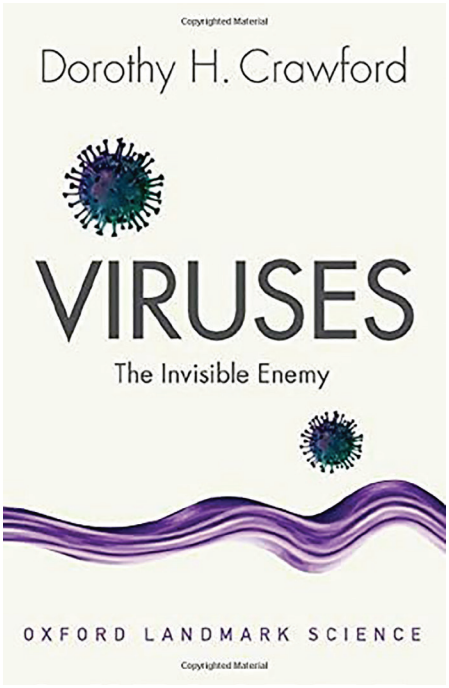
BOOK REVIEWS

KIRSTIN MILKS & FRANK BROWN CLOUD, DEPARTMENT EDITORS

Viruses: The Invisible Enemy. By Dorothy H. Crawford. 2021. Oxford University Press. (ISBN 9780192845030). 247 pp. Paperback. $12.95.



Like a viral capsid packed with only essential genetic information, *Viruses: The Invisible Enemy* carries the essential information about viral diseases of humans. Spanning ancient and emerging viral diseases, Dr. Crawford's clear, concise writing expertly transmits the scientific who, what, where, when, and why of viruses. She walks us through what viruses are, as well as how they emerge, cause disease, and spread. More importantly, she explains how scientists and medical personnel gather information on the disease, identify the virus, and provide solutions to slow or stop viral spread. Released in January 2021 during distribution of the revolutionary mRNA COVID-19 vaccines, *Viruses* clearly explains human immunology and multiple types of vaccine technology. To that end, perhaps my analogy of this fabulous primer should be a "vaccine against misinformation and conspiracy theories." Readers "inoculated" by *Viruses* will gain a strong foundation for thinking about viral diseases—those we have experienced and those to come.

Viruses: The Invisible Enemy is accessible to high school and college students, science writers, and anyone else interested in learning the fundamentals of viral diseases of humanity. This slim primer could be used in classes discussing society's distrust or misunderstanding of science, history of science, science journalism, or science communication. It certainly models concise and accurate science writing. After reading, students could play the video game *Plague, Inc.* to apply their knowledge of virus transmission. A video game assessment tool, anyone? As my general microbiology undergraduate course focuses primarily on bacteria, not viruses, I'm adding *Viruses: The Invisible Enemy* to my list of optional books for interested students. I highly recommend you read it to "vaccinate" yourself from misinformation about human viruses.

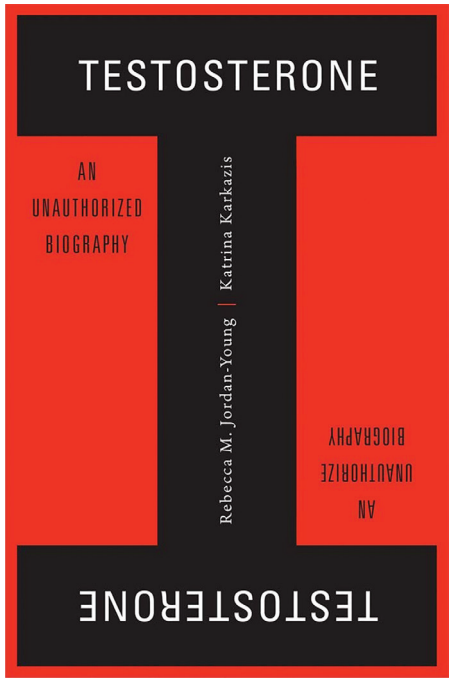
Anne M. Estes, assistant professor
Towson University, Department of Biological Sciences
Towson, MD
aestes@towson.edu

Testosterone: An Unauthorized Biography. By Rebecca M. Jordan-Young and Katrina Karkazis. 2019. Harvard University Press. (ISBN 9780674725324). Hardcover. 288 pp. $29.95. Paperback, audiobook, and ebook also available.

