RELEASE NOTES

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Concepts of Biology

Concepts of Biology Release Notes 2023

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Revision Number:

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Page Count Difference:

This revision adds narratives of more diverse scientists, improves and corrects references to gender, sex characteristics, and family diversity, and updates artwork with more inclusive representations. Other additions include attention to scientific ethics, relevant and current subsections, and a new design. The new page count is 615 down from 619.

We've removed the answer key from the PDF to align with the online format of the book. You can now find solutions in the Student Solution Manual under the "Student resources" tab of the book page on openstax.org.

Errata:

Below is a table containing submitted errata and the resolutions that OpenStax has provided for this latest text.

Location	Detail	Resolution Notes	Error Type
Throughout textbook	Titles for Features are renamed to align more with Biology 2e.	Features retitled to standardize the design across the Biology textbooks in the OpenStax library. Detailed changes below: • "Careers in Action" is now "Career Connection" ▪ "Art Connection" is now "Visual Connection" ▪ "Evolution in Action" is now "Evolution Connection"	General/pedagogical suggestion or question

		▪ "Biology in Action" is now "Everyday Connection" ▪ "Concepts in Action" is now "Link to Learning"	
Chapter 1 Introduction to Biology: Introduction	In this book, unit 1 chapter 1 states that "only in the last 300,000 years have humans started looking like we do today." But in the AP version of the Bio book it states that "only in the last 200,000 years have humans started looking like we do today." I was wondering if this was a typing error and if one version is more current or accurate than the other.	Revise "200,000" to "300,000".	Other factual inaccuracy in content
Chapter 1 Introduction to Biology: Section 1.1 Themes and Concepts of Biology	Supposed to be listing 8 total characteristics of life but missing the last one, evolution. Currently, only the first 7 are listed even though evolution is described later on in this section. So it should read: "All groups of living organisms share several key characteristics or functions: order, sensitivity or response to stimuli, reproduction, adaptation, growth and development, regulation/homeostasis, energy processing, and evolution."	Our reviewers accepted this change, and it will be included in the next print cycle.	Typo
Chapter 1 Introduction to Biology: Section 1.1 Themes and Concepts of Biology	In the string, "The highest level, domain, is a relatively new addition to the system since the 1990s. And the recognition in the 1990s that certain 'bacteria,'..." 1990s needs to be changed to 1970s. Sorry that is two errors, but	Revise "1990s" to "1970s" in both places.	Other factual inaccuracy in content

	same paragraph and same issue, twice.		
Chapter 1 Introduction to Biology: Section 1.1 Themes and Concepts of Biology	Regulation and homeostasis are basically the same thing, or if they are not you do not explain at all how they are not. Also consider including either heredity or evolution as a characteristic of life.	This section will be revised to classify them as the same thing, and a paragraph on evolution will be added.	General/pedagogical suggestion or question
Chapter 1 Introduction to Biology: Section 1.1 Themes and Concepts of Biology	Sorry, I just suggested an edit to one sentence and am now suggesting an edit to this two paragraph part of section 1.2. Again, my problem with this section is the use of the term homeostasis as a verb. Homeostasis refers to the relatively stable internal environment, not how we get to or maintain that stability. I realize that in this early part of the book we might not want to get into the details of feedback mechanisms. I've made an attempt to edit these two paragraphs in order to make it more clear what homeostasis means (I hope). "Regulation/Homeostasis Even the smallest organisms are complex and require multiple regulatory mechanisms to coordinate internal functions, respond to stimuli, and cope with environmental stresses in order to maintain homeostasis. Homeostasis refers to the relatively stable internal environment required to maintain life. Two examples of internal functions regulated in an organism are nutrient transport and blood flow.	The Regulation/Homeostasis section will be revised.	Other factual inaccuracy in content

	Organs (groups of tissues working together) perform specific functions, such as carrying oxygen throughout the body, removing wastes, delivering nutrients to every cell, and cooling the body. In order to function properly, cells require appropriate homeostatic conditions such as proper range of temperature, pH, and concentrations of diverse chemicals. These conditions may, however, change from one moment to the next. Organisms maintain homeostatic internal conditions almost constantly, despite external environmental changes, through regulatory mechanisms. For example, an organism needs to regulate body temperature through the thermoregulation process. Organisms that live in cold climates, such as the polar bear (Figure 1.13), have body structures that help them withstand low temperatures. Structures that aid in this type of heat production/conservation include muscle tissue, brown and white fat, fur, feathers, and blubber. In hot climates, organisms have methods (such as perspiration in humans or panting in dogs) that help them to shed excess body heat."		
Chapter 1 Introduction to Biology: Section 1.1	“The atom is the smallest and most fundamental unit of matter.” Defined _after_ first use on page 23. Also incorrect	Revise the sentence "The atom is the smallest..." to "The atom is the smallest and most fundamental unit of matter	General/pedagogical suggestion or question

Themes and Concepts of Biology	in the Oxford Dictionary of English's definition of matter: "…especially as distinct from energy."	that retains the properties of an element."	
Chapter 1 Introduction to Biology: Section 1.1 Themes and Concepts of Biology	"All adaptations enhance the reproductive potential of the individuals exhibiting them," This sounds like a factual generalization, but I think you just meant a consequence of the definition, in which case remove "all." (If it's meant as a statement of fact, it's odd, because it is often false for non-technical senses of "adaptations," and could be false in your sense: e.g. if an evolutionary adaptation benefited past generations but will not turn out to "enhance the reproductive potential of the individuals exhibiting them.")	Revise "All adaptations..." to "Adaptations..."	Other factual inaccuracy in content
Chapter 1 Introduction to Biology: Section 1.1 Themes and Concepts of Biology	The 8 properties of life listed in the opening paragraph do not match the ones listed in bold headings (with their own paragraphs further elaborating on these). Furthermore, list in the the chapter summary does not match either, please look at evolution and homeostasis/regulation for the text discrepancies. The update in the read online version was inconsistent and has not been updated in the pdf or app versions. Thanks!	This issue was addressed in another report and will be corrected in webview.	General/pedagogical suggestion or question
Chapter 1 Introduction to Biology: Section 1.2 The Process of Science	The quote below from Chapter 1 (page 11) on the process of science is incomplete, as STATISTICAL ANALYSIS OF DATA IN DATABASES or DATA RESEARCH has become	Revise text to add the following after the last paragraph: In recent years a new approach of testing hypotheses has developed as a result of an exponential	General/pedagogical suggestion or question

	increasingly important in testing hypotheses, not just scientific experiments. With the huge amounts of data that increase exponentially every year, this aspect of the scientific method will become increasingly important.	growth of data deposited in various databases. Using computer algorithms and statistical analyses of data in databases, a new field of so-called "data research" (also referred to as "in silico" research) provides new methods of data analyses and their interpretation. This will increase the demand for specialists in both biology and computer science, a promising career opportunity.	
Chapter 1 Introduction to Biology: Section 1.2 The Process of Science	On page 18, row three, it says: "Science has cannot investigate these areas because..." It should be: "Science cannot investigate these areas because..." This is a link to a screenshot of it in the text: http://i.imgur.com/FCyRFPc.png	Our reviewers accepted this change.	Typo
Chapter 1 Introduction to Biology: Section 1.2 The Process of Science	“The experimental results must be consistent with the findings of other scientists.” Delete; the very best experiments disprove previous beliefs.	Delete "The experimental results must be consistent with the findings of other scientists."	Other factual inaccuracy in content
Chapter 1 Introduction to Biology: Section 1.2 The Process of Science	“Without basic science, it is unlikely that applied science would exist.” Delete; Ancient Mesopotamian applied science was quite advanced (though less so than their pseudosciences), but there is much less evidence of interest in basic science.	Revise "would" to "could".	Other factual inaccuracy in content
Chapter 1 Introduction to Biology: Section 1.2	“From those general principles, a scientist can extrapolate and predict the specific results that would be valid as long as the	Revise "extrapolate" to "deduce".	Other factual inaccuracy in content

