RELEASE NOTES

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Atoms First

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Page Count Difference:

Changes in formatting and design have allowed the page count to be reduced from 1327 in the previous revision to 1211 in the new revision.

Errata:

Below is a table containing submitted errata and the resolutions that OpenStax has provided for this latest text. Beyond errata and related updates, this release includes significant additions of more diverse scientists and increased discussions of discoveries and scientific processes. New narratives include historical and recent contributors such as Alma Levant Hayden, Percy Lavon Julian, Lise Meitner, Alice Ball, Susan Kwolek, Reatha Clark King, and many others. These expansions are aimed at engaging students in the personal and practical impacts and opportunities related to chemical principles.

Location	Detail	Resolution Notes	Error Type
Preface	Image in Chem 2e and Atoms First 2e prefaces appears only there and nowhere else in the book, so there is no alt text available to assign to it. CNX_Chem_06_03_3dOrbitals.jpg	Alt text will be added to this figure.	Other
Chapter 1 Essential Ideas: Section 1.1 Chemistry in Context	Exercise 51(f) In the lesson you say "if the dropped digit is 5, round up or down, whichever yields an even value for the retained digit". But in the answer to exercise 51 f, you round 0.445 with two sig. dig. to 0.45 instead of 0.44	Revise the answer to "0.44".	Incorrect answer, calculation, or solution
Chapter 1 Essential Ideas: Section 1.2 Phases and Classification of Matter	The author wrote that "Pure substances that can be broken down by chemical changes are called compounds.", however, this definition seems inaccurate. For example, we won't view H2 and O2 as compounds, that's because they aren't consist of two or more than two kinds of elements. Nevertheless, if we apply the author's definition in this case, we can find out that H2 + O2 = H2O, and in this reaction, both of the reactants are actually broken down by chemical changes while both of which aren't categorized as compounds. Therefore, I suggest that we should change the definition into "a	Revise “Pure substances that can be broken down by chemical changes are called compounds. This breakdown may produce either elements or other compounds, or both.” to “Pure substances that are comprised of two or more elements are called compounds. Compounds may be broken down by chemical changes to yield either elements or other compounds, or both.”	Other factual inaccuracy in content

	pure substance consist of two or more than two kinds of elements."		
Chapter 1 Essential Ideas: Section 1.4 Measurements	Example 1.2 There is a minus sign "-" where there should be an equal sign "=". "29.5 mL - 25.5 mL - 4.0 mL" should be "29.5 mL - 25.5 mL = 4.0 mL"	Our reviewers accepted this change, and it will be included in the next print cycle.	Typo
Chapter 1 Essential Ideas: Section 1.4 Measurements	In para. 2 under Density, the phrase "this as an inconvenient unit" should be "this is an inconvenient unit".	Our reviewers accepted this change, and it will be included in the next print cycle.	Typo
Chapter 1 Essential Ideas: Section 1.4 Measurements	Exercise 41 has 5 questions. Answer (d) is the answer of question (e), and there's no answer to question (d). Answer to (d) should be: red < green < blue < yellow.	Add "red < green < blue < yellow;" as the answer to part (d), and add "(e)" before "If the volumes are..."	Incorrect answer, calculation, or solution
Chapter 1 Essential Ideas: Section 1.4 Measurements	End of chapter Qs c) asking for base SI units so speed of sound should be m/s not km/s	Revise from kilometers/second to meters/second.	Other factual inaccuracy in content
Chapter 1 Essential Ideas: Section 1.4 Measurements	example 1.2 http://openstax.org/l/16phetmasvolden Flash is no longer supported.	This link and exercise, as well as the related questions (41-43) will be updated.	Broken link
Chapter 1 Essential Ideas: Section 1.5 Measurement Uncertainty, Accuracy, and Precision	The rule about rounding "5" to an even digit (list item 3 under "Significant Figures in Calculations) is not explained correctly. This rule only applies when 5 is the digit being dropped *and is the last nonzero digit*. The later qualifier is important because if the unrounded number has nonzero digits following that 5, then it is closer to the rounded up value than the rounded down value. This error is reinforced by the third bullet point example, which gives an incorrect explanation: "6.8752 rounds “up” to 6.88 (the dropped digit is 5, and the retained digit is even)". The correct reason to round up is because 6.8752 is closer to 6.88 (abs. difference = 0.0048) than to 6.87 (abs. difference = 0.0052). 6.7852 should still be rounded up to 6.79 and not to the even digit 6.78 for this same reason. The "bias" argument for rounding to the even applies to a single non-zero digit being dropped because there are only four digits that would go down (1-4) and five that would go up (5-9) using "normal" or "high school math" rounding rules. If the dropped digit is assumed to be uniformly distributed, this is a pretty significant bias towards increasing the value. The round to the even rule fixes this by having 5 go up as often as down (also assumes odd is as likely as even for the last retained digit). With two digits that get rounded away, the bias is only 50 up to 49 down, and is similarly removed if the only two digit case that is rounded to the even is 50. Rounding 51 through 59 to the nearest even while still always rounding 41-49 actually creates a downward bias (there are now 49 always round down pairs of digits to 40	Revise rule 3 as follows: "If the digit to be dropped (the one immediately to the right of the digit to be retained) is less than 5, “round down” and leave the retained digit unchanged; if it is more than 5, “round up” and increase the retained digit by 1. If the dropped digit is 5, and it’s either the last digit in the number or it’s followed only by zeros, round up or down, whichever yields an even value for the retained digit. If any nonzero digits follow the dropped 5, round up. (The last part of this rule may strike you as a bit odd, but it’s based on reliable statistics and is aimed at avoiding any bias when dropping the digit “5,” since it is equally close to both possible values of the retained digit.)" Revise the third bullet below this to the following: "6.8752 rounds “up” to 6.88 (the dropped digit is 5, and a nonzero digit follows it)"	

