

ELA: Grade 5, Lesson 10, Electrifying Personalities: Guglielmo Marconi

Lesson Focus: Guglielmo Marconi's contribution to the history of electricity; his later life and inventions.

Practice Focus: Students will create a timeline to demonstrate their knowledge of Guglielmo Marconi and the history of the wireless communication.

Objective: Students will use *Electrifying Personalities: Guglielmo Marconi* to learn about the history of electricity with a focus on the contributions of Guglielmo Marconi, specifically, his invention of a wireless communication system.

Academic Vocabulary:

- telegraph (reinforced from previous lessons)
- physics (reinforced from lesson 9)
- electromagnetic wave (reinforced from lesson 9)
- Nobel Prize

TN Standards: 5.RI.KID.1 / 5.RI.KID.2 / 5.RI.CS.4 / 5.RI.CS.5 / 5.WTTP.3

Teacher Materials:

- Grade 5, Lesson 10 Teacher Packet
- Chart paper (or regular paper) for teacher graphic organizer
- Marker or highlighter

Student Materials:

- 2 pieces of paper
- pen or pencil
- marker or highlighter (if available)

Teacher Do	Students Do
<p>Opening (1 min)</p> <p>Hello! Welcome to Tennessee's At Home Learning Series for literacy! Today's lesson is for all our 5th graders out there, though everyone is welcome to tune in. This lesson is the last in this series.</p> <p>My name is ____ and I'm a ____ grade teacher in Tennessee schools. I'm so excited to be your teacher for this lesson! Welcome to my virtual classroom!</p> <p>If you didn't see our previous lessons, you can find it on www.tn.gov/education. You can still tune in to today's lesson if you haven't seen any of our others.</p> <p>Today we will be learning even more about the man that changed the history of human communication! But before we get started, and to participate fully in our lesson today, you will need:</p> <ul style="list-style-type: none">• 2 pieces of paper• something to write with and a flat surface to write on	<p>Students gather materials for the lesson and prepare to engage with the lesson's content.</p>

<ul style="list-style-type: none"> • a highlighter or marker if you have one around, if not, your pen or pencil will do just fine. <p>I'll give you a few moments to get prepared for our time together! [Slight pause].</p> <p>Ok, let's begin!</p>	
<p>Intro (5 min.)</p> <p>We have had some great fun getting started in each of our previous lessons, and yes today is going to be another blast! Since I've had you <u>count</u> a lot, I thought I'd try something new! Intrigued? 😊 Grab your piece of paper and something to write with.</p> <p>Okay, in our last lesson we stopped reading at a very interesting part: Marconi finally got his laboratory and we can't wait to find out what he makes in there! So, let's imagine <u>you</u> had laboratory, what things do you think you might need? What would a scientist, an inventor, need in his or her laboratory? My list is already starting in my head! I can't wait to write it down! Ready? Go! [Pause for about a minute and make your list]. Don't give up, you got this! [Pause]. Alright, I think I'm about done, what about you? I can't think of any more, but will probably think of some laboratory stuff later and need to add to my list.</p> <p>Alright, what did you come up with? [Pause]. So cool! I'm going to share my list with you. As I do, place a check beside anything on your list that is also on mine. Ready? Okay, in my laboratory, the following items are a <u>must</u>:</p> <ul style="list-style-type: none"> • jars • microscope • scales • charts • measuring tools • beakers • goggles • wires and cables • my lab coat! <p>Did you get some of the same things that I did? [Pause]. Did you get anything different? [Pause]. Cool!</p> <p>[The following section is intended to review the previous lesson: beginning with a check-in on the independent practice</p>	<p>Students engage in an activity to create interest in today's focus on the invention of a wireless communication system.</p> <p>Students recall learning from previous lessons and review the information from their lesson eight graphic organizer.</p>

assignment, moving to key ideas and takeaways from the reading, and then connecting and transitioning to today's focus on the later part of Guglielmo Marconi's life and his invention of a wireless communication system].

Before we really dig into today's lesson, I want to check in on what we learned about in our last lesson, and am especially excited to hear all about your *convincing* letter, young Marconi. Did your dad agree that you needed a laboratory? Does he agree that the attic would be the perfect place? What did he think when you explained everything you knew about electromagnetic waves? I'm sure he was persuaded knowing how strongly you believe that you're so close to discovering a way to communicate long distances without wires! Please let me know when you'd like for me to come visit your new attic laboratory! 😊

Speaking of a laboratory, in our last lesson we found out Marconi's journey to a laboratory was very interesting! Like Alexander Graham Bell and Thomas Edison, Marconi wasn't the best student in school, but had a great interest in science. This led him to devour books about science and begin tinkering around with wires and batteries. He even took apart a telegraph and put it back together. We learned that it wasn't long for him to have this great IDEA – he wanted to create worldwide communication system! To get started, his interest landed on something really cool, something that scientists had already discovered: electromagnetic waves! Scientists had discovered that electromagnetic waves could travel short distance, but Marconi wanted to see if he could use this technology to send signals even longer distances, possibly across oceans...across the world! Even more so, could he use electromagnetic waves to send messages long distances...and wirelessly!