Among all the endogenous small molecules of our bodies, perhaps oxytocin and testosterone have garnered the most mystique, the supposed biochemical mediators of love and dominance, respectively.

In the popular imagination, we know what these molecules do. But biology isn't simple. A single compound can have myriad effects throughout a body—depending on the relative concentrations of receptors in different organ systems, the same molecule might affect two people's bodies very differently.

Testosterone unpacks dozens of studies on the role of testosterone in athleticism, psychology, and sexuality, attempting to separate the robust, significant findings from a swirl of hyperbolic summaries and news reports. (While reviewing the book, we chanced across conspiracy-theory-ish headlines bemoaning a drop in testosterone levels among young men, others touting testosterone as an anti-aging miracle drug. This sort of hype isn't new: throughout the 1920s, celebrity doctor John Brinkley toured the country implanting goat testicles into the bodies of credulous patients as a cure for diminished vigor.)



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Testosterone is a potent molecule; high doses of exogenous testosterone can permanently change a person's voice, face shape, distribution of body hair, and ability to build muscle mass, especially if that person was assigned female at birth. But numerous correlation studies also attribute personality traits to small differences in the interpersonal levels of endogenous testosterone, often in ways that are unintentionally classist or racist; for instance, dominance-seeking behavior is described as antisocial aggression when studied in prison populations and as prosocial leadership when studied in university settings. Jordan-Young and Karkazis deftly note these hidden biases in scientific research.

Often, Jordan-Young and Karkazis are frustrated by the narrow scope of questions that have even been asked, reminding us of the book *Invisible Women,* in which Caroline Criado Perez explains how the paucity of data collected on the ways that medicines, buildings, and political structures affect women has perpetuated designs that actively harm women.

The same gender-biased omissions in data collection appear throughout the scientific literature on testosterone. The design of our experiments determines the range of possible knowledge that we might gain from them; for instance, perhaps because we refer to testosterone as a "male sex hormone," researchers have only recently begun to study the role of testosterone in ovulation and female fertility.

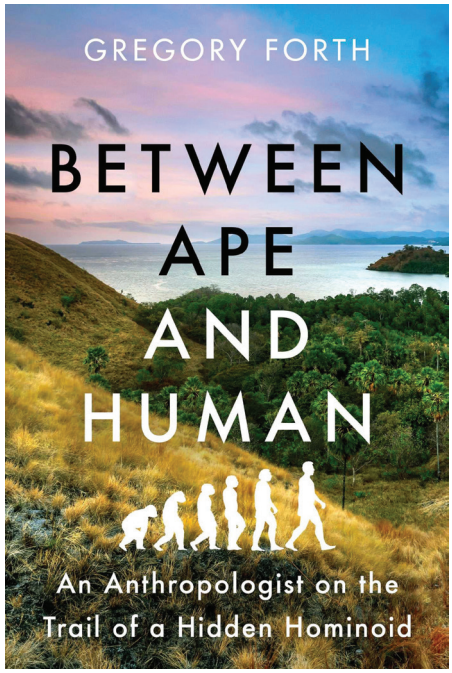
At times, though, we felt that Jordan-Young and Karkazis were overly critical of studies they cited. In our experience attending journal clubs, undergraduates often seemed most trusting of research papers' discussion and conclusion sections; mid-career graduate students, hypersensitive to imperfect data or overstatement; and postdocs and faculty, more understanding of the compromises inherent in any scientific study. Most scientists would conduct experiments differently if all the results could be predicted in advance, or if they were granted an infinite budget of time and money. (Memorably, at one of Kirstin's first graduate journal clubs, the faculty advisor listened patiently for five minutes while the students denigrated the stray bands of a paper's Western blot. Finally, the professor smiled and said, "You, too, will have such bands.")

