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Bioluminescence: Nature And Science At Work (Nonfiction Açâ,¬â€•Young Adult)



Synopsis

What do giant squids, mantis shrimp, and fireflies have in common? These animals, along with a wide range of creatures, are able to give off light; this is called bioluminescence. Different species use different chemistries to bioluminesce, and they produce their light for a variety of reasons, including communication, hunting, and self-defense. Bioluminescence is a unique and fascinating adaptation found in the animal kingdom. Surprisingly, about half of all known phyla (a classification for animals that share the same body type) contain some bioluminescent species. Scientists don't yet understand all facets of bioluminescence, but they have managed to harness the glow and use it in a myriad of ways. One of the most important applications involves using bioluminescence as a microscope in medical studies. For example, laboratory scientists can create fluorescent malaria parasites to track the path by which the disease is spread from a mosquito to the animal it bites. Bioluminescent proteins are also helping researchers learn more about cancer, HIV and other viruses, and complex neurological processes. In fact, bioluminescent proteins are so useful to twenty-first-century medicine that two groups of scientists, one in 2008 and the other in 2014, were awarded the Nobel Prize in Chemistry for their work with these proteins and related technologies. Even artists and fashion designers use bioluminescence in their work to create glowing, light-sensitive paintings and clothing lines. Author Marc Zimmer, a world-renowned specialist in fluorescent proteins, takes readers on a glowing journey into the frontiers of bioluminescence.

Book Information

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Customer Reviews

This non-fiction book about bioluminescence was very interesting from the start. It explains in detail how different insects, deep sea creatures, and other organisms give off natural light. It explains the chemistry and the process very well with lots of real-life pictures. I really enjoyed the pictures, because I already knew a lot of the facts that were in this book, but I had not seen some of these creatures before. For example, it was really cool to see the angler fish with its bioluminescent dorsal fin! All the pictures really make the book come alive. I was not able to read this book at one go. It was hard to read the small print and absorb so much of the details in one sitting. I enjoyed reading it over several days. But, I would have liked it better if it came in slightly larger print and less detail. Maybe more charts and graphs, to show what the writer was trying to say, would have been a better idea to keep my attention going. My favorite part of the book was the descriptions of the angler fish, the crystal jellyfish and the Hawaiian bobtail squid. Also, although I already knew the basics about how bioluminescence works in the firefly, it was very interesting to read why and how it uses this light. Same with all the other creatures ÃfÃ¢Ã â ÑÃ â œ it was great to figure out how come creatures use the light to communicate, as defense, for camouflage or even to scare predators away! I gave this book 4 stars, because I would have liked it to not have so much detail. It would have been nice if each chapter had some bullets with important points, so that if I wanted to, I could refer to the end of the chapter to see what it covers. But it did make up for all that by having really interesting and beautiful pictures, so I could make sense of what I am reading. I did need help from my mom to understand some of the chemistry ÃfÃ¢Ã â ÑÃ â œ that is not a bad thing, but I would say this book is not for very young readers. I am 7 years old and loved it because I love science and nature and love reading everything about it. But ideal age in general for this book might be around 8 years and up. Review by Dhruv K., age 7, North Texas Mensa

One of the most fascinating, fun, yet mysterious childhood wonders is the firefly. They race through the night skies emitting a most unusual glow, signaling with "a distinctive pattern of flashes" in order to find a mate. The firefly is bioluminescent, a creature that has the "ability to bioluminescence, or to make and emit [its] own light." The mystery behind the glow was explored by French physiologist

Raphaël Dubois in 1885. His groundbreaking work with bioluminescent organisms set the stage for amazing scientific discoveries in the twenty-first century. Bioluminescent creatures use their "light to defend themselves, to communicate, to attract food, and to find mating partners." The majority of bioluminescent creatures can be found far beneath our ocean waters, the sole source of light. The bathypelagic, abyssopelagic and hadalpelagic zones, zones sans any of the "sun's light spectrum," are where most of the world's bioluminescent creatures can be found. Their amazing bodily light sources could be said to be the stuff that would make for great science fiction, but this is real science. If you think that little glow from a firefly has nothing to do with you, you might have second thoughts after reading this book. Historically speaking, the phenomenon of bioluminescence did not go unnoticed. Everyone from Aristotle to Benjamin Franklin was fascinated by the phenomenon. Perhaps you are thinking that those glow in the dark stars you have in your room are bioluminescent, but not so. You'll quickly learn that "bioluminescence and phosphorescence are two very different light-producing processes." Just how are scientists able to study bioluminescence in a lab? Obviously they must have species that "can be reproduced in a lab ... In large numbers." Those are so-called "model organisms" and fireflies are the model organism of choice. A bit of background information on the firefly, which is actually a beetle, and you'll be launched into the most amazing world of real-world science and its application to the world today. You'll learn about William McElroy, Edith (Edie) Widder, luminescence in the art world, possible life on Mars, you'll meet some incredible undersea creatures, green fluorescent protein (GFP), and you'll learn many other fascinating facts about bioluminescence. This is a stunning look at the world of bioluminescence that will fascinate young readers. The world of science meets that of nature in a way that will excite and mesmerize young science buffs. The layout of the book pops with amazing photographs, some that are simply stunning in nature. For example, we are privy to a photograph of genetically modified chicks, one of whom is actually glowing. There are numerous informative sidebars that definitely add to the adventure of the text. In the back of the book is an index, a glossary, source notes, a selected bibliography, and additional recommended book, film, and website resources to explore. Science: Grades 9 to 12. This book courtesy of the publisher.

This book is highly impressive and beautiful. The photographs in the book are high definition and something no one can take with a regular camera. It is amazing to see the quality of the images captured throughout the book for those who cannot experience the dinoflagellates, an angular fish, or a crystal jellyfish in person. The images are accompanied by understandable explanations of the studies that found the bacteria and the growing usage of it. It is amazing to see how

bioluminescence is used to learn more about diseases such as chagas, HIV, and dengue. This book is highly recommended to any future scientists who have a fond for lights, water, diseases, and/or animals.

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