Who Invented What?

Grade Level: 6-12

Subject: Science / United States History / World History / World Languages

Categories: Arts and Sciences / History and Society

Standards:

Please see page 11 of the lesson plan for complete New Jersey Student Learning Standards.

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Objectives:

Students will be able to:

1. analyze historic data, articles, House resolutions, and Supreme Court decisions.
2. synthesize researched data and produce ratiocinations.
3. develop rhetoric to produce cogent arguments, orally and in writing.

Abstract:

The controversies surrounding who invented the radio and the telephone are explored. Marconi and Meucci have great claims, but the students will research and decide.

Background:

The turn of the twentieth century was a time of great individual creativity. Inventors such as New Jersey's Thomas Edison and George Westinghouse fiercely competed in the electronics business. Various automakers pitted their best creations against one another. Many inventors feverishly worked to get their inventions to the Patent Office before competitors could. The competition produced some of the greatest inventions the world had ever seen. Today, Americans believe that the all of the controversies surrounding inventions have long been settled. Little do they know that many of the battles still continue to be debated.

When average Americans are asked, "Who invented the telephone?" they quickly answer, "Alexander Graham Bell!" When asked, "Who invented the radio?" they reply, "Marconi!" Nevertheless, the United States government says both answer are wrong. In spite of Marconi's phenomenal and precedent-setting transatlantic wireless radio transmission in 1901, in 1943, the Supreme Court ruled that Nikolo Telsa, a Croatian immigrant, actually invented the radio, not Guglielmo Marconi. In addition, a Slovakian Roman Catholic priest from Wilkes Barre, Pennsylvania, Fr. Joseph Murgas, claimed that he was the true inventor of the radio.

Trying to settle another controversy, the House of Representatives in 2002 passed a resolution proclaiming that that the Florentine immigrant to America, Antonio Meucci actually invented the telephone, not the Scottish immigrant, Alexander Graham Bell. Ironically, this was not the first challenge to Bell's claim. Bell had beaten Elisha Gray to the patent office by a few hours and received the patent for the telephone. Gray sued Bell, but the Scottish inventor won the case in court.

Procedures:

I. Tell students that there are great controversies regarding who invented the first telephone and who invented the first radio.
   A. The students are being commissioned by the (fictitious) National Board of Science to settle the controversies.
   B. Divide the class into two.
      1. Half the class will investigate the radio controversy.
      2. Half the class will investigate the telephone controversy.
   C. Further divide each group into three subgroups
      1. Radio Group
         a. Guglielmo Marconi
         b. Fr. Joseph Murgas
         c. Nikolo Telsa
      2. Telephone Group
         a. Antonio Meucci
         b. Alexander Graham Bell
         c. Elisha Gray
   D. Each subgroup will investigate their respective inventor's claims.
      1. Each subgroup will record their findings in a subgroup journal.
      2. Each subgroup will write a five-page (double spaced) report advancing their inventor's claim.
         a. Each paper will contain at least 6 sources in a bibliography.
         b Each paper will contain at least 12 endnotes. (All sources must be cited in the endnotes; all endnotes must be listed).
         c. Each group should make enough copies for the teachers and for each classmate.
      3. Each group will put together a seven-minute talk (members of the subgroup may share the time with each other), advancing their inventor's position.
         a. They will use information from their research and their position paper.
         b. They will organize their talk, by reminding the listeners of their thesis, as they discuss each supporting detail, or proof.
         c. They should use some props and other visuals.
         d. They have a conclusion at the end of their talk, recapping their positions.
      4. The radio group will judge which inventor actually invented the telephone.
      5. The telephone group will judge which inventor actually invented

the radio.

E. All groups may use the websites below, find other sites, or use the stacks in a library for their research.

Assessment:

Assess the paper by using the *New Jersey Registered Holistic Writing Rubric* for scoring. Assess the oral presentation with a teacher-made checklist.

