary Sources

Primary Sources	Secondary Sources
☐ diary/journal ☐ speech ☐ interview ☐ original artwork, sketches, or drawings ☐ photographs ☐ video recording ☐ actual words of the subject or witnesses ☐ patents ☐ autobiographies	☐ informational books and articles ☐ newspapers ☐ words written after a historical event ☐ biographies ☐ second-hand facts on a website

Innovators in Medicine

Lydia Villa-Komaroff	discovered how bacteria can be used to make insulin
Jonas Salk	developed the first effective polio shot
Charles Drew	introduced new ways to store and save blood
Benjamin Carson	helped separate twins who were stuck together
Virginia Apgar	made a test for newborn babies

Excerpt

“In the 1920s, Philo Farnsworth, a high school chemistry student, got curious about vacuum tubes. Vacuum tubes were an early tool that controlled the direction of an electrical current, or flow of electricity. Farnsworth created an innovative technique that used vacuum tubes to break apart a picture, turn it into electricity, and then put it back together again. His curiosity about vacuum tubes eventually led to black-and-white television, a new way to share information, stories, and entertainment. Later, Guillermo González Camarena innovated further with Farnsworth’s methods. This led to him inventing color television—a clear improvement!”

Informational Writing Template

Introductory Paragraph

Hook: [Begin with an engaging sentence related to the innovator or their innovation.]

Imagine a towering structure that revolutionized entertainment at the World's Fair.

Topic Sentence: [Introduce the topic with the research question.]

How did George Ferris change the way people had fun at the 1893 World's Fair?

Sentence 2: [Tell the reader who (innovator) and what (innovation) the topic is that will help answer the research question.]

George Ferris was not just an inventor, he was an engineer who created the Ferris wheel.

Sentence 3: [Tell the reader a detail related to the when of the topic.]

In 1893, when organizers of the World's Columbian Exposition in Chicago wanted something new and exciting, George Ferris had a brilliant idea.

Sentence 4: [Tell the reader why this topic is important.]

He decided to create a gigantic Ferris Wheel, a massive spinning ride, to add a lot of excitement and joy to the event.

Informational Writing Template

Body Paragraph 1: (Add transition word here)

Idea 1 Topic Sentence: George Ferris, born in 1859, was an American engineer.

- Fact and Supporting Detail, citing source: [According to the (name of book or author of article), Ferris liked to build things from a young age and studied engineering at school.]
- Fact and Supporting Detail, citing source: [An article in (name of magazine newspaper, or website) tells us that he started his career building bridges, which taught him how to make strong structures.]
- Fact and Supporting Detail, citing source: [(Name of website) mentions that George Ferris was really good at solving problems, leading to numerous successful projects and a growing reputation within the engineering field.]
- Why is the topic important? [But in 1893 he faced a big challenge to design something for the World's Columbian Exposition in Chicago that would amaze visitors!]

Body Paragraph 2: (Add transition word here)

Idea 2 Topic Sentence: Ferris's most significant innovation was the creation of the Ferris wheel, a groundbreaking invention that left a lasting impact on amusement parks and fairs.

- Fact and Supporting Detail, citing source
- Fact and Supporting Detail, citing source
- Fact and Supporting Detail, citing source

Informational Writing Template

Body Paragraph 3: (Add transition word here)

Idea 2 Topic Sentence: George Ferris's contributions extended beyond his innovative creations, leaving a lasting legacy in the field of engineering and entertainment.

- Fact and Supporting Detail, citing source
- Fact and Supporting Detail, citing source
- Fact and Supporting Detail, citing source

Conclusion

- Concluding Sentence: [Tell what you learned or want others to learn from your research.]
- As you have read, George Ferris's curiosity and engineering skills led to a thrilling ride for people at the World's Fair and had a lasting impact on amusement parks today.
- [Tell the reader why this is important information.] This is important information for others to know, because we might not think that an engineer is behind something designed to make our lives more fun.
- [Tell the reader another reason why this is important information.] And, if George had not been willing to keep working to solve all the many problems he faced, we would not have the Ferris wheel.
- [Tell the reader the most memorable fact you learned about the idea/topic.] I will always remember George Ferris when I ride the Ferris wheel at the fair or an amusement park.