The Process of Science	general principles are valid." Results are true or false; rules of inference are valid or invalid. "extrapolate" is also an incorrect word choice. Replace with: "From those general principles, a scientist can deduce specific results that must be true as long as the general principles are true."		
Chapter 1 Introduction to Biology: Section 1.2 The Process of Science	"Deductive reasoning is a form of logical thinking that uses a general principle or law to forecast specific results." "forecast" is an unfortunate word choice for a field that is independent of time; as Frege noted, logic is also independent of the act of thinking. Replace with: "Deductive logic deduces specific truths from general principles or laws."	Revise "forecast" to "predict".	Other factual inaccuracy in content
Chapter 1 Introduction to Biology: Section 1.2 The Process of Science	On page 18 of this textbook, in the beginning of the third full sentence it says, "Science has cannot investigate these areas..." Obviously this is an incorrect sentence and I figured I should bring it to you attention! Thank You!	Our reviewers accepted this change.	Other factual inaccuracy in content
Chapter 1 Introduction to Biology: Section 1.2 The Process of Science	The text currently reads "A scientific theory is a generally accepted, thoroughly tested and confirmed explanation for a set of observations or phenomena," for the definition of scientific theory. However, this definition does not account for obsolete scientific theories from the past, and it may confuse students coming	Revise this sentence to "A generally accepted scientific theory is thoroughly tested and confirmed explanation for a set of observations or phenomena."	Other factual inaccuracy in content

	across obsolete scientific theories being referred to as a well-accepted scientific theory would normally be. I suggest keeping the definition largely the same; only translocating the “generally accepted” phrase to before “scientific theory.” This will avoid confusion for obsolete scientific theories and still allow for emphasis that our well-accepted scientific theories are supported by thorough, replicable scientific experimentation.		
Chapter 1 Introduction to Biology: Section 1.2 The Process of Science	Erratum #17015 wasn't quite finished. The "Concept in Action" box links to a yeast fermentation video but describes it as "anaerobic cellular respiration in action." I'm not familiar enough with your editorial policy to say whether you should use a different video or move the existing video to the Alcohol Fermentation section.	The link to learning will be moved to the Fermentation section.	Other factual inaccuracy in content
Chapter 1 Introduction to Biology: Section 1.2 The Process of Science	I would like to request a change in the definition a a gene. In the intro of the book a gene is defined as: The gene is the basic unit of heredity. I would like to request that the definition be changed to a sequence of DNA that codes for a functional product.	Revise the sentence beginning "The gene is the basic..." to "The gene is the basic unit of heredity represented by a specific DNA segment that codes for a functional molecule."	General/pedagogical suggestion or question
Chapter 1 Introduction to Biology: Key Terms	There is an error and an omission in the Chapter 1 list of terms: 1. Your definition of Biology is actually the definition of Ecology: the study of the interactions of living organisms	Revise "biology: the study of living organisms and their interactions with one another and their environments" to "biology: the study of life."	Other factual inaccuracy in content

	with each other and their environment. Please add "Ecology" to the list of defined terms at the end of Chapter 1 and use this definition. 2. Please correct your definition of Biology to say the study of living organisms.		
Chapter 2 Chemistry of Life: Section 2.1 The Building Blocks of Molecules	Both Cl atom (upper right) and Cl- ion (lower right) need to have 8 electrons in the second shell/ring not 7.	Update Figure 2.5.	Other factual inaccuracy in content
Chapter 2 Chemistry of Life: Section 2.1 The Building Blocks of Molecules	Figure 2.6 is showing water molecules and their partial charges on hydrogen and oxygen. However, oxygen is marked as a slight positive charge when it should be marked as a slight negative charge.	This issue was addressed in another report and is correct in webview.	Other factual inaccuracy in content
Chapter 2 Chemistry of Life: Section 2.1 The Building Blocks of Molecules	"The only exception is hydrogen (H), which is made of one proton and one electron with no neutrons." The sentence, as written, implies that the hydrogen atom never contains any neutron and, therefore, has no isotopes. Hydrogen has 2 natural isotopes: deuterium (D) and tritium (T). Suggested edit: "Hydrogen (H) is the only atom which does not have to contain any neutron; its most common isotope is made of one proton and one electron with no neutrons."	Revise the sentence "The only exception is..." to "The most common isotope of hydrogen (H) is the only exception and is made of one proton and one electron with no neutrons."	Other factual inaccuracy in content
Chapter 2 Chemistry of Life: Section 2.1	I was looking at the Periodic Table in the textbook, and I noticed several errors. For example, Nitrogen is listed as	Replaced table image.	Other factual inaccuracy in content

The Building Blocks of Molecules	Carbon, Aluminum is identified as Sodium, Calcium is identified as Potassium, Selenium is listed as Arsenic and Strontium is listed as Rubidium. I thought I should bring this to your attention. Case #30000		
Chapter 2 Chemistry of Life: Section 2.2 Water	L2L: /l/ice_lattice2 I was checking my google analytics, and see that there have been some 404 errors coming from the ice 3D movie page. I do still have it on my web site (http://janewhitney.com/ice_movie_resources).	This link will be updated.	Broken link
Chapter 2 Chemistry of Life: Section 2.2 Water	2.2 has a link to learning (http://openstaxcollege.org/l/ice_lattice2). When I click this link, it downloads a .MOV file that I cannot view. I get an error that says the video cannot be run. Is this file executable/viewable by anyone? If not we should get a new movie to add here.	Our reviewers accepted this change.	Typo
Chapter 2 Chemistry of Life: Section 2.2 Water	On page 41 of Concepts of Biology, the following link does not work: (http://openstaxcollege.org/l/ice_lattice). Has this link been fixed in newer editions? I downloaded a sample copy a year ago, I think. The links before that do work. Thanks.	Our reviewers accepted this change.	Broken link
Chapter 2 Chemistry of Life: Section 2.2 Water	openstax.org/l/ice_lattice redirects to 404	This link will be updated, and the credit information for the old link will be deleted.	Broken link
Chapter 2 Chemistry	The first paragraph in section 2.3	Revise "Biological macromolecules are organic..."	Other factual

of Life: Section 2.3 Biological Molecules		to "Biological macromolecules are organic, meaning they contain carbon and are bound to hydrogen, and may contain oxygen, nitrogen, and additional minor elements."	inaccuracy in content
Chapter 2 Chemistry of Life: Section 2.3 Biological Molecules	Re: saturated fatty acids and the claim that "they originate from animal sources." This promotes the idea that these fatty acids are exclusively from meats and dairy. The tropical oils (all plant sources) are much higher in saturated fatty acids than [generically stated] animal sources.	This link will be updated.	Other factual inaccuracy in content
Chapter 2 Chemistry of Life: Section 2.3 Biological Molecules	Referring to the major classes of biological macromolecules, the sentence states, "Combined, these molecules make up the majority of a cell's mass." No, water does. These biological macromolecules make up the majority of a cell's DRY mass.	Revise "cell’s mass" to "cell’s dry mass".	Other factual inaccuracy in content
Chapter 2 Chemistry of Life: Section 2.3 Biological Molecules	In the third panel from the top, tertiary structure, it looks like the pointer from "Beta-pleated sheet" should extend a little farther right so that it points to the distinctively zig-zaggy part of the molecule rather than the curvy part the pointer actually ends at.	This figure will be updated.	Other factual inaccuracy in content
Chapter 2 Chemistry of Life: Section 2.3 Biological Molecules	In the sentence "...herbivores such as cows, buffalos, and horses are able to digest grass that is rich in cellulose and use it as a food source. In these animals, certain species of bacteria reside in the rumen (part of the digestive system of herbivores) ...", there is a	Revise "In these animals, certain species of bacteria reside in the rumen (part of the digestive system of herbivores) and secrete..." to "In these animals, certain species of bacteria reside in the digestive system of herbivores and secrete..." and	Other factual inaccuracy in content