Extension:

Have students investigate who invented the light bulb. Thomas Edison or Englishman, Joseph Swan? Students can begin their research at:
Did Thomas Edison really invent the light bulb?
https://www.livescience.com/43424-who-invented-the-light-bulb.html
https://www.cio.com/article/2441341/thomas-edison--joseph-swan-and-the-real-deal-behind-the-light-bulb.html

Resources:

Telephone

- ✓ Invention of the Telephone: Complete History and Timeline
  https://sciencestruck.com/invention-of-telephone
- ✓ Bell did not Invent Phone Guardian Unlimited
  http://www.uwosh.edu/faculty_staff/palmeri/commentary/meucci.htm
- ✓ Who is credited as inventing the telephone: Was it Alexander Graham Bell, Elisha Gray, or Antonio Meucci?
  http://www.loc.gov/rr/scitech/mysteries/telephone.html

Gray

- ✓ Gray's Caveat: The Invention of the Telephone
  https://www.thoughtco.com/elisha-gray-race-to-patent-telephone-1991863
- ✓ Elisha Gray
  http://www.oberlin.edu/external/EOG/OYTT-images/ElishaGray.html

Bell

- ✓ Alexander Graham Bell Family Papers Home
  http://memory.loc.gov/ammem/bellhtml/bellhome.html
- ✓ Alexander Graham Bell's Path to the Telephone -- Home Page
  http://www.iath.virginia.edu/albell/homepage.html

Meucci

- ✓ Antonio Meucci Explained
  https://everything.explained.today/Antonio_Meucci/
- ✓ The Tragic Tale of the Telephone's Real Inventor, Antonio Meucci
  https://www.scmp.com/lifestyle/technology/article/1240794/tragic-tale-telephones-real-inventor-antonio-meucci

- ✓ Antonio Meucci
  http://www.lifeinitaly.com/heroes-villains/antonio-meucci.asp
- ✓ Antonio Meucci
  http://www.freemasonry.bcy.ca/biography/meucci_a/meucci_a.html

Radio

- ✓ United States Early Radio History
  http://earlyradiohistory.us/index.html
- ✓ The Radio Entrepreneurs
  http://www.westga.edu/~bquest/2001/radio.htm
- ✓ Nikola Tesla: The Guglielmo Marconi case
  http://en.wikipedia.org/wiki/Invention_of_radio
- ✓ Priority in the Invention of Radio: Tesla vs. Marconi
  http://www.tfcbooks.com/mall/more/cover/431-pir.htm
  PBS - Master of Lightning Who Invented Radio
  http://www.pbs.org/tesla/ll/ll_whoradio.html

Marconi

- ✓ Guglielmo Marconi : Biography
  https://www.biography.com/inventor/guglielmo-marconi
- ✓ Marconi: Marconi History
  https://www.history.com/topics/inventions/guglielmo-marconi

Murgas

- ✓ Accomplishment of Joseph Murgas in his invention of the radio
  http://en.wikipedia.org/wiki/Jozef_Murga%C5%A1
- ✓ Murgas System of Wireless Telegraphy (1905)
  http://earlyradiohistory.us/1905mur.htm

Telsa

- ✓ Nikola Tesla
  http://en.wikipedia.org/wiki/Nikola_Tesla
- ✓ Nikola Tesla inventor, engineer, scientist
  https://www.famousscientists.org/nikola-tesla/

Supplemental Information

Guglielmo Marconi

On April 25, 1874, Giuseppe Marconi, an Italian country gentleman, and his second wife Annie Jameson, daughter of Andrew Jameson of Daphne Castle in the County Wexford, Ireland and of Jameson Whiskey fame became parents to their second son, Guglielmo, in Bologna, Italy. Giuseppe's two sons spent their childhood in England with their mother Annie. From his mother, Guglielmo inherited tenaciousness and firm resolve, along with knowledge of the English language. From his father, he received a strong will and adroit business talent.