So, grab your organizer from our last lesson, the one we started on Guglielmo Marconi. Remember, his name is pronounced: gool-YAY-moh. We ended our reading yesterday when Marconi convinced his father that he needed a laboratory to continue his research. His mother helped him set it up in their attic. Marconi got to work, spending long nights in his new laboratory, trying to get electromagnetic waves to travel long distances!

I'm now wondering:

- Will this be the place that Marconi's discovery takes place?
- If so, what was it like?

<ul style="list-style-type: none"> • What did this time in his life lead to? Other discoveries? • What was the path that led to what we know as his famous invention: a worldwide wireless communication system? <p>Okay! I'm really curious to head back into today's text and find out more about this Marconi guy. I want you to listen closely as I read. I wonder if we'll find any evidence that Marconi's life was anything like Bell or Edison's. Let's get going!</p>	
<p>Teacher Model/Read-Aloud (13 min.)</p> <p>Guglielmo Marconi (1874-1937)</p> <p>Marconi spent long nights in his laboratory, working to get electromagnetic waves to travel longer distances. Marconi eventually figured out how to send an actual signal—Morse code—across the attic without wires. Soon he was sending messages from the attic to the patio, then half a mile away, then a mile away. He had started a revolution in communication.</p> <ul style="list-style-type: none"> • Okay...what did Marconi actually do...something that no one had ever done before? [Pause]. Yes! He figured out how to send an actual Morse code signal without wires! Woohooo! You remember it from our last lesson, right!? It looks like this. [Show image L10-A: Morse code]. A series of dots and dashes that correspond to letters in the alphabet. • How far did he get the signal to go? [Pause]. Can you believe it! First, just across the attic, then to the patio, then a half a mile away, then...how far? [Pause]. Yes! A whole mile away, without wires! • The text says that Marconi started a "revolution in communication." What do you think that means? [Pause]. Good thinking! This means that Marconi had changed the way communication worked. • Let's add this new information to our organizer. Let's say that Marconi worked in a laboratory in his attic and discovered that he could send a wireless signal over a long distance. [Model adding to your organizer: attic laboratory, long distance wireless signal worked!]. • I can't wait to find out what happens next. Let's keep reading. 	<p>Students will learn about the life and inventions of Guglielmo Marconi and capture this information on a teacher-led graphic organizer.</p> <p>Throughout, students will:</p> <ul style="list-style-type: none"> • Be probed to think about how his path was paved with influences and experiences that led to the invention of wireless communication. • Consider how his life experiences and work experiences are similar to those of Alexander Graham Bell and Thomas Edison.

To develop his wireless transmission system, Marconi needed more money. His mother's nephew, who was an engineer living in England, offered to help. He knew people at the British Post Office who were interested in Marconi's work. The young inventor went to England in 1896 and began demonstrating his wireless system. It could now send signals for miles. People were amazed. Suddenly, everyone was talking about Guglielmo Marconi and his accomplishments.

- So, Marconi is now 22 and has just discovered that wireless communication was possible! But let's think back to that IDEA he had long ago. Look at your organizer... do you see it? [Pause]. You found it! His IDEA was to create a worldwide communication system. He wasn't done at the discovery itself! He wanted more!
- The text tells us that he had to develop his wireless system. What do you think the word develop tells us here? [Pause]. Yep, that he had to keep trying to make it better.
- He also knew that he had to get this new technology in front of people to see. Think about this: why do you think it was important for him to demonstrate his wireless system? [Pause]. I agree! He knew people would be amazed and might see, like he did, the possibility of a world of communication without telegraphic wires!

The Road to Radio:

It was now time to turn a passion into a business. Marconi formed a company that set up wireless stations in England. Progress was rapid. Signals were soon being transmitted across greater distances. In 1898, a ship at sea was able to report news to people on land. In 1899, a signal was sent successfully across the English Channel. That same year, the United States got its first wireless demonstration. In 1901, Marconi and his team battled freezing weather in Newfoundland, Canada, to receive a signal from a station in England. A message had been transmitted all the way across the Atlantic Ocean!