Transitions

To Open (1st Idea Paragraph)	To Connect Ideas (beginning and within Body Paragraphs)	To Close (before Conclusion Paragraph)
To begin, First, First of all, To start, For starters, The first reason, The first way	Additionally, Another reason why, For example, For instance, In fact, As a matter of fact, Furthermore, Moreover, Second, Third, Also, Next, One last example,	In conclusion, To summarize, In summary, Therefore, Finally, You can see why

Original and Revised Body Paragraphs

Original Writing	Revised Writing
George Ferris, born in 1859, was an American engineer.	George Ferris, born in 1859, was an American engineer known for his curious spirit and love for creating exciting things.
The book, <i>Mr. Ferris and His Wheel</i> describes how Ferris liked to build things from a young age and studied engineering at school.	To start, the book, <i>Mr. Ferris and His Wheel</i> describes how Ferris liked to build things from a young age and studied engineering at school.
He started his career building bridges. He learned how to make strong structures.	When he started his career building bridges, he had learned how to make strong structures.
As the book also mentions, George Ferris was really good at solving problems, leading to numerous successful projects and a growing reputation within the engineering field.	Furthermore, as the book also mentions, George Ferris was really good at solving problems. This skill led to numerous successful projects and a growing reputation within the engineering field.
He faced a big challenge to design something amazing for the World’s Columbian Exposition in Chicago.	You can see why he was the man given the big challenge to design something amazing for the World’s Columbian Exposition in Chicago.

Citing Sources

For a book: Last name of author, first name. Title, underlined. The year the book was published.

Example: Smith, John. The Art of Persuasion. 2018.

For an article in a print encyclopedia or reference book: Last name of author, first name. Title of article, in quotes. Title of encyclopedia or book, underlined. The year the book was published.

Example: Williams, Emily. "Renaissance Art." Encyclopedia of Art History, 2005.

For a Web page or article on a Web page: The title on the page or of the section of the page you used in quotes. Title of the Web page (found in the address bar). The date the page was published or last updated (month day year). Online.

Example: "John Coltrane." www.loc.gov/item/2007683518 15 Sept. 2020. Online.

For an article from an online database: Author of the article last name, first name. Title of the article in quotes. Name of the source. The date the article was published (month day year). Online.

Example: Mahon, Maureen. "How Bessie Smith Influenced a Century of Popular music." NPR, All Things Considered. Aug. 5, 2019. Online.

Designing an Infographic

Organization:

- Select a clear topic for your infographic, collect relevant information, and place that information into categories.
- Consider the order or flow of how that information will be presented.

