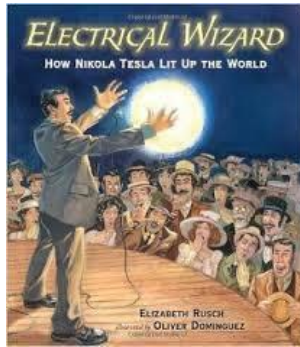


Electrical Wizard: How Nikola Tesla Lit Up the World

Written by Elizabeth Rusch/Illustrated by Oliver Dominguez



Book Summary:

From an early age in his home country of Serbia, Nikola Tesla was curious about how things worked. From the sparks created from stroking his cat, to the wonders of the rushing waters of Niagra Falls, Nikola's observations inspired him to visualize great inventions that would help power the world. Although he was met with great opposition, including that of Thomas Edison, Nikola persevered to become one of the greatest inventors of all time.

Learning Invitations:

NIKOLA TESLA'S PATH

CONNECTING AND REFLECTING

AC VS. DC

TESLA VS. EDISON

Standards Addressed:

SCIENCE

The Design Process: *Students will learn to employ the basic principles of the engineering design process in order to find solutions to problems.*

Physical Science:

Provide evidence that heat and electricity are forms of energy. (4.1.1, 4.1.2)

Demonstrate that electrical energy can be transformed into heat, light, and sound. (4.1.5)

SOCIAL STUDIES

Geography: *Locate, identify, and describe locations. (4.3.3)*

Read and interpret texts to answer geographic questions. (4.3.13)

WRITING

Genres: *Write narrative compositions. (4.W.3.3)*

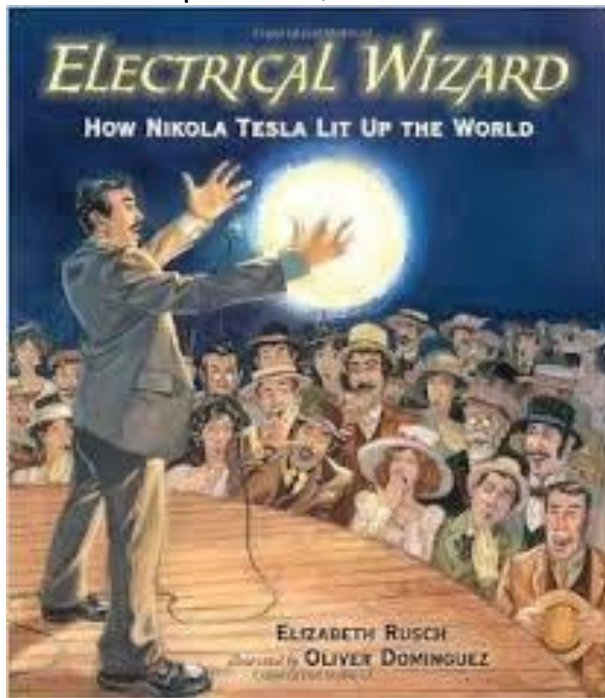
Items included on the following pages:

1. Copy of Student Booklet
2. Resources to cut out/assemble invitation stations
(*Note, I am including a link to each video in case the QR codes do not work.
Some student iPads had issues with them)
3. Photos of finished product and students working

Name _____

Electrical Wizard: How Nikola Tesla Lit Up the World

(Student Booklet)



Invitations to Explore
(check off when finished)

___ *NIKOLA TESLA'S PATH* (p. 2-3)

___ *CONNECTING AND REFLECTING* (p. 4-5)

___ *AC vs. DC* (p.6)

___ *TESLA VS. EDISON* (p. 7-8)

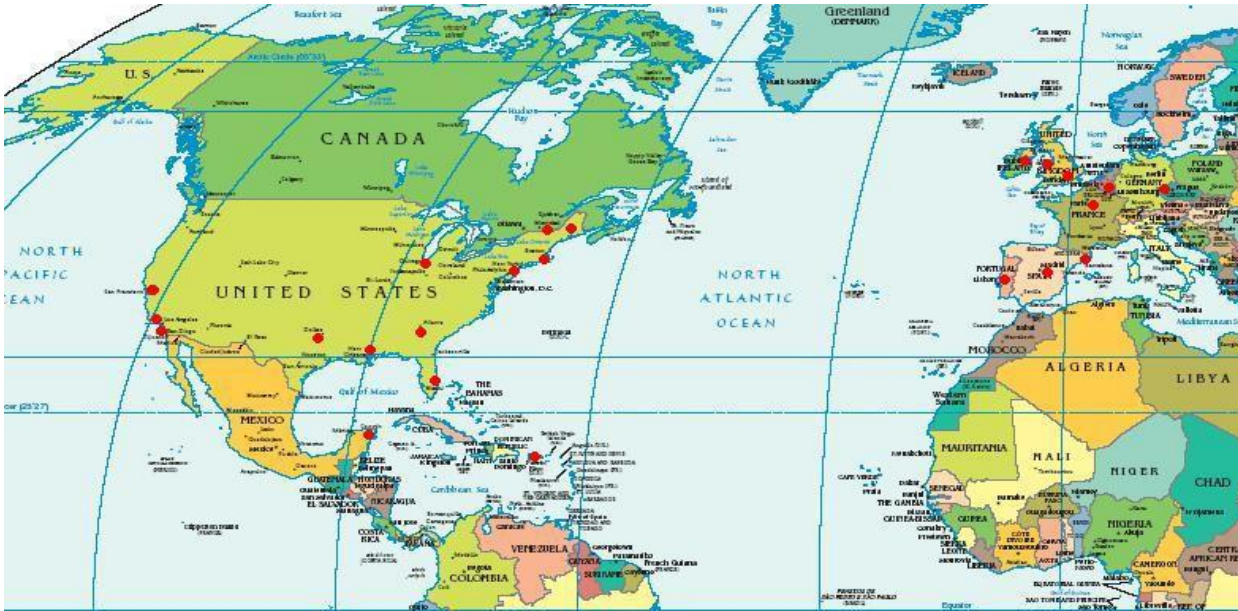
NIKOLA TESLA'S PATH



1. *Nikola's hometown is Šmiljap, in what is now Croatia. On the map above, draw a star on the approximate location of Šmiljap. (Use the map on the display for help.)*
2. *What are your thoughts about the video? Did anything surprise you about Nikola Tesla's hometown?*