- Business! That reminds me of another one of our famous inventors, Thomas Edison. Do you remember what his first business sold? [Pause]. Right, that strange-looking machine called stock tickers!
- Let me reread this part: "*Marconi formed a company that set up wireless stations in England. Progress was rapid.*" What do you think it means by "*progress was rapid*"? [Pause]. Yep, it means that growth and

<p>improvements to Marconi's wireless communication system was happening fast. I'm guessing that everyone was excited to use this new technology!</p> <ul style="list-style-type: none"> • Speaking of rapid progress, this section is full of evidence in the form of achievements, one after the next. Let's add them to our organizer. I'm going to start my list right here, in a place that I know I'll have plenty of room to add them all. • First, let's go back a bit and make sure that we add 1896, when Marconi began demonstrating his wireless communication system [model adding to your organizer: 1896 began demonstrating wireless system]. Then, the amazing feat of 1898 when a ship's signal reached land. [Model adding to your organizer: 1898 ship to land]. Let's add 1899 when the United States got their first demonstration of Marconi's wireless communication. [Model adding to your organizer: 1899 US gets demonstration]. Then 1901 for the unbelievable transmission of a message from England to Canada...all the way across the Atlantic Ocean! [Model adding to your organizer: 1901 across the Atlantic Ocean]. • Okay, I want you to take a moment to think back to the beginning of our reading. What did we learn that Marconi loved as a boy? [Pause]. Yes! He loved the sea! Isn't it neat that he was able to develop a system that would send messages <u>across the sea</u>! • We've seen images of all kinds of crazy looking inventions over the last three lessons, no reason to stop now. Take a look at this. [Show image L10-B]. This is a drawing of Marconi's wireless communication device. Another really strange thing, but think of what it could do! <p>Marconi continued to improve his wireless system. He expanded service across the ocean, and his company grew. In 1905, he got married. Around this time, he began having money problems. His wireless system had still not caught on completely. Then one night in 1909, Marconi got a lucky break as a result of a disaster at sea. One ship had hit another off the coast of the United States. The wireless system on the heavily damaged ship survived well enough for the operator to signal for help. Seventeen hundred people were saved. Marconi was a hero!</p> <ul style="list-style-type: none"> • Whoa! What happened at sea? [Pause]. Wow, that's amazing! If it hadn't been for the ship having 	
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Marconi's wireless communication system on board, 1700 people would have lost their lives!

- I'm with you. This date definitely belongs on our list. Let's head to our organizer. I'm going to add that the 1909 disaster at sea and that Marconi's wireless system saves 1700 people. You add it too, like this. [Model adding to your organizer: 1909 disaster at sea, wireless system saves 1700 people].
- Let's get back to the text to learn more!

In 1909, Marconi shared the Nobel Prize for Physics. Winning the prize was an impressive feat for someone without a university degree.

- Well, I remember the we learned early on that Marconi didn't get into college, but that he was allowed access to the university's library where he devoured (remember that word?) books on science. But it seems as though Marconi did just fine learning on his own. So much that he won a very important award called the Nobel Prize. This is a prize awarded for outstanding achievements in science, the arts, and the cause for peace. Marconi was awarded the Nobel Prize for Physics. There's that word we learned earlier: *physics*! Take a moment to look at your organizer and remember what it meant.
- This was a great accomplishment and I believe we definitely need to add it to our organizer. This is in the same year, 1909, that Marconi's wireless system saves 1700 people in a ship wreck at sea, so I'm going to add it right underneath that, like this. [Model adding to your organizer: 1909 Nobel Prize for Physics].
- Let's keep reading!

Marconi's next goal was to transmit human voices instead of Morse code over the airwaves.

- Of course, another goal! I love it! Marconi wanted to transmit human voices over the electromagnetic waves, or what they call it here, the airwaves. What had been transmitted wirelessly up to this point? [Pause]. Right! Just Morse code, that code of dots and dashes that translate into the alphabet. Now he's thinking he wants to transmit a human voice? Wow! Do you think he will make it happen? [Pause]. Let's find out!

At the time, this (transmitting a human voice without wires) was called “wireless telephony”—telephone without wires. Marconi and his staff weren’t the only ones to try to figure out how to do this. There was a lot of competition. Marconi did not turn out to be the first to broadcast the human voice. However, he later became the first to get two ships at sea to exchange voice messages.