Not that we'd wish for Jordan-Young and Karkazis to overlook the flaws of ill-designed studies, but they don't always exhibit the sympathy that comes from undergoing one's own trials and tribulations in the laboratory. And while we enjoyed the book, the stylistic conventions and jargon from gender theory might reduce its appeal to students and teachers of science. We found ourselves wishing it was written more accessibly, because the study of testosterone is fascinating: implicated in wound-healing, essential for gender-affirming medical care, interwoven with many men's self-conceptions of masculinity, stubbornly debated in the context of competitive sports. While Jordan-Young and Karkazis don't offer firm conclusions, their careful guidance and philosophical insights could help anyone think about and teach these subjects from a more nuanced, open-minded perspective.

Frank Brown Cloud, public scholar
Bloomington, IN
fcbrowncloud@protonmail.com

Kirstin Milks, science teacher
Bloomington High School South
Bloomington, IN
kmilks@mccsc.edu

Between Ape and Human: An Anthropologist on the Trail of a Hidden Hominoid. By Gregory Forth. 2022. Simon & Schuster. (ISBN 9781639361434). 249 pp. Hardcover. $28.95. Ebook also available.



One important aspect of ethnographic fieldwork is ethnobiology: learning how humans view other living things they encounter. The ethnobiologist's main problem is understanding the language used to describe these organisms. Imagine how calling someone a dog can be interpreted in different contexts. *Between Ape and Human* explores the ethnobiology of an organism that the Lio people of Flores Island (Indonesia) call *lai ho'a*, which Gregory Forth glosses either as "ape–man" or "hominoid." The term has no easy translation into English, but it indicates an organism whose features seem to be a mix of humans and other primates.

Forth interviewed multiple informants over several years about the *lai ho'a*. He describes individual informants; the nature, location, and circumstances of encounters they reported; whether this was an eyewitness or more general historical account; and the language used in describing the *lai ho'a,* the encounter, and its aftermath. In one chapter, Forth reviews the myths and legends of the types of beings inhabiting the Lio world. For the Lio, *lai ho'a* are different in kind from forest or earth spirits, "vine mothers," and witches. For the most part, the descriptions do not ascribe any extra-natural features to the *lai ho'a* common to descriptions of these others.

The challenge for the ethnographer is to sift and winnow the content of interviews to come up with a coherent description of features for the *lai ho'a*. On the one hand, we look for consistencies that identify a set of features that characterize what Forth calls a zoological being. On the other hand, interviews often provide a set of standard features ascribed to a being that may or may not have been observed directly. If this sounds questionable to Western ears, imagine asking ten neighbors to describe dragons. Certain descriptions would appear in all the descriptions. This is because your neighbors are describing "what everyone knows" about dragons rather than personal observations.

One of the best aspects of this book is the meticulous work that Forth did to extract a set of essential features from among all the interviews. In addition to recording the informants' observations, he explains how he evaluated the reliability of the reports and the informants. In a final summary of the information from these interviews, Forth distills the features that appear most reliable as physical descriptions of the *lai ho'a* as a "zoological" entity.

Some of the evidence Forth calls most reliable includes stature, posture, and facial and foot morphology that are entirely consistent with the features associated with *Homo floresiensis*—a species known from tools and

skeletal remains on Flores Island from long before the first arrival of *Homo sapiens* around 50,000 years ago. However, other common elements in the report do not fit well: for example, informants commonly describe *lai ho'a* with a tail. And others are just in the "we don't know" category: the extent of hair cover, the ability to vocalize, the nocturnal activity.

