

# FRANK EINSTEIN

## AND THE ELECTRO-FINGER

### TEACHING GUIDE



### INTRODUCTION

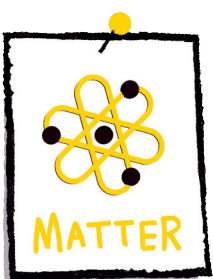
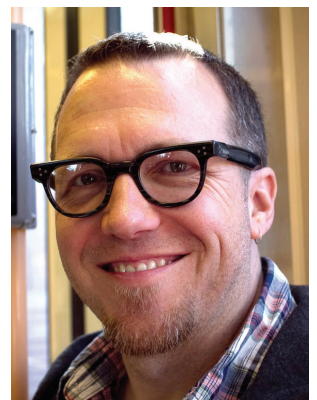
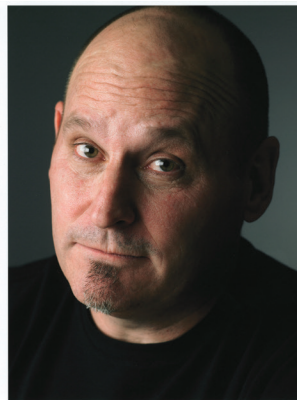
In this second book in the series, Frank Einstein (kid-genius scientist and inventor) and his best friend, Watson, along with Klink (a self-assembled artificial-intelligence entity) and Klank (a mostly self-assembled artificial *almost* intelligence entity), once again find themselves in competition with T. Edison, their classmate and archrival—this time in the quest to unlock the power behind the science of **energy**. Frank is working on a revamped version of one of Nikola Tesla’s inventions, the “Electro-Finger,” a device that can tap into energy anywhere and allow all of Midville to live off the grid, with free wireless energy. But this puts Frank in direct conflict with Edison’s quest to control all the power and light in Midville, monopolize its energy resources, and get “rich rich rich.” Time is running out, and only Frank, Watson, Klink, and Klank can stop Edison and his sentient ape, Mr. Chimp!

### AGES 8 TO 12

### ABOUT THE AUTHOR AND ILLUSTRATOR

**Jon Scieszka** has sold more than 11 million books, including *The Stinky Cheese Man and Other Fairly Stupid Tales*, *The True Story of the 3 Little Pigs*, the Time Warp Trio series, *Guys Read*, *Spaceheadz*, and *Battle Bunny* with Mac Barnett. He lives in Brooklyn, New York.

**Brian Biggs** has collaborated with Garth Nix, Cynthia Rylant, and Katherine Applegate, in addition to working on his own picture books in his Everything Goes series. He lives in Philadelphia.



## VOCABULARY

- shuffles (pp. 7)
- fiddles (pp. 11)
- throttling (p. 27)
- rubble (p. 30)
- pivots (p. 40)
- yapping (p. 43)
- consults (p. 45)
- sputter (p. 48)
- glitch (p. 56)
- rummages (p. 69)
- gourd (p. 97)
- hustle (pp. 111)
- lunges (pp. 118)
- ignite (p. 141)
- surges (p. 142)
- inevitably (p. 145)