- Looks like he wasn’t the one to do it first! As we have been learning, lots of experimenting and inventing was happening at this time, and it looks like someone beat him to the finish line. This reminds me of the “race” between Alexander Graham Bell and Thomas Edison to see who would be the first to invent the “speaking telegraph” or telephone (with wires, of course). Remember who won? [Pause]. Yes! Bell!
- So, maybe not the first to broadcast the human voice, but he still did something really cool. What was it? [Pause]. Right on! He got two ships at sea to exchange voice messages.
- Again, it’s still 1909. A lot happened for Marconi this year, didn’t it? Let’s add this to our organizer as well. I’m going to write: 1909 and 2 ships at sea wirelessly communicate. [Model adding to your organizer: 1909, 2 ships at sea].
- Back in the text for more!

The start of World War I in 1914 spurred a great deal of development in technology. By the war’s end in 1918, almost everything was in place for the first public wireless telephony broadcast—what we call radio today.

- Remember, Thomas Edison helped to make advancements during war time as well, during the Civil War. It’s now the start of World War I and Marconi can help. His wireless communication system was ready for the very first public broadcast. How cool!
- How do you think Marconi’s wireless communication system could help during this time of war? [Pause]. I agree! During war, each side is trying to find the newest, best, and quickest way to outwit the other side. With new technology on your side, like a wireless communication system, it could mean the difference between winning and losing, and saving lots of lives in the meantime!
- I want to add this to our organizer. Let’s write, 1918 WWI first public wireless broadcast. [Model adding to

your organizer: 1918 WWI first public wireless broadcast].

Radio became very popular after World War I. In 1919, Woodrow Wilson became the first U.S. president to make a public radio broadcast. In 1920, the first radio stations began broadcasting. By 1925, radio was a major source of news and entertainment in U.S. homes.

- **Wow, it took 15 years for Marconi's wireless communication system to develop into something that "caught on." Remember, it took a while for Edison's light bulb to do the same.**
- **Let's take a look at a picture of Marconi surrounded by his one of his wireless communication systems. [Show image L10-C]. That looks like a lot to keep up with! All those dials and levers. How cool!**
- **Here's another few important dates that I think we can add to our list. Grab your organizer and let's add 1919 as the first public broadcast made by the President of the United States. [Model adding to your organizer: 1919 President first public broadcast].**
- **Then let's add 1920 as the year that the first radio stations began to broadcast. [Model adding to your organizer: 1920 first radio stations].**
- **Then let's finish up our list with 1925, the year that marked the fact that Marconi's wireless system had, in fact, "caught on." What we now consider RADIO, was now a major source of entertainment, even in people's homes. [Model adding to your organizer: 1925 radio as entertainment and news].**
- **Today, families sit around together and watch TV. What do you think it was like back then to sit around and listen to the radio? [Pause]. Want to see? I'll show you. [Show image L10-D]. Although this might seem strange to us, it was the wave of the future for people living in 1925!**

Marconi was not really involved in the radio industry. His contribution had been discovering how to send sound without wires, and then creating a worldwide wireless network. Yet the work he did with wireless technology made the radio industry possible.

- **We learned here that Marconi didn't really want to be involved in the radio industry, the making and selling of radios. Why do you think this was the case? [Pause]. Yes, I think so too. I believe Marconi was satisfied being on the science end of this discovery**

<p>and was happy to leave the radio industry up to other people.</p> <p>In 1919, Marconi bought a yacht and made it his floating laboratory. He continued to experiment with his lifelong interest, electromagnetic waves. In his later years, Marconi suffered from bad health. He wasn't able to work much of the time. On July 20, 1937, this amazing inventor died at the age of 63. His death was reported around the world over the wireless network. That network was then briefly shut down—as telephones were for Bell and lights were for Edison—to mark the end of a life that significantly changed communication and the world forever.</p> <ul style="list-style-type: none"> • So, like Bell and Edison, Marconi also continued to experiment. Where did we just read that Marconi made his new laboratory? [Pause]. How totally cool! A floating laboratory! Well, Marconi <u>did</u> love the sea, so I guess it makes sense. But you know, you'd have to be very careful! 😊 • We also just read, that like Bell and Edison, something special happened when Marconi died. What was it? [+Pause]. Yep, Marconi's death was reported around the world, all across his wireless network, then the network briefly shut down as a tribute to this great inventor. 	
<p>Guided Practice (5 min.)</p> <p>Now, let's put our brains together and get you ready for your independent practice.</p> <p>Let's look over ALL of our notes about Guglielmo Marconi. Wow – our organizer is full! [pause and begin looking over your organizer, then read the following script as you orally review your notes]</p> <ul style="list-style-type: none"> • I see that Marconi was born 30 years later than Alexander Graham Bell and Thomas Edison. • He loved the sea, which would be important to his work later in life. • I also notice, like Bell and Edison, Marconi was not a good student and had his own interests: science and electricity! • We found out that Marconi did not get into college, but due to the kindness of a physics professor there, had access to the library's books. 	<p>Students will engage in a review of facts and information recorded on their organizer.</p>

