

FRANK EINSTEIN

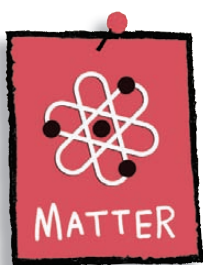
& THE ANTIMATTER MOTOR

TEACHING GUIDE

INTRODUCTION

Frank Einstein loves figuring out how the world works by creating household contraptions that are part science, part imagination, and definitely unusual. After an uneventful experiment in his lab, a lightning storm and flash of electricity bring Frank's inventions—the robots Klink and Klank—to life! Not exactly ideal lab partners, the wisecracking Klink and the overly expressive Klank nonetheless help Frank attempt to perfect his Antimatter Motor . . . until Frank's archnemesis, T. Edison, steals Klink and Klank for his evil doomsday plan! Using real science, Jon Scieszka has created a unique world of adventure and science fiction—an irresistible chemical reaction for middle-grade readers.

AGES 8 TO 12



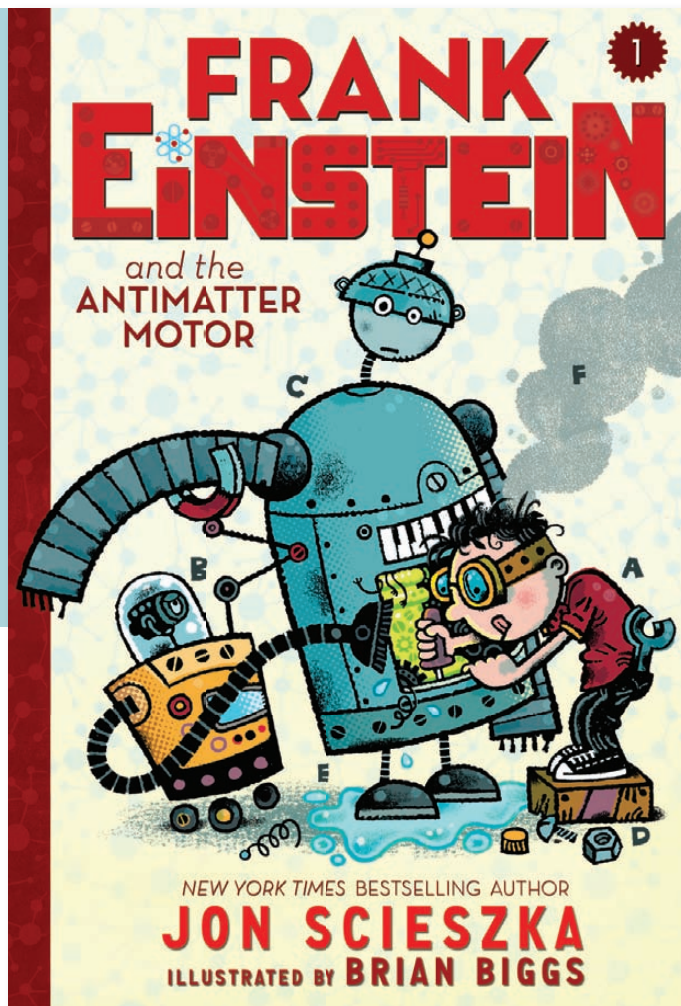
SCIENCE TOPICS

Over the course of the six books in the **Frank Einstein** series, Jon Scieszka—a former teacher—takes his readers from **Matter** to **Energy** to **Humans** to **Life** to **Earth** and on through the **Universe**—from the smallest objects (atoms) to the largest (the cosmos). *Frank Einstein and the Antimatter Motor* covers the topic of **Matter**.

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 most recently, *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

- intersect (pp. 3, 167)
- concentrated (pp. 3, 167)
- flicker (p. 7)
- vibration (p. 7)
- unconsciously (p. 11)
- interconnected (p. 18);
interconnections (p. 83)
- interlocking (p. 21)
- mural (p. 25)
- intricate (p. 29)
- entity (p. 33)
- bionic (p. 38)
- synaptically (p. 38)
- dabbled (p. 44)
- manipulation (p. 59)
- triggered (p. 63)
- casually (p. 69)
- plastered (p. 73)
- commotion (p. 76)
- drone (p. 76)
- annihilation (pp. 91, 168);
annihilating (pp. 94, 163)
- solder, soldering (p. 100)
- constitutional (p. 113)
- surge (p. 128)
- inconspicuous (p. 139)
- whaled (p. 152)