	always round up pairs). Same argument applies no matter how many digits are being dropped.		
Chapter 1 Essential Ideas: Section 1.5 Measurement Uncertainty, Accuracy, and Precision	Example 1.5, Solution of (b). is presented as 0.86728... g/mL when the actual correct answer should be 0,866728... g/mL.	Revise "0.86728" to "0.866728".	Typo
Chapter 1 Essential Ideas: Section 1.6 Mathematical Treatment of Measurement Results	I think Question 71 is intended to link to table 1.2 instead of 1.3	Our reviewers accepted this change.	Broken link
Chapter 1 Essential Ideas: Section 1.6 Mathematical Treatment of Measurement Results	Under "Learning objectives" and before "Conversion factors and dimensional analysis" It says (m/m/s)=s. Based on order of operations, this would be m/m=1, then 1/s= s^(-1). It needs to use (m/(m/s))=s because then if you are dividing by a fraction, you are multiplying by the reciprocal, so m*(s/m)=s	Revise "(m/m/s = s)" to "(m/(m/s) = s)".	Incorrect answer, calculation, or solution
Chapter 1 Essential Ideas: Section 1.6 Mathematical Treatment of Measurement Results	It says (m/m/s)=s. Based on order of operations, this would be m/m=1, then 1/s= s^(-1). It needs to use (m/(m/s))=s because then if you are dividing by a fraction, you are multiplying by the reciprocal, so m*(s/m)=s	Revise "(m/m/s = s)" to "(m/(m/s) = s)".	Incorrect answer, calculation, or solution
Chapter 1 Essential Ideas: Section 1.6 Mathematical Treatment of Measurement Results	The time period should be listed as the late 19th Century rather than the late 1800s because late 1800s implies 1807-1809, which is not the time when the cathode ray tube experiments were performed.	Revise the sentence "The mercury or alcohol in a common..." to "The liquid in a common glass thermometer changes its volume as the temperature changes, and the position of the trapped liquid's surface along a printed scale may be used as a measure of temperature."	Other factual inaccuracy in content
Chapter 1 Essential Ideas: Section 1.6 Mathematical Treatment of Measurement Results	In example 1.9, before it says the first two steps for volume converison (how to get from quarts to millileter), it says "Volume may be converted from quarts to millimeters via two steps," when it should say millileters.	Revise "millimeters" to "milliliters".	Typo
Chapter 1 Essential Ideas: Section 1.6 Mathematical Treatment of Measurement Results	In the equation relating the temperature (T) scales converting from Celsius to Fahrenheit the book states incorrectly +32C and it should be corrected to 32F. Otherwise, you are teaching to add apples and oranges to produce apples.	Revise C to F.	Other factual inaccuracy in content

Chapter 1 PowerPoint, Slide 32	Instructor PowerPoint material, Chapter 1, Slide 32 - it should read as 'most elements exist as individual atoms 'only a few exist as molecules'	This slide will be deleted from the PowerPoint.	Other factual inaccuracy in content
Chapter 1, Chapter 3, Appendix D	Update to revise the definitions of several fundamental physical constants that were adopted May 2019.	Revise as indicated.	General/pedagogical suggestion or question
Chapter 2 Atoms, Molecules, and Ions: Section 2.1 Early Ideas in Atomic Theory	Example 2.2 In the answer, the book reads " In compound Y, the mass ratio of carbon to oxygen is" when it should be " In compound Y, the mass ratio of carbon to hydrogen is"	Revise oxygen to hydrogen.	Typo
Chapter 2 Atoms, Molecules, and Ions: Section 2.1 Early Ideas in Atomic Theory	In the molecules represented at the right of the figure, the angle between the aldehyde function and the phenyl ring in the benzaldehyde differs from the ideal 120 degrees.	This figure will be updated.	Other factual inaccuracy in content
Chapter 2 Atoms, Molecules, and Ions: Section 2.1 Early Ideas in Atomic Theory	Example 2.2's solution explanation states "...with A having one-half as much carbon per amount of oxygen (or twice as much carbon per amount of oxygen) as B." Carbon and oxygen should be switched in the first part. It should read: with A having one-half as much oxygen per amount of carbon...	Revise "carbon" to "oxygen" and vice versa.	Typo
Chapter 2 Atoms, Molecules, and Ions: Section 2.3 Atomic Structure and Symbolism	Exercise 25 The atomic mass listed in Ch 2 problem 25 for B-11 is incorrect. It should be 11.00931 amu, not 11.0931 amu.	This will be updated in the Answer Key and solution manual.	Other factual inaccuracy in content
Chapter 2 Atoms, Molecules, and Ions: Section 2.3 Atomic Structure and Symbolism	typo in one occurrence of Oxygen-18 (e.g., "Oxyen-18" should be "Oxygen-18")	Our reviewers accepted this change, and it will be included in the next print cycle.	Typo
Chapter 2 Atoms, Molecules, and Ions: Section 2.4 Chemical Formulas	At the end of Chapter 2, right before the Key Terms, there's a "How Sciences Interconnect" section with a picture of the brain on the left and neuron cells on the right. Immediately above the picture, the last sentence in that paragraph links to a White House article from the Obama administration that's since been archived. (see first screenshot) I did a little digging and found the original linked article on an archived web page, but think this link would be better, since it's the BRAIN Initiative website: https://braininitiative.nih.gov/	This link will be updated.	Broken link
Chapter 2 Atoms, Molecules, and Ions: Section 2.4 Chemical Formulas	Value of the mole in text 6.02214179 × 1023. New value is 6.02214076 × 1023	Our reviewers accepted this change.	General/pedagogical suggestion or question

Chapter 2 Atoms, Molecules, and Ions: Section 2.4 Chemical Formulas	Chapter 2 Problem 55 Answer in the back of the book. The problems asks for greatest mass; however the answer provided is in moles.	Revise the solution to exercise 55 as follows: AlPO4: 1.000 mol or 26.98 g Al Al2Cl6: 1.994 mol or 53.74 g Al Al2S3: 3.00 mol or 80.94 g Al The Al2S3 sample thus contains the greatest mass of Al.	Typo
Chapter 2 Atoms, Molecules, and Ions: Section 2.4 Chemical Formulas	Chapter 2 Exercise 31, you define the molecular formula of fructose as C12H22O11. However, this is incorrect: C12H22O11 is actually the formula for table sugar, while the formula for fructose is C6H12O6.	Revise "fructose" to "sucrose".	Other factual inaccuracy in content
Chapter 2 Atoms, Molecules, and Ions: Section 2.4 Chemical Formulas	#48 c) last item listed should be 6.9 x 102 moles of OXYGEN	The solution will be updated.	Incorrect answer, calculation, or solution
Chapter 2 Atoms, Molecules, and Ions: Section 2.4 Chemical Formulas	Human cells do not contain cell walls. Instead, "cell membrane" should be printed instead of "cell wall".	Revise "cell wall" to "cell membrane".	Other factual inaccuracy in content
Chapter 2 Atoms, Molecules, and Ions: Section 2.4 Chemical Formulas	Ch 2 Problem #61 asks for the lowest number of molecules in an assortment of compounds. It wants students to calculate the number of molecules in each compound. By these calculations, the answer is correct, however technically, the answer is the CaH2 (Calcium hydride) compound, regardless of quantity. Because CaH2 is ionic, it contains zero molecules. Suggest that either that compound is removed or problem is changed to ask for formula units.	Revise "CaH_2 (42.09 g/mol)" to "C_3H_6 (42.08 g/mol)."	Incorrect answer, calculation, or solution
Chapter 2 Atoms, Molecules, and Ions: Section 2.4 Chemical Formulas	"Determine which of the following contains the greatest mass of aluminum: 122 g of AlPO4, 266 g of Al2C16, or 225 g of Al2S3." The "1" after the "C" in Al2C16 should be an "l" (lower case ell): Al2Cl6	Revise "1" to lowercase "l".	Typo
Chapter 2 Atoms, Molecules, and Ions: Section 2.7 Molecular and Ionic Compounds	In Problem 98, revise MgC2H3O2 to Mg(C2H3O2)2	In exercise 98 part b, revise "MgC2H3O2" to "Mg(C2H3O2)2".	Other factual inaccuracy in content
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.1 Electromagnetic Energy	I'm troubled that men get mentioned winning the noble prize throughout the textbook... but Dorothy Hodgkin's 1964 Nobel Prize in Chemistry isn't mentioned in her "Portrait of a Chemist". Seems a bit sexist and doesn't set a inclusive tone to skip her awards -- especially when awards for men are mentioned often in the text.	The Portrait of a Chemist box on Dorothy Hodgkin will be updated.	Other
Chapter 3 Electronic Structure and Periodic Properties	#26 show work! Not just the answer.	The full solution will be added.	General/pedagogical suggestion or question