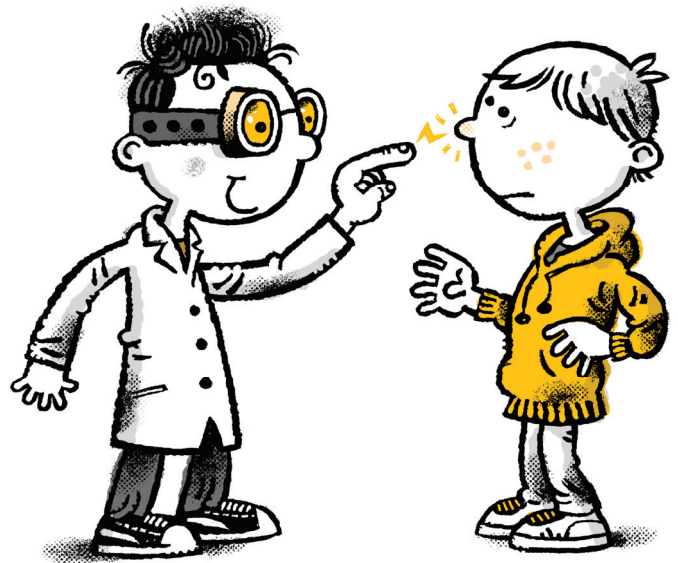
## FUN ACROSS THE CURRICULUM

### Language Arts

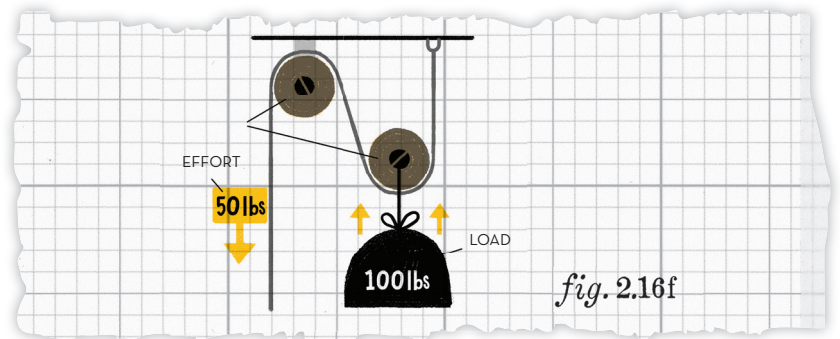
- Page 1 is a sneak peek of something that happens later in the book. Predict how you think these two pages will fit into the story. When you reach that part of the book, check your prediction and see if you were correct.
- “Figurative language is a tool that an author employs to help the reader visualize what is happening in a story or poem.” Throughout *Frank Einstein*, Jon Scieszka uses figurative language such as similes (p. 86), alliteration (p. 107–08), idioms (pg. 102, 103, 112), and onomatopoeias (pg. 13, 40, 47, 107, 112, 118, 140, 157). Why do you think he uses figurative language when writing his books? How do they help the reader enjoy the book more?
- Why do you think Watson puts up with Frank’s antics?
- Use context clues to determine what Grandpa Al’s silly phrase “chin-waggin’ confab” (pg. 17) means.
- Throughout the book, Mr. Chimp is called a monkey, but he is actually an ape. Complete a double bubble map or Venn diagram comparing and contrasting apes and monkeys. Why would Mr. Chimp be upset that he is called a monkey?
- Reread the scenes where Mr. Chimp and T. Edison interact (pg. 28, 43, 135). How does Edison treat Mr. Chimp? Do you think it is fair that he treats him this way? Why do you think Mr. Chimp keeps working with Edison?
- On pg. 52, Watson, Klank, and Klink have a small discussion about *Diary of a Wimpy Kid* and the Cheese Touch. If you haven’t read *Diary of a Wimpy Kid*, does this discussion make you want to? If you have read it, what other good parts from the book could Klink or Watson mention to make Klank want to finish the book?
- Who do you think has influenced Frank more: his parents or Grandpa Al? Explain your answer and use text evidence to back it up.
- Jon Scieszka uses very descriptive language throughout the book to describe the setting (ex. pg. 61, 83, 106, 145). Why is it important for authors to be descriptive when describing the setting in their books?
- Jon Scieszka also uses very specific word choices when it comes to verbs. Mr. Chimp stomps, jams, chomps, smashes, and crashes when he attacks the wind farm instead of just destroying it. Why is using specific verbs important when writing? How does this change your experience when reading the book?
- On pg. 76–77 Janegoodall shares how she disagrees with chimps being used in movies. Do you agree or disagree with her? Why or why not? (This could also be used as a debate question in class.)
- Why do you think T. Edison dislikes Frank so much? Use text evidence to support your answer.
- On pg. 98, someone accuses Frank of creating monsters. How does this compare to the book *Frankenstein*? Do you think the name Frank Einstein was created to allude to *Frankenstein* or Albert Einstein or both? How is Frank like Dr. Frankenstein and Albert Einstein? Explain your answer.
- In the back matter, we get to read Chief Jacobs’s poem in his pocket. This poem is by Emily Dickinson. What do you think it means? Participate in Poem in your Pocket Day with Chief Jacobs <http://www.poets.org/national-poetry-month/poem-your-pocket-day>

### Science

- How are static electricity (pg. 8–9) and lightning (pg. 9–10) similar? Why does rubbing your feet on a rug and touching someone else cause static electricity?