Guglielmo was privately educated in Bologna, in Florence, and in Leghorn. As a young student, he developed an ardent passion for both physical and electrical sciences. Marconi studied physics unremittingly at the technical institute of Livorno and the University of Bologna. On his family estate, *Villa Griffone* in Pontecchio, Marconi used his own laboratory for elementary experiments, trying to transmit a wireless message with electromagnetic waves. Through assiduous study of research from earlier scientists such as: the Scotsman, Clark Maxwell, the German Heinrich Hertz, the Italian, Augusto Righi, and the Englishman Oliver Lodge, the young Marconi succeeded in sending wireless signals over a distance of one and a half miles.

On February 2, 1896 Marconi returned to England where he met with his cousin David Jameson, an Anglo-Irish scion of the whiskey empire. Jameson introduced his cousin to the Director of the Post and Telephones Company, Sir William Preece, who quickly became an enthusiastic supporter. Later the following year on June 2, 1897, Marconi was granted the world's first patent for a system of wireless telegraphy-- British Patent number 12039.

On July 27 Marconi performed his first official experiment from the terrace of the Post Office, at Three Mile Hill sending signals across the Salisbury plain. Also during July 1897 Marconi formed The Wireless Telegraph & Signal Company Limited. On September 2, Marconi sent signals between Penarth and Weston, England; he had sent signals across the Bristol Channel.

Later in 1897 the Bologna native gave a demonstration to the Italian Government at Spezia, where wireless signals were sent over a distance of twelve miles. In 1899 Marconi established wireless communication between France and England, across the English Channel. He then erected permanent wireless stations at The Needles, the Isle of Wight, at Bournemouth and later at the Haven Hotel, Poole, and Dorset.

In 1900 Marconi took out patent #7777 for "tuned or syntonic telegraphy." In December 1901, he transmitted the first wireless signals across the Atlantic between Poldhu, Cornwall, in the United Kingdom and St. John's, Newfoundland in Canada. He wanted to demonstrate that wireless waves were not affected by the curvature of the Earth, so his experimental transmission traveled 2,100 miles.

On February 22, 1902, during a voyage on the American liner *Philadelphia*, he first demonstrated "daylight effect" relative to wireless communication. Later that same year, he patented his magnetic detector which then became the standard wireless receiver for many years. Marconi came to the New World to build a big radio station in Glace Bay in Nova Scotia, through invitation of the Canadian government. While crossing the Atlantic, the Italian electronic genius conducted important experiments, discovering the harmful influence of solar radiation on transmissions. He soon realized that the coherer could not meet the mounting needs of stability of reception. To compensate for this deficiency, he created a new kind of detector. This new device was the Magnetic Detector, which he patented on June 25, 1902.

In December 1902 Marconi transmitted the first complete messages to Poldhu from stations at Glace Bay, Nova Scotia, and afterward from Cape Cod, Massachusetts. These early tests culminated in 1907. Later, after the first shorter-distance public service of wireless telegraphy had been established between Bari, Italy and Avidari, Montenegro. He then opened the first transatlantic commercial service between Glace Bay and Clifden, Ireland.

In 1905 Marconi patented his horizontal directional aerial, and during the same year he married the Honorable Beatrice O'Brien, daughter of the l4th Baron of Inchiquin, Ireland. His marriage with O'Brien lasted twenty-two years and produced a son and two daughters.

Four years later in l909, Marconi shared the Nobel Prize in Physics, with Karl Ferdinand Braun, for his important work in radio communications. Marconi has received honorary doctorates from several universities and many other international honors and awards

When the "unsinkable" ocean liner *Titanic* struck an iceberg and sank to the bottom of the sea on April 15, 1912, the horrific tragedy cost hundreds of lives; nonetheless, those whom survived did so because rescuers could receive distress calls from the Marconi wireless equipment on board. The Right Honorable Herbert Samuel, British Postmaster General at the time, stated: "Those who had been saved, had been saved through one man, Mr. Marconi and . . . his marvelous invention."

In 1914, prior to Italy's entrance into World War I, Marconi joined the Italian Army as a lieutenant. He was promoted to captain in 1915 after Italy joined the Allied side in the Great War. Marconi was then transferred to the Italian Navy with the rank of commander. As a naval commander, he was part of the Italian government's mission to the United States in 1917. After the war in 1919, Marconi was appointed Italian plenipotentiary delegate to the Paris Peace Conference at Versailles. The Italian government awarded Marconi the Italian Military Medal in 1919 for his war service.