of Elements: Section 3.2 The Bohr Model			
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.2 The Bohr Model	Question 28 describes multiple hydrogens with electrons in n = 1, 2, 3, 4 *orbitals*. This is confusing because the quantum number n refers to the shells of the atom, which contain multiple orbitals. The quantum number m_l would refer to the orbitals.	Revise "orbital" to "orbit" and "orbitals" to "orbits" in section 6.2 and problem 28.	Other factual inaccuracy in content
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.2 The Bohr Model	The text reads "The sizes of the circular orbits for hydrogen-like atoms are given in terms of their radii by the following expression, in which α 0 is a constant called the Bohr radius, with a value of 5.292 × 10−11 m:" The equation listed uses a0, rather than α0.	Revise "α" to "a" in the text before the equation.	Typo
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.2 The Bohr Model	In the teacher solutions to chapter 3 #27, Joules are converted to eV, though the question asks for Joules. Was the question intended to ask for eV?	This solution will be updated.	Incorrect answer, calculation, or solution
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.3 Development of Quantum Theory	The highlighted value should be $\hbar$, not h. h is the Planck's constant with value 6.626x10^-34 Js. $\hbar$=h/(2pi), which is 1.055x10^-34	Our reviewers accepted this change, and it will be included in the next print cycle.	Incorrect answer, calculation, or solution
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.3 Development of Quantum Theory	That h (highlighted one) should be a 'ħ'.	Revise "h" to "ħ".	Typo
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.4 Electronic Structure of Atoms (Electron Configurations)	Within the key terms, discussing transition elements, a sentence reads as "The valence electrons (those added after the last noble gas configuration) in these elements include the ns and (n – 1) d electrons." The electrons being referred to are the 'outer' electrons and not the 'valence' electrons. Then, within the instructor's powerpoint slides, where it says the same incorrect sentence, there is an example for Vanadium, discussing it has 5 valences electrons. Again, this should be corrected to say 5 outer electrons and followed up with 2 valence electrons (being the 4s2 as they can extend furthest form the nucleus).	While our reviewers determined that the current text is consistent with the widespread usage of the term "valence," revisions will be made to the definitions of valance electrons and valance shell in the Key Terms section. Revise the definition of valance electron to "electrons in the high energy outer shell(s) of an atom" and valance shell to "high energy outer shell(s) of an atom".	Other factual inaccuracy in content
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.4 Electronic Structure of Atoms (Electron Configurations)	At exercise 47, in the answer key, you write the wrong electron configuration for Ca2+	Revise "Ca^2+: 1s^22s^22p^6" to "Ca^2+: 1s^22s^22p^63s^23p^6".	Incorrect answer, calculation, or solution

Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.4 Electronic Structure of Atoms (Electron Configurations)	Figure 3.27 is supposed to show the electron configuration for each subshell at top right of each element. As such, it gives a 4f^1 configuration for Ce, 4f^2 for Pr, 4f^3 for Nd etc. This is wrong. The correct electron configurations are shown on figure 6.29: 4f^3 for Pr, 4f^4 for Nd etc. With the exception of La, Ce and Gd for the lanthanides (more exceptions in the case of the actinides), they follow the rule represented figure 6.26, and correspond to electronic configurations 6d^24f^n for La-Yb and 7s^25f^n for Ac-No, with no electrons in the d shell. In short, for the purpose of figure 6.27, La and Ac should be seen as part of the f block, and Lu and Lr as part of the d block (irrespective of the larger debate about where to place them in general). Maybe showing the table as in appendix A (with the spaces under Y occupied by La-Lu and Ac-Lr place markers) would provide a more general representation.	This figure and caption will be updated.	Other factual inaccuracy in content
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.4 Electronic Structure of Atoms (Electron Configurations)	Shouldn't the electron configuration "1s2 2s2 2p6 3s2 3p6 3d10 4s2 4p6 4d5" be written in this order? "1s2 2s2 2p6 3s2 3p6 4s2 3d10 4p6 4d5" (order change between 3d10 and 4s2)	Revise "1s22s22p63s23p63d104s24p64d5" to "1s22s22p63s23p64s23d104p64d5".	Typo
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.4 Electronic Structure of Atoms (Electron Configurations)	#52 a) 2p needs 3 orbitals shown, c) 3d needs 5 orbitals shown	The solution will be updated.	Incorrect answer, calculation, or solution
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.4 Electronic Structure of Atoms (Electron Configurations)	Figure 3.27 The table is supposed to show the electron configuration for each subshell at top right of each element. As such, it gives a 4f^1 configuration for Ce, 4f^2 for Pr, 4f^3 for Nd etc. This is wrong. The correct electron configurations are shown on figure 6.29: 4f^3 for Pr, 4f^4 for Nd etc. With the exception of La, Ce and Gd for the lanthanides (more exceptions in the case of the actinides), they follow the rule represented figure 6.26, and correspond to electronic configurations 6d^24f^n for La-Yb and 7s^25f^n for Ac-No, with no electrons in the d shell. In short, for the purpose of figure 6.27, La and Ac should be seen as part of the f block, and Lu and Lr as part of the d block (irrespective of the larger debate about where to place them in general). Maybe showing the table as in appendix A (with the spaces under Y occupied by La-Lu and Ac-Lr	This figure and caption will be updated.	Other factual inaccuracy in content

	place markers) would provide a more general representation.		
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.4 Electronic Structure of Atoms (Electron Configurations)	Under the header "Electron Configurations and the Periodic Table" and under 3. Inner Transition Metals, it says The lanthanide series: lanthanide (La) through lutetium (Lu) The actinide series: actinide (Ac) through lawrencium (Lr) when it should say (stars indicate the error) The lanthanide series: *lanthanum* (La) through lutetium (Lu) The actinide series: *actinium* (Ac) through lawrencium (Lr)	Revise "lanthanide" to "lanthanum" and revise "actinide" to "actinium".	Typo
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.4 Electronic Structure of Atoms (Electron Configurations)	The electron configurations sometimes have the wrong order, for example, the solution to 63 gives the order as ... 3s, 3p, 3d, 4s, 4p, 4d, 5s ... when it should be ... 3s, 3p, 4s, 3d, 4p, 5s, 4d ... following Madelung's rule.	Revise the solution to 1s^22s^22p^63s^23p^64s^23d^104p^65s^24d^105p^66s^24f^145d^10.	Incorrect answer, calculation, or solution
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.5 Periodic Variation in Element Properties	The label for Mg is floating away from where it should be and it is unclear which data point it is associated with. It should be in a similar position to the Be label, directly above the data point associated with it.	This figure will be updated to remove the "Mg" label because there is no unambiguous location to place it.	Other
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.5 Periodic Variation in Element Properties	Figure 3.36. The electron affinity in the table should be -200 (-20 is currently listed in the table).	This figure will be updated.	Typo
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.6 The Periodic Table	#92 a) Answer = Cl	The solution will be updated.	Incorrect answer, calculation, or solution
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.7 Molecular and Ionic Compounds	In the table of Common Polyatomic Ions the formula for chromic acid is incorrect in both the on-line and paper copies of OpenStax Chemistry. Currently, OpenStax has the formula as H2Cr2O4 (forgive the lack of ability to insert the subscripts correctly but I did not see any word processor on-line assistant; this is incorrect. The correct formula for chromic acid is H2CrO4. One of the themes of Section 2.6 is to teach the students the correct formulas for common compounds and ions.	This formula will be corrected.	Incorrect answer, calculation, or solution

Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.7 Molecular and Ionic Compounds	Table 3.4 The acid for sulfate is misspelled. It should be sulfuric acid, not sulfiric acid.	Revise to "sulfuric".	Typo
Chapter 3 Electronic Structure and Periodic Properties of Elements: Section 3.7 Molecular and Ionic Compounds	The title of this section is "Molecular and Ionic Compounds", but the text describes ionic compounds first and then molecular. Consider changing the order in the title to better reflect the contents.	Revise the title to "Ionic and Molecular Compounds".	General/pedagogical suggestion or question
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.1 Ionic Bonding	There is a small typo in the section on Electronic Structures of Cations. When discussing the formation of Fe2+ it should say "...by the loss of the 4s electrons..." The word electron should be plural.	Revise as indicated.	Typo
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.2 Covalent Bonding	Figure 4.4 provides the H-H bond length as 0.74 which is the Internuclear Distance in angstrom but the Internuclear Distance is labeled as picometers (pm).	This figure will be updated.	Typo
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.3 Chemical Nomenclature	In Problem 31, part b), revise titanium dioxide to titanium(IV) oxide	In exercise 31, revise part b "titanium dioxide" to "titanium(IV) oxide".	Typo
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.3 Chemical Nomenclature	"Naming Ionic Compounds" -- question (d) lists MgSO4·7H2O, but the solution discusses Cl and Cr, neither of which are in (d)	Delete "Cl–" and revise "Cr^3+" to "Mg^2+".	Incorrect answer, calculation, or solution
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.4 Lewis Symbols and Structures	Ch. 4 End of Chapter Questions #37 E needs to specify if the solution is acidic or basic.	Add the following to the end of the answer: "(in basic solution)".	Other factual inaccuracy in content
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.4 Lewis Symbols and Structures	#43 a) phosphate ion needs one P=O bond. c) sulfite ion needs one S=O double bond	The solution will be updated.	Incorrect answer, calculation, or solution
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.5 Formal Charge and Resonance	#69 in SOO structure, the formal charge of the Oxygen on the far right should = 0	The solution will be updated.	Incorrect answer, calculation, or solution

Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.5 Formal Charge and Resonance	shortlink http://openstax.org/l/16LewisMake needs new target, as http://firstyear.chem.usyd.edu.au/iChem/lewis.shtml times out	This link will be updated.	Broken link
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.5 Formal Charge and Resonance	Example 4.10 The Lewis structure that shows a nitrogen-nitrogen triple bond and a nitrogen-oxygen single bond (nitrogen in the center) should also be shown and compared to the others. This one, which puts the negative formal charge on the oxygen, is the most stable (point #4 in the preceding text).	This example will be updated.	General/pedagogical suggestion or question
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.5 Formal Charge and Resonance	When the resonance structures of nitrite are shown, they are properly shown with one N=O and one N-O. However, my question pertains to the blended structure. If the bond lengths are the "same," shouldn't the number of lone pairs on each O be the same?	The section on resonance will be updated.	Other factual inaccuracy in content
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.6 Molecular Structure and Polarity	#96 b) need a lone pair of electrons on the N. c) REMOVE the lone pair of electrons on the S. d) should be trigonal pyramid, not tetrahedral; Also, one S-O single bond should be a S=O double bond	The solution will be updated.	Incorrect answer, calculation, or solution
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.6 Molecular Structure and Polarity	#86 b) molecular shape should be tetrahedral	The solution will be updated. -WW SE	Incorrect answer, calculation, or solution
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.6 Molecular Structure and Polarity	#84 b) molecular shape should be see-saw. c) SnCl3+ needs to be a positive ion with a +1 charge to have the properties listed. e) molecular shape should be T-shape	In part C), revise "SnCl_3^−" to "SnCl_3^+". The rest of the solution will also be updated.	Incorrect answer, calculation, or solution
Chapter 4 Chemical Bonding and Molecular Geometry: Section 4.6 Molecular Structure and Polarity	Figure 4.16 and 4.19 The left column is labeled "Number of electron pairs", but actually describes the "Number of Electron Groups". It is possible, and often occurs that an electron group consists of two or more electron pairs.	Figures 7.16 and 7.19 will be updated to use "region" instead of "pair".	Other factual inaccuracy in content
Chapter 4: Key Equations	in the equation for formal charge instead of "# one pair electrons" it should be "# lone pair electrons"	Revise "one" to "lone".	Typo
Chapter 5 Advanced Theories of Bonding: Section 5.1	Example 5.2 In the worked-out solution for HCl, the charge on an electron has an exponent of +19 (should be -19).	In the solution to Example 5.2 Finding the Partial Ionic Character,	Typo

Valence Bond Theory		revise "(1.60218 × 10^19 C)" to "(1.60218 × 10^-19 C)".	
Chapter 5 Advanced Theories of Bonding: Section 5.1 Valence Bond Theory	Example 5.2 "To get the partial ionic character, we divide This means the bond is about 17% ionic" The calculation to get partial ionic character is incomplete	In the solution after "we divide," add the following: the experimentally measured bond moment by this limiting value: %ionic character = μ_exp/μ_lim × 100% = (1.03 D)/(6.09 D) × 100% = 17%	Typo
Chapter 5 Advanced Theories of Bonding: Section 5.2 Hybrid Atomic Orbitals	Figure 5.10 The intermediate structure (to the right of the "hybridization" arrow and above the "gives a trigonal planar arrangement" arrow) looks to me like those sp2 hybrid orbitals are oriented along the +x, -x and -y axes, at 90 degrees to each other. Then somehow they go to 120 degrees in the final structure. Compare this to the analogous figure 8.15, where it is clear in the intermediate structure that the hybridized orbitals are NOT aligned with the axes.	This figure will be updated.	Other factual inaccuracy in content
Chapter 5 Advanced Theories of Bonding: Section 5.4 Molecular Orbital Theory	In the example box, charge is given as 10^19C but should be 10^-19C	Our reviewers accepted this change.	Typo
Chapter 5 Advanced Theories of Bonding: Section 5.4 Molecular Orbital Theory	The explanation of how to get to the solution is cut off mid-sentence: "To get the partial ionic character, we divide This means...". It should probably say "by the mass of the molecule" or something similar.	Our reviewers accepted this change.	Other
Chapter 5 Advanced Theories of Bonding: Section 5.4 Molecular Orbital Theory	Link to Orbitron website is broken. Message says "account suspended." Is there an updated link? Or even a new source?	This link will be updated.	Broken link
Chapter 5 Advanced Theories of Bonding: Section 5.4 Molecular Orbital Theory	The description for Figure 5.38 in the hardback OpenStax 2016 and the e-book on-line (where it is Chapter 8 Figure 12) both have a typo that is confusing my students. The description states, "Without mixing, the MO pattern occurs as expected, with the σp (sorry that the "P" is not a subscript - I created the sigma symbol with a "P" subscript in Word but after copying and pasting into your errata description box, your box removed the subscript function)orbital energy lower in energy than the σp orbitals...." The only way this sentence can make sense is for the second σp to be πp so that the description matches the figure." Please make this correction because in its current form it makes no sense and the students are confused. Thanks	Revise the caption as indicated.	Typo