- On **pg. 47–48**, Frank teaches us about **NEWTON'S 3 LAWS OF MOTION**. Using two marbles, experiment with motion and see how the 3 laws work.
  - For **#1**, place a marble on a flat surface. The marble will not move unless a force causes it to.
  - For **#2**, line up the two marbles. Push them both at the same time but one harder than the other. This will show you how a larger force means greater acceleration.
  - For **#3**, push the marbles toward each other until they hit. The marble will bounce backward, showing how one action causes a reaction.
  - There are many other experiments you can do to practice and learn about **NEWTON'S 3 LAWS OF MOTION**—how else do you think you can show these laws?
- On **pg. 19–22**, Frank and Grandpa Al share the difference between nonrenewable energy and renewable energy. What is the difference? What are examples of nonrenewable energy? Renewable energy? What do we primarily use now? Brainstorm with a group and come up with ideas for more efficient energy in your community.
- On **pg. 31–33**, Frank shows Watson how electricity could be made wirelessly by doing an experiment showing how “extra negative charge, caused by gathering electrons, attracts positively charged pepper and water.” Reenact Frank’s experiments. Why does the pepper separate and the water move? How does this experiment show that electricity could be made wirelessly?
- Frank’s parents are traveling within the Arctic Circle, so they were able to witness the Northern Lights (**pg. 35–39**). What are the Northern Lights? Why can you only see them when you are close to the North Pole? Are there Southern Lights near the South Pole?
- Frank explains to Watson how a compass works on **pg. 38–39**. Why does the magnetic end of a compass always point north?
- There are six types of simple machines (**pg. 53–55**). How does each of these machines “increase mechanical power”? Why are they called simple machines?
- On **pg. 58–59** Frank shows Watson how electricity can cause magnetism and vice versa by doing an experiment that shows how an electric current flowing through wires can produce a magnetic field, and how a magnet within coils of copper wire makes electricity. Reenact Frank’s experiments. How does it work?
- Klink and Klank are both examples of artificial intelligence (**p. 74**), but they are able to learn and converse and ultimately have their own personalities. How is this different than any artificial intelligence created so far?
- On **pg. 99–101** and **106**, we learn about how solar panels work to create electricity. Can you explain how they work? Why do you think more people don’t have solar panels?
- In the back matter of the book, Frank shares his Energy notes (**back matter**). Use Frank’s notes as a jumping-off point to learn more about energy. Choose one of his topics shared and research to learn more. Share what you learned with the class by creating an experiment.