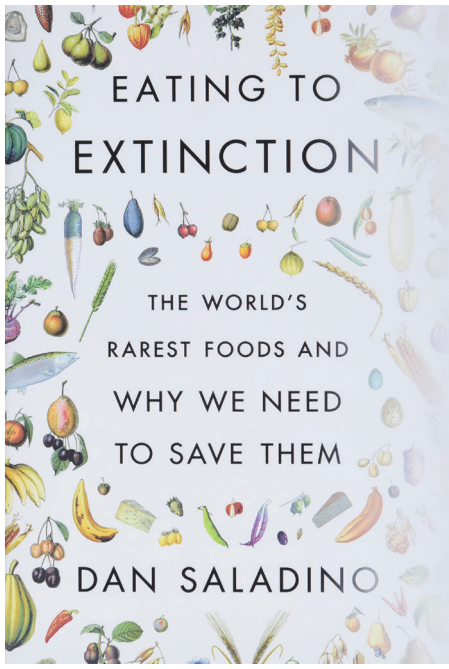
Is it possible that the *lai ho'a* is a remnant or descendant of *H. floresiensis*? It is not out of the question, even if there is not enough biological evidence to decide. Forth is sanguine about the likelihood of a field project to find and identify the *lai ho'a* (pp. 238–239); it is rare to mount a field study with the express goal of locating an unknown species. However, identifying another extant hominan species would undoubtedly be a very big deal!

For the general reader, there is just one important caveat to keep in mind. If Forth is correct about the relationship of the *lai ho'a* to *Homo floresiensis,* then these organisms are neither "ape-men" (typically referring to hominins emerging before genus *Homo*) nor "hominoids" (typically used to include species outside the branch that includes humans and the other African apes). They would be fully human, not "between ape and human," as are all members of genus *Homo.*

For science educators, it reveals the essence of the nature of scientific inquiry: beginning with an observation, then collecting and analyzing data to interpret the observations. It shows how Forth verified and evaluated available data. It also shows how some questions are left unanswered. Perhaps the most rewarding feature of the book is that it reveals the power of using interviews to understand ecological relationships of humans to the local ecosystems where they live. It's messy work, but it reinforces the value of Indigenous knowledge of nature. In all, this is a remarkable and informative book that stands head and shoulders above the typical book on cryptozoology.

Andrew J. Petto, distinguished lecturer, emeritus
University of Wisconsin–Milwaukee, Department of Biological Sciences
Milwaukee, Wisconsin
ajpetto@uwm.edu

Eating to Extinction: The World's Rarest Foods and Why We Need to Save Them. By Dan Saladino. 2021. Farrar, Straus, and Giroux. (ISBN 9780374605322). 450 pp. Hardcover. $30.



I love reading books that teach me about the things I eat. This book does just that, while being easily understandable and enjoyable. Each chapter of *Eating to Extinction* tells a fascinating in-depth story about the origins and history of a particular food that is in danger of being lost to us. It is surprising how many foods are in this precarious position. Author Dan Saladino, a renowned British food journalist, uncovers for us why each meat, grain, fruit, and vegetables is in danger of extinction and the impact of these plants' and animals' potential extinction on humanity. If you or your students have an interest in the foods you eat and how humanity can prepare for a future with plenty of healthy food for everyone, then you will find this to be a fascinating read.

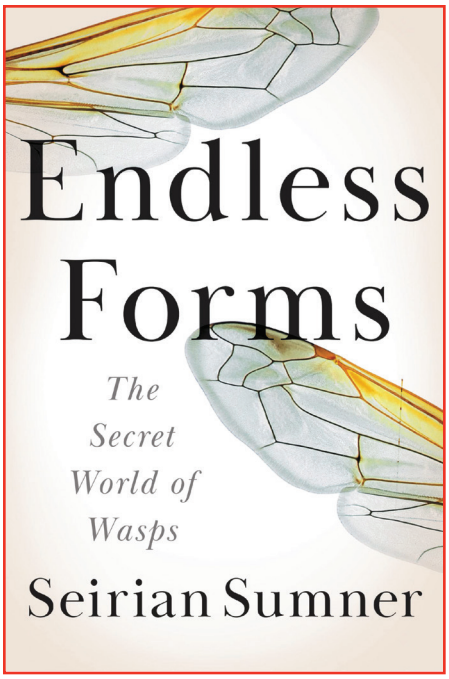
Saladino conducted extensive research, including traveling to many of the sites around the world where these foods originated. There, he met with the people who still have knowledge of the earliest known versions of the food we now find on our grocery store shelves. Chapters discuss how wild foods, ones our hunter-gatherer ancestors ate, were gradually tamed by farmers during our 10,000 years of agriculture. I found it amazing that the author was still able to find some of the earliest versions of the foods covered in the book. The early versions of foods, sometimes called "landraces," turn out to be critically import for the genetic diversity they hold. This is because it is in these organisms where important survival genes can still be found. Modern farmers often grow vast crops of monoculture plants or animals in which all the organisms are virtually genetically identical. When a disease or pest appears, or when the climate changes, these monocultures have little genetic diversity to help them adapt to the challenge. However, the earlier versions of the foods are much more genetically diverse. It is in these earlier versions of our foods that important survival genes can still be found. One of the major points Saladino makes is that we need to preserve these early versions of our foods so we can protect our food production from collapse by disease and/or environmental challenges by maintaining a large gene pool.