3. *In 1880, Nikola Tesla moved to Budapest Hungary. Find Budapest on the map above and circle it. Next, draw a dotted line from the star of Šmiljap to Budapest to show his path.*
4. *In 1882, Nikola Tesla moved to Paris, France. Find Paris on the map above and circle it. Next, draw a dotted line from the Budapest to Paris to show his path.*

5. In 1884, Nikola Tesla moved to the United States to live in New York City. Find New York City and Paris on the map below and circle both cities. Draw a dotted line to show Tesla's path from Paris to New York City.



6. Use the display to locate the populations of each place Nikola Tesla lived. Fill in the table showing the order of population from greatest to least.

Place	Population (greatest to least)

7. Study all the photos and information on the display about Šmiljan, Budapest, Paris, and New York City.

Which one of these places would you like to visit the most? _____

Explain why you chose this place and not the others.

CONNECTING AND REFLECTING

1. Think about the story you heard about Nikola Tesla. What learner profile comes to mind when you think about him? Choose one and explain why you chose it using evidence from the text.

2. Now look at the list of attitudes. What attitude do you think Nikola Tesla displayed? Explain why using evidence from the text.

3. *In your opinion, what effect did Nikola Tesla's ideas and inventions have on the world? What would life have been like without him?*

4. *There were several things from Nikola Tesla's childhood that sparked his interest in science and inventions. The display shows a couple.*

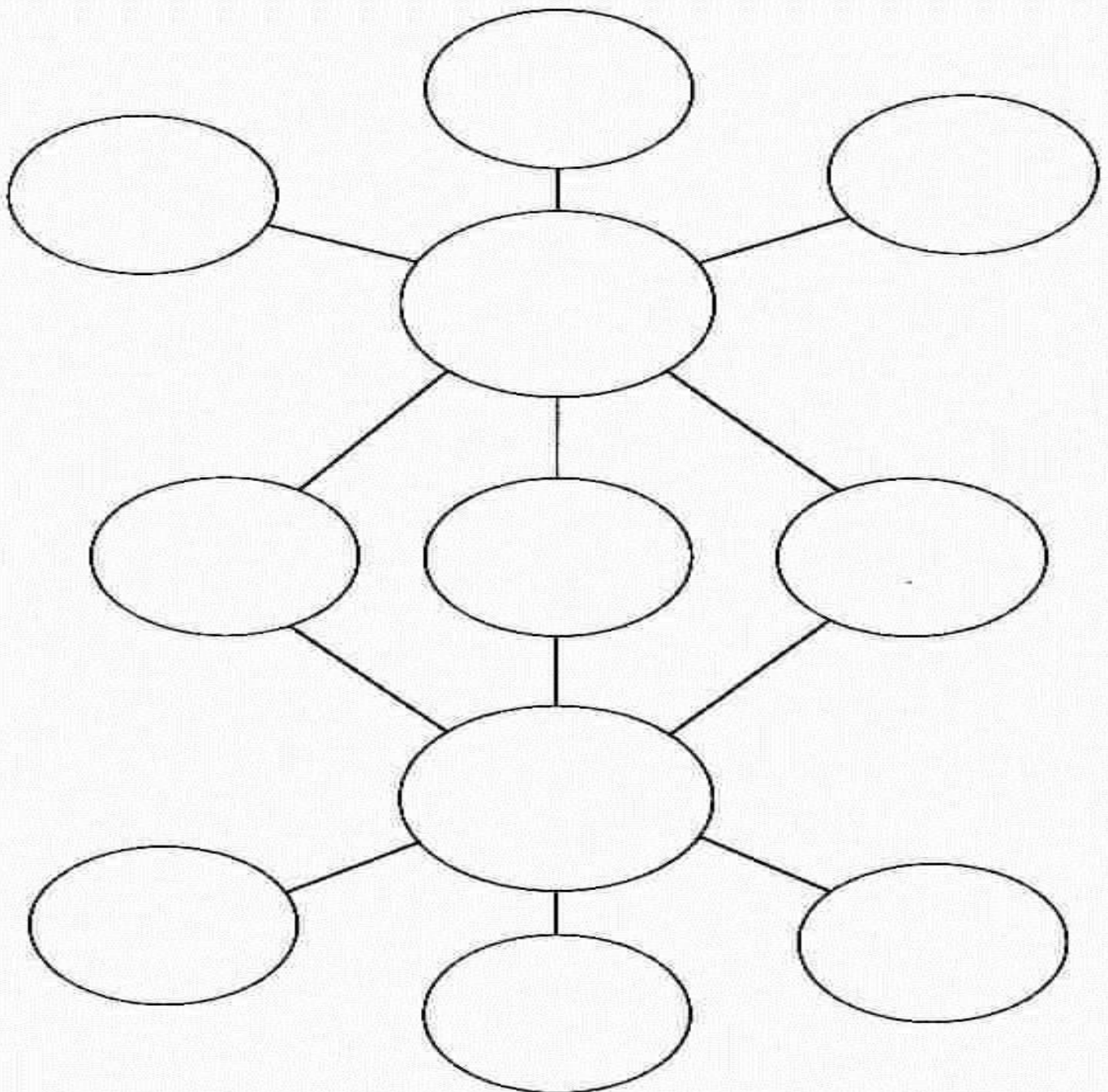
Is there anything that you wonder (or have wondered) about?