	factual error. Horses are NOT ruminants. Horses are monogastric herbivores that are hindgut fermenters. Ruminants are foregut fermenters. Both types of herbivores have bacteria living in specialized structures in their digestive tracts that help them digest cellulose. I would suggest that the sentence be modified to remove the reference to ruminants and just refer to herbivores in general. Here is my suggested correction: "While the glucose-glucose bonds in cellulose cannot be broken down by human digestive enzymes, herbivores are able to digest grass that is rich in cellulose and use it as a food source. Certain species of bacteria reside in specialized structures in the digestive systems of herbivores and secrete the enzyme cellulase." I would also suggest that this sentence (The appendix also contains bacteria that break down cellulose, giving it an important role in the digestive systems of ruminants.) be removed as not all ruminants have an appendix.	also revise "...important role in the digestive systems of ruminants" to "...important role in the digestive systems of some ruminants".	
Chapter 3 Cell Structure and Function: Section 3.2 Comparing Prokaryotic and	In figure 3.2 (Concepts Biology) there is an error. The picture to the right, the dissecting microscope, shows a focus knob that is pointing to the zoom knob. The focus knob is on the scope, where it attaches to the arm.	This figure will be updated.	Other factual inaccuracy in content

Eukaryotic Cells			
Chapter 3 Cell Structure and Function: Section 3.4 The Cell Membrane	The peripheral protein label is not pointing to a peripheral protein. As drawn, this figure has no peripheral proteins.	This figure will be updated.	Incorrect answer, calculation, or solution
Chapter 3 Cell Structure and Function: Section 3.5 Passive Transport	"CONCEPTS IN ACTION For an animation of the diffusion process in action, view this short _video_ on cell membrane transport." "CONCEPTS IN ACTION Watch this _video_ that illustrates diffusion in hot versus cold solutions." Both _video_ links forward me to: https://www.youtube.com/watch?v=JShwXBWGMyY I think the second link (hot & cold) is meant to forward users to: https://www.youtube.com/watch?v=UhL9OsRSKO8 OpenStax Biology 2/e (section 5.2) includes a link to the latter video, which fits the description given in Concepts of Biology section on Passive Transport (3.5).	The second link will be updated.	Broken link
Chapter 3 Cell Structure and Function: Section 3.5 Passive Transport	"Polar substances, with the exception of water, present problems for the membrane." In the context of this section, this means that water can pass through the membrane unassisted. This was indeed a subject of controversy at one time with one side arguing that water could pass through	Revise the sentence "Polar substances, with the..." to "Polar substances present problems for the membrane."	Other factual inaccuracy in content

	membranes without a special channel, but to the extent that this may happen, it is not biologically meaningful. This is why our cells have aquaporins, whose discovery was recognized with the 2003 Nobel Prize in Chemistry.		
Chapter 3 Cell Structure and Function: Section 3.5 Passive Transport	Needs consistency. "Semipermeable" and "selectively permeable" are used equally in the book (six times each). "Semipermeable" is not a key term but "selective permeable" is. I think for a textbook, it would be better to keep to just one term, or give some kind of explanation some where that this is the same concept.	Add "(semipermeable)" after selectively permeable. Add "(also known as semipermeable)" to the end of the definition for selectively permeable in the key terms.	General/pedagogical suggestion or question
Chapter 3 Cell Structure and Function: Section 3.5 Passive Transport	Water moves from high concentration to low concentration??? Water is a solvent, it's concentration is fixed (55.6 M, this is what I was taught as a student). Water moves from area of high water potential to area of low water potential.	Revise the sentence beginning "Osmosis is the movement..." to "Osmosis is the movement of free water molecules through a semipermeable membrane according to the water's concentration gradient across the membrane, which is inversely proportional to the solutes' concentration." Revise the sentence beginning "Water, like other substances, moves..." to "Water, like other substances, moves from an area of high concentration of free water molecules to one of low free water molecule concentration."	Other factual inaccuracy in content
Chapter 3 Cell Structure and Function: Section 3.6	The following link needs a new target: (http://openstaxcollege.org/l/endocytosis2)	Revise the URL for http://openstaxcollege.org/l/endocytosis2 to: https://www.youtube.com/watch?v=hLbjLWNA5c0 Revise text as follows:	Broken link

Active Transport		See receptor-mediated endocytosis (http://openstaxcollege.org/l/endocytosis2) in action.	
Chapter 3 Cell Structure and Function: Section 3.6 Active Transport	Figure 3.24 does not add clarity to the concept of "electrochemical gradient", nor is it clear what the big arrow through the protein is meant to convey	Add the following to the caption after the first sentence: Na+ ions are at higher concentration outside the cell, and K+ ions are at higher concentration inside of the cell, and yet the inside of the cell has negative net charge compared to the other side of the membrane. This is due to the presence of K+ binding proteins and other negatively charged molecules. The difference in electrical charges attracts the positively charged Na ions toward the inside of the cell, the electrical gradient, while the K ions tend to flow through K channels toward the outside of the cell due to the concentration difference, the concentration gradient.	General/pedagogical suggestion or question
Chapter 3 Cell Structure and Function: Key Terms	Existing definition of phagocytosis is easily confused with pinocytosis: a process that takes macromolecules that the cell needs from the extracellular fluid; a variation of endocytosis Recommended change to definition: phagocytosis: the type of endocytosis by which large particles, such as polymers, smaller cells, or parts of cells are taken in or engulfed by the cell	Revise the definition of phagocytosis to "a process that takes particulate matter like macromolecules, cells, or cell fragments that the cell needs from the extracellular fluid; a variation of endocytosis".	General/pedagogical suggestion or question
Chapter 3 Cell Structure	None of the Key Terms sections at the end of the chapters have "chromosome"	Revise "To understand chromatin, it is helpful to first consider chromosomes.	Other

