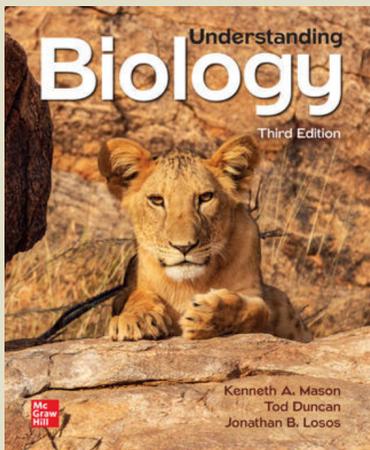


List of Changes



Understanding Biology 3rd Edition

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available in



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The goal of this third edition of *Understanding Biology* is a text containing the topics actually covered in the majority of introductory biology classes at the depth appropriate for a majors course. We also endeavored to create a text that is approachable for students. Feedback indicates our coverage is appropriate, so in this revision we have concentrated on updating content throughout while improving clarity and readability. We continue our concept based organization, with pedagogy to support comprehension and understanding. Based on user feedback, we have simplified the formatting of our end-of-chapter questions and improved their quality. We also expanded our Connecting the Concepts feature, which helps students to think conceptually and connect important ideas to core concepts. Instructors liked the Connecting the Concepts end-of-part features in the second edition, but felt students needed a way to more directly connect these to the different chapters. To that end, we added an end-of-chapter feature and added chapter identifiers to the end-of-part feature.

SEE LIST OF CHANGES ATTACHED.

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Changes to Mason, Understanding Biology, 3e

- **Part I The Molecular Basis of Life**

- Chapter 1 The introductory section on diversity was rewritten to reflect the latest information. The section on scientific reasoning was rewritten for greater clarity and a more modern presentation of the nature of science. This is supported by a new process-of-science figure. A new scientific-thinking figure was added. The list of core concepts was updated to reflect the new connecting-the-concepts features.
- Chapter 2 Some minor edits were made for clarity. Significant edits were made to clarify the nature of ionic and covalent bonds. Minor changes were made to improve the accuracy of two figures.
- Chapter 3 Edits were made to clarify the nature of isomers and macromolecules. A DNA figure was altered for improved accuracy.

- **Part II Biology of the Cell**

- Chapter 4 The section on prokaryotic cells was rewritten to reflect new data, especially regarding archaea. The endomembrane section was rewritten and includes a new subhead to include lipid droplets.
- Chapter 5 A new section was added on proteins that alter membrane topology. The figure and text concerning the sodium–potassium pump was rewritten to reflect the best current model for function.
- Chapter 6 The material on thermodynamics was edited to improve clarity, accuracy, and readability. The section on ATP was rewritten to clarify the role of ATP in cells and to improve the chemical accuracy of this material.
- Chapter 7 Editing to improve the chemical accuracy of concepts related to energy and redox reactions begun in the second edition were continued. The text in the glycolysis overview figure was rewritten for clarity. The introduction to the citric acid cycle was rewritten, and the term Krebs cycle has been changed to the more chemically accurate citric acid cycle throughout the chapter and book.
- Chapter 8 Material was rewritten to clarify the nature the reaction center for photosynthesis. Editing improves clarity and readability of presentation.
- Chapter 9 The chapter was edited for clarity regarding the nature of receptors types and signal transduction. The information on the genomics of GPCRs was updated to reflect new data.
- Chapter 10 The section on eukaryotic chromosome structure was rewritten to reflect new data. Material on control of the cell cycle and the cancer genome were also updated to reflect new data.

- **Part III Genetics and Molecular Biology**

- Chapter 11 The material on synapsis and crossing over was rewritten for clarity and readability.
- Chapter 12 In addition, the description of Mendel's experiments was refined for greater clarity. Concepts related to the alteration of dominance and altered Mendelian ratios were rewritten for accuracy and clarity. Minor changes were made to two figures for accuracy.
- Chapter 13 A new section to improve material on genetic mapping in humans was added to reflect new data. New material on human genetic diseases was added to reflect new information. New information was added to discuss preimplantation genetic screening and noninvasive screening for specific genetic disorders. The maternal inheritance section was rewritten for clarity and accuracy. One figure was edited to reflect new data.
- Chapter 14 The material on the eukaryotic replisome and archaeal replication was rewritten to reflect new information and for clarity and readability. The section on telomere replication was rewritten for clarity and accuracy. The material on DNA repair was rewritten to include mismatch repair.