Saladino makes these foods sound so enticing that one wants to go out and sample many of them. However, I must admit I am not yet tempted by a few he enjoys, like skerpikjot, a fermented and dried sheep meat from the Faroe Islands that is covered in a thick layer of yellow, chalky, white and brown mold. Saladino enjoys it, as do people around the world with ancestral ties to the Faroe Islands, but his descriptions made me appreciate both our world's great culinary diversity and, simultaneously, the advent of modern refrigeration.

Jonathan Morris, professor of biology, retired
Manchester Community College
Middletown, CT
jimor22@comcast.net

Endless Forms: The Secret World of Wasps. By Seirian Sumner. 2022. Harper. (ISBN 0063029928). 400 pp. Hardcover. $28.99. Ebook also available.

Pollinators, predators of agricultural pests, paper makers, and insect "hounds" identifying explosives—wasps do it all. Fed up with wasps being unappreciated and maligned for disturbing picnics, wasp biologist Dr. Sumner passionately entertains readers with "soap operas" of wasps' fascinating social behavior, architectural and mathematical prowess, and more. From the remote jungles to heather fields in the United Kingdom, Sumner's stories of her research on wasp behavior are captivating and informative. Did you know wasps can recognize each other's faces? How about that there are over 80,000 ***described*** species of wasps? That's only the tip of the



antennae of what you'll learn about wasps in *Endless Forms*.

I'll admit to not being a hard sell on wasp love. As a kid, I broke open numerous dirt dauber nests to see chambers of multicolored spiders inside. Yet, my appreciation has grown tremendously upon reading this tome of wasp love. I also appreciate how Sumner connects current science to the observations and hypotheses of early wasp scientists. You'll never forget that wasps are ancestral to bees and ants after discovering that "bees are wasps that forgot how to hunt" and ants are "flightless mutant wasps" that are "grounded by evolutionary innovation." However, I must admit to skipping some bits during the lengthy imaginary dinner with Aristotle.

Overall, *Endless Forms* is an excellent resource. It would be a great book club read or fun "gateway" book on wasps for high school or college students, and it provides secondary and environmental educators with a wealth of stories to draw from. Insect lovers will enjoy *Endless Forms* and perhaps even instill a new respect for wasps in others. When we start seeing "Save the Wasps" and "People are problems—not wasps" T-shirts, we'll know whom to credit.

Anne M. Estes, assistant professor
Towson University, Department of Biological Sciences
Towson, MD
aestes@towson.edu

Holiday Gift Guide For Younger Readers

Is There Life on Your Nose? Meet the Microbes. By Christian Bortslap. 2021. Prestel Junior. (ISBN 9783791374970). 56 pp. Hardcover. $17.95. Ebook also available.

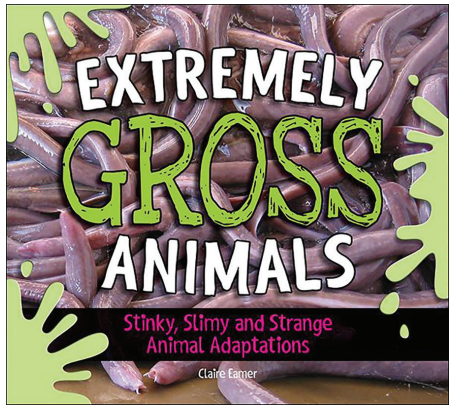
This book has engaging and kid-friendly pictures and uses a variety of microbial anecdotes to engage the reader and convey the diversity of roles microbes play on Earth and in human day-to-day life. There are a few instances where the book discusses issues of scale and evolution. Both are high-cognitive-load concepts, so an introduction to these topics is a great entry point for small children.