and Function: Key Terms	listed, at least not that I was able to find in Chapters 6, 7, or 8, which is where it makes sense to have that word defined in the key terms.	Chromosomes are structures within the nucleus that are made up of DNA, the hereditary material, and proteins." to "To understand chromatin, it is helpful to first consider chromosomes. A chromosome is a structure within the nucleus that is made up of DNA, the hereditary material, and proteins." Set "chromatin" and "chromosome" as key terms.	
Chapter 4 How Cells Obtain Energy: Section 4.1 Energy and Metabolism	The following 2 sentences describing noncompetitive inhibition is incorrect. "On the other hand, in noncompetitive inhibition, an inhibitor molecule binds to the enzyme in a location other than the active site, called an allosteric site, but still manages to block substrate binding to the active site. Some inhibitor molecules bind to enzymes in a location where their binding induces a conformational change that reduces the affinity of the enzyme for its substrate." An inhibitor described in these two sentences is actually an allosteric competitive inhibitor because, even though it binds outside of the substrate binding site, it still reduces the affinity of the enzyme for its substrate (i.e., increases the Km). In other words, when the inhibitor is bound, the substrate can't bind, so the inhibitor competes with the substrate for binding to the enzyme. A noncompetitive inhibitor	Revise "On the other hand, in noncompetitive inhibition, an inhibitor molecule binds to the enzyme in a location other than the active site, called an allosteric site, but still manages to block substrate binding to the active site. Some inhibitor molecules bind to enzymes in a location where their binding induces a conformational change that reduces the affinity of the enzyme for its substrate." to "On the other hand, in noncompetitive inhibition, an inhibitor molecule binds to the enzyme in a location other than the active site, called an allosteric site, but still manages to prevent substrate binding to the active site. Some inhibitor molecules bind to enzymes in a location where their binding induces a conformational change that reduces the enzyme activity as it no longer effectively catalyzes the conversion of the substrate to product."	Other factual inaccuracy in content

	does NOT reduce the affinity of the enzyme to its substrate but it changes the enzyme conformation, making it less optimal for the catalytic function. It is called NONCOMPETITIVE because both the inhibitor and the substrate can bind to the enzyme at the same time. This is different for competitive inhibitors: only the inhibitor or the substrate can be bound at a given moment (their binding is mutually exclusive). The correct definitions of competitive and noncompetitive inhibitors can be found in numerous biochemistry or enzymology textbooks. Below, I added a screenshot from the Khan academy site (https://www.khanacademy.org/science/biology/energy-and-enzymes/enzyme-regulation/a/enzyme-regulation), which gives a correct definition of a noncompetitive inhibitor.		
Chapter 4 How Cells Obtain Energy: Section 4.1 Energy and Metabolism	The animation link doesn't work on this page	This link will be updated.	Broken link
Chapter 4 How Cells Obtain Energy: Section 4.1 Energy and Metabolism	Figure 4.2 has 2 arrows coming out of sun on the left, and it is not clear what they are each supposed to mean. The one label that provides "heat" is wrong. The correct label should be "light energy"	This figure will be updated.	Other factual inaccuracy in content

Chapter 4 How Cells Obtain Energy: Section 4.1 Energy and Metabolism	Under the heading "Free Energy" in Section 4.1, about the middle of the first paragraph, a sentence begins with: "Recall that according to the second law of thermodynamics,...". Yet the second law of thermodynamics is not covered until section 4.3. This would be confusing to students unfamiliar with the basic principles of thermodynamics.	Revise "Recall that according to..." to "According to...".	General/pedagogical suggestion or question
Chapter 4 How Cells Obtain Energy: Section 4.1 Energy and Metabolism	Energy reaction link directs to a dead site. http://www.learnerstv.com/animation/animation.php?ani=161&cat=biology	This link will be updated.	Broken link
Chapter 4 How Cells Obtain Energy: Section 4.3 Citric Acid Cycle and Oxidative Phosphorylation	"to generate a electrochemical gradient" should be "to generate AN electrochemical gradient." "Electrochemical" starts with a vowel sound.	Our reviewers accepted this change.	Typo
Chapter 4 How Cells Obtain Energy: Section 4.4 Fermentation	This section refers to the process of fermentation as anaerobic respiration. This is incorrect and misleading, a common misconception for students. Anaerobic respiration still involves the ETC, except that it uses sulfur as a final electron acceptor instead of oxygen. Fermentation is a completely different process that does not involve any of the cellular processes after glycolysis. For	Revise the end of the paragraph starting from "In contrast, some living systems..." to "In contrast, in some living systems the electron transport chain (ETC) uses an inorganic molecule as a final electron acceptor, which is called anaerobic cellular respiration. Both processes allow organisms to convert energy for their use in the absence of oxygen."	Other factual inaccuracy in content

	examples of anaerobic respiration, see here: https://www.pnas.org/content/97/24/12961. Actually, the wikipedia article is accurate in its distinction between the two cellular processes: https://en.wikipedia.org/wiki/Anaerobic_respiration		
Chapter 5 Photosynthesis	I do want to mention that the opening photograph for Chapter 5, labeled a Sage Thrasher, is in fact a Northern Mockingbird. The diagnostic white wing patch is visible. Whoever misidentified it was probably led astray by the speckling on the breast, which unfortunately is not useful to separate it from Mockingbird when the bird is in juvenal plumage- Mockingbirds have breast spotting for several weeks after they obtain adult body (incl. tail) proportions after fledging. Regards,	In the figure caption, revise "sage thrasher's" to "mockingbird's".	Other factual inaccuracy in content
Chapter 5 Photosynthesis: Section 5.2 The Light-Dependent Reactions of Photosynthesis	Figure 5.13 in PDF. Should Pq be PQ? It used to be PO and was correct to Pq, but plastoquinone is abbreviated as PQ, not Pq. Source: NIH.gov (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4030317/)	Our reviewers accepted this change.	Typo
Chapter 5 Photosynthesis: Section 5.2 The Light-Dependent Reactions of Photosynthesis	The textbook reads: "The energy that these molecules carry is stored in a bond that holds a single atom to the molecule. For ATP, it is a phosphate atom, and for NADPH, it is a hydrogen atom." Phosphate is a molecule (a group of atoms). Calling	Revise the paragraph beginning "In the light-dependent reactions..." to "In the light-dependent reactions, energy absorbed by sunlight is stored by two types of energy-carrier molecules: ATP and NADPH. The energy that these molecules carry is stored in a	Other factual inaccuracy in content

	phosphate an "atom" here is incorrect.	bond that holds a single atom or group of atoms to the molecule. For ATP, it is a phosphate group, and for NADPH, it is a hydrogen atom. Recall that NADH was a similar molecule that carried energy in the mitochondrion from the citric acid cycle to the electron transport chain. When these molecules release energy into the Calvin cycle, they each lose either atoms or groups of atoms to become the lower-energy molecules ADP and NADP+."	
Chapter 5 Photosynthesis: Section 5.3 The Calvin Cycle	The paragraph begins: "In plants, carbon dioxide (CO_2) enters the chloroplast through the stomata and diffuses into the stroma of the chloroplast". This makes it sound like the stomata is the opening to the chloroplast. Carbon dioxide uses the stomata to enter the leaf, where it then diffuses into a mesophyll cell. Once in the mesophyll cell, it then encounters a chloroplast.	Revise the sentence beginning "In plants, carbon dioxide..." to "In plants, carbon dioxide (CO_2) enters the leaf through the stomata and diffuses into the mesophyll cells and into the stroma of the chloroplast—the site of the Calvin cycle reactions where sugar is synthesized."	Other factual inaccuracy in content
Chapter 5 Photosynthesis: Section 5.3 The Calvin Cycle	The heading reads "The Energy Cycle." This is incorrect. While matter cycles in ecosystems, energy flows through ecosystems. It is constantly being radiated back to the atmosphere as heat, with some lost in every transition, and more energy continually comes in from the sun. If energy did "cycle" as you suggest, the continual input of sun energy would mean that the amount of energy in ecosystems would increase	Revise "The Energy Cycle" to "The Energy Flow".	Other factual inaccuracy in content

