Nikola Tesla

The Child of Light

Author: Nick Quark · Recommended age: 7–12 · 8 chapters

Name: _____ Date: _____

1. Before you read

1. Count how many things around you run on electricity. Which of them could exist without it?
2. Have you ever felt a little zap when you pulled off a sweater or touched a door handle? What do you think is happening?
3. The book says Tesla built whole machines in his head without drawing them. Can you picture your bedroom with your eyes closed and "walk" around it? Try it.

2. Comprehension questions

Keep the book in front of you: look things up, reread, and answer in your own words. The labels tell you what kind of question it is: ***fact*** *(it's written in the book),* ***why*** *(you have to explain a cause), and* ***opinion*** *(there's no single right answer).*

Chapter 1 · The Child of Light

1. According to the family legend, what did his mother answer when the midwife said the baby would be "a child of darkness"? Can we be sure it happened? FACT

2. What happened when Nikola stroked his cat, Mačak, and how did his father explain it? FACT

3. Why did the deal Nikola made with his father when he was sick change his whole life? WHY

Chapter 2 · The Professor Who Said Impossible

4. What bothered Tesla about the dynamo Professor Pöschl brought to class? FACT

5. What did the professor say in front of everyone? FACT

6. Explain in your own words the trick of the dog and the invisible carrot. What is the dog and what is the carrot in a real motor? WHY

7. People laughed at Tesla in class for an idea that turned out to be right. Has anything like that happened to you? What would you do if it did? OPINION

Chapter 3 · Four Cents and a Broken Dream in the Big Apple

8. How much money did Tesla have when he arrived in New York in 1884, and what was the letter of recommendation he carried said to say? FACT

9. According to Tesla, why did he stop working for Edison? WHY

10. What did Tesla do to win over the investors Brown and Peck, and why did the copper egg stand up? FACT

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Chapters 4 and 5 · The War of the Currents and Niagara

11. Using the book's comparison: why is Edison's direct current an "ice-cream truck" and Tesla's alternating current a "bullet train"? WHY

12. What does a transformer do before electricity leaves the power plant, and again when it arrives? FACT

13. What happened in Buffalo on November 16, 1896, and how far away was the power plant? FACT

14. As a boy, Tesla saw an engraving of Niagara Falls and said what he would do when he grew up. What did he say? FACT

Chapters 6 and 7 · The boat without wires and the tower

15. In 1898, the crowd at Madison Square Garden couldn't understand how the little boat moved. What explanations did they come up with, and what was the real one? WHY

16. What did Tesla tell J. P. Morgan the Wardenclyffe tower would do, and what did he really want it to do? FACT

Chapter 8 · The Lonely Genius and the Last Flash of Light

17. What did Tesla describe in a 1926 magazine interview, long before it existed? FACT

18. Tesla died believing he had failed. Do you agree? Find three things in your home that exist thanks to him. OPINION

3. Timeline

Every date comes from the book. There are three blanks, marked ✎: find the year and write it in.

1856	He is born in Smiljan around midnight on July 10; family legend says during a lightning storm.
1875	He enrolls at the Polytechnic School in Graz, Austria.
1882	In a park in Budapest, the idea of the rotating magnetic field finally comes to him.
✎ _____	In June he arrives in New York with four cents and goes to see Thomas Edison.
1887	After a winter digging ditches, the copper egg wins over the investors: at last he has a laboratory.
✎ _____	On November 16, the Niagara plant lights up the city of Buffalo, about 20 miles away.
1898	He steers a boat without wires in front of the crowd at Madison Square Garden.
1901	J. P. Morgan gives him $150,000 to build Wardenclyffe Tower.
1917	Wardenclyffe Tower is sold for scrap and torn down to pay his debts.
✎ _____	He is found dead on January 8 in room 3327 of the Hotel New Yorker.

4. Science vocabulary

Brushes
Metal contacts that rubbed against the spinning part of the old motors. They were what threw off sparks in Professor Pöschl's dynamo.

Direct current
Edison's electricity. Safe and slow, like an ice-cream truck: if it tries to go too far, the energy "melts" away in the wires.

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Alternating current
Tesla's electricity, like a bullet train. With transformers it can travel long distances, and it's what reaches the outlets in your home today.

Rotating magnetic field
The invisible magnet that circles around the motor and drags the rotor along without touching it: the "ghost carrot."

Transformer
The device that raises the "pressure" (the voltage) of electricity so it can travel far, and then lowers it so it's safe in your home.

Generator
The machine that makes electricity. At Niagara, falling water spun the turbines and the generators made the electricity.

Tesla coil
His favorite invention: a "giant loudspeaker" for electricity that, instead of sound, fired man-made lightning bolts across the room.