What are you interested in finding out more about or what problem are you interested in solving?

Use the space below to include a sketch if you would like.

AC vs. DC

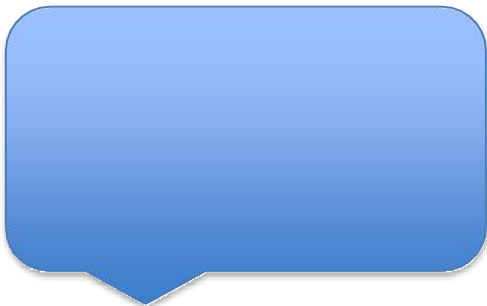
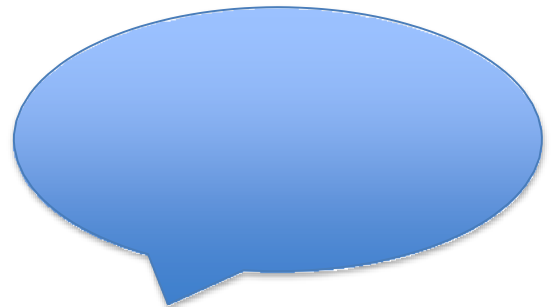
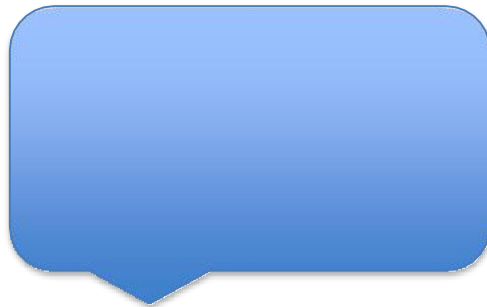
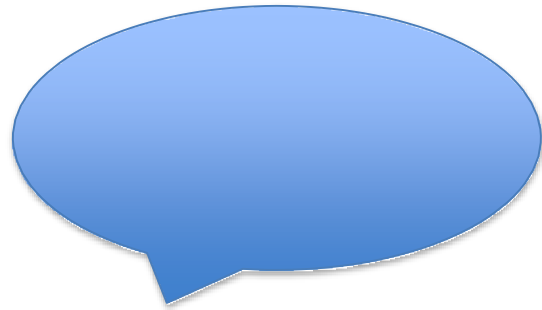
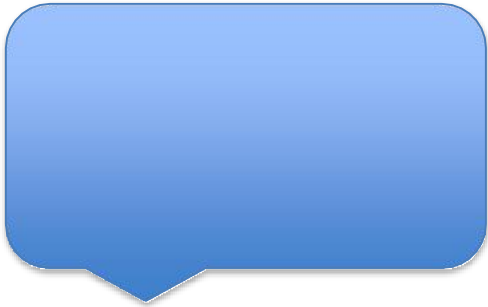
1. Watch the video about the difference between Alternating Current and Direct Current.
2. Complete the double bubble below to outline the similarities and differences between Alternating Current and Direct Current.



TESLA VS. EDISON

Nikola Tesla and Thomas Edison had their differences. Every story *has two sides*. The book gave you Nikola Tesla's perspective. Now, try to imagine the story from Thomas Edison's perspective.

1. Read the passage "Tesla vs. Edison: The Rivalry" from the back of the book.
2. Think about how a conversation between Nikola Tesla and Thomas Edison might have gone. Choose a setting (time and place) and create dialogue between the two.



NIKOLA TESLA'S PATH

July 10, 1856

Nikola Tesla, a Serbian, was born in what is now Šmiljan, Croatia. He was one of five children. His family was Serbian. His mother, Djuka Mandić, invented small household appliances, which sparked Nikola's interest in science.

Watch this video to get a glimpse of his hometown of Šmiljan. (Scan the QR Code and be sure to set the YouTube video to full screen.) It shows the Nikola Tesla Memorial Centre. You will answer questions 1 and 2 in your booklet when you are finished watching.



<https://youtu.be/8YWDbXFEDT4>



Smiljan

Village in Croatia

Smiljan is a village in the mountainous region of Western Lika in Croatia. It is located 6 km northwest of Gospić, and fifteen kilometers from the Zagreb-Split highway; its population is 418. [Wikipedia](#)





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www.alamy.com



1880

After studying engineering at Graz Technical University (now in Austria) and the University of Prague (now in the Czech Republic) Tesla moved to Budapest (in present day Hungary) in 1880. He worked for the Austria-Hungary's phone system in Budapest called the Central Telephone Exchange.



Budapest

Capital of Hungary

Budapest, Hungary's capital, is bisected by the River Danube. Its 19th-century Chain Bridge connects the hilly Buda district with flat Pest. A funicular runs up Castle Hill to Buda's Old Town, where the Budapest History Museum traces city life from Roman times onward. Trinity Square is home to 13th-century Matthias Church and the turrets of the Fishermen's Bastion, which offer sweeping views.

Founded: November 17, 1873

Area: 202.8 mi²

Weather: 28°F (-2°C), Wind NW at 3 mph (5 km/h), 79% Humidity

Local time: Monday 10:04 PM

Population: 1.732 million (2012) UNdata

Neighborhoods: Újpest, Erzsébetváros, Castle Hill, Inner City, [More](#)



Sarah Knepper, Grade 4, University Elementary School

Nikola Tesla moved to Paris, France. He worked for the Continental Edison Company.