	every second. I know what you're trying to get at - energy moves through various parts of ecosystems - but don't be misleading. I also teach an upper-level ecology class and find that students often have difficulty understanding how energy behaves in ecosystems. Don't make my job harder.		
Chapter 6 Reproduction at the Cellular Level: Section 6.2 The Cell Cycle	The youtube video on the cell cycle has been removed due to copyright. I suggest the Crash Course video (https://www.youtube.com/watch?v=L0k-enzoeOM) or the Amoeba Sisters video (https://www.youtube.com/watch?v=f-ldPgEfAHI) to replace it.	Revise the video on the cell cycle to "https://www.youtube.com/watch?v=f-ldPgEfAHI".	Broken link
Chapter 6 Reproduction at the Cellular Level: Key Terms	Incorrect definition of disaccharides- "peptide bond" should be replaced with "glycodsidic bond"	Revise "peptide bond" to "glycosidic bond".	Other factual inaccuracy in content
Chapter 7 The Cellular Basis of Inheritance: Section 7.2 Meiosis	The photo in this reading assignment (7.2) is incorrectly showing a biochemical reaction rather than independent assortment during meiosis.	This figure will be updated.	Other factual inaccuracy in content
Chapter 7 The Cellular Basis of Inheritance: Section 7.3 Variations in Meiosis	I am writing you now as I'm getting to the meiosis section and was excited that you cover nondisjunction and all the diversity it introduces into a population. I really stress the importance of biodiversity in my course. I also cover how the SRY gene can hop from a Y chromosome 23 to an X chromosome 23 to create chromosomal males that do	Thank you for your thoughtful and sensitive comments. We have worked with our faculty advisors to address the issue you raised in a balanced way. Our solution may not be perfect, but we hope it is an improvement that will include and welcome all students and also be more informative about genetic variation. Briefly, our direction will be to change	General/pedagogical suggestion or question

	not develop male sex characteristics and a chromosomal female that does. The thing is, the title 7.3 Errors in Meiosis, is problematic. These occurrences are natural variations. Is there a way to change the title to something more inclusive that means the same thing? I have students representing different genders, sexualities, skin colors, neurodiversities, values, backgrounds... I can't assign this reading if it contrasts, at a small and meaningful level, with what is true AND inclusive. I'm sure you will have better ideas if you consider this change, but I don't like request a change without an example or suggestion. Here's what I got: Variation in Meiosis Differences in Meiosis	the name of the section as you suggest, and also change some of the terms within it. In some specific instances, the term "error" will remain, but the overall approach and tone of the section will evolve as needed.	
Chapter 7 The Cellular Basis of Inheritance: Section 7.3 Variations in Meiosis	The following link needs a new target: (http://openstaxcollege.org/l/down_syndrome2)	Revise the URL for http://openstaxcollege.org/l/down_syndrome2 to: https://www.youtube.com/watch?v=ze_6VWwLtOE Revise text as follows: Visualize the addition of a chromosome that leads to Down syndrome (http://openstaxcollege.org/l/down_syndrome2) in this video.	Broken link
Chapter 7 The Cellular Basis of Inheritance: Section 7.3	Figure 7.8. It would be clearer if the label in the figure "nondisjunction during meiosis II" pointed to the upper blue replicated chromosome on the left-hand side of the cell, as it	In Figure 7.8, move the label "nondisjunction during meiosis II" to point to the upper blue replicated chromosome on the lefthand side.	Other factual inaccuracy in content

Variations in Meiosis	is a sister chromatid of this chromosome that did not separate properly. As it stands now, the label is on a sister chromatid that did separate properly, and so is not technically the result of a nondisjunction event.		
Chapter 8 Patterns of Inheritance: Introduction	Last sentence reads: "Not all genes are transmitted from parents to offspring according to Mendelian Genetics." Instead of "genes" the more accurate word for this concept is "traits" as in this version: "Not all traits are transmitted from parents to offspring according to Mendelian Genetics."	Revise "genes" to "traits".	General/pedagogical suggestion or question
Chapter 8 Patterns of Inheritance: Section 8.1 Mendel's Experiments	For an excellent review of Mendel's experiments and to perform your own crosses and identify patterns of inheritance, visit the Mendel's Peas (http://openstaxcollege.org/l/mendels_peas) web lab.	This link to learning box will be deleted.	Broken link
Chapter 8 Patterns of Inheritance: Section 8.2 Laws of Inheritance	I believe that "alleles" are not "observed", whereas "traits" are. I suggest that you change the above sentence to: The recessive trait will only be observed in homozygous recessive individuals.	Revise the sentence beginning "The recessive allele..." to "The traits of the recessive allele will only be observed in homozygous recessive individuals."	Typo
Chapter 8 Patterns of Inheritance: Section 8.2 Laws of Inheritance	Figure 8.10 :… "In pea plants, purple flowers (P) are dominant to…", but in the Table – it is the "R"	Revise the caption to "In pea plants, round seed shape (R) is dominant to wrinkled seed shape (r) and yellow peas (Y) are dominant to green peas (y). What are the possible genotypes and phenotypes for a cross between RrYY and rrYy pea plants? How many squares	General/pedagogical suggestion or question

		do you need to do a Punnett square analysis of this cross?"	
Chapter 8 Patterns of Inheritance: Section 8.3 Extensions of the Laws of Inheritance	In "Concepts of Biology", which I use in a non-majors Biology course, there is a link in 8.3 Extensions of the Laws of Inheritance to a Khan Academy video. The video is a person talking and writing with their computer, it is also dated information and a very dry presentation. Khan Academy has become a "shortcut" for students to trying to avoid putting in the work and is not material made or discussed by "experts". I specifically tell my students to avoid the site as it gives a very basic, archaic view of Biology. I would be supportive of you finding a different resource to use in its place.	This link will be updated.	General/pedagogical suggestion or question
Chapter 8 Patterns of Inheritance: Section 8.3 Extensions of the Laws of Inheritance	"Mendel's seminal publication makes no mention of linkage, and many researchers have questioned whether he encountered linkage but chose not to publish those crosses out of concern that they would invalidate his independent assortment postulate. The garden pea has seven chromosomes, and some have suggested that his choice of seven characteristics was not a coincidence. However, even if the genes he examined were not located on separate chromosomes, it is possible that he simply did not observe linkage because of the extensive shuffling effects of recombination." It might be	Revise "The garden pea has seven chromosomes..." to "The garden pea has seven pairs of chromosomes..."	General/pedagogical suggestion or question

	more clear to say the "the garden pea has seven PAIRS of chromosomes".		
Chapter 9 Molecular Biology: Section 9.1 The Structure of DNA	Figure 9.3a "Each DNA nucleotide..." . Problem: the nucleotide shown is an RNA nucleotide, not a DNA nucleotide - it contains a ribose sugar, not the deoxyribose sugar that is present in DNA nucleotides.	This figure will be updated.	Other factual inaccuracy in content
Chapter 9 Molecular Biology: Section 9.1 The Structure of DNA	In Figure 9.3 the structure of cytosine contains an incorrectly placed double bond between the top carbon and amino group; it should be a single bond.	Our reviewers accepted this change.	Typo
Chapter 9 Molecular Biology: Section 9.1 The Structure of DNA	On Chapter 9 (DNA Structure and Sequencing) page 367 on the pdf version, there is a figure of pyrimindines and purines (Figure 9.3). I would like to point out that there is a mistake on the the structure of cytosine. The carbon is not double bonded to both nitrogen and NH3 group. The NH3 group should be single bonded to a NH2 group. In the figure, the carbon has five bonds, which is absolutely wrong, especially since this is an organic molecule.	Our reviewers accepted this change.	Typo
Chapter 9 Molecular Biology: Section 9.2 DNA Replication	The figure of the replication bubble is slightly inaccurate. Each replication bubble should have two leading strands and two lagging strands (Fig. 9.10 has only one leading and one lagging strand). The two leading strands should be diagonally across from one-another, as should the two	This figure will be updated.	Other factual inaccuracy in content

