



It has become increasingly common to explain the behavior of animals—from sperm whales to songbirds—in terms of culture. But what is animal culture, what is its relationship to other biological concepts and to human culture, and what impact does culture have on a species' evolution and ecology? My dissertation is an attempt to answer these questions. After an introductory chapter, the dissertation begins (Chapter 2) with a proposal for a novel concept of culture and a critique of the existing ways in which culture has been characterized. These characterizations include views from cultural anthropology as well as attempts to apply the concept of culture to animals. The existing concepts are problematic in a number of ways, such as a priori excluding infrahumans from being candidates for possessing culture, or mistaking what culture is for its measure. In this chapter I offer a way to understand culture that avoids these and other problems. With a concept of culture in hand, the next chapter of my dissertation (Chapter 3) examines and criticizes one key way of understanding the concept of culture, meme theory. In Chapter 4 I turn to the question of how cultural systems can arise in nature, how they can be adaptive, and how the evolution and ecology of species is impacted by the possession of a cultural system. In order to answer these questions I introduce a general constraint on cultural systems--what I am calling the Fundamental Constraint--that has to be satisfied in order for cultural systems to be adaptive. In the final chapter I develop a concept of innovation and draw out the conceptual and empirical implications of this concept.

Learning and Teaching Primary Science brings primary science to life through the stories and experiences of pre-service and practising teachers. It explores the roles of the teacher and the learner of science and examines major issues and challenges, including: engaging diverse learners, utilising technology, assessment and reporting, language and representation, and integration in the 'crowded curriculum'. Each chapter contains examples, activities and reflective questions to help readers create relevant and meaningful lesson plans. Dedicated chapters for the areas of chemistry, physics, biology and earth and environmental science will give confidence to those without a science background. Practical strategies and skills are underpinned by relevant theories and evidence-based research. Written by experts from Australia and New Zealand, Learning and Teaching Primary Science is an essential resource for those beginning their journey of teaching science in the primary school classroom.

Biological sciences have been revolutionized, not only in the way research is conducted -- with the introduction of techniques such as recombinant DNA and digital technology -- but also in how research findings are communicated among professionals and to the public. Yet, the undergraduate programs that train biology researchers remain much the same as they were before these fundamental changes came on the scene. This new volume provides a blueprint for bringing undergraduate biology education up to the speed of today's research fast track. It includes recommendations for teaching the next generation of life science investigators, through: Building a strong interdisciplinary curriculum that includes physical science, information technology, and mathematics. Eliminating the administrative and financial barriers to cross-departmental collaboration. Evaluating the impact of medical college admissions testing on undergraduate biology education. Creating early opportunities for independent research. Designing meaningful laboratory experiences into the curriculum. The committee presents a dozen brief case studies of exemplary programs at leading institutions and lists many resources for biology educators. This volume will be important to biology faculty, administrators, practitioners, professional societies, research and education funders, and the biotechnology industry.

Molecular Biology, Second Edition, examines the basic concepts of molecular biology while incorporating primary literature from today's leading researchers. This updated edition includes Focuses on Relevant Research sections that integrate primary literature from Cell Press and focus on helping the student learn how to read and understand research to prepare them for the scientific world. The new Academic Cell Study Guide features all the articles from the text with concurrent case studies to help students build foundations in the content while allowing them to make the appropriate connections to the text. Animations provided deal with topics such as protein purification, transcription, splicing reactions, cell division and DNA replication and SDS-PAGE. The text also includes updated chapters on Genomics and Systems Biology, Proteomics, Bacterial Genetics and Molecular Evolution and RNA. An updated ancillary package includes flashcards, online self quizzing, references with links to outside content and PowerPoint slides with images. This text is designed for undergraduate students taking a course in Molecular Biology and upper-level students studying Cell Biology, Microbiology, Genetics, Biology, Pharmacology, Biotechnology, Biochemistry, and Agriculture. NEW: "Focus On Relevant Research" sections integrate primary literature from Cell Press and focus on helping the student learn how to read and understand research to prepare them for the scientific world. NEW: Academic Cell Study Guide features all articles from the text with concurrent case studies to help students build foundations in the content while allowing them to make the appropriate connections to the text. NEW: Animations provided include topics in protein purification, transcription, splicing reactions, cell division and DNA replication and SDS-PAGE Updated chapters on Genomics and Systems Biology, Proteomics, Bacterial Genetics and Molecular Evolution and RNA Updated ancillary package includes flashcards, online self quizzing, references with links to outside content and PowerPoint slides with images. Fully

revised art program

Biology of Humans

Physics in Molecular Biology

A philosophical analysis

Biology for AP® Courses

Biology: How Life Works

Concepts for Inquiry

Rethinking biology means rethinking the text, the visual program, and assessment. Ordinarily, textbooks are developed by first writing chapters, then making decisions about art and images, and finally, once the book is complete, assembling a test bank and ancillary media. This process dramatically limits the integration across resources, and reduces art, media, and assessments to ancillary material, rather than essential resources for student learning. Biology: How Life Works is the first project to develop three pillars—the text, the visual program, and the assessment—developed in parallel to make sure that each idea is addressed in the most appropriate medium, and to ensure authentic integration. These three pillars are all tied to the same set of core concepts, share a common language, and use the same visual palette. In this way, the text, visual program, and assessments are integral parts of student learning, rather than just accessories to the text. RETHINKING THE TEXT Integrated Biology: How Life Works moves away from a focus on disparate topics, towards an integrated approach. Chemistry is presented in context, and the flow of information in a cell is introduced where it makes the most conceptual sense, and cases serve as a framework for connecting and assimilating information. Selective Biology: How Life Works was envisioned not as a reference book for all of biology, but a resource focused on foundational concepts, terms, and experiments. This allows students to more easily identify, understand, and apply critical concepts, and develop a framework on which to build their understanding of biology. Thematic Biology: How Life Works was written with six themes in mind.

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