- We see that the telegraph was also an important device for Marconi, but his IDEA was to send messages long distances, and wirelessly!
- He wanted to explore the use of electromagnetic waves as a way to send wireless messages. And he did! First, in his attic laboratory, then eventually, miles away.
- From then on, Marconi's life was full of amazing accomplishments. We made a timeline of important dates as a way to remember them. From 1896 to 1920, Marconi used his wireless system to send messages from ships to land, from ships to other ships, then all the way across the Atlantic Ocean. His wireless system even saved the lives of 1700 people aboard a ship that was going down!
- In that time period, we noted that Marconi also won the Nobel Prize for Physics and assisted in making the first public wireless broadcast during World War I. In 1919, we found out that the President of the United States made a public broadcast over what was being called "radio."
- And then, by 1925, the radio was a regular way for people to get their news and entertainment. It had "caught on." No more of those wires strung everywhere!
- But most importantly, we discovered that Marconi was a man that was mesmerized by science. He wasn't interested in the radio industry, but was satisfied to have contributed to the discovery of a worldwide wireless communication system that paved the path for the radio.

Like both Alexander Graham Bell and Thomas Edison, Marconi led a very interesting life, full of challenges, lots of hard work, and many great accomplishments along the way. He continued to think about ways that he could build upon the ideas of others, but set himself a life goal and pushed and pushed until he hit the target: a worldwide wireless communication system. Let's take some time to think about the path that led Marconi to his famous invention.

Grab a piece of paper and jot down your thoughts as I ask you a few guiding questions about Marconi.

- What were some of the opportunities Marconi had along the way to show others what he could do?
[Pause].

Students will write short responses to the guiding questions to more deeply think about the path that led Marconi to invent a wireless communication system that paved the path to the radio.

<ul style="list-style-type: none"> • How does his invention of a worldwide wireless communication system <u>prove</u> that he valued the process of building upon the ideas of other inventors? [Pause]. • How do we know that it was simply the <u>science</u> behind his discovery that he was so very proud of? [Pause]. <p>I'll give you a few moments to go back and look over your answers before moving on. [Pause].</p>	
<p><u>Independent Work</u> (3 min.)</p> <p>Now, I'd like for us to make sure that we have everything we need to do for our independent practice</p> <ul style="list-style-type: none"> • We just completed a solid review of our organizer notes. Another great job capturing so much neat information about Marconi! • We also just took some time to think deeply about how Marconi's life led him to invent a worldwide wireless communication system, what we now think of as <i>radio</i>! <p>I think you're ready!</p> <p>After our lesson is over for today, I want you to take some time to complete another cool activity.</p> <p>Take a moment and look at this picture. [Show image: L10-E].</p> <p>Now I'm going to set up a scenario for you. You can read along if you'd like to. [Show image: L10-F Student Independent Practice scenario and prompt].</p> <p>Imagine you are living in 1925 and people have been getting this really cool new gadget for their homes: a radio! Your family lives on the outskirts of town and it's taken quite a while for all of those telegraphic cables to come down as wireless communication takes over. You've been following this invention from the start and have even clipped out every newspaper article about the great inventor, Guglielmo Marconi; he's the one that developed the <i>science</i> behind the wireless communication that has made it possible to listen to the radio in homes and businesses all over the world.</p> <p>You come home from school one day see that your family has a radio! You are so excited and ask your parents if you can</p>	<p>Students will prep for their independent practice.</p> <p>Students develop a timeline.</p>

<p>invite some friends over to listen to it with you. Your parents tell you that your friends are welcome to come a little later this week. You decide that you're going to impress them with everything you know about this invention, including all that led up to it. You head into your room, pull out a notebook, and start making a timeline of everything you can remember about Marconi, his work towards a wireless communication system, and how the world has used what's now called the <i>radio</i>.</p> <ul style="list-style-type: none">• Use a clean piece of paper to create your timeline. Be sure to reference your organizer for facts and details. <p>So again... [Repeat directions another time].</p> <p>I know you're going to do a fantastic job. Who knows, maybe I'll come along with your friends and listen too!</p>	
<p>Closing (1 min)</p> <p>I enjoyed learning with you today and am glad we know more about Guglielmo Marconi, especially as we add him to the list of great inventors of the Electrical Age, right there beside Alexander Graham Bell and Thomas Edison! All three of these inventors changed the way we live!</p> <p>Thank you for inviting me into your home. I look forward to seeing you in our next lesson in Tennessee's At Home Learning Series! Bye!</p>	



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