Changes to Mason, Understanding Biology, 3e

- Chapter 15 The overview of eukaryotic transcription was edited for clarity and accuracy. A figure on prokaryotic transcription was edited for accuracy. The details of eukaryotic transcription, especially initiation, were edited to incorporate new data. The data on alternative splicing were updated, as were data on human mutation rates.
- Chapter 16 The chapter was edited for clarity and accuracy, concentrating on the topics of eukaryotic regulation and chromatin structure. The scientific-thinking figure was rewritten for clarity. The data on alternative splicing were updated.
- Chapter 17 Some illustrations and text were edited and updated for clarity and readability. Changes to the Inquiry and Analysis feature make it easier for students to think critically about how statistics are
 - used in biological analyses. Several new application level questions are added.
- Chapter 18 Textual changes reflect the current status of the Wheat Genome Project. New application level questions were added to facilitate student practice.
- **Part IV Evolution**
 - Chapter 19 The topic of sexual selection was moved into this chapter from the Behavioral Biology chapter (chapter 37). New examples of pleiotropy were added, and new data on how the speed of racehorses has not changed through time were added along with a revised figure.
 - Chapter 20 A number of points were updated and an example of vestigial traits involving the toenails of manatees was added.
 - Chapter 21 The discussion of evidence for sympatric speciation was updated. A new example of geographic variation, the eastern rat snake, was added. The explanation for allopolyploidy was revised.
- Part V The Diversity of Life
 - Chapter 22 The material on supergroups and Archaea was updated to reflect new information. This includes updating the figure showing overall relationships among all living systems. The approach to classification was made congruent across all chapters.
 - Chapter 23 All material on archaea was updated to reflect new data. This includes a new figure to show differences in membrane phospholipids. All material on human pathogens was updated to incorporate new data, especially on influenza.
 - Chapter 24 The section on protist nutrition was significantly updated to reflect current thinking in the field. Protist phylogeny, including figure 24.8, was revised to include five supergroups, grouping Chromalveolata and Rhizaria into the SAR supergroup. Statistics on leishmaniasis were updated to reflect current WHO data. Application-level questions were added to the end of chapter materials.
 - Chapter 25 Material on the derivatives of penicillin, along with the cephalosporins, was added. A discussion of the evolution of fermentation in the yeasts as a competitive advantage over fermenting bacteria has been added.
 - Chapter 26 The chapter was edited for clarity and readability.
 - Chapter 27 The presentation of taxonomic relationships was revised as a result of new findings based primarily on molecular phylogenetic studies, specifically with regards to Platyhelminthes, lophotrochozoans and a few others. References to Spiralian in text and figures were removed.
 - Chapter 28 The discussion of the evolutionary history of vertebrates was substantially revised, especially the sections on lobe-finned fishes/early tetrapods/ early amniotes (emphasizing those terms, rather than referring to all of the early diverging lineages as amphibians or reptiles). Also, the terminology about human evolution was revised to acknowledge the new meaning of “hominin” and “hominid.” A new paragraph on *Homo naledi* was added to discuss recent discoveries.

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- **Part VI Plant Form and Function**

- Chapter 29 Minor edits were made throughout for readability. A brief discussion of the metabolic reasons for plants possessing large vacuoles was added.
- Chapter 30 The chapter was edited for clarity and readability. New Apply questions were added.
- Chapter 31 The chapter was edited throughout for clarity and readability. Application-level questions were added to aid students in learning how to use their knowledge.
- Part VII Animal Form and Function
- Chapter 32 The introductory material on organization and types of tissues was rewritten for clarity. The material on epithelia was rewritten for clarity and readability. A new figure was drawn for muscles moving joints, and this material was edited for clarity.
- Chapter 33 The introduction and description of nervous systems was rewritten for clarity and accuracy. The action potential figure was improved. New material was added on the evolution of the eye, including a new figure.
- Chapter 34 The chapter throughout was edited for clarity and readability. A new figure was added for the cardiac cycle, and the material on diffusion was rewritten.
- Chapter 35 The introductory section on homeostasis and temperature regulation was completely rewritten. The material on hydrophilic hormones was rewritten for clarity and accuracy. The section on innate immunity was also updated and rewritten for clarity.
- Chapter 36 The material on nuclear reprogramming was updated and rewritten to improve readability. The material on neural crest cells was updated and a new figure added to show tissues derived from the neural crest.

- **Part VIII Ecology and Behavior**

- Chapter 37 A stronger emphasis on phylogenetic and evolutionary perspectives was added throughout the chapter, including a new section on evolution and behavior.
- Chapter 38 The data on human populations was updated.
- Chapter 40 Evolution was discussed more thoroughly in the section on microclimate adaptation during adaptive radiation. All of the data on human impacts on the biosphere were updated to stay current.

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