Paris

Capital of France

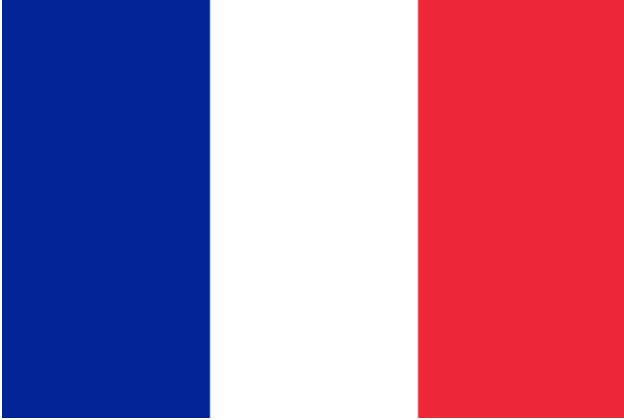
Paris, France's capital, is a major European city and a global center for art, fashion, gastronomy and culture. Its 19th-century cityscape is crisscrossed by wide boulevards and the River Seine. Beyond such landmarks as the Eiffel Tower and the 12th-century, Gothic Notre-Dame cathedral, the city is known for its cafe culture and designer boutiques along the Rue du Faubourg Saint-Honoré.

Population: 2.244 million (2010) UNdata

Currency: Euro

Mayor: Anne Hidalgo

Neighborhoods: Le Marais, Latin Quarter, Paris, More



Sarah Knepper, Grade 4, University Elementary School

1884

Nikola Tesla moved to the United States to live in New York City and work for Thomas Edison. This only lasted for about one year, as the two encountered conflicts in ideas, and some say, personality. Tesla remained in New York until he died on January 7, 1943, at the age of 86.



New York City

City in New York

New York City comprises 5 boroughs sitting where the Hudson River meets the Atlantic Ocean. At its core is Manhattan, a densely populated borough that's among the world's major commercial, financial and cultural centers. Its iconic sites include skyscrapers such as the Empire State Building and sprawling Central Park. Broadway theater is staged in neon-lit Times Square.

Population: 8.406 million (2013)

Points of interest

[View 15+ more](#)



