Lesson Descriptions

Chapter 6: The Inventor’s Secret
Two books that emphasize the power of perseverance are paired up, engaging students in a challenge to design a toy car using everyday materials. Students are introduced to the design process and use it to improve their car design.

Chapter 7: Mesmerized
After hearing the true story of how Ben Franklin challenged Franz Mesmer’s “magic force” with a blind test, students take part in a blind taste test of two different sodas. They learn that even though advertisers try to “mesmerize” us with their ads, they must have evidence to support the claims they make. Then, students design and perform their own product comparison tests and share their results at a Consumer Fair.

Chapter 8: Wind It Up!
After reading a story about a loveable toy robot, students explore wind-up toys, observe their patterns of motion, graph the distance they travel, and predict their future motion. Then they take the toys apart to see how they work. Through a nonfiction read-aloud they learn how springs inside wind-up toys store energy that is released when the spring unwinds, causing the toy move. Finally, students build their own wind-up toy, and design an instruction manual that explains how it works.

Chapter 9: Light It Up
Students explore how incandescent lightbulbs, compact fluorescent lights, and light-emitting diodes (LEDs) transform electricity into light and heat, and then use mathematics to compare their energy efficiency. After reading a story about a child who is afraid of the dark, they apply their learning about energy transformations by designing a nightlight using an LED bulb, circuit tape, and a battery.

Chapter 10: Burn
After reading about Michael Faraday’s famous lecture for young scientists called, “The Chemical History of a Candle,” students explore the extraordinary chemical and physical changes that occur as an ordinary candle is burned. They elaborate on their understandings about combustion and the conservation of matter by learning about wildfires and firefighting technologies, and then compare a variety of solutions used to combat fires.
Chapter 11: From Edison to the iPod
Students read about famous inventors of the past (Thomas Edison) and the present (Tony Fadell), and explore the evolution of sound recording devices, beginning with the invention of Edison's phonograph and ending with Fadell's iPod. They learn how the first analog recordings worked by exploring with “Talkie Tapes,” and then design and build a 3-D prototype for a music player of the future.

Chapter 12: Better Together
After learning about some of the many collective nouns used to describe groups of animals, students observe a species that is known for having one of the most complex social structures of all mammals - the elephant. Students explore how scientists compile animal behaviors into inventories called ethograms and then use simulated field data to graph the frequency of certain elephant behaviors. This provides evidence for an argument that some animals form groups that help members survive. Analyzing their graphs also helps students understand that individual elephants have different roles within groups. Through a variety of text and digital media, students also learn about the benefits that other species get from living in groups, and how scientists use technology to track individual animals within larger groups.

Chapter 13: Spider Science
Students explore the secret lives of spiders, discovering just how intricate their webs are by undertaking a difficult design challenge. They also learn how genetic information is passed from parent to offspring, the difference between inherited and acquired traits, and how scientists design experiments to study animal behavior in space. They learn the true story of Nefertiti, a jumping spider that spent 100 days in the International Space Station learning how to hunt in microgravity.

Chapter 14: Bionic Animals
After hearing the true story of a young bottlenose dolphin who loses her tail and is helped by a team of dedicated prosthetists, students are challenged to design, build, and test a prosthetic part for a wind-up toy animal. In the process, they learn how biomedical engineers design everything from life-saving medical devices to life-changing prosthetic limbs. They also learn how the fast-growing field of 3D printing technology is helping both people and animals with limb differences.

Chapter 15: From Seed to Tree
Students explore the “magic” of seeds by investigating maple samaras and reading both fiction and nonfiction picture books about tree seeds. They discover that plants get their material for growth chiefly from air and water through the remarkable process of photosynthesis. Then they learn how plants are grown on the International Space Station.
Chapter 16: Hurricane
After reading the heartwarming true story of a cat and a dog who survived the devastation following Hurricane Katrina, students learn why this storm was one of the worst natural disasters in U.S. history - including the fact that many of the levees built to protect New Orleans failed. Students then learn more about levees, and are challenged to build and test a model of one.

Chapter 17: Solving the Puzzle Under the Sea
After hearing the inspiring story of Marie Tharp, who was first to map the ocean floor, students learn that the ocean floor has many interesting features, including large mountain ranges. Then, students use a model to understand how sonar measurements (soundings) provide information about the ocean floor features. Next, students learn about how mountains form (both in the ocean and on land) and observe patterns in their locations. Finally, students summarize how Marie Tharp’s maps changed the way we look at the Earth.

Chapter 18: Space Exploration
By exploring the history of various scientific discoveries about space, students will recognize a fundamental understanding of the nature of science – scientific knowledge is open to revision as new evidence is discovered. They will also learn about the latest in space exploration technologies.

Chapter 19: Star Stuff
Students read about astrophysicist Carl Sagan and his passion for learning and teaching others about the stars. They complete an investigation to find out how the apparent size and brightness of stars in the night sky depends upon their distance from Earth. They also learn why this distance is measured in light-years instead of kilometers. Finally, they share what they have learned by creating their own episode of Carl Sagan’s iconic Cosmos television show.

Chapter 20: Trash to Treasure
After reading a remarkable true story about a woman in The Gambia who started a plastic bag upcycling project that transformed her community, students learn the benefits and risks of plastics, explore ways that others are solving the plastic pollution problem, and then design their own upcycled plastic product.