BOOK REVIEWS

AMANDA GLAZE-CRAMPES, DEPARTMENT EDITOR

FOR YOUNG SCIENTISTS: THE HUMAN BODY

Power Up: Your Incredible, Spectacular, Supercharged Body. By Seth Fishman. Illustrated by Isabel Greenberg. 2019. Greenwillow Books, an imprint of HarperCollins. (ISBN 9780062455796). 40 pp. Hardcover, $17.99.

Children are natural scientists – their budding minds brim with questions, and they're prone to experimentation, poking and prodding the world around them to see what happens. Just watching a baby push toys off the edge of a high chair can be an inspiring experience, because you can see the way repetition allows the child to formulate theories about cause (push block!) and effect (block falls!).

We love to see books that encourage children's innate enthusiasm for exploration and demonstrate that science is for everyone. For instance, *Six Dots: A Story of Young Louis Braille*, by Jen Bryant and Boris Kulikov, depicts the *why* and *how* of a young inventor at work; for younger readers, *Gus's Garage*, by Leo Timmers, promotes tinkering and the do-it-yourself ethos that drives the development of scientific tools from telescopes to microarrays. *The Watcher: Jane Goodall's Life with the Chimps*, by Jeanette Winter, lets children know that skills they already have – the enthusiasm to sit and watch ants or potato bugs skitter in the dirt – are the foundation of scientific research. These books beautifully convey the practice of science to young readers (and their families!).

Contemporary scientific exploration also builds upon the expertise of those who have come before us. Which, again, is something most children intuitively understand: inundate your parents with questions until you reach the limits of their understanding, then investigate further yourself. So our family is thrilled when we find books that can repackage the current state of the art in a format accessible to even the youngest readers. *Baby Loves Green Energy!*, by Ruth Spiro, is an accurate, endearing board book; *Grandmother Fish*, by Jonathan Tweet and Karen Lewis, depicts evolution through the progression of most recent common ancestors that *Homo sapiens* has shared with other species. We were pleased to find that *Power Up* comfortably straddles these categories, encouraging children's natural tendency toward exploration alongside accessible, holistic information about science and wellness.

This author-illustrator duo also created the award-winning *A Hundred Billion Trillion Stars*, which celebrates the power of numbers and how a sense of scale helps us understand the world. *Power Up* features some of that number play, but its main goal seems to be helping young readers connect their own embodied experiences – and potential for discovery – to science. When our family read *Power Up* at bedtime, our preschooler started piping up: "I do that!" – which we imagine to be the exact response Fishman and Greenberg hoped for.

Fishman explains in an author's note that the book's title and framing device are intended as a playful take on mass-energy equivalence, an idea that isn't explored in the text beyond Einstein's famous equation displayed prominently in a picture. Nor are the various types of energy inside a body – mass, atomic, chemical, electrovoltaic, and so on – explicitly enumerated. But the basic principle that our bodies have and need energy provides a lovely lens for Fishman to connect children with the awe-inspiring breadth of human endeavor and healthy practices for mind and body. Greenberg's illustrations follow a young person of color, her caregiver, and many other children endearingly engaged in activities both profound (building cities!) and mundane (eating broccoli!).

Biology is, in our humble opinion, a particularly beautiful science, but we'd wager that most of us who teach it are generally motivated by science's potential to inspire the next generation. As our enthralled kiddo repeated "That's just like ME" on page after page, we realized that this book has the power to do just that.

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IMMUNOLOGY

The Beautiful Cure: The Revolution in Immunology and What It Means for Your Health. By Daniel M. Davis. 2018. University of Chicago Press. (ISBN: 9780226371009). Hardcover, $17.90.

Folklore tells us that some basic immunology may have been understood long before Jenner's discovery that intentionally infecting people with cowpox made them immune to smallpox. Some Chinese, Indian, and African cultures deliberately and successfully infected their people in order to protect them. While these techniques apparently worked, nobody really knew why. But this book provides some answers. Author Daniel Davis, a riveting storyteller, declares, "In all of human biology, the process that's been studied the most, details excavated the deepest, is the body's response to a cut or an infection."