	lagging strands. Please compare Fig. 9.10 with the image found here, which has the leading and lagging strands correctly illustrated and labeled: http://oregonstate.edu/instruction/bb331/lecture06/FigH2.html		
Chapter 9 Molecular Biology: Section 9.4 Translation	broken link http://learn.genetics.utah.edu/content/begin/dna/transcribe/	Our reviewers accepted this change.	Typo
Chapter 12 Diversity of Life: Section 12.1 Organizing Life on Earth	In the Concepts in Action box on this page, the link takes you to the right place, but when you click Launch Interactive, it isn't launching. https://www.pbs.org/wgbh/nova/nature/classifying-life.html My thought is maybe the tech it was built with isn't supported anymore. I tried multiple browsers. I'm thinking if no one can get it to work, might be good to replace it with something else. Here's something I found from another publisher: http://www.glencoe.com/sites/common_assets/science/virtual_labs/E07/E07.html It's Flash based, but perhaps better than not having anything. However if we aren't able to use Flash or other publisher materials, then maybe the CiA box ought to be removed? If we do replace, we'd just need to remove the second sentence in the instructions.	This issue was addressed in another report and has been updated in webview.	Broken link

Chapter 12 Diversity of Life: Section 12.2 Determining Evolutionary Relationships	If I am reading the figure correctly, the Amniote group seems to include the fish. Fish are not amniotes. I think the left bracket line should be shifted over to the lizard.	This figure will be updated.	Other factual inaccuracy in content
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.1 Prokaryotic Diversity	The scale for (c) in figure Figure 13.4 is shown as "500 µm". The same picture is repeated in Figure 13.13, but with a scale of "500 nm". Assuming this isn't a different bacteria, 1,000 times larger but otherwise identical, I suspect the former is incorrect. I don't know anything about bacteria, but given that a human hair is 50 µm wide, quite a few of the scales in the pictures in this chapter seem questionable to me, perhaps the whole thing could do with a review.	This figure will be updated.	Other factual inaccuracy in content
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.1 Prokaryotic Diversity	In the section titled “Early Life on Earth,” Clare Patterson should be Claire Patterson.	Revise "Clare" to "Clair".	Typo
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.1 Prokaryotic Diversity	The following link needs a new target: (http://openstaxcollege.org/l/extremophiles)	Revise the URL for http://openstaxcollege.org/l/extremophiles to: https://www.discovery.com/tv-shows/plane-crash/videos/what-can-extremophiles-teach-us-about-extraterrestrial-life	Broken link
Chapter 13 Diversity of Microbes,	redirect /l/black_death2 is broken. Needs new link	This issue was addressed in another report and is corrected in webview.	Broken link

Fungi, and Protists: Section 13.1 Prokaryotic Diversity			
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.1 Prokaryotic Diversity	The scale bar in the middle panel of Figure 13.4 showing the piliform bacteria cannot be correct (2 nanometers is molecular scale, not cellular scale). This could have been due to a typographical error if the correct value was 2 micrometers. If that's the case, I suggest changing the label to 2000 nm to be consistent with the other panels.	This figure will be updated.	Other factual inaccuracy in content
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.1 Prokaryotic Diversity	broken link: http://openstax.org/l/antibiotics2	This link will be updated.	Broken link
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.1 Prokaryotic Diversity	https://openstax.org/l/antibiotics2 redirect is broken. Needs new link.	This link will be updated.	Broken link
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.1 Prokaryotic Diversity	https://openstax.org/l/extremophiles redirect is broken. Needs new link.	This link will be updated.	Broken link
Chapter 13 Diversity of	Under the Reproduction heading, the authors briefly	Add the following text "Binary fission as a way of	General/pedagogical

Microbes, Fungi, and Protists: Section 13.1 Prokaryotic Diversity	describe the process of binary fission (which could use a nice diagram). The next paragraph describes three methods of lateral (horizontal) gene transfer, which is NOT reproduction. Conjugation, transduction, and transformation should be under a different heading such as "Lateral Gene Transfer" and clearly separated from reproduction. My students assume that this is still reproduction and I have to spend a lot of time clarifying. Then, there is a random subheading "How Prokaryotes Obtain Energy and Carbon" under the main Reproduction heading which seems to be either in the wrong place or the font should indicate that it is a main heading. Also, it gives very little information.	reproduction does not provide an opportunity for genetic recombination and increased genetic variability. However, prokaryotes can alter their genetic makeup by three mechanisms of obtaining exogenous DNA."	suggestion or question
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.2 Eukaryotic Origins	13.2 “Most mitochondria are shaped like a specific group of bacteria and are surrounded by two membranes, which would result when one membrane-bound organism was engulfed into a vacuole by another membrane-bound organism.” (This sentence is wrong and repeating a misconception on why there are two membranes found in the mitochondria. This is contrary to the information that was in chapter 20.3 that indicates that gram negative bacteria such as proteobacteria, have dual membranes already. The outer	In the paragraph above figure 13.11, revise as follows: Most mitochondria are shaped like a specific group of bacteria and are surrounded by two membranes. The mitochondrial inner membrane involves ...	General/pedagogical suggestion or question

	membrane of the mitochondria has porins similar to the outer membrane of gram negative bacteria.)		
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.3 Protists	The following links need a new target: (http://openstaxcollege.org/l/malaria2), (http://openstaxcollege.org/l/African_sleep2)	Revise the URL for http://openstaxcollege.org/l/malaria2 to: https://www.animalplanet.com/tv-shows/monsters-inside-me/videos/malaria-parasite Revise the URL for http://openstaxcollege.org/l/African_sleep2 to: https://www.animalplanet.com/tv-shows/monsters-inside-me/videos/african-sleeping-sickness	Broken link
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.4 Fungi	Fungi thrive in environments that are moist and slightly acidic, and can grow with or without light. >>This makes it sound like some fungi are photosynthetic, which is not true.	Revise "...can grow with or without light..." to "...can grow in dark places or places exposed to light..."	Other factual inaccuracy in content
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.4 Fungi	The wall protects the cell from desiccation and predators. >>The primary function of the cell wall is probably to provide structural integrity. Moisture passes easily across cell walls (and membranes).	Revise "The wall protects the cell from desiccation and some predators." to "The wall provides structural support and protects the cell from desiccation and some predators."	Other factual inaccuracy in content
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.4 Fungi	The kingdom Fungi includes an enormous variety of living organisms collectively referred to as Eucomycota, or true Fungi. >>The term “Eucomycota” is not in general use. The name of the kingdom is simply “Fungi” While scientists have identified about 100,000 species of fungi, this is only a fraction of the 1.5 million species of fungus likely present on Earth. >>There are	Revise "The kingdom Fungi includes an enormous variety of living organisms collectively referred to as Eumycota, or true Fungi. While scientists have identified about 100,000 species of fungi, this is only a fraction of the 1.5 million species of fungus likely present on Earth." to "The kingdom Fungi includes an enormous variety of living organisms. While scientists have identified	Other factual inaccuracy in content