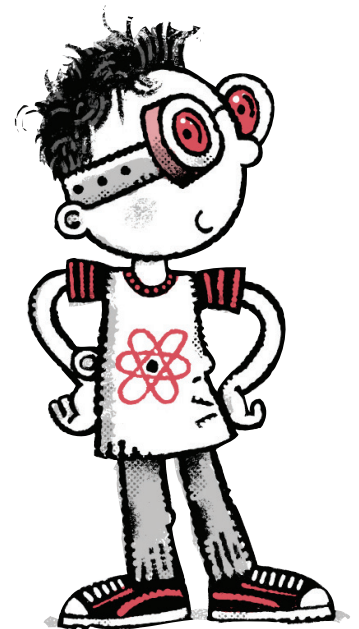
FUN ACROSS THE CURRICULUM

Language Arts

- Watson's name is an allusion to a famous sidekick. In what stories can you find this sidekick?
- Scieszka includes much onomatopoeia throughout the book, including *boom* (thunder) and *hmmmm* (motor). What do these add to the story? Where else did he use this device?
- How did Scieszka help you “see” the laboratory on **p. 17**?
- In **chapter 2**, what caused the SmartBots to come to life? What was the series of events that led to them working?
- Why did the author choose to have Frank's last name be Einstein? Why would he have chosen this name versus a different one? What about T. Edison's name?
- Using the information on **pp. 27–28**, what are the similarities and differences between human and computer brains?
- Frank's parents don't seem to know Frank very well. Using the phone call on **p. 30**, what evidence is there to back up this statement?
- On **pp. 35–39**, Klink and Klank are described. What is your first impression of each robot? How does what they are made from affect their personality? How are Klink and Klank the same? Different?
- Based on what is shared about Professor Poopypants, how are Frank and the professor similar? Different?
- After **chapter 11**, predict what you think T. Edison is planning. At the end of the book, check your prediction.
- Grandpa Al uses the phrase “Blow this pop stand” (**p. 112**). This is an idiom meaning “Let's get out of here.” What are idioms? What are some idioms you use in your daily life?
- Throughout **chapter 18**, T. Edison calls Frank and Watson a bunch of different duos' names, such as Bert and Ernie. Who are these duos? What famous duos do Frank and Watson remind you of?
- Following Asimov's laws of robotics (**p. 57**), Klank should not do anything that hurts him; however, he still chose to hug the antimatter squirt gun (**p. 170**). Why did he make that choice?
- In the appendix, the ASL (American Sign Language) alphabet has been included. Using the guide, spell out your name, your city, and some of your other favorite words.

Science

- What is the scientific method? How does Frank use it in his daily life (**pp. 2–3, 166–67**)?
- **Chapter 1** starts by saying that it begins 2 rotations of the Earth earlier than the events in the prologue. What does this mean? How long is a rotation?
- Frank has a double helix DNA slide. What would this look like?
- Why are failures as important as successes in science (**p. 26**)?



- What chemical reaction happens to make a stink bomb (pp. 48–49)? And the volcano effect in a baking soda volcano (p. 111)?
- On page 52, Frank shows us his hovering skateboard. How did he make the skateboard work?
- What are the different states of matter (p. 53)?
- How could cow farts power a car (p. 54)?
- In the wild, primates actually use tools to go ant fishing, just like Mr. Chimp does. What does this tell you about primates? What other tools do primates use in the wild?
- Fig 1.8 on page 70 contrasts monkeys and apes. What are the main differences between the two animals?
- Of the six areas of science, which sounds the most interesting to you (pp. 80–85)?
- What are atoms made of (p. 89)?
- How does antimatter work (pp. 90–91)?
- Why is Grandpa Al worried about what others would do with Frank's antimatter? What could happen if antimatter ends up in the wrong hands (p. 106)?
- Frank's parents are in Antarctica, where the ozone is getting a hole in it (p. 110). What is causing this hole? Frank mentions CFCs. What are they? How do they affect the ozone?
- What are the similarities and differences between insect legs and human legs (p. 115)?
- A person should never smile at a primate, and when humans show their teeth on page 128, it worries Mr. Chimp. Why is this?
- Frank compares what Edison is planning to CERN (pp. 103, 136). What is CERN? How is what Edison is planning similar to CERN?
- Why did Edison's building need to be located near a lake (p. 139)?
- Each person has a unique fingerprint (p. 142). What changes between each person's fingerprint to make them unique?
- What are the two basic rock types (p. 143)?

