

ANIMAL BEHAVIOR

Animal Vigilance: Monitoring Predators and Competitors (1st Edition). By Guy Beauchamp. 2015. Academic Press. (ISBN 978-0-12-801983-2). 254 pp. E-Book. \$49.95.

Animal Vigilance is a comprehensive review of this aspect of the field of animal behavior. This text is designed for undergraduate and graduate students, as well as faculty with an interest in the topic. It begins by defining vigilance and the scope of this particular review, and provides a guide for students looking for research guidance. Beauchamp warns against some of the anthropomorphic terminology that still pervades in animal behavior, and provides a table that compares this language with the more suitable language of the field. I found this to be exceptionally helpful as I gained my footing with this subject, which I studied in college, but have not been involved in since.

After providing an overview of the field, Beauchamp explains why animals engage in vigilance, both from a proximate and an ultimate perspective. These reasons range from levels of corticosteroids and the acuity of vision (proximate) to maintenance of a harem and ecological considerations (ultimate). From there, Beauchamp explores the drivers of vigilance from a social and a predation perspective, moves to the theory behind group size and vigilance, follows that with empirical studies to support the theory, and ends with the applications of vigilance. This is an authoritative study of the field of vigilance, and Beauchamp has left no stone unturned in his exploration.

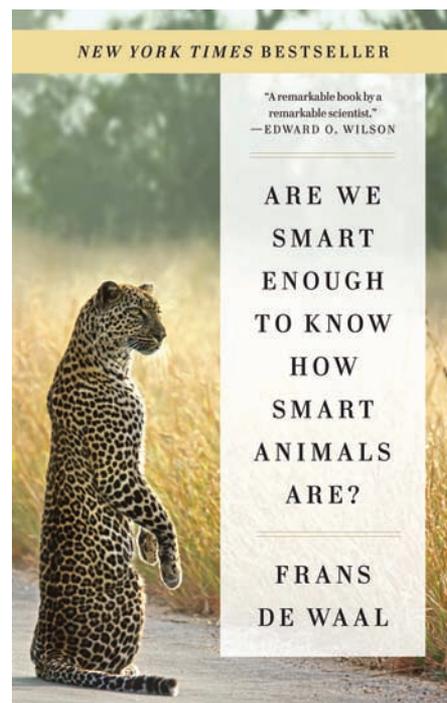
I received this book to review at the beginning of March Mammal Madness, and the excitement of creating my bracket along with my own interest in animal behavior (what I studied as an undergraduate) propelled me through the book. I was struck by the attention to detail, with a variety of studies to illustrate and support each argument. As someone who has been away from this field for some time, I most appreciated the level of attention given to defining concepts that a seasoned academic might not consider, like the difference between proximate and ultimate, and the explanation of meta-analyses.

This book would be a fabulous addition to anyone teaching undergraduate or graduate level science, as well as for high school teachers who either have an interest in animal behavior or have students who do research in this field. It has more detail than would be needed at a high school level or introductory college level biology course, but will certainly strengthen your knowledge of both animal behavior and research methodologies.



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Are We Smart Enough to Know How Smart the Animals Are? By Frans De Waal. 2016. Norton. ISBN (9780393353662). 2756 pp (not including Appendices). Paperback. \$16.95

What does it mean to have cognition? Based on many studies of animal (including human) behavior, this question has been answered, refuted, answered again, and refuted again. In the past, it was thought that humans were the only animals capable of having cognition, and other animals were seen as acting on instinct alone with little future planning, understanding of the past, or ability to plan. That we cannot compete with some animals on many tasks is irrelevant because cognition has many different dimensions beyond what can be easily understood through surface observations of behavior. In fact, countless studies have shown that many animals do indeed plan, persist, and process, and that the “ecology

of the species is the key” (p. 12) to understanding their cognition.

For anyone who has ever wondered about animal behavior, whether animals think and how we go about determining the outcomes of animal studies, this book serves as a wonderful catchment of information. One redeeming quality of the book is that the author attempts, in many cases, to show the protagonists’ side of many studies. This allows one to see where differing views are coming from and, perhaps more importantly, to reaffirm that not everyone agrees in scientific outcomes. In fact, the more answers we get, the more questions we have. The author challenges us to consider many questions when we read about animal behavior studies. Chief among these is whether animal behavior is influenced by the scientists conducting any given study. Animal studies (even those that put the best controls in place) are still run by humans in human settings. Would the outcomes be different if we could train the animals to conduct the studies, instead of the scientists?

This book is a wonderful primer on animal studies. Written in easily understood and engaging language, the author makes us dig deep in thinking about our own cognition as well as that of other animals. Although this book would be difficult to place in a high school curriculum, many students may find it a fascinating read (especially those who have an interest in veterinary science). The information presented led this reader to conclude that the more we know, the more we need to know. We are not alone in our cognitive thoughts, and we perhaps the answer to the author’s title question is that we will never be smart enough to know how smart the animals are because they, like us, are constantly evolving in cognition, and the closer we get, the further away we are.