Central Park



Empire State Building



Statue of Liberty



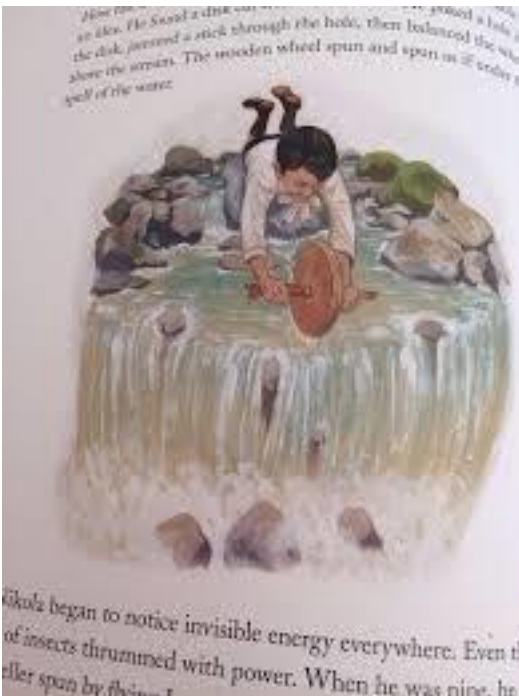
Metropolitan Museum of Art



Museum of Modern Art

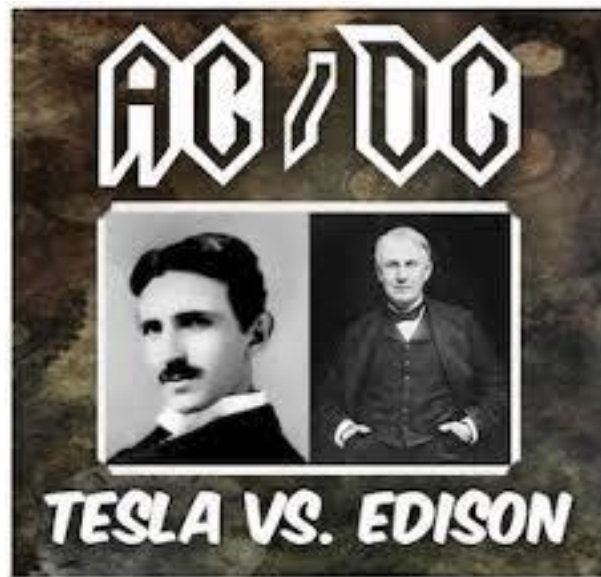


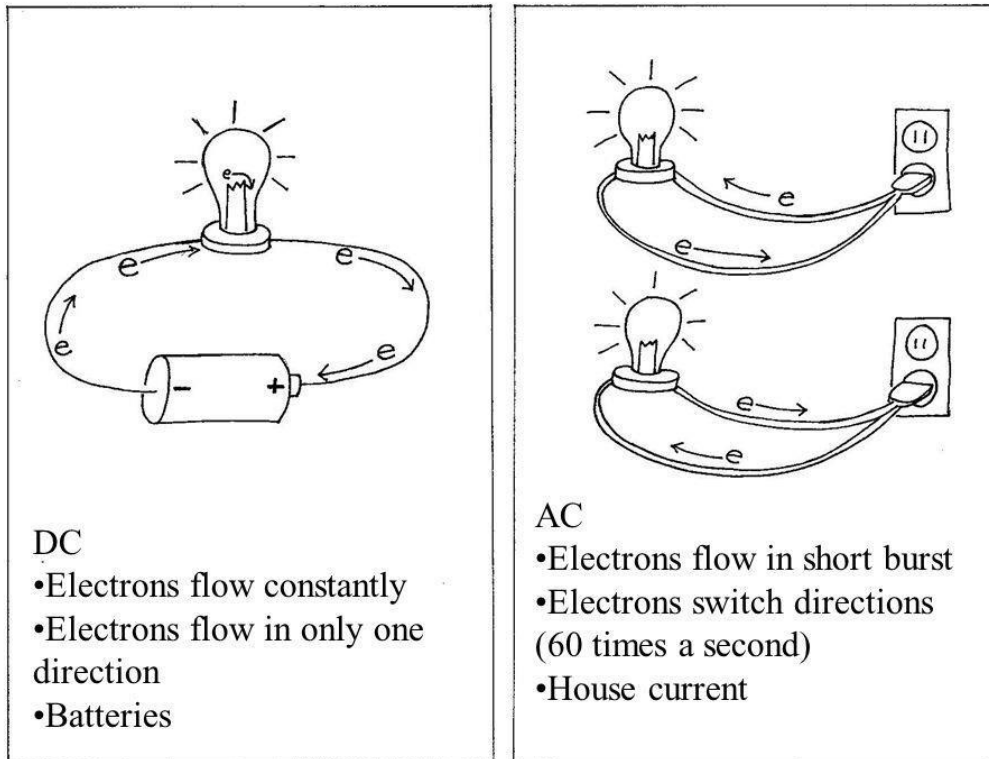
CONNECTING AND REFLECTING



AC vs. DC

What is the difference
between Alternating Current
and
Direct Current?



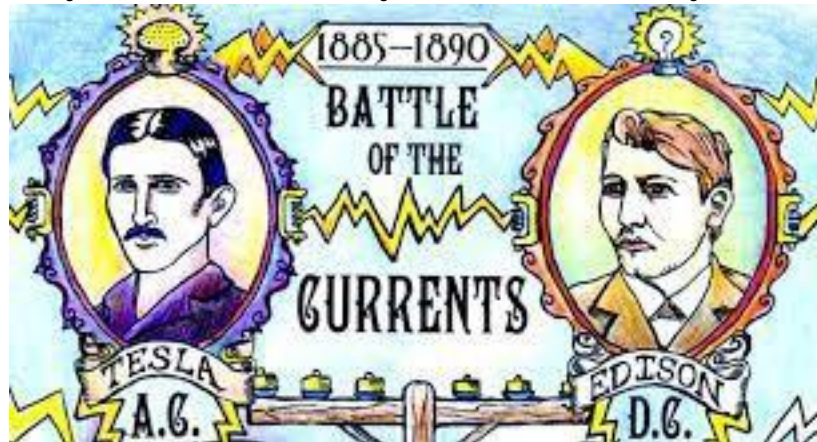


Watch this video about the difference between Direct Current and Alternating Current.

<https://youtu.be/BcIDRet787k>



TESLA VS. EDISON



TESLA VS. EDISON: THE RIVALRY

When Thomas Edison and Nikola Tesla first met in 1884, the American inventor had eighteen power stations producing direct-current electricity in New York, Boston, Philadelphia, and New Orleans—and plans for hundreds more. The renowned inventor was already the master of a new electrical empire.

Nikola Tesla was an unknown electrician with a strange accent whose only invention existed in his head. And Tesla's alternating-current idea wasn't an improvement of the direct-current system; it was a direct competitor.

Though Edison dismissed Tesla's ideas about alternating current, he did hire the young engineer. For a year, Nikola toiled for Edison, often from 10:30 a.m. until five the next morning. Edison said to him, "I have had many hardworking assistants but you take the cake."

He promised to pay Tesla \$50,000 to improve his direct-current motors. Tesla did, but when he tried to collect his pay, Edison just laughed. "Tesla, you don't understand our American humor." Nikola stormed out of Edison's office. The young engineer struggled financially for months, even digging ditches to feed himself.

When Tesla found investors and began developing his AC electrical system, Edison strove to squelch the competition before it even got off the ground. He published a pamphlet with a scarlet cover blazoned with the word **WARNING!** that claimed that alternating current was deadly. "It is a matter of fact," he wrote, "that any system employing high pressure, i.e. 500 to 2,000 units [volts], jeopardizes life." He backed efforts to limit the voltage of current used in New York City (which would rid AC of its advantage), to electrocute animals with AC current, and to convince New York State to enforce the death penalty using an AC-powered electric chair.

Even after Edison lost the contract to wire the World's Fair, he continued to put up a fight. Edison barred Westinghouse from using his incandescent lightbulb design at the fair. While scrambling to install the biggest lighting system in history, the Westinghouse team had to invent a new lightbulb, build a glass factory, and produce a quarter million of the new bulbs. Despite Edison's roadblocks, Tesla and Westinghouse succeeded brilliantly.

One later incident suggests a grudging respect between the two inventors. In 1895, Nikola Tesla's lab was completely destroyed by a fire. Edison let Tesla use his equipment and work in his lab for a few weeks until he got a new lab up and running.

In 1917, Nikola Tesla was offered what had become the most prestigious award in electrical engineering, the Edison Medal. At first Nikola refused. "You would not be honoring Tesla," he wrote, "but Edison, who has previously shared unearned glory from every previous recipient of this medal." But eventually, Tesla accepted.

The night of the award ceremony, a friend introduced Nikola Tesla: "Were we to seize and eliminate from our industrial world the results of Mr. Tesla's work, the wheels of industry would cease to turn, our electric cars and trains would stop, our towns would be dark."

While Thomas Edison himself never publicly recognized the genius of Nikola Tesla's work, the honor given in his name did.