Chapter 5 Advanced Theories of Bonding: Section 5.4 Molecular Orbital Theory	Figure 5.29 The two s orbitals that are being combined have different phases. When they are added, it should result in an antibonding orbital, and when they are subtracted it should result in a bonding orbital. The figure is inaccurate in its current form. The easy solution is to give both s orbitals the same phase.	This figure will be updated.	Other factual inaccuracy in content
Chapter 5 Advanced Theories of Bonding: Section 5.4 Molecular Orbital Theory	Figure 5.29 contradicts what you discuss in the section on sigma bonding with p-orbitals as well as standard MO representations. As you say, "We indicate the phases by shading the orbital lobes different colors." In figure 8.29, you show s orbitals with two different phases interacting by representing the s-orbitals with different colors. Both should be the same color and the sigma(bonding) should be shaded with a single color. To help students understand this representation, you would need to mention the difference in colors earlier in the text. There is an additional typo; you say that "The plus (+) signs indicate the locations of nuclei." The image has dots, not +.	In the caption, revise "The plus (+) signs" to "The dots (·)". The figure colors were addressed in a previous report and are correct in webview.	Other factual inaccuracy in content
Chapter 5 Advanced Theories of Bonding: Section 5.4 Molecular Orbital Theory	shortlink openstax.org/l/16labelorbital needs new target, as http://firstyear.chem.usyd.edu.au/calculators/mo_diagrams.shtml times out	Delete this link to learning feature box.	Broken link
Chapter 5 Advanced Theories of Bonding: Section 5.4 Molecular Orbital Theory	According to the New York Times article "Walter Kohn, Who Won Nobel in Chemistry, Dies at 93", Walter Kohn died in 2016, so the sentence "Although he is now an emeritus professor, he is still actively working on projects involving global warming and renewable energy" cannot be correct.	Revise the sentence beginning "Although he is now..." to "Dr. Kohn passed away in 2016 at the age of 93."	Other factual inaccuracy in content
Chapter 5 Advanced Theories of Bonding: Section 5.4 Molecular Orbital Theory	The image in figure 8 shows the MO diagram for Be2 + ion having the 2p MO's in the sigma, pi, pi filling (energy) order, but later in the chapter (image 11) the filling (energy) order is pi, pi, sigma. The image could be fixed by changing the bonding order or by changing the molecule to Ne2.	This figure will be updated.	Other factual inaccuracy in content
Chapter 6 Composition of Substances and Solutions: Section 6.1 Formula Mass and the Mole Concept	In exercise #43(a), the molar mass of S8 is given as 256.528 g/mol. This is correct when the molar of mass of S is taken to the 3rd decimal place. However, the periodic table provided in Appendix A provides the atomic/molar mass of S to only 2 decimal places. This inconsistency in presentation may cause confusion among students.	Revise "256.528 g/mol" to "256.48 g/mol".	Other
Chapter 6 Composition of Substances and Solutions: Section	Examples 2.7, 2.8, 2.9, 2.10, 2.11, 2.12 cancel units but also should cancel unit (say g) and substance (say CO). some have unit (g) where it is better to show unit and substance (g CO)	This will be updated throughout the chapter.	General/pedagogical suggestion or question

6.1 Formula Mass and the Mole Concept			
Chapter 6 Composition of Substances and Solutions: Section 6.2 Determining Empirical and Molecular Formulas	Problem 8 The phrase: '(...) photographic "hypo" ' is perhaps not the best - or at the very least requires a few additional words of explanation. I developed film in the day - and I didn't readily pick up on what this meant. Many of my students think that it is a 'typo'. Maybe: 'the percent composition of sodium thiosulfate'	In part b of exercise 8, revise as follows: 8. Calculate the following to four significant figures: (b) the percent composition of photographic fixer solution (“hypo”), Na2S2O3	General/pedagogical suggestion or question
Chapter 6 Composition of Substances and Solutions: Section 6.2 Determining Empirical and Molecular Formulas	Change "Hydrogen" to "Oxygen".	Revise as indicated.	Other
Chapter 6 Composition of Substances and Solutions: Section 6.2 Determining Empirical and Molecular Formulas	In the sentence that leads into the first worked problem, it states, "Consider a sample of compound determined to contain 1.71g C....." However, in the worked problem the mass used is not 1.71g C but the mass 1.17g C is used. Please correct this error. I have already had my students complaining about this. The error is in the current version on-line. Thanks for your help, Dr. Palamara	Change "1.17 g" to "1.71 g" in the first equation.	Typo
Chapter 6 Composition of Substances and Solutions: Section 6.2 Determining Empirical and Molecular Formulas	In Chapter 3.2, in the "Determination of Empirical Formulas" section, the page states, "Thus, this compound may be represented by the formula C0.142H0.248. Per convention, formulas contain whole-number subscripts, which can be achieved by dividing each subscript by the smaller subscript: C0.142/0.142 H0.284/0.142 or CH2. The issue here is that you state the compound formula as C0.142H0.248, despite the mol H already being evaluated as 0.284, not 0.248.	Revise C_0.142H_0.248 to C_0.142H_0.284.	Other factual inaccuracy in content
Chapter 6 Composition of Substances and Solutions: Section 6.2 Determining Empirical and Molecular Formulas	The opening sentence of chapter 6.2 states: "The previous section discussed the relationship between the bulk mass of a substance and the number of atoms or molecules it contains (moles)." This was not discussed in the previous section, but in chapter 2.4. However, I think it makes more sense to discuss in chapter 6, so I would recommend moving that part here.	Revise "The previous section" to "A previous chapter of this text". We will consider the relocation of content for future editions of this book.	Typo
Chapter 6 Composition of Substances and Solutions: Section 6.2 Determining Empirical and Molecular Formulas	Check Your Understanding 6.3 sigfig error: 71.8% Cl should be 71.78% Cl	Revise "71.8%" to "71.79%".	Incorrect answer, calculation, or solution