During the war, Marconi returned to his investigation of short waves, which he had used in his first experiments. After further tests by his colleagues in Britain, he conducted an intensive series of trials from installations at the Poldhu Station and in his yacht *Elettra,* cruising in the Atlantic and Mediterranean. After the tests, the British Government decided to use Marconi's system for communications throughout the Empire. The first beam station was opened in 1926 between England and Canada. Other stations were

used the following year.

In 1927, Marconi had his marriage to Beatrice O'Brien annulled, and he then wedded the Countess Maria Cristina Bozzi Scali**.** They soon had a baby daughter. By the next year on January 1, Marconi was named president of C.N.R. (National Research Council) and he continued his work. On March 26, 1930, from aboard the *Elettra,* moored in the harbor of Genova, he sent a signal that covered 14,000 miles and lit the town hall in Sydney, Australia. On September 17, Marconi was then named President of the Italian Royal Academy. Because of the start of regular radio services all throughout the world, the air was becoming more and more jammed with signals.

On February 12, 1931 Marconi, in the presence of Pope Pius XI, inaugurated the new Vatican Radio Station, and on September 13 of that same year, from his office in Rome, he lighted the statue of the Redeemer in Rio de Janeiro, via the Coltano repeater. In 1931 Marconi began research into the propagation characteristics of still shorter waves, resulting in the opening of the world's first microwave radiotelephone link between the Vatican City and the Pope's summer residence at Castel Gandolfo in 1932.

After some more time in England, Marconi moved to Rome in 1935, never to leave Italy again. He died July 20, 1937 at the age of sixty-three. His body was laid to rest in the mausoleum on the grounds of his family estate at *Villa Griffone*. In honor of the great Italian inventor, wireless stations throughout the world fell silent for two full minutes. For those two minutes, the airwaves were again as silent as they had been before Marconi's miraculous breakthrough.

Sources:

- ✓ "A Science Odyssey: People and Discoveries Guglielmo Marconi 1874-1937." http://www.pbs.org/wgbh/aso/databank/entries/btmarc.html
- ✓ Guglielmo Marconi Biography: Physicist, Entrepreneur (1874–1937) https://www.biography.com/inventor/guglielmo-marconi
- ✓ "Marconi and Ireland – The Small Country that Played a Big Role in the Radio Age," 23 January 2018. Engineers Journal. http://www.engineersjournal.ie/2018/01/23/marconi-ireland-radio-age/
- ✓ Carole E. Scott. "The Contribution of Guglielmo Marconi." *The Radio Inventor/Entrepreneurs.* http://www.westga.edu/~bquest/2001/radio.htm

Supplemental Information

Antonio Meucci

American history books all teach about the brilliant Scotsman, Alexander Graham Bell's invention of the telephone in 1876. Students often learn of Bell calling his assistant with "Come here Watson, I want you," as the first words to ever travel on a wire to a listener in another room. As with many legends and even actual stories in history, there are factors and events that are often neglected by students' textbooks or movies. Rarely does a student hear that Alexander Graham Bell only beat a fellow inventor, Elisha Gray to the patent office by a few hours on the same day. Even fewer people ever learn that the telephone had really been invented years before Bell's 1876 patent. In 1855 an Italian immigrant, named Antonio Meucci, first used the telephone to stay connected with his infirmed wife in another room. In order to report accurate history, textbooks must be rewritten to tell the true story.

Meucci was an inscrutable man who seemed not to possess a great deal of managerial adroitness to complement his unbelievable scientific genius. To further compound his problems dealing with fast-pasted American society, Meucci could not communicate in English. Thus, most of his activity centered around an Italian speaking community on Staten Island. He lived in an Italian immigrant world within the English-speaking American culture of the United States.