Niagra Falls

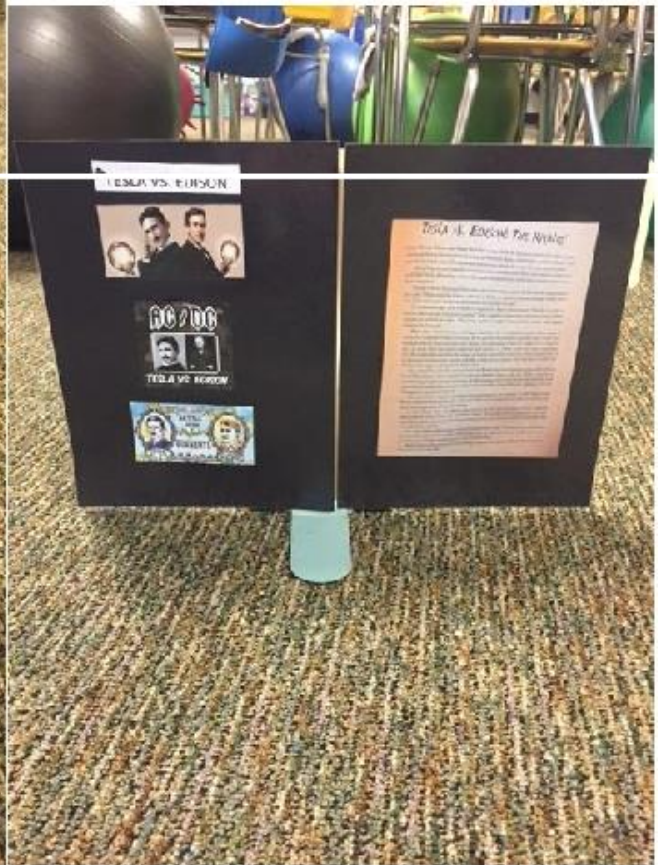
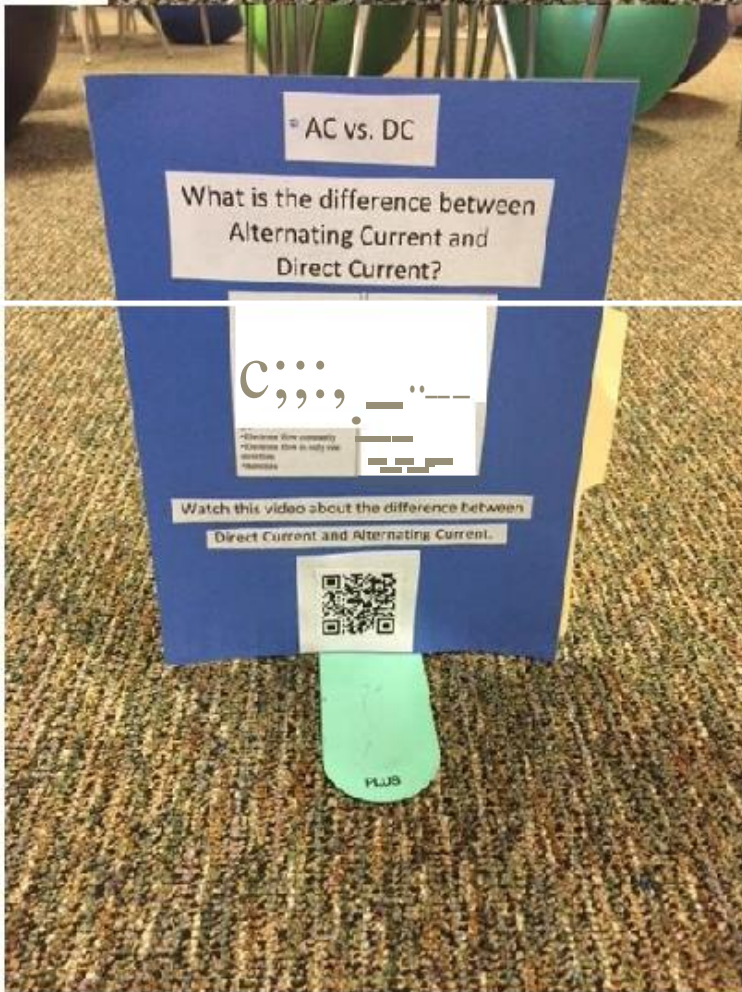
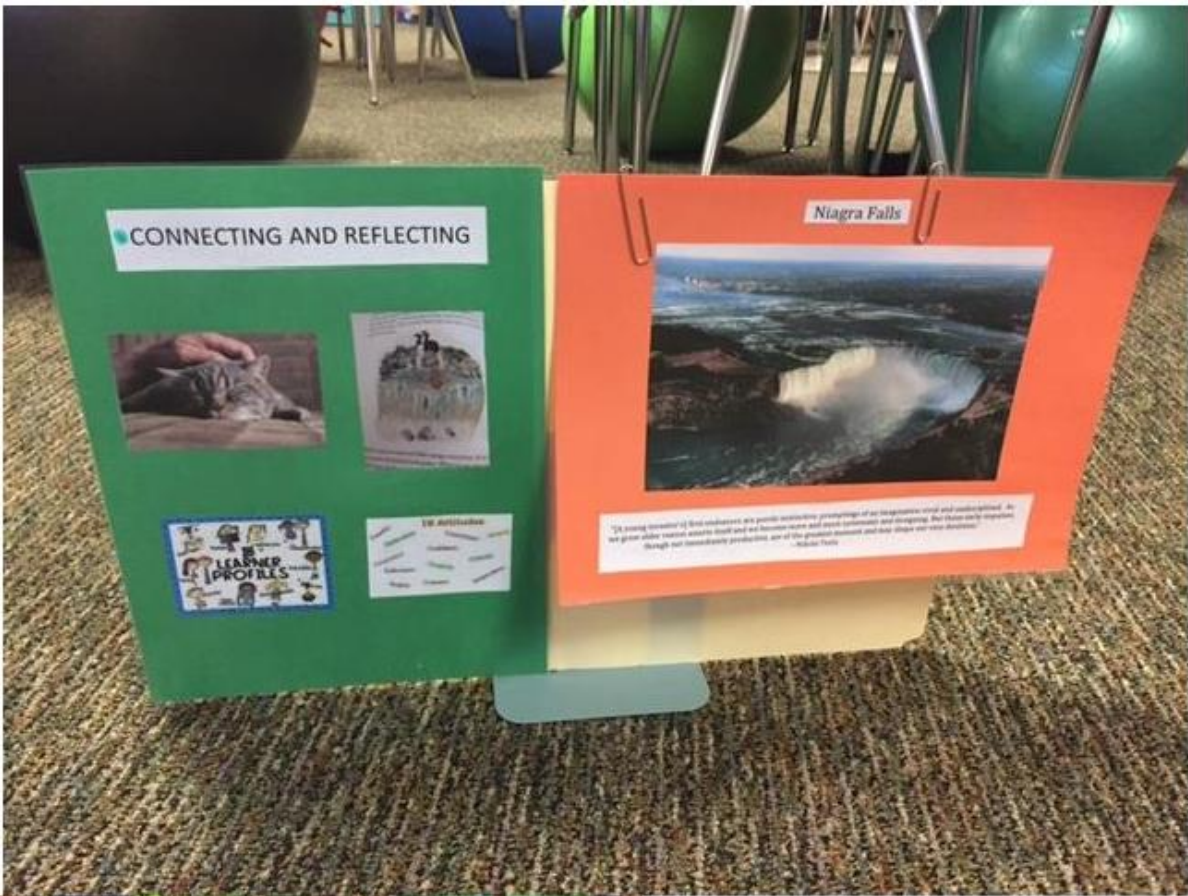