There is much to be learned and enjoyed in this book. The reader will encounter thought-provoking

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NABT
National Association of Biology Teachers

Call for Nominations

The Nominating Committee is looking for your recommendations for NABT's next leaders.

Open positions for the 2020 election are listed below. Candidates for president-elect alternate between the pre-college, two-year college and four-year college/university communities and nominations from the **K-12 level** are sought for president in this election.

Candidates for NABT Office should have: (1) evidence of active participation in NABT such as previous service as an elected officer, committee chairperson or member, section or affiliate leader, etc. (2) at least five years of continuous membership in NABT; and (3) five years experience teaching biology, life science, or science education.

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POSITIONS AVAILABLE

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Region IV (IA, KS, MN, MO, NE, ND, SD)

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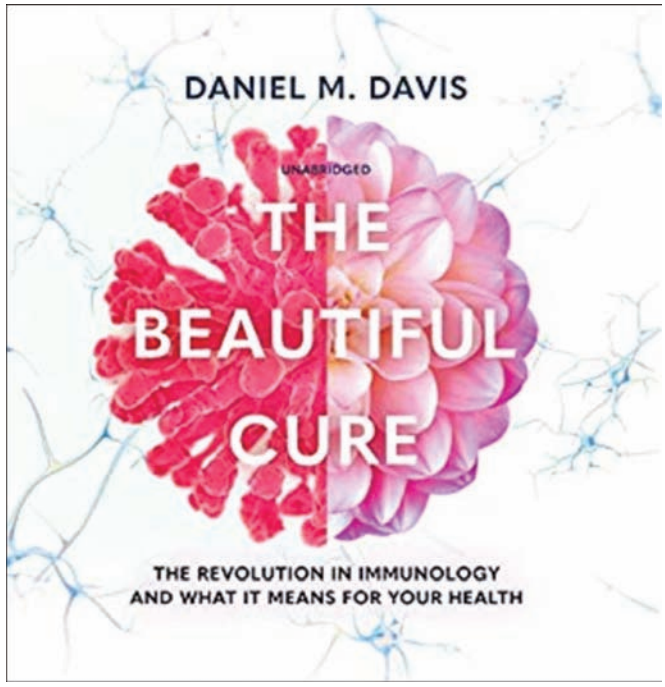
Region IX (AK, CA, HI, OR, WA, Pacific Territories)

Nominations accepted online at
https://www.nabt.org/About-Leadership-Opportunities

Nominations are due
March 15



descriptions of historical research leading to an understanding of the mechanisms of the immune system. George Bernard Shaw once noted that "science can never solve one problem without raising ten more problems." This grand tale of immunology supports Shaw's quote as it traces many paths of research that led to a clearer understanding of the immune system, often showing conflicting ideas and clashes between scientists seeking to identify the molecules that trigger immune reactions in the body. Descriptions of the step-by-step techniques used in provocative experiments follow the thoughts of scientists as they ask questions and seek answers, sometimes reaching dead ends, other times reaching new ideas, and feeling excitement from these accomplishments, despite often facing skepticism from other scientists.

When people think about human body systems, most think of the nervous, cardiovascular, respiratory, and several other systems, without thinking of the immune system. But there is so much to be learned about this vital system. This book's stories include the disease-fighting genetic legacy shared by insects and humans; the importance of dendritic cells in immune responses; the significant roles of pattern-recognition receptors, T cells, B cells, interferon, cytokines, hormones, hybridomas, monoclonal antibodies, metabolites, and genetic engineering; the London research carried out in a building that had appeared as a psychiatric hospital in the motion picture *Batman Begins*; the reasons why one type of virus can block the growth of another virus; the effects of fever on the immune system; how the immune system connects to circadian rhythms; the ways that aging affects the immune system; why vaccinations are more effective when given at a particular time of day; and the ways that the immune system is a factor in space flight. Explanations of how virus strains are selected for each year's influenza vaccines and why influenza is much worse for some people than for others are also featured. Not surprisingly, it seems that the immune system works best if we get lots of sleep, avoid stress, and stay young.