Antonio Meucci was born April 13, 1808 in San Frediano, near Florence, Italy. At the Florence Academy, Meucci learned design and mechanical engineering. He later worked as a stage technician until 1835, when he accepted a job as scenic designer and stage technician in Havana, Cuba, then a colony of Spain. While in Cuba in 1849, working on methods to treat illnesses with electric shocks, he discovered that sounds could travel by electrical impulses over copper wire. Realizing the tremendous potential of his discovery, he moved to Staten Island, near Manhattan, in 1850 in hopes attaining financial backing for his project. In 1855 when Meucci's wife, Ester, became partially paralyzed he rigged a system to link her bedroom with his neighboring workshop and other rooms in the house.

While in New York, Meucci had trouble getting anyone to review his discoveries. Moreover, he spent much of his time assisting exiled and fugitive Italian revolutionaries. The world-renowned Italian republican, revolutionary Giuseppe Garibaldi, resided with Meucci while he was in the United States. Unfortunately, Meucci spent considerable hours trying to help his revolutionary friends, while many of them stayed with him in America. He worked hard to develop new or improved manufacturing methods for products such as beer, candles, pianos, and paper to support them all. Regrettably, he possessed very little business acumen and many of his ventures failed. The projects that did meet some success were quickly stolen by deceitful agents or frittered away by incompetent managers. Much of Meucci's misfortune could be attributed to his lack of proficiency in the English language. The revolutionaries whom Meucci had endeavored to assist would often just take from the humble inventor, while they spent most of their

days engaged in deep political debate. While providing for his guests, Meucci also spent time perfecting his telephone for practical use.

Meucci organized an exposition in his Italian community to attract financial support for his working-model telephone in 1860. He had a singer sing into the mouthpiece. A crowd he had placed a good distance away clearly heard the singer's voice. A local Italian language newspaper recorded the event, and Signor Bendelari took a model of the invention to Italy in an effort to help Meucci get the financial backing he needed. Unfortunately, Bendelari was unable to get anyone in Italy to support Meucci's project.

Meucci's failure to find funding relegated the unfortunate inventor to a near impecunious existence. While at this near nadir of his life, more tragedy followed. When traveling from New York he was severely burned when the ship's boiler exploded. Fortunately, Meucci survived the accident, but only after serious injury. While he was in the hospital, his wife sold many of Meucci's working models including the telephone, to a secondhand dealer for a much-needed six dollars. When Meucci sought to get the models back from the dealer, he discovered that they had been sold to an unknown buyer.

Meucci knew that the telephone could be the key to his success. He worked unceasingly to build new models and designs. Knowing that someone had his first models, Meucci worried that he would not be able to cash in on his invention. Since the $250 fee needed to take out a patent was an astronomical amount at the time for someone in Meucci's modest position, he decided to register for a much cheaper caveat or notice of intent on December 28, 1871. He renewed the registration in 1872 and again 1873. Unfortunately, Meucci never made subsequent renewals.

Immediately after he received his caveat, Meucci tried again to attain financial support for his telephone. He brought a model to the vice president of one of the affiliates of the newly established Western Union Telegraph Company in 1872. Meucci asked the executive if he could demonstrate his "Talking Telegraph" on the wires of the Western Union system. Lamentably, every time Meucci contacted the vice president, Edward B. Grant, he was told that there was no time for the test. After two years Meucci demanded the return of his materials. Astonishingly, he was told that they had been "lost."

Meucci's greatest fears were realized when in 1876, Alexander Graham Bell filed a patent for an invention he called the telephone. When Meucci found out, he instructed his lawyer to write a protest to the U.S. Patent Office in Washington, something that was never done. Later, an associate did contact Washington and found out that all of the documents relevant to Meucci's caveat had been "lost"! Later, an investigation showed illegal collusion between certain employees of the Patent Office and officials of Bell's company.

In an 1886 court case Meucci was able to explain every detail of his invention which left little doubt of his truthfulness. The Supreme Court agreed to hear the case in 1889, but Meucci died and the case was then dropped.