Chapter 6 Composition of Substances and Solutions: Section 6.2 Determining Empirical and Molecular Formulas	Problem 10asks to find the percent composition of ammonia of a certain chemical formula containing no calcium; yet, I find that in the detailed solution guide that calcium's atomic mass is used in the calculations to find the answer. I believe the answer is 69.2% rather than 38.2%. Additionally, the provided answer is unreasonable based on the given information in the problem. Please go over this problem in case my answer is incorrect as I cannot check that due to the error in the key.	The solution manual will be updated.	Incorrect answer, calculation, or solution
Chapter 6 Composition of Substances and Solutions: Section 6.2 Determining Empirical and Molecular Formulas	Right after "Consider as another example a sample of compound determined to contain 5.31 g Cl and 8.40 g O. Following the same approach yields a tentative empirical formula of:" In line 7 of this code you will see C1 but it should be Cl.	Revise "C1" to "Cl" (letter l).	Typo
Chapter 6 Composition of Substances and Solutions: Section 6.3 Molarity	Exercise #26 when calculating this, it does not match the answer key. the problem should be 10^-5 or the answer key as 10^-7	In part (b), revise "10^−6" to "10^−7" and "10^−4" to "10^−5".	Incorrect answer, calculation, or solution
Chapter 6 Composition of Substances and Solutions: Section 6.3 Molarity	Problem #47 - the molar mass should be 74.09 instead of 79.09. Problem #51 - should read b) should be 3.8x10^-6, not 10^-5 .	Revise problem 51 question stem part (b) to 3.8 × 10^−6. The problem 47 solution will be updated in the solution manual.	Incorrect answer, calculation, or solution
Chapter 6 Composition of Substances and Solutions: Section 6.3 Molarity	Example 6.9 references "sweetened tea" from example 6.8, but there is now previous mention of sweetened tea.	This issue has been fixed previously.	Other
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.2 Classifying Chemical Reactions	It seems like there's an error because in the instruction it's said ClO4-, but in the answer it's Cl03-. The correct answer for the problem is therefore: 4Cl2 + 8OH- => 7Cl- + ClO4- + 4H2O	Right before the "HINT" revise "ClO4−" to "ClO3−". The answer is then correct.	Incorrect answer, calculation, or solution
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.2 Classifying Chemical Reactions	When demonstrating on how to use the solubility guidelines (Table 4.1), the textbook gives an example of mixing solutions of silver nitrate and sodium fluoride. One of the products in this chemical reaction is silver fluoride, AgF. According to the textbook, "The solubility guidelines indicate... AgF is one of the exceptions to the general solubility of fluoride salts." However, in Table 4.1, the only exceptions to the solubility rule written for fluoride are "compounds with group 2 metal cations, Pb(2+ charge) and Fe(3+ charge)."	Revise the line of Table 4.1 beginning "compounds with group 2" to "compounds with group 2 metal cations, Pb^2+, Fe^3+, and Ag^+".	Other factual inaccuracy in content

Chapter 7 Stoichiometry of Chemical Reactions: Section 7.2 Classifying Chemical Reactions	Table 7.1 has been updated to list all of the group I cations as soluble, but ammonium (NH4+), which is also always soluble, has been omitted. Please modify the table to contain all group I ions plus ammonium in the 'always soluble' section.	Revise to add "NH4+" before "group I cations:".	Other factual inaccuracy in content
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.2 Classifying Chemical Reactions	Example 7.5 Part (a) should be referring to guideline 3 for the oxidation number of H, not guideline 1	Revise "guideline 1" to "guideline 3".	Typo
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.2 Classifying Chemical Reactions	#20 c) C is oxidized from -2 to +4	The solution will be updated.	Incorrect answer, calculation, or solution
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.2 Classifying Chemical Reactions	AgF is soluble in water, and should not form a precipitate. The text says that it would form a precipitate. This does not agree with the information provided in the solubility table on page 183.	In Table 4.1, revise "Pb^2+, Fe^3+, and Ag^+" to "Pb^2+ and Fe^3+". Also revise "fluoride" to "chloride" and "F" to "Cl" in the text and equation below the table. Replace "one of the exceptions to the general solubility of fluoride salts" with "insoluble".	Incorrect answer, calculation, or solution
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.2 Classifying Chemical Reactions	Chapter 4 Question 34 stated SO3 + H2O produces "liquid hydrogen sulfate" as the only product, "liquid hydrogen sulfate" should be "sulfuric acid".	Revise "hydrogen sulfate" to "dihydrogen sulfate".	Typo
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.3 Reaction Stoichiometry	Answer key at the back of the book for Chapter 4, question 45 (d). The correct answer should be 769 mol H2O and 13.8 kg of H2O. This question requires students to answer question 44 first for this chapter. In the instructors solution manual, the molar mass of C2H2 is written as 28.054 g/mol. Instead, the molar mass should be 26 g/mol. Hence the wrong numbers in the key.	Revise "713 mol" to "768 mol" and "12.8 kg" to "13.8 kg".	Incorrect answer, calculation, or solution
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.5 Quantitative Chemical Analysis	#94 Formula for KHP is KHC8H4O4 and product is KNaC8H4O4. Incorrect formulas written are KHC8H5O4 and KNaC8H5O4.	Revise "H_5" to "H_4".	Incorrect answer, calculation, or solution
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.5	Example 7.15 The problem involves MgSO4, but the associated flow chart indicates CaSO4.	The image in the solution will be updated.	Typo

Quantitative Chemical Analysis			
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.5 Quantitative Chemical Analysis	Exercises #89 in the balanced equation the product H2PO4 should be H3PO4.	This will be updated in the solution manual.	
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.5 Quantitative Chemical Analysis	Example 7.14, Check Your Learning Question The question states the reaction containing potassium permanganate, KMnO4, however the molecular equation for the reaction in the question has only permanganate.	Add the following after "KMnO_4": "(see net ionic equation below)".	Other factual inaccuracy in content
Chapter 7 Stoichiometry of Chemical Reactions: Section 7.5 Quantitative Chemical Analysis	The answer for the question was actually for another similar question with slight tweaks on the figures. The 3 figures in Question 79 are 18, 72, 36 The answer in the student manual was meant for 24, 96, 48.	Revise the answer to "XeF_4". The full solution will also be updated in the solution manual.	Incorrect answer, calculation, or solution
Chapter 8 Gases: Section 8.1 Valence Bond Theory	In an example demonstrating pressure as P = F/A, the text determines that a figure skater is more likely to fall through ice than an elephant. The text states the pressure of a figure skater on one skate is higher than the pressure of an elephant standing on its four feet. While this is true, it misleads the reader since it implies that average pressure is the only consideration to take to determine if an object will break on ice. In the case of average sheer stress (assuming that the ice has a maximum allowable shear stress of ice is 600 kPa or 87 lb/in^2), a 14,000 lb elephant would need ~160 in^2 of cross sectional ice for support while the 120 lb skater would need ~1.4 in^2 of cross sectional ice for support. Assuming that the circumference of an elephant's foot is ~48 inches, it would take ~192 inches to enclose all four feet in perimeter and require the ice to be about 160 in^2/192 in = 0.83 inches thick. Assuming that a skate blade is ~12 inches long, it would take ~24 inches to enclose one skate in perimeter and require the ice to be about 1.4 in^2/24in = 0.058 inches thick. Given these calculations, it is more likely that the elephant will break the ice by average shear stress than the ice skater. Regardless of the relevance of average shear stress to chemistry, there should be a better and more direct example/application of pressure than falling through ice, such that it takes less force to puncture a balloon with a sharp object than a blunt object.	Revise the sentence "Let's apply this concept to determine..." to "Let's apply this concept to determine which exerts a greater pressure in Figure 9.3—the elephant or the figure skater?" Also revise the sentence "Even though the elephant is more than..." to " Even though the elephant is more than one hundred-times heavier than the skater, it exerts less than one-half of the pressure."	Other factual inaccuracy in content
Chapter 8 Gases: Section 8.1 Valence Bond Theory	In the worked-out solution for HCl, the charge on an electron has an exponent of +19 (should be -19).	In the solution to Example 5.2 Finding the Partial Ionic Character,	Typo