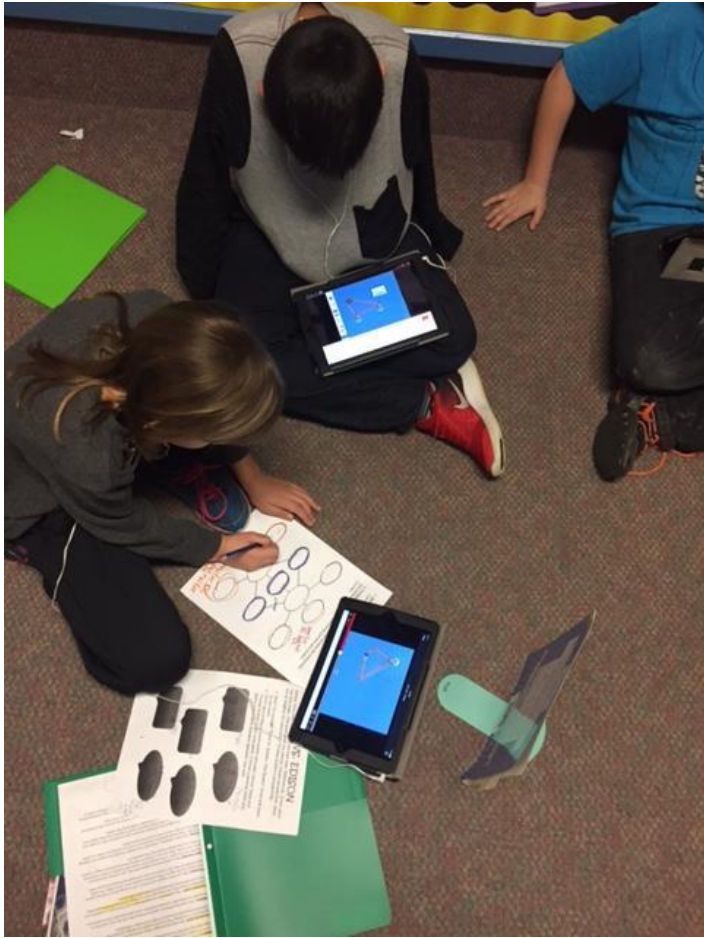
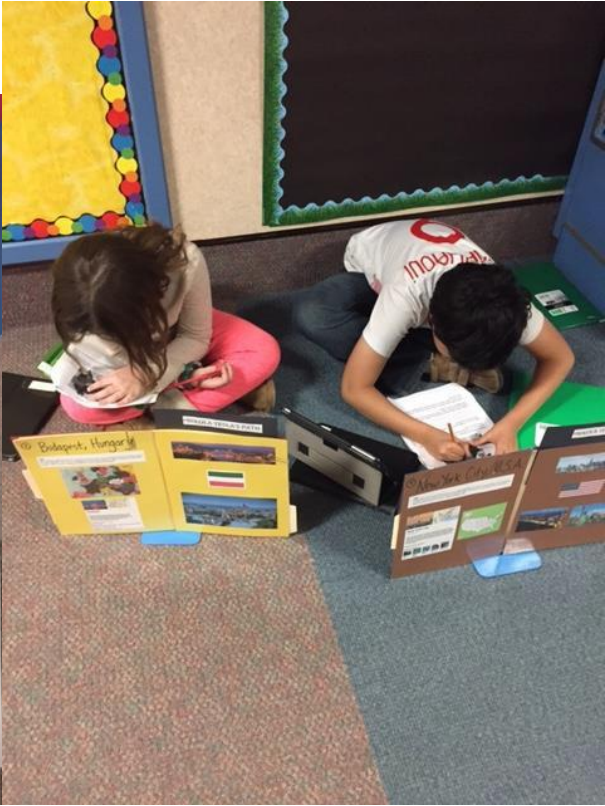
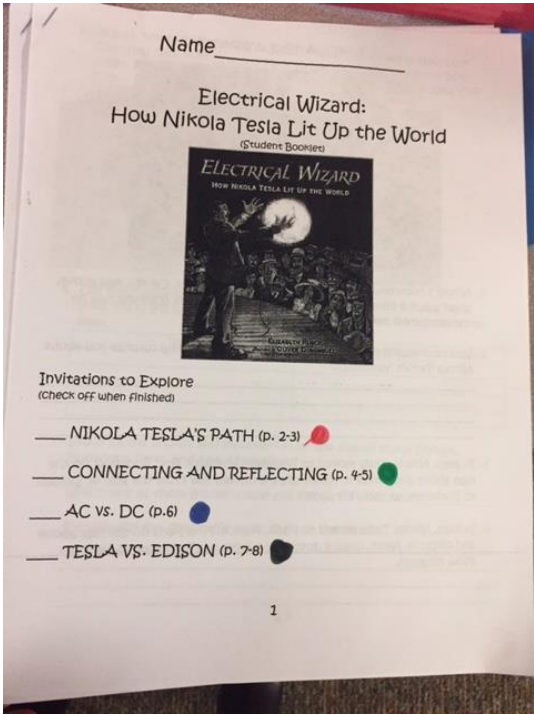
“[A young inventor’s] first endeavors are purely instinctive, promptings of an imagination vivid and undisciplined. As we grow older reason asserts itself and we become more and more systematic and designing. But those early impulses, though not immediately productive, are of the greatest moment and may shape our very destinies.”