Though the immune system usually protects us, it sometimes attacks healthy cells. This can result in autoimmune conditions. Over 50 of these conditions are known, among which are diabetes, rheumatoid arthritis, and multiple sclerosis. This detailed account reveals an intense amount of research that includes the importance of the gut microbiome to autoimmunity. An interesting aside also describes a connection to the Manhattan Project.

Immunotherapy is now being intensively studied as a way of fighting cancer. Much has already been accomplished, and some people with late-stage melanoma have survived for two to 10 years beyond expectations. While there is still no cure for cancer, research involving the immune system shows great promise for someday leading to a cure.

The book is not without touches of humor, including the scientist who, like Snow White, enjoyed whistling while he worked, though his preference was for whistling opera music. Enjoy the story of the invisible gorilla. Meet the scientist who was a Playboy bunny and later named her dog as the coauthor of a research paper published in a prominent scientific journal.

Scientist Albert Szent-Györgyi once noted that the trick is "to see what everybody else has seen, but to think what nobody else has thought." Readers will find this book, which includes over 50 pages of notes documenting text information, to be fascinating, entertaining, and superbly well written. It paints a profound picture of the intense assemblage of inquiry, reflection, experimentation, cooperation, creativity, repetition, revision, and conclusion that are vital aspects of new scientific discoveries. The book would be a valuable resource for college-level biology instructors as well as an asset for students in an immunology class.

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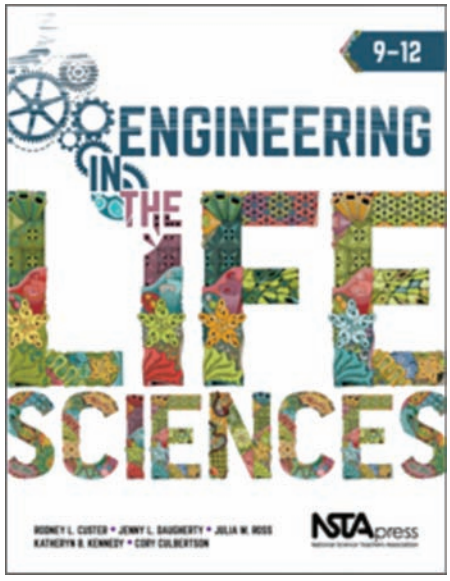
BIOLOGY AND ENGINEERING IN THE CLASSROOM

Engineering in the Life Sciences, 9–12 (Teacher Edition). By Rodney L. Custer, Jenny L. Daugherty, Julia M. Ross, Katheryn B. Kennedy, and Cory Culbertson. 2018. NSTA Press. (ISBN: 978-1-68140-477-6). 340 pp. Paperback, $39.95.



Engineering in the Life Sciences is a collection of lessons and teacher instructions that integrate engineering standards and designed projects into life science. Written for high school teachers, the first chapter of the book describes how the engineering standards work with the *Next Generation Science Standards* (NGSS) for life sciences.

This chapter is followed by six classroom-tested examples of life science lessons that include engineering components. Each of the six lessons incorporates one or more of the Life Science content areas in the NGSS standards. Each lesson takes multiple days, and a reasonable estimation of timing is included. These lessons are laid out with lots of resources for the teacher. Each lesson follows a 6E staged series of activities. NGSS alignment, assessment criteria, unit progression, content outline, materials lists, resources, and student worksheets for each of the activities are given.

The suggested uses of resources, including differentiation ideas, are helpful. Embedded throughout each lesson plan are teaching tips. These lessons also serve as a model or template for teachers to use to design their own. The chapters that follow explain how teachers can manage the different aspects of completing design projects in the classroom. Lots of suggestions about student and teacher mindsets, materials management, and assessments are provided. The last two chapters of the book are filled with ideas that can be turned into more engineering-infused lessons and some short case studies that can be shorter stand-alone lessons or include suggestions for where they can be used within larger units.

Engineering in the Life Sciences is a useful resource for teachers looking for lessons and ideas to make greater connections between engineering and life science NGSS standards. It is also available as an e-book.

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