		revise "(1.60218 × 10^19 C)" to "(1.60218 × 10^-19 C)".	
Chapter 8 Gases: Section 8.2 Relating Pressure, Volume, Amount, and Temperature: The Ideal Gas Law	question 45 describes a balloon going over Mount Crumpet in British Colombia. The correct spelling for this location is Mount Crumpit	Our reviewers accepted this change.	Typo
Chapter 8 Gases: Section 8.2 Relating Pressure, Volume, Amount, and Temperature: The Ideal Gas Law	#45: The number 278.24 is listed with units of atm. It should be 278.24 K.	The solution manual will be updated.	Incorrect answer, calculation, or solution
Chapter 8 Gases: Section 8.2 Relating Pressure, Volume, Amount, and Temperature: The Ideal Gas Law	#29: The answer lists the temperature as -193. It should be -196 as stated in the problem	The solution manual will be updated.	Incorrect answer, calculation, or solution
Chapter 8 Gases: Section 8.2 Relating Pressure, Volume, Amount, and Temperature: The Ideal Gas Law	#28 wrong answer entirely. Answer should solve for Temperature	The solution will be updated.	Incorrect answer, calculation, or solution
Chapter 8 Gases: Section 8.3 Stoichiometry of Gaseous Substances, Mixtures, and Reactions	Figure 8.22 Y-axis (vapor pressure) is missing its unit. If this graph is to match the data in Table 9.2, the unit should be torr.	This figure will be updated.	Typo
Chapter 8 Gases: Section 8.3 Stoichiometry of Gaseous Substances, Mixtures, and Reactions	Figure 8.20 The middle cylinder (red/purple) has P = 600 kPa and the right-hand cylinder (yellow) has P = 450 kPa. These should be switched, as it appears that there are more gas particles in the yellow cylinder. Also, the caption refers to gas A, gas B and gas C, but these letters do not appear in the figure.	This figure will be updated. Also update the caption to "If equal-volume cylinders containing gasses at pressures of 300 kPa, 450 kPa, and 600 kPa are all combined in the same-size cylinder, the total pressure of the gas mixture is 1350 kPa."	Other factual inaccuracy in content
Chapter 8 Gases: Section 8.3 Stoichiometry of Gaseous Substances, Mixtures, and Reactions	Ch 8, ex69, temperature should be in Kelvin not unspecified degreesTemp is given as "875°" which implies Celsius but the answer is only valid if 875 Kelvin.	Revise "875°" to "875 K".	Typo
Chapter 8 Gases: Section 8.3 Stoichiometry of Gaseous Substances,	https://openstax.org/l/16SusanSolomon redirect is broken. Needs new link.	This link will be updated.	Broken link

Mixtures, and Reactions			
Chapter 8 Gases: Section 8.3 Stoichiometry of Gaseous Substances, Mixtures, and Reactions	#66 it would be preferable to use the stoichiometric ratio 4/4 rather than 1/1 so students know where the numbers come from	The solution will be updated.	Incorrect answer, calculation, or solution
Chapter 8 Gases: Section 8.3 Stoichiometry of Gaseous Substances, Mixtures, and Reactions	it incorrectly says "and the definition of molarity" when it should say "and the definition of molar mass".	Revise "definition of molarity" to "definition of molar mass".	Typo
Chapter 8 Gases: Section 8.3 Stoichiometry of Gaseous Substances, Mixtures, and Reactions	broken link http://openstax.org/l/16GlobalWarming	This link will be updated.	Broken link
Chapter 8 Gases: Section 8.3 Stoichiometry of Gaseous Substances, Mixtures, and Reactions	Example 8.15 Question asks for N2O mole fraction and partial pressure but the solution is written as N2.	Revise "N_2" to "N_2O" and "143.6" to "144".	Other factual inaccuracy in content
Chapter 8 Gases: Section 8.5 The Kinetic-Molecular Theory	This chapter makes many references to molecular velocities, but all reasoning relies upon using the Maxwell-Boltzman speed distribution. It looks like a previous errata (ID 6109) addressed this in several figures, but the chapter text and figure captions still refer to velocities. The online version of the text currently uses the word "velocity" or "velocities" 11 times. In all cases, replacing with the words "speed" or "speeds" would be appropriate and improve the accuracy of the arguments.	Replace "velocity" and "velocities" with "speed" and "speeds" throughout the chapter.	Other factual inaccuracy in content
Chapter 8 Gases: Section 8.5 The Kinetic-Molecular Theory	The label for the scenario of decreased volume says "Volume decreased Wall area decreased = Pressure increased". The pressure increases whenever the volume is decreased even if the wall area remains constant (e.g. half sphere capping a cylinder, invert and push the half sphere inside the cylinder: same wall area, lower volume -> pressure increased). On the other hand, if you increase or decrease the wall area while keeping the volume constant (for example by going from "zig-zag" wall to straight wall), the pressure will not change.	Revise Boyle's law bullet point to "Boyle's law. If the volume of a given amount of gas at a given temperature is decreased (that is, if the gas is compressed), the molecules will be exposed to a decreased container wall area. Collisions with the container wall will therefore occur more frequently and the pressure exerted by the gas will increase (Figure 9.31)."	Other factual inaccuracy in content