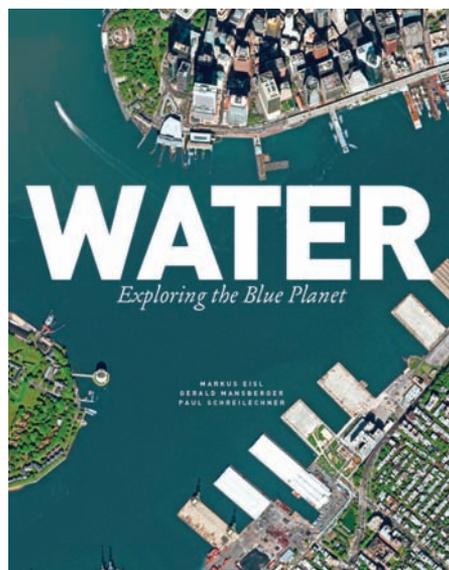


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EVOLUTION

Monarchs and Milkweed: A migrating butterfly, a poisonous plant, and their remarkable story of coevolution. By Anurag Agrawal. 2017. Princeton University Press. (ISBN 978-0-691-16635-3). 296 pp. Paperback. \$29.95.

The monarch is one of only a handful of insects that can survive the bite into the milkweed plant with its interior, sticky white latex substance. In fact, half of monarch caterpillars that bite into the milkweed plant may not survive, as



the fast drying latex substance is capable of gluing their mouthparts shut. This long-standing, plant-animal interaction provides a fascinating and dramatic example of an evolutionary arms race in nature. And there is still so much to learn and discover about the dynamic relationship. The monarch needs the milkweed, but the book emphasizes that the milkweed does not necessarily need the monarch. In terms of the relationship between the monarch and the milkweed, author Anurag Agrawal writes, “Unlike many other co-evolutionary relationships, that between the monarchs and milkweeds is not symbiotic.”

Monarchs and Milkweed does a phenomenal job in blending historical, foundational research on the monarch butterfly with emerging findings related to monarch and milkweed biology, while concurrently weaving in life science concepts that connect to major themes in biology. The book is informative and engaging, and it would appeal to a diverse audience. Beautiful images are included, which serve to effectively highlight aspects of the monarch’s biology and relationship with the milkweed plant. In addition to fantastic quotes leading into each chapter, the chapters also begin with an image of a metamorphosing monarch that grows and changes in form as the chapters progress—a very thoughtful and creative addition.

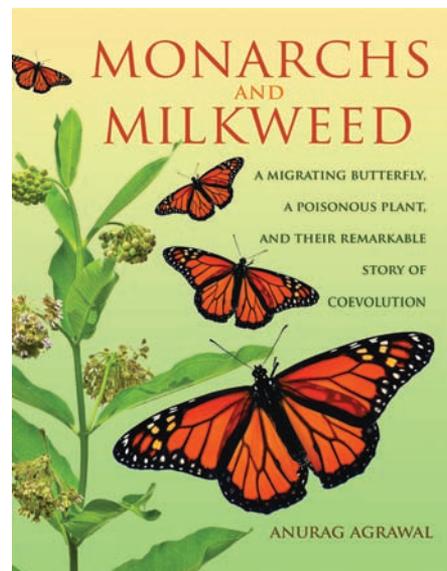
This publication could be used in secondary science and university life science classrooms as part of a project-based learning unit with connections to monarch butterflies, biology, ecology, evolution, chemistry, and much more. Students would be able to refer back to primary research literature that is described in the book for further investigation into select topics. Biology classrooms could also replicate some of the studies described in the book, and students could generate new

driving research questions based on the readings. Teachers could make great use of readings in the book to engage students in biological concepts such as evolution, natural selection, and plant and animal interactions, among others. In a 5E unit on the biology and ecology of monarch butterflies, educators could use the book as part of the “explain” portion of the 5E model, where students immerse in literature that covers what we know and questions that remain to be answered related to monarchs and milkweed. This could lead into the “elaborate” portion, where students conduct further research into concepts covered in the book. The book can also be a great tool to highlight the process of science—how science is done, showing how one study leads to future questions, and follow-up research.

Given the many questions and challenges related to 21st-century monarch butterfly biology and conservation, this book would be a wonderful addition to the science curriculum to encourage students to ask questions and investigate solutions. I could envision scenarios where educators utilize the whole book, or choose to use portions of the book to address specific areas in the biology curriculum.



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LIFE ON EARTH

Water, Exploring the Blue Planet. Marcus Eiel, Gerald Mansberger, and Paul Schreilechner. 2016. Firefly Books (ISBN 13-978-1-77085-813-8). 302 pp. Hardcover \$49.95.