Reading this book with a small child will elicit lots of wonderful questions and conversations, and adult readers should be prepared that a background knowledge in biology will be extremely helpful in answering these questions and continuing discussions. Readers of *ABT* will likely be well-prepared for these conversations, but some of the illustrations might create misconceptions in children in a more general audience. Overall, though, this is a fun and engaging exploration of our relationships with microbes for inquisitive minds. Appropriate for kids ages 5 and up, with adult biologists of any age.

Julie Minbiole, associate professor
Columbia College Chicago, Department of Science and Mathematics
Chicago, IL
jminbiole@colum.edu

Stephen Traphagen, science teacher
Oak Park and River Forest High School
Oak Park, IL
stephen@mrtraphagen.com

Extremely Gross Animals: Stinky, Slimy and Strange Animal Adaptations. By Claire Eamer. 2021. Kids Can Press. (ISBN 978-1-5253-0337-1). Hardcover. 40 pp. Ebook also available.

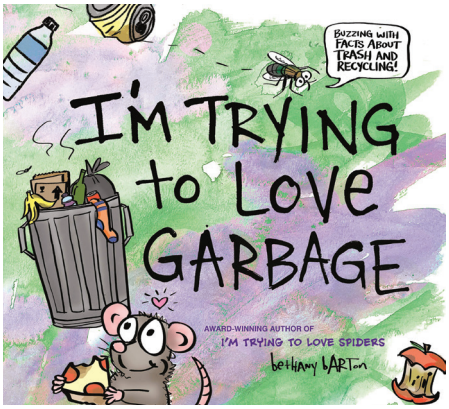


This picture book is exactly as advertised: a feast of screams, icked-out faces, and wild laughter alongside some serious science. We watched as *Extremely Gross Animals* traveled with our second-grader from room to room, where she'd plop down, read a paragraph, then come to find an adult to say things like "Did you ***know***, Father, that horned lizards can shoot horrible-tasting blood from pouches just under their eyes?" while the adult was doing things like eating breakfast.

In this inviting, G-rated, easy-to-parse book, animals and their accompanying adaptations are organized in one-paragraph doses by page spread, with headings like "The Scoop on Poop," "More Spitters," and "Ew . . . Just Ew!" Each paragraph is accompanied by a photo, sometimes lightly annotated; our younger kid might not have been ready for reading the paragraphs quite yet, but she was delighted to find us around the house, ask us to read "this paragraph called 'Who Needs a Hankie?,'" then cackle in delight at the faces we made as we read aloud an intense description of how a giraffe blows—or doesn't—its nose.

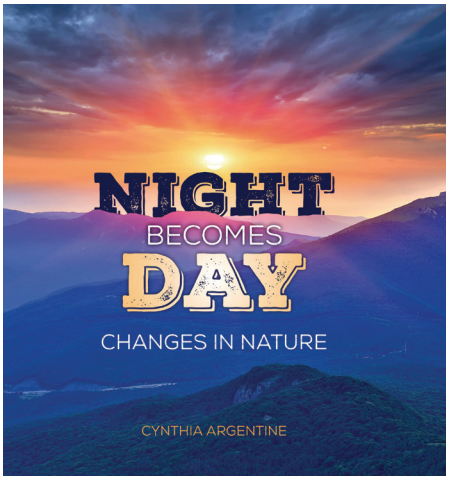
In summary, this book is ideal for kids and adults, probably ages 7 and up, who love animals, gross things, or both—but not for Frank, who refused to even proofread this review. ~ Kirstin Milks

I'm Trying to Love Garbage. By Bethany Barton. 2021. Viking Books for Young Readers. (ISBN 9780593207031). 40 pp. Hardcover. $17.99. Ebook also available.