~Nikola Tesla

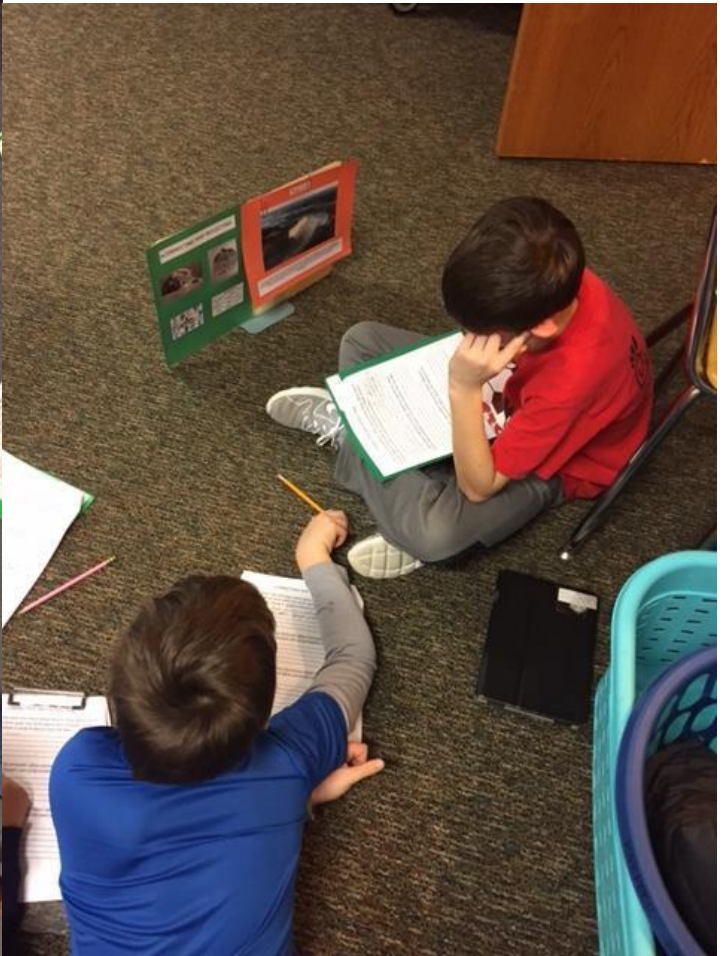
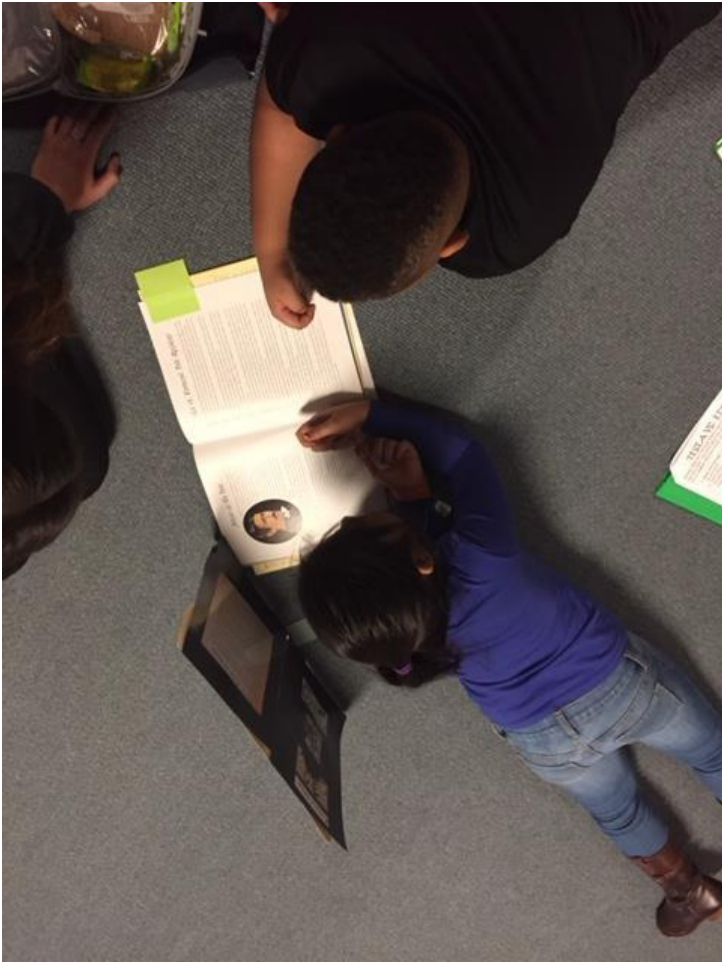


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