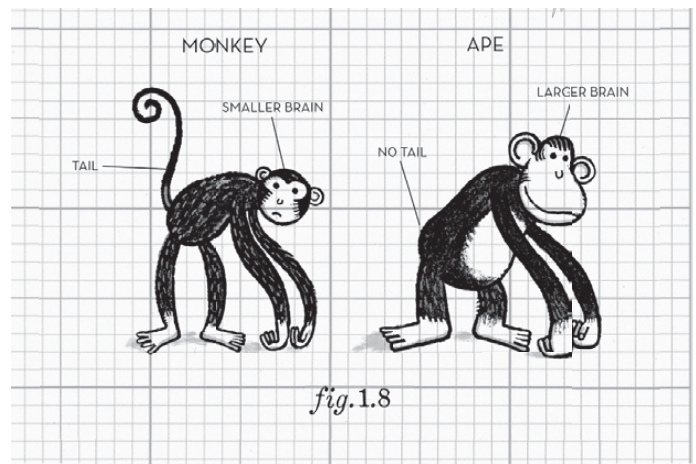


fig.1.8

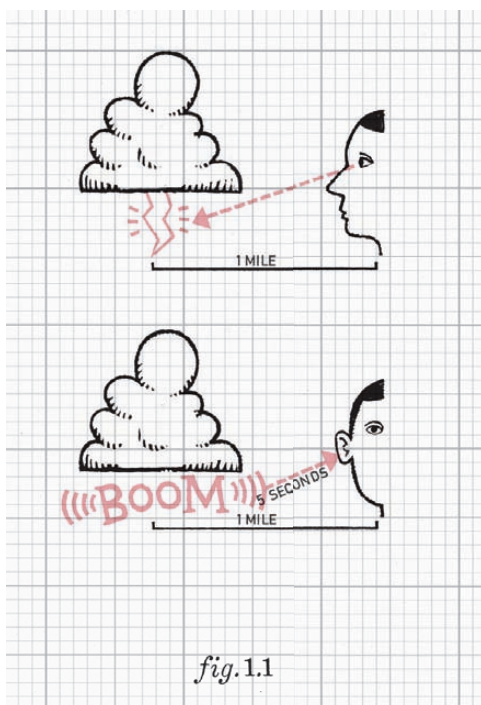


fig.1.1

- Why does an ape make a good bodyguard (p. 149)? What other animals would make good bodyguards?
- What makes the sky so pretty during sunrises and sunsets (p. 154)?

Math

- In Fig 1.1, Frank shows us that every second between light and sound equals 1/5 of a mile, because of the difference between the speed of light and the speed of sound. So, if there are 5 seconds between thunder and lightning, that means the storm is 1 mile away. What if there are 10 seconds between? 15 seconds? 12 seconds? 100 seconds?
- On page 93, we learn that to figure out the amount of energy from matter, you use the equation $E=mc^2$ and that $c=300,000$ km/sec. Using this information, determine the amount of energy that would be created by matter that has a mass of 2 grams, 5 grams, 20 grams, etc. Look up the mass of different objects and determine the energy they would create.

Social Studies/History

- On page 109, we learn that corn flakes were an accidental invention. Are there other accidental inventions?
- Aristotle is one of Frank Einstein's inspirations (p. 80). Who was Aristotle?

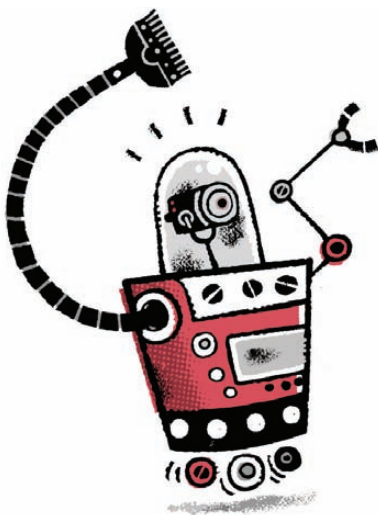
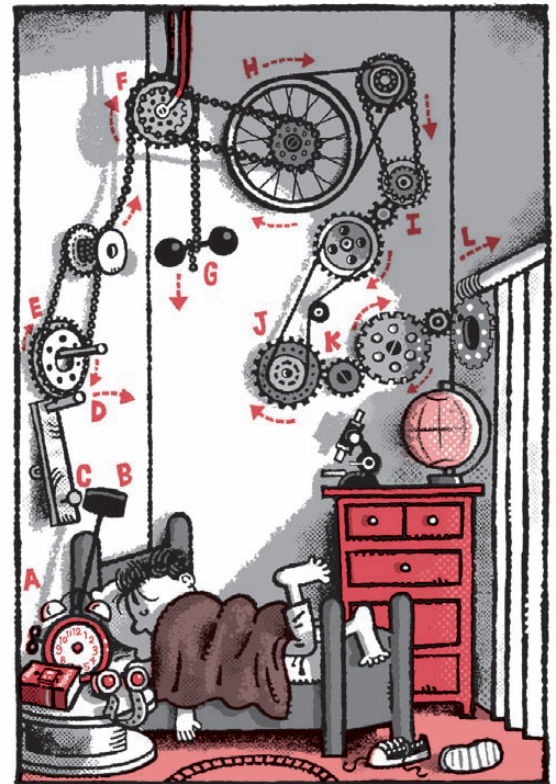
COMMON CORE STATE STANDARDS

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 6:** Assess how point of view or purpose shapes the content and style of a text.

NEXT GENERATION SCIENCE STANDARDS

- **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-LS1-1:** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- **4-PS1.A:** Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means.
- **4-PS1.B:** When two or more different substances are mixed, a new substance with different properties may be formed.
- **5-ESS2.A:** Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.
- **MS-PS1.A:** Substances are made from different types of atoms, which combine with one another in various ways.
- **MS-ESS1-1:** Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
- **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.
- **MS-ESS3.D:** Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities



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