Radio waves
Invisible waves that travel through the air. With them he steered the boat without wires; today they carry radio, remote controls, and Wi-Fi.

5. Try it at home: Mačak's spark

It all started with a cat and a stroke of the hand. You're going to repeat what fascinated young Nikola, no cat required.

You need

- A blown-up balloon.
- A wool sweater or your own (dry) hair.
- Small scraps of paper.
- A faucet that can run a very thin stream of water.

Steps

1. Rub the balloon hard against the wool or your hair, about twenty times.
2. Bring it close to the scraps of paper without touching them. Write down what happens.
3. Rub it again and bring it slowly toward a very thin stream of water, without getting it wet.
4. Turn off the light, rub the balloon again, and bring it very slowly toward your arm: listen.

What to look for

The paper scraps jump toward the balloon and the stream of water bends, even though nothing touches them. And in the dark you can hear a tiny crackle. Does it work the same if your hair is wet? Or on a rainy day?

What it has to do with the story

That's what Nikola saw on Mačak's back: blue sparks under his hand. His father told him it wasn't magic but electricity, the same thing you see in a storm. If a stroke of the hand could make sparks, and lightning was the same thing only gigantic… that was the beginning of his lifelong curiosity about this invisible force.

Safety: use only a balloon and dry hands. Don't touch any outlet, cord, or plugged-in device. With little children, have a grown-up nearby: pieces of a popped balloon must never go in anyone's mouth.

6. Talk or write about it

Class discussion

Tesla wanted energy to reach everyone; a famous (but unproven) story says his banker asked, "Where do we put the meter?" Who was right? Can an invention that big be paid for with good intentions alone?

Writing (half a page)

Tesla imagined inventions that didn't exist yet, and people thought he was dreaming. Describe an impossible invention for the year 2100: what it does, what it's for, and why people today would say you're crazy.

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Answers for grown-ups

*The **opinion** questions (7 and 18) have no set answer: any well-reasoned response is fine. For the **why** questions we give the explanation the book offers, as a guide.*

Comprehension questions

1. "No. He will be a child of light." We can't be sure: nobody can prove those words were spoken. The book tells it as a family legend.
2. Blue sparks jumped from the cat's fur under his hand. His father explained it wasn't magic but electricity, the same thing you see during a storm.
3. His father wanted him to be a priest. When Nikola was very ill with cholera, he asked his father to let him study engineering if he got well, and his father agreed: that opened the path of his life.
4. The sparks from the brushes: to him they were wasted energy, useless heat, and noise.
5. "Mr. Tesla may accomplish great things, but he certainly will never do this." He called it a perpetual motion scheme, an impossible idea.
6. The dog is the rotor, the part that spins in the middle of the motor; the carrot is the invisible magnet Tesla creates with alternating current, which keeps circling around it. The rotor chases the magnet without anything touching it, so it turns with no sparks and no noise.
7. *Opinion: no set answer.*
8. Four cents. Legend says Charles Batchelor's letter read: "I know two great men, and you are one of them; the other is this young man." Nobody has ever found the letter, so we can't be sure of the words.
9. Because, as Tesla told it, Edison had promised him $50,000 to improve his generators and, when he did, laughed and said it had been a joke.
10. He made a copper egg spin until it stood up on its tip. Under the dish, coils created an invisible spinning magnetic field, and the egg chased it, spinning faster and faster.
11. Because direct current is safe but slow, and if it goes too far the energy "melts" away in the wires. Alternating current, with transformers, can travel long distances without getting lost.
12. It raises the voltage (the "pressure") so the electricity can travel far, and another transformer lowers it when it arrives so it's safe in people's homes.
13. The electricity made at Niagara reached Buffalo, about 20 miles away: the city's streetcars began to move and, soon after, its lights and factories came on.
14. That one day he would go to America, put a big wheel under the falls, and use it to make power.
15. Some said it was a trick, some that a trained monkey was hidden inside, others that it was telepathy or mind control. In fact it was radio waves: his control box sent them, and a device in the boat, the coherer, picked them up and worked the rudder.
16. He told Morgan it would send news, messages, and stock prices across the ocean without wires, a "world wireless" system. What he really wanted was to send electric power through the planet to anyone, anywhere.
17. Devices small enough to carry in a vest pocket that would let people talk instantly, at any distance, and see and hear each other as if face to face: something like today's phones and video calls.
18. *Opinion: no set answer.*

Timeline blanks

- **1884** — arrives in New York.
- **1896** — Niagara lights up Buffalo on November 16.
- **1943** — found dead on January 8 at the Hotel New Yorker.

Before you read and Talk or write about it

No set answers: these are for sparking ideas and conversation.

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