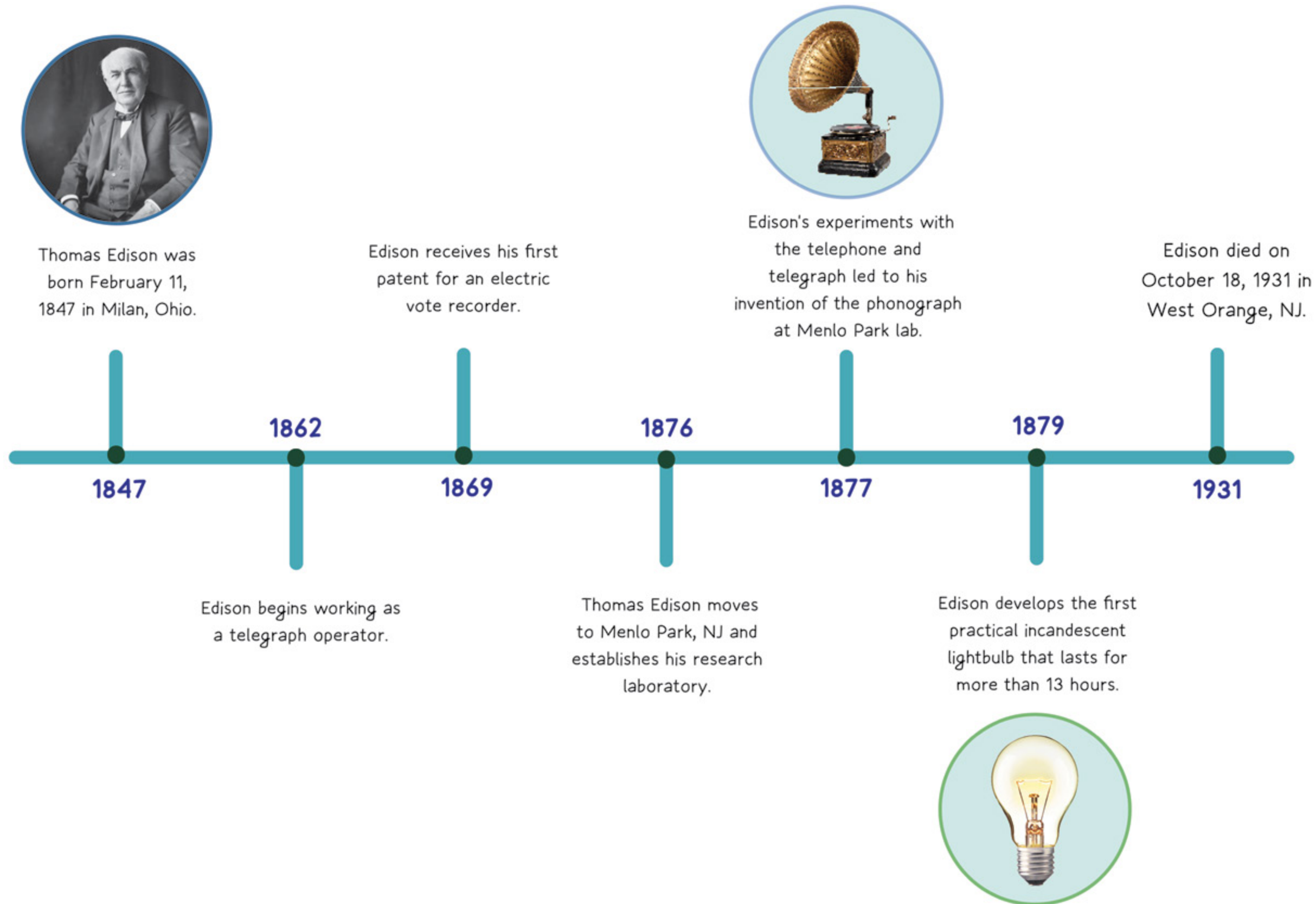
Visuals:

- Icons, images, and charts help share information quickly and in a way that can better engage your audience.
- Choose visuals that will help amplify or clarify your message.

Design:

- Visual appeal in your infographic helps capture and retain the attention of your audience.
- Choose color schemes and fonts strategically.
- If you can use a picture, icon, or graph to replace a longer explanation, do it!
- Headings, subheadings, and bullet points help organize and make your infographic more readable.

Sample Infographic



Questions for student presenters

- What inspired you to choose this particular innovator or innovation for your presentation?
- What were the primary challenges or obstacles faced by the innovator during their development process?
- How did the innovator's background or personal experiences influence their work?
- How did innovation impact society, industry, or technology at the time of its introduction?

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Gibbs Davis, Kathryn. *Mr. Ferris and His Wheel*. Clarion Books, 2014.

Lord, Michelle. *Patricia’s Vision: The Doctor Who Saved Sight*. Union Square and Co., 2020.

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