	at least 135,000 described species. Estimates of the actual number of species vary widely, with the 1.5 million figure being on the low end. 5 million is a commonly cited estimate, but we really don't know!	about 35,000 species of fungi, this is only a fraction of the more than 1.5 million species of fungus likely present on Earth."	
Chapter 13 Diversity of Microbes, Fungi, and Protists: Section 13.4 Fungi	I have a suggestion for a modification of the Fungi chapter. Under the Growth and Reproduction heading, it is stated that "They display two distinct morphological stages: vegetative and reproductive." The paragraphs following this statement go on to describe the vegetative stage, but the text never returns to discuss the reproductive stage. There is no mention of mushrooms or other types of fruiting bodies or where the spores (mentioned in the reproduction paragraph) are formed. A short paragraph describing the "reproductive structure" of fungi would be immensely helpful to my students.	Revise from "Fungi can reproduce sexually or asexually." to "The reproductive stage could be sexual or asexual."	General/pedagogical suggestion or question
Chapter 14 Diversity of Plants: Section 14.2 Seedless Plants	The following link needs a new target: (http://openstaxcollege.org/l/fern_life_cycl2)	Update the URL for http://openstaxcollege.org/l/fern_life_cycl2 to: https://www.youtube.com/watch?v=Fhk-Y0duNjg Revise text as follows: Watch this video illustrating the life cycle of a fern (http://openstaxcollege.org/l/fern_life_cycl2) and assess your knowledge.	Broken link
Chapter 14 Diversity of Plants: Section 14.3	broken youtube link	These links will be updated.	Broken link

Seed Plants: Gymnosperms			
Chapter 14 Diversity of Plants: Section 14.3 Seed Plants: Gymnosperms	Line 23	Revise "Because the gametophytes mature..." to "Because gametophyte maturation depends on water and nutrient supply from the dominant sporophyte tissue, they are not free-living, as are the gametophytes of seedless vascular plants."	Other factual inaccuracy in content
Chapter 14 Diversity of Plants: Section 14.3 Seed Plants: Gymnosperms	"tamarack Larix larcinia" Should be "laricina"	Revise "larcinia" to "laricina".	Typo
Chapter 14 Diversity of Plants: Section 14.4 Seed Plants: Angiosperms	Pollinators is spelled wrong in Link to Learning just below Table 14.1.	Our reviewers accepted this change, and it will be included in the next print cycle.	Typo
Chapter 15 Diversity of Animals: Section 15.2 Sponges and Cnidarians	The link takes you to a video that no longer exists. It's the second video link in the chapter.	This link will be updated.	Broken link
Chapter 15 Diversity of Animals: Section 15.2 Sponges and Cnidarians	The following link needs a new target: (http://openstaxcollege.org/l/box_jellyfish)	Update the URL for http://openstaxcollege.org/l/box_jellyfish to: https://www.youtube.com/watch?v=74v498Oqlm8	Broken link
Chapter 15 Diversity of Animals: Section 15.2	The following link does not work: http://openstaxcollege.org/l/amazing_jelly2	Revise URL for shortlink openstax.org/l/amazing_jelly2 to: http://bcs.whfreeman.com/webpub/Ektron/Hillis%20Principle	Typo

Sponges and Cnidarians		s%20of%20Life2e/Animated%20Tutorials/pol2e_at_2301_Life_Cycle_of_a_Cnidarian/pol2e_at_2301_Life_Cycle_of_a_Cnidarian.html Revise text as follows: Identify the life cycle stages of jellies using this video (openstax.org/l/amazing_jelly2) animation.	
Chapter 15 Diversity of Animals: Section 15.2 Sponges and Cnidarians	redirect link /l/amazing_jelly2 is broken. Needs new link.	This link will be updated.	Broken link
Chapter 15 Diversity of Animals: Section 15.6 Vertebrates	There error states that monotremes are metatherians but that is incorrect. Monotremes are prototherians (or protherians) and marsupials are metatherians.	Revise "The eutherians, or placental mammals, and the marsupials collectively are called therian mammals, whereas monotremes are called metatherians." to "The eutherians, or placental mammals, and the marsupials collectively are called therian mammals, whereas monotremes are called prototherians."	Other factual inaccuracy in content
Chapter 15 Diversity of Animals: Section 15.6 Vertebrates	The following link needs a new target: (http://openstaxcollege.org/l/river_monster2)	Update the URL for http://openstaxcollege.org/l/river_monster2 to: https://www.youtube.com/watch?v=P_kyeHZjRJ4	Broken link
Chapter 15 Diversity of Animals: Section 15.6 Vertebrates	The following sentence implies that Australian marsupials do not have mammary glands at all, when the likely intention is to say that only female Australian marsupials have mammary glands, not males. "In both monotremes and eutherians, both males and females possess mammary	Revise the sentence beginning "In both monotremes and eutherians..." to "In both monotremes and eutherians, both males and females possess mammary glands, while in some marsupials, mammary glands are found only in females, with exception of some opossums."	Typo

	glands, while in marsupials, mammary glands have been found only in some opossums."		
Chapter 16 The Body's Systems: Section 16.2 Digestive System	This section links to www.letsmove.gov, a site which no longer exists. The sentence could be replaced and the sentences immediately preceding changed into the past tense. Alternatively, this site is still available at https://letsmove.obamawhitehouse.archives.gov/ .	Revise "www.letsmove.gov" to "https://letsmove.obamawhitehouse.archives.gov/".	Broken link
Chapter 16 The Body's Systems: Section 16.3 Circulatory and Respiratory Systems	https://openstax.org/l/electric_heart2 redirect is broken. Needs new link.	This link will be updated.	Broken link
Chapter 16 The Body's Systems: Section 16.6 Nervous System	https://openstax.org/l/split-brain2 redirect is broken. Needs new link.	The link has been updated in webview.	Broken link
Chapter 17 The Immune System and Disease: Section 17.1 Viruses	All the images, except the lipids, are of single items and appropriately labelled with singular names. However, the bacterium is labeled "bacteria" and the mitochondrion is labelled "mitochondria". Please change these to singular nouns to match the rest of the figure.	Our reviewers accepted this change.	Typo
Chapter 17 The Immune System and Disease: Section 17.2 Innate Immunity	The following link needs a new target: (http://openstaxcollege.org/l/neutrophil)	Update the URL for http://openstaxcollege.org/l/neutrophil to: https://commons.wikimedia.org/wiki/File:S1-Polymorphonuclear_Cells_with_Conidia_in_Liquid_Media.ogv	Broken link

Chapter 17 The Immune System and Disease: Key Terms	MHC should be short for major histocompatibility 'complex' instead of major histocompatibility 'class' as in the text.	Revise "major histocompatibility class" to "major histocompatibility complex".	General/pedagogical suggestion or question
Chapter 18 Animal Reproduction and Development: Section 18.1 How Animals Reproduce	There might be a note at the end of this paragraph what wasn't intended to be published: External fertilization usually occurs in aquatic environments where both eggs and sperm are released into the water. After the sperm reaches the egg, fertilization takes place. Most external fertilization happens during the process of spawning where one or several females release their eggs and the male(s) release sperm in the same area, at the same time. The spawning may be triggered by environmental signals, such as water temperature or the length of daylight. Nearly all fish spawn, as do crustaceans (such as crabs and shrimp), mollusks (such as oysters), squid, and echinoderms (such as sea urchins and sea cucumbers). Revise to "Frogs, corals, squid, and octopuses also spawn (Figure 18.6).	Our reviewers accepted this change, and it will be included in the next print cycle.	Typo
Chapter 18 Animal Reproduction and Development: Section 18.1 How Animals Reproduce	In the text, it states that barnacles reproduce through self-fertilization. Although they are Hermaphrodites, studies are showing that barnacles reproduce sexually with their close neighbor. When they are isolated from other barnacles, they are being fertilized through "sperm casting". Although not impossible, self-	Delete "Self-fertilization is more common in animals that have limited mobility or are not motile, such as barnacles and clams."	Other factual inaccuracy in content