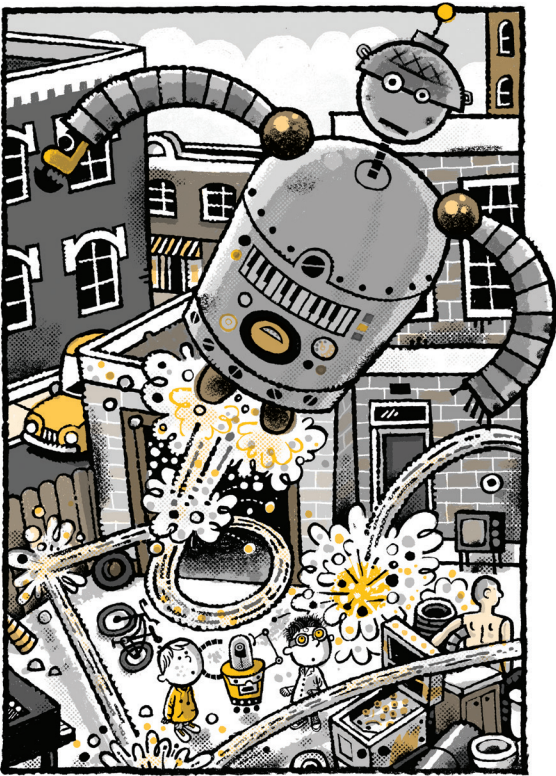
## **Math**

- When using a pulley, it takes half the effort of the load to pull it down. In Frank’s diagram, the load is 100 lbs, so the effort is 50 lbs. How much effort would it take if the load was 200 lbs? 1,000 lbs? 7,614 lbs?
- The formula to determine force is Force = mass x acceleration.
  - Find the force of an object with a mass of 2 kg and an acceleration of 5 meters per second<sup>2</sup>; 4 kg and 5 meters per second<sup>2</sup>; 10 kg and 12 meters per second<sup>2</sup>.
  - Find the acceleration of an object with a force of 10 and a mass of 2 kg; force of 20 and mass of 2 kg; force of 20 and mass of 4 kg.
  - Find the mass of an object with a force of 10 and an acceleration of 10 meters per second<sup>2</sup>; force of 100 and 10 meters per second<sup>2</sup>; force of 10 and 5 meters per second<sup>2</sup>.

## **History/Geography**

- Frank mentions scientists Isaac Newton (**pg. 13, 47–48**) and Nikola Tesla (**pg. 23, 104**) throughout the book. Who are these scientists? How did they change the world of science?
- Frank’s parents are in Yellowknife within the Arctic Circle (**pg. 36**). Where does the Arctic Circle run? What differs between being in the circle and out of the circle? It is one of five major circles of latitude on Earth—what are the other four?





- A monopoly is when one organization or business has excessive control of a service. In *Frank Einstein*, T. Edison's goal was to monopolize the energy sources in Midville. What are some examples of monopolies from history? Why are monopolies against the law? Do you agree with monopolies not being allowed?
- Janegoodall is named after Jane Goodall, an anthropologist who studies chimpanzees (pg. 71, 74). What has Jane Goodall's research taught us about chimps? How has Jane Goodall's research affected what we know about chimps?
- Grandpa Al mentions that many experiments throughout history have been viewed as frightening (pg. 103). Research experiments and inventions from history to find out why people have been afraid of certain experiments/inventions when they were discovered/created/done.
- Watson's favorite invention is kitty litter (shared in the back matter). What is your favorite invention? Do some research to find out who invented it and the story behind the invention.
- The cover scene is inspired by the art on the Sistine Chapel ceiling. Which famous artist painted this ceiling and what are the similarities? What does this allusion say about the Frank Einstein story?

## COMMON CORE STATE STANDARDS

### ENGLISH LANGUAGE ARTS COMMON CORE STATE STANDARDS

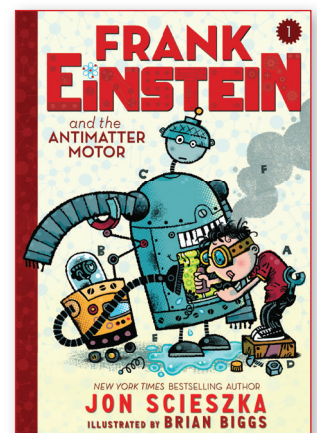
- **ANCHOR STANDARD 1:** Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- **ANCHOR STANDARD 3:** Analyze how and why individuals, events, or ideas develop and interact over the course of a text.
- **ANCHOR STANDARD 4:** Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
- **ANCHOR STANDARD 5:** Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

### NEXT GENERATION SCIENCE STANDARDS

- **3-PS2-1:** Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- **3-PS2-3:** Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.
- **4-PS3-3:** Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- **4-PS3-4:** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
- **4-ESS3-1:** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- **MS-PS2-1:** Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
- **MS-PS2-3:** Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
- **MS-ETS1.B:** A solution needs to be tested, and then modified on the basis of the test results, in order to improve it.
- **MS-PS2.B:** Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.

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