In 2002, the United States Congress, in order to rectify an injustice, recognized the destitute Italian immigrant as the true inventor of the telephone, rather than Alexander Graham Bell. Congress finally hailed Antonio Meucci as a father of modern

communications, 113 years after his death.

Sources:

- ✓ Mary Bellis, "Did Meucci Invent the Telephone Before Alexander Graham Bell?" Thought Co. July 03, 2019. https://www.thoughtco.com/antonio-meucci-4071768
- ✓ "Antonio Meucci, The True Inventor of the Telephone," Wednesday, January 25, 2012 https://todayinsocialsciences.blogspot.com/2012/01/antonio-meucci-true-inventor-of.html
- ✓ Rory Carroll, "Bell Did Not Invent Telephone, US Rules Scot Accused of Finding Fame by Stealing Italian's Ideas." *Guardian Unlimited,* June 17 2002. http://www.guardian.co.uk/Archive/Article/0,4273,4434963,00.html
- ✓ Rory Carroll, "Bell Cut Off as Phone Inventor." *The Age,* June 18 2002. http://www.theage.com.au/articles/2002/06/17/1023864404146.html

New Jersey Student Learning Standards

English Language Arts

W.6.1. Write arguments to support claims with clear reasons and relevant evidence.

W.6.1.a. Introduce claim(s) and organize the reasons and evidence clearly.

W.6.1.b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.

W.6.1.c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.

W.6.1.d. Establish and maintain a formal/academic style, approach, and form.

W.6.1.e. Provide a concluding statement or section that follows from the argument presented.

W.6.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

W.6.2a A. Introduce a topic and organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.

W.6.2b Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.

W.6.2c Use appropriate transitions to clarify the relationships among ideas and concepts.

W.6.2d Use precise language and domain-specific vocabulary to inform about or explain the topic.

W.6.2e Establish and maintain a formal/academic style, approach, and form.

W.6.2f Provide a concluding statement or section that follows from the information or explanation presented.

W.6.7 Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

W.6.8 Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.

W.6.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

W.6.9a Apply *grade 6 Reading standards* to literature (e.g., "Compare and contrast texts in different forms or genres [e.g., stories and poems; historical novels and fantasy stories] in terms of their approaches to similar themes and topics").

W.6.9b Apply *grade 6 Reading standards* to literary nonfiction (e.g., "Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not").

W.7.1 Write arguments to support claims with clear reasons and relevant evidence.

W.7.1a Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.

W.7.1b Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

W.7.1c Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.

W.7.1d Establish and maintain a formal style/academic style, approach, and form.

W.7.1e Provide a concluding statement or section that follows from and supports the argument presented.

W.7.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

W.7.2a . Introduce a topic; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.

W.7.2b Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.

W.7.2c Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.

W.7.2d Establish and maintain a formal style/academic style, approach, and form

W.7.2e Establish and maintain a formal style/academic style, approach, and form.

W.7.2f Provide a concluding statement or section that follows from and s upports the information or explanation presented.

W.7.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.

W.7.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

W.7.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

W.7.9a Apply *grade 7 Reading standards* to literature (e.g., "Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history").

W.7.9b Apply *grade 7 Reading standards* to literary nonfiction (e.g. "Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims").

W.8.1 Write arguments to support claims with clear reasons and relevant evidence

W.8.1a Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.

W.8.1b Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

W.8.1c Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.

W.8.1d D. Establish and maintain a formal style/academic style, approach, and form.

W.8.1e Provide a concluding statement or section that follows from and supports the argument presented.

W.8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

W.8.2.a Introduce a topic and organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia).

W.8.2b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

W.8.2.c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

W.8.2.d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

W.8.2.e. Establish and maintain a formal style/academic style, approach, and form.

W.8.2f Provide a concluding statement or section that follows from and supports the information or explanation presented.

W.8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

W.8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

W.8.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

W.8.9a Apply *grade 8 Reading standards* to literature (e.g., "Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new").

W.8.9b Apply *grade 8 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced").

W.9-10.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.9-10.1a Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence.

W.9-10.1b Develop claim(s) and counterclaims avoiding common logical fallacies, propaganda devices, and using sound reasoning, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level and concerns.

