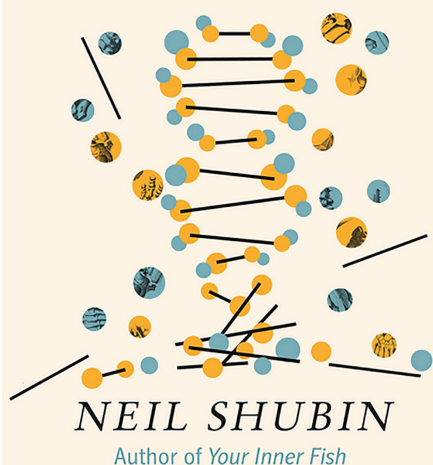


SOME ASSEMBLY REQUIRED

Decoding Four Billion Years of
Life, from Ancient Fossils to DNA



Some Assembly Required: Decoding Four Billion Years of Life, from Ancient Fossils to DNA. By Neil Shubin. 2020. Pantheon Books. (ISBN 9781101871348). 288 pp. Hardcover, \$26.95.

Neil Shubin's latest book picks up where his others left off. In typical Shubin style, he does a fantastic job of meshing storytelling with modern science. The overarching theme here is that the evolutionary changes we often associate with new species (e.g., feathers, legs, lungs) were present in creatures much farther back than we realize: "Massive changes came about by repurposing ancient structures for new uses." The book is filled with examples and the stories of scientists who dedicated their careers to discovering and explaining these changes. Some of the topics were discussed in Shubin's previous books (e.g., the *Sonic hedgehog* gene). But we continue to learn more about existing species, and this book provides updated information.

The book features a variety of scientists of different countries, sexes, and scientific

backgrounds. Given today's social climate, I truly appreciate the lengths to which Shubin goes to give credit to some of the less discussed scientists (and their graduate students!). This technique also does a great job of illustrating the truly collaborative nature of science that is often difficult for our students to see. The context of each story ties the how and why of the science into history and culture seamlessly.

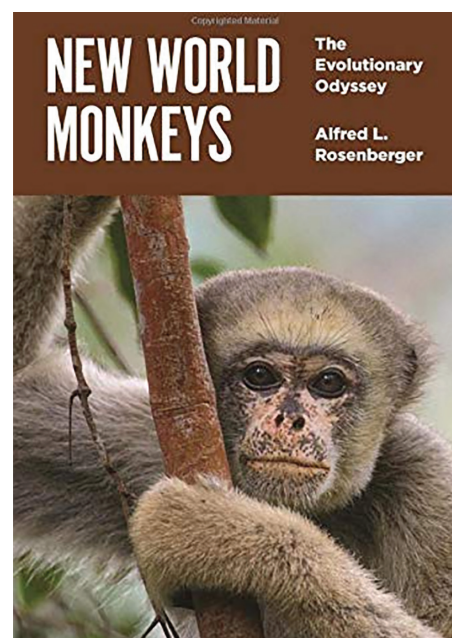
I have long been a fan of using Shubin's books in my classroom because he provides descriptions of the scientific process while also imparting scientific knowledge. The true way that scientists work is crucial for students to understand, especially when things don't go as planned – "they repeated the process and reanalyzed the results. But try as they might, the result stood." This book provides plenty of points where students might stop and hypothesize or think about how they would design their own experiments to answer the questions posed by scientists in the stories. Teachers can also use this book to guide students' reflections on their understanding of concepts (e.g., RNA's role in protein synthesis). The book could even provide cross-curricular opportunities with social studies teachers as students read about scientists of different times and places.

The main part of the book is only 218 pages long (eight chapters), followed by a lengthy list of additional resources for readers. The chapters could be used by teachers as stand-alone supplements, or students could dive into the entire book if time allows. Some sections are more focused on genetics, but they do a great job of supporting evolutionary theory. As the book builds the foundation of the genetic similarities (and differences) between species and organisms, it becomes easier to understand how far back different species branched from one another. "All land-living animals have the *Arc* gene; fish do not. This means that about 375 million years ago a virus entered the genome of the common

ancestor of all land-living animals." By tying together a branch that students can see and manipulate, and that is incredibly relevant to their lives (genetics), they come to see how evolution does happen (and it's not just about dinosaurs and primates). We might not find salamanders or fruit flies the most exciting creatures in the world, but Shubin has found a way to make us want to read about them!



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New World Monkeys: The Evolutionary Odyssey. By Alfred L. Rosenberger. 2020. Princeton University Press. (ISBN 9780691143644). 334 pp. Hardcover, \$39.95.

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