	fertilization has not been found in genetic testing of barnacles.		
Chapter 18 Animal Reproduction and Development: Section 18.3 Human Reproduction	The following link needs a new target: (http://openstaxcollege.org/l/embryo_fetus2)	Update the URL for http://openstaxcollege.org/l/embryo_fetus2 to: https://embryology.med.unsw.edu.au/embryology/index.php/Fetal_Development	Broken link
Chapter 19 Population and Community Ecology: Section 19.2 Population Growth and Regulation	You use a good example of logistic growth... "Malthus published a book in 1798 stating that populations with unlimited natural resources grow very rapidly, and then population growth decreases as resources become depleted." ...to introduce the idea of exponential growth... "This accelerating pattern of increasing population size is called exponential growth." This is really misleading and is making me regret my decision to adopt this as my class text.	Revise the paragraph beginning "Charles Darwin, in his theory of natural selection..." to "Charles Darwin, in his theory of natural selection, was greatly influenced by the English clergyman Thomas Malthus. Malthus published a book in 1798 stating that populations with unlimited natural resources grow very rapidly, which represents an exponential growth, and then population growth decreases as resources become depleted, indicating a logistic growth."	Other factual inaccuracy in content
Chapter 19 Population and Community Ecology: Section 19.4 Community Ecology	The section in the "Ecology" chapter talks about camouflage, and how chameleons can change their color based on their background. This is false information, as chameleons cannot change their color based on background. They change color based on a number of things like mood, health and body temperature. Yes, their coloring can help with their camouflage, but the chromatophores in their flesh	Revise "In another example, the chameleon can change..." to "In another example, the chameleon can, within limitations, change...".	Other factual inaccuracy in content

	can only show certain colors. A green veiled chameleon wont turn pink, just because you put it in a pink box. I would suggest changing the example in this section from chameleons to something like an octopus or a cuddle fish.		
Chapter 19 Population and Community Ecology: Section 19.4 Community Ecology	broken link: http://openstax.org/l/find_the_mimic2	This link will be updated.	Broken link
Chapter 19 Population and Community Ecology: Section 19.4 Community Ecology	The text says that, "These defenses may be mechanical, chemical, physical, or behavioral." But only examples of mechanical and chemical are given.	Revise "Many species use their body shape and coloration to avoid being detected by predators." to "Many species use physical appearance, such as body shape and coloration, to avoid being detected by predators." Add the following sentence to the end of the same paragraph: "There are many behavioral adaptations to avoid or confuse predators. Playing dead and traveling in large groups, like schools of fish or flocks of birds, are both behaviors that reduce the risk of being eaten."	General/pedagogical suggestion or question
Chapter 20 Ecosystems and the Biosphere: Section 20.1 Waterford's Energy Flow through Ecosystems	In the last bulleted point, it reads that students will be able to "Explain how the efficiency of energy transfers between trophic levels effects ecosystem." It should read "...transfers between trophic levels affects ecosystems."	Revise “effects” to “affects”.	Other factual inaccuracy in content
Chapter 20 Ecosystems	The link that's there presently takes you to a 404 page, but	This link will be updated.	Broken link

and the Biosphere: Section 20.1 Waterford's Energy Flow through Ecosystems	here is the correct link to replace it with: https://www.learner.org/series/the-habitable-planet-a-systems-approach-to-environmental-science/ecology-lab/		
Chapter 20 Ecosystems and the Biosphere: Section 20.2 Biogeochemical Cycles	The arrows labeling marine photosynthesis and marine respiration are reversed. Respiration adds carbon to the atmosphere and photosynthesis removes it.	This figure will be updated.	Other factual inaccuracy in content
Chapter 20 Ecosystems and the Biosphere: Section 20.2 Biogeochemical Cycles	Atmospheric sulfur is found in the form of sulfur dioxide (SO2), and as rain falls through the atmosphere, sulfur is dissolved in the form of weak sulfuric acid (H2SO4). Previously, your reviewers found this statement correct, which, sadly, is wrong from the chemical standpoint. SO2 dissolves in water forming sulfurous (H2SO3), not sulfuric acid. Eventually H2SO3 may get oxidized forming H2SO4, but the latter is by no means a weak acid. For the chemistry's sake, correct this mistake.	Revise "sulfuric" to "sulfurous" and revise "H2SO4" to "H2SO3".	Other factual inaccuracy in content
Chapter 20 Ecosystems and the Biosphere: Section 20.4 Aquatic and Marine Biomes	The in question text reads: "Plants and animals have adapted to this fast-moving water. For instance, leeches (phylum Annelida) have elongated bodies and suckers on the anterior and ventral areas of the body. These suckers attach to the substrate, keeping the leech anchored in place, and are also used to attach to their prey. Freshwater trout species	Revise "For instance, leeches (phylum Annelida) have elongated bodies and suckers on the anterior and ventral areas of the body. These suckers attach to the substrate, keeping the leech anchored in place, and are also used to attach to their prey. Freshwater trout species (phylum Chordata) are an important predator in these fast-moving rivers and	Other factual inaccuracy in content

	(phylum Chordata) are an important predator in these fast-moving rivers and streams." To the best of my knowledge, few species of leeches are well-adapted to fast-moving water and most are found in slow-moving water or ponds. As an alternative, the text could describe certain species of mayflies. E.g.,: "Plants and animals have adapted to this fast-moving water. For instance, some species of mayfly (phylum Arthropoda) have (dorsoventrally?) flattened bodies and legs with modified claws to help them cling to the underside of submerged rocks. This body form reduces drag and allows these species to benefit from the high oxygen concentrations in fast-moving currents without being dislodged. Freshwater trout species (phylum Chordata) are an important predator in these fast-moving rivers and streams."	streams." to "For instance, some species of mayfly (phylum Arthropoda) have flattened bodies and legs with modified claws to help them cling to the underside of submerged rocks. This body form reduces drag and allows these species to benefit from the high oxygen concentrations in fast-moving currents without being dislodged. Freshwater trout species (phylum Chordata) are an important predator in these fast-moving rivers and streams."	
Chapter 20 Ecosystems and the Biosphere: Section 20.4 Aquatic and Marine Biomes	The text reads: "The deepest part of the ocean is the abyssal zone, which is at depths of 4000 m or greater. The abyssal zone (Figure 20.28) is very cold and has very high pressure, high oxygen content, and low nutrient content." However, to the best of my understanding the abyssal zone has high nutrient content due to the collection of decomposing material that falls to the ocean	Revise "The abyssal zone (Figure 20.28) is very cold and has very high pressure, high oxygen content, and low nutrient content." to "The abyssal zone (Figure 20.28) is very cold and has very high pressure, very low or no oxygen content, and high nutrient content as the dead and decomposing material that drifts down from the layers above."	Other factual inaccuracy in content

	floor. In addition, the sea floor, where the highest concentration of life is, can be essentially depleted in oxygen.		
Chapter 21 Conservation and Biodiversity: Section 21.3 Preserving Biodiversity	I'm unsure if this is an error or if the text is simply unclear, but the text states that the background extinction rate is 1 E/MSY, and in the following paragraph, the the bird extinction rate in recent centuries has been at least 26 E/MSY. The text then goes on to say that the latter is almost three times the former. This does not fit with my understanding of multiplication.	Revise "three" to "thirty".	Typo