W.9-10.1c. Use transitions (e.g. words, phrases, clauses) to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

W.9-10.1d. Establish and maintain a style and tone appropriate to the audience and purpose (e.g. formal and objective for academic writing) while attending to the norms and conventions of the discipline in which they are writing.

W.9-10.1.e. Provide a concluding paragraph or section that supports the argument presented.

W.9-10.2 Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

W.9-10.2a Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

W.9-10.2b Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

W.9-10.2c Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.

W.9-10.2d Use precise language and domain-specific vocabulary to manage the complexity of the topic.

W.9-10.2e Establish and maintain a style and tone appropriate to the audience and purpose (e.g. formal and objective for academic writing) while attending to the norms and conventions of the discipline in which they are writing.

W.9-10.2f Provide a concluding paragraph or section that supports the argument presented (e.g., articulating implications or the significance of the topic).

W.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

W.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. (MLA or APA Style Manuals).

W.9-10.9 Draw evidence from literary or nonliterary informational texts to support analysis, reflection, and research.

W.9-10.9a Apply *grades 9–10 Reading standards* to literature (e.g., "Analyze how an author draws on and transforms source material in a specific work [e.g.,

how Shakespeare treats a theme or topic from mythology or the Bible or how a later author draws on a play by Shakespeare]").

W.9-10.9b Apply *grades 9–10 Reading standards* to nonfiction information (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning").

W.11-12.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.11-12.1a Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.

W.11-12.1b Develop claim(s) and counterclaims avoiding common logical fallacies and using sound reasoning and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases.

W.11-12.1c. Use transitions (e.g. words, phrases, clauses) to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

W.11-12.1d. Establish and maintain a style and tone appropriate to the audience and purpose (e.g. formal and objective for academic writing) while attending to the norms and conventions of the discipline in which they are writing. E. Provide a concluding paragraph or section that supports the argument presented (e.g., articulating implications or the significance of the topic).

W.11-12.2 Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

W.11-12.2a Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

W.11-12.2b Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

W.11-12.2c Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.

W.11-12.2d Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

W.11-12.2.e Establish and maintain a style and tone appropriate to the audience and purpose (e.g. formal and objective for academic writing) while attending to the norms and conventions of the discipline in which they are writing.

W.11-12.2. f. Provide a concluding paragraph or section that supports the argument presented (e.g., articulating implications or the significance of the topic).

W.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

W.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (MLA or APA Style Manuals).

W.11-12.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

W.11-12.9a Apply g*rades 11–12 Reading standards* to literature (e.g., "Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics").

W.11-12.9b Apply *grades 11–12 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., *The Federalist*, presidential addresses]").

SL.6.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

SL.6.1a Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

SL.6.1b Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.

SL.6.1c Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.

SL.6.1d Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.

SL.6.2 Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.

SL.6.3 Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.

SL.6.4 Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.

SL.6.5 Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

SL.6.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 here for specific expectations.)

SL.7.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

SL.7.1a Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

SL.7.1b Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.

SL.7.1c Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.

SL.7.1d Acknowledge new information expressed by others and, when warranted, modify their own views.

SL.7.2 Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.

SL.7.3 Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.

SL.7.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.

SL.7.5 Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

SL.7.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 7 Language standards 1 and 3 here for specific expectations.)

SL.8.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

SL.8.1a Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

SL.8.1b Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.

SL.8.1c Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.

SL.8.1d Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

SL.8.2 Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.

SL.8.3 Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.

SL.8.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

SL.8.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 8 Language standards 1 and 3 here for specific expectations.)

SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on

grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

SL.9-10.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.

SL.9-10.1b Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.

SL.9-10.1c Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.

SL.9-10.1d Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.

SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 here for specific expectations.)

RH.6-8.1 Cite specific textual evidence to support analysis of primary and secondary sources.

RH.6-8.8 Distinguish among fact, opinion, and reasoned judgment in a text.

RH.6-8.9 Analyze the relationship between a primary and secondary source on the same topic.

RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.

RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

RH.11-12.1 Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.

RH.11-12.8 Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.

RH.11-12.9 Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.