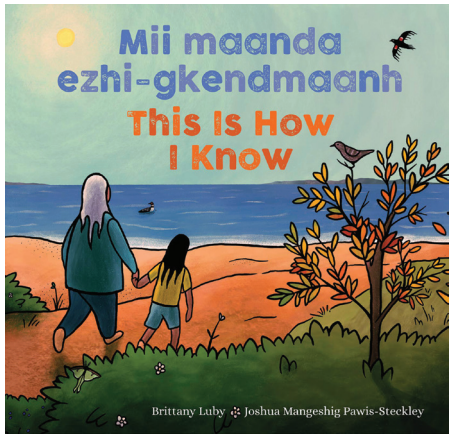
A very kid-friendly book about garbage, as narrated by detritivores and decomposers. Kids ages 4 to 8 will laugh at the silliness, including a great gag in which the reader fans a page to get rid of stinky smells. Includes an introduction to food webs in different ecosystems, landfills, and the three Rs. Pair as the first course at bedtime, following with a more soothing book, to avoid lengthy late-night fits of giggles. ~ Kirstin Milks

Night Becomes Day: Changes in Nature. By Cynthia Argentine. 2021. Millbrook. (ISBN 9781541581241). 32 pp. Hardcover. $29.32. Ebook also available.



This nonfiction book for ages 3 to 8 is richly illustrated by photographs showing a variety of changes that happen across the natural world. It's a great book for introducing younger children to the idea that nature is constantly at work, transforming everything on earth. *Night Becomes Day* includes a few pages at the end that give a closer look at the science of change for places including beaches and canyons, forests, deserts, caverns, and the big sky full of clouds—with connections to biology, geology, chemistry, and environmental science. Our children were transfixed by the photographs and excellent font choices, making this a compelling and soothing bedtime book on difficult evenings. ~ Kirstin Milks

Mii maanda ezhi-gkendmaanh / This Is How I Know. By Brittan Luby. Illustrated by Joshya Mangeshig Pawis-Steckley. 2021. Groundwood. (ISBN 9781773063263). Hardcover. $18.95. Ebook also available.



This peaceful, luminous book honors Indigenous knowledge in a bilingual story-poem and features vibrant illustrations that bring the seasons to life. *Mii maanda ezhi-gkendmaanh / This Is How I Know* is written in both English and Anishinaabemowin, a language spoken by the Anishinaabe people of the Great Lakes area in the United States and Canada. It provided a rich opportunity for our family to celebrate the diversity of Indigenous languages spoken across North America / Turtle Island, as well as an accessible starting point for gently unpacking the historical contexts that led to our children's ancestors losing access to their own Indigenous languages and cultures. Our kids selected this book for bedtime several times while we had it on loan from our local library, asking us to linger on the kid-friendly illustrations of a child and her grandmother as they explore (and delight in) the familiar changes of each season. It's a perfect nighttime read for families who, like ours, want to celebrate the connections we have with our elders as well as with nature. Ages 3 to 7. ~ Kirstin Milks

Maker Comics series. Published by First Second.

These books are absolutely delightful DIY guides, aimed at kids from 9–13 but potentially exciting for the whole family. So far, we've read and loved *Grow a Garden!*, *Build a Robot!*, *Create a Costume!*, and *Draw a Comic!*, with other titles like *Fix a Car!*, *Survive in the Outdoors!*, and *Build a Game!* on hold for us at the local library. Each book in this series is written and illustrated by different teams, making each book feel fresh if you're exploring multiple titles over the span of a few weeks. The ones we've read all leverage winning characters and comics formatting as scaffolding for high-interest activities, projects, history, knowledge, and celebrations of creative thinking.

As I type this, my 6-year-old is reading the part in *Build a Robot!* about how batteries are constructed, and is politely but intensely shushing me when I ask what she likes about it. She and Frank have been working together on some projects in *Build a Robot?*, a model that would work well if you also have a young maker who's a little less independent and/or less prone to follow the great safety advice. We also think these books' deep details might draw in teenagers, even if most of the characters are younger kids. Personally, I'm taking another look at *Create a Costume!* well before next Halloween rolls around. ~ Kirstin Milks