	In short, the wall area does not influence the pressure.		
Chapter 9 Thermochemistry: Section 9.1 Energy Basics	Example 9.1 In the "check your learning" question in example 9.1 (found on p 240 of pdf), the letter x is used instead of the multiplication symbol.	Revise Example 9.1 Measuring Heat as follows: Ensure multiplication symbol is used throughout, not the letter x.	Typo
Chapter 9 Thermochemistry: Section 9.1 Energy Basics	Example 9.1 - "Check your learning" - The question reads - How much heat,in joules, must be added to a 5.07 x 10^4 J iron skillet.... The answer is 5.07 x 10^4 J. According to the calculation, the question should read "How much heat, in Joules, must be added to a 502 g iron skillet...."	Revise "5.07 × 10^4 J iron skillet" to "502 g iron skillet".	Incorrect answer, calculation, or solution
Chapter 9 Thermochemistry: Section 9.1 Energy Basics	Check Your Learning: How much heat, in joules, must be added to a 5.07 × 10^4 J iron skillet to increase its temperature from 25 °C to 250 °C? The specific heat of iron is 0.449 J/g °C. Solution: 5.07 × 10^4 J The unit for 5.07x10^4 should be measured in g, not J. the answer should be closer to 5.12x10^6 if the number above is in g.	Revise the unit for 5.07 × 10^4 to g and the answer to 5.12 × 10^6 J.	Incorrect answer, calculation, or solution
Chapter 9 Thermochemistry: Section 9.2 Calorimetry	Check Your Learning of Exercise 9.7 The fuel burned it Benzene and not Glucose as the question asks. Replace Glucose by Benzene.	Revise "glucose" to "benzene".	Typo
Chapter 9 Thermochemistry: Section 9.2 Calorimetry	Example 9.7 - Bomb Calorimetry - Check Your Learning Answer should be -39.0 kJ indicating it's an exothermic reaction.	Revise the answer to "q_rx = –39.0 kJ (the reaction produced 39.0 kJ of heat)".	Incorrect answer, calculation, or solution
Chapter 9 Thermochemistry: Section 9.2 Calorimetry	Example 9.5 - Check Your Learning The answer should be -1.34 X 10^3 J indicating it's an exothermic reaction.	Revise the answer to "1.3 kJ".	Incorrect answer, calculation, or solution
Chapter 9 Thermochemistry: Section 9.2 Calorimetry	#28 - states 6.9 degrees C, should use the symbol for degrees: 6.0 °C	In exercise 28, revise "increased the temperature of the solution by 6.9 degrees" to "increased the temperature of the solution by 6.9 °C".	Typo
Chapter 9 Thermochemistry: Section 9.3 Enthalpy	Question 50 states that the heat capacity of the products is 4.19 J/g C. This should be described as the specific heat instead. Solving the question while treating the number as heat capacity provides an unreasonable temp change of -346 C. Solving it while treating it as specific heat gives a much more reasonable -1.46 C temperature change.	Revise "heat capacity" to "specific heat".	Typo
Chapter 9 Thermochemistry: Section 9.3 Enthalpy	Exercise 75 When I do the calculation using Appendix G, I get -66.4 kJ The solution in the back of the book is +67.1 kJ	Update the answer to "–66.4 kJ".	Incorrect answer, calculation, or solution

Chapter 9 Thermochemistry: Section 9.3 Enthalpy	Exercise 83 Ethylene should be C2H4	Revise C_2H_2 to C_2H_4.	Typo
Chapter 9 Thermochemistry: Section 9.3 Enthalpy	Example 9.13 shouldn't Cl2 + 1/2 Cl2 be 3/2 Cl2 ?	Revise 1/2 Cl_2 to 3/2 Cl_2.	Typo
Chapter 9 Thermochemistry: Section 9.3 Enthalpy	Example 9.10 The second line of "692g C8H18" should be changed to "6.07 mol C8H18".	Revise "692g" to "6.07 mol".	Typo
Chapter 9 Thermochemistry: Section 9.3 Enthalpy	Chapter 5: Exercise 85 part b states: (b) Calculate the volume of air at 25 °C and 1.00 atmosphere that is needed to completely combust 25.0 grams of propane. Assume that air is 21.0 percent O2 by volume. (Hint: We will see how to do this calculation in a later chapter on gases—for now use the information that 1.00 L of air at 25 °C and 1.00 atm contains 0.275 g of O2 per liter.) IT should state that "1.00 L of oxygen at 25 °C and 1.00 atm contains 0.275 g of O2.")	Delete "per liter" from the end of part b.	Typo
Chapter 9 Thermochemistry: Section 9.3 Enthalpy	Question #85, answer (b) given in the book is for the volume of O2, but the question was asking the volume of AIR, so the answer should be 330Liters/0.21 = 1571 Liters	Revise the answer for part (b) to "1570 L air".	Incorrect answer, calculation, or solution
Chapter 9 Thermochemistry: Section 9.4 Strengths of Ionic and Covalent Bonds	The calculation following table 7.4 is not correct, and the Hlattice listed does not match that show in figure 7.13. Hlattice=(553.5+76.5+79.4+375.7+328.2)kJ/mol =1413.3kJ/mol Correction that matches what is listed in figure 7.13 Hlattice=(553.5+76.5+79.4+375.7-328.2)kJ/mol=756.9kJ/mol	Table 7.4 will be updated, as well as the Hlattice calculation.	Incorrect answer, calculation, or solution
Chapter 10 Liquids and Solids: Introduction	Sentences starting with "Aside from the symptoms..." is repeated twice	Our reviewers accepted this change, and it will be included in the next print cycle.	Typo
Chapter 10 Liquids and Solids: Introduction	The entire body is repeated twice, i.e. it starts out "Leprosy has been .." and then in the middle it comes back again: "... treatment for leprosy for decades.Leprosy has been ...". Also there is a typo with "her" being written "hr"	corrected typo	Typo
Chapter 10 Liquids and Solids: Section 10.1 Intermolecular Forces	Figure 10.14 The base labeled as thymine is uracil (no -CH3 group). I'll upload a suggested replacement for this figure as several bonds are awkwardly drawn as well or would be happy to be contacted.	This figure will be updated.	Other factual inaccuracy in content

Chapter 10 Liquids and Solids: Section 10.2 Properties of Liquids	Problem # 24 It looks like for the shown 3-d structure of acetone the carbon atom geometry is tetrahedral. It should be optimized or rearranged to be trigonal planar.	This figure will be updated.	Other factual inaccuracy in content
Chapter 10 Liquids and Solids: Section 10.3 Phase Transitions	Figure 10.22 In the series of pictures, the pressure gauge indicates an increase in pressure. However, the mercury level in the manometer does not change. This seems inconsistent.	The figure will be updated.	Other factual inaccuracy in content
Chapter 10 Liquids and Solids: Section 10.4 Phase Diagrams	example 10.12 the answer is for 50 k Pa not 500 k Pa	Revise "500" to "50".	Typo
Chapter 11 Solutions and Colloids: Section 11.1 The Dissolution Process	The sentence "Ammonium nitrate (NaNO3) is one such example and is used to make instant cold packs for treating injuries like the one pictured in Figure 11.5" is an example of a misplaced modifier. Figure 11.5 doesn't illustrate an injury, it illustrates a cold pack.	Revise "instant cold packs for treating injuries like the one pictured in Figure 11.5." to "instant cold packs like the one pictured in Figure 11.5, which are used for treating injuries.	General/pedagogical suggestion or question
Chapter 11 Solutions and Colloids: Section 11.3 Solubility	Example 11.2 requires students to used Figure 11.8. But this information isn't mentioned until the solution. The question needs to refer students to this graph so that they don't have to read the solution to find out. Not that this change would mean the solution to the problem would no longer need to mention Figure 11.8.	Add the following to the end of the question: "Hint: Use the data in Figure 11.8 to estimate a value for the Henry's law constant at this temperature."	General/pedagogical suggestion or question
Chapter 11 Solutions and Colloids: Section 11.3 Solubility	Example 11.2 asks students to use values read from Figure 11.8 to solve the problem. The figure is currently only marked at 1.0 and 2.0. Additional horizontal lines (perhaps in a lighter grey, but not labeled on the y-axis. "minor horizontal gridlines") would help students estimate the values, especially at the precision referred to in the given solution. Gridlines at least every 0.2, and perhaps every 0.1, would allow all students to make the estimate near 1.15.	Revise the sentence "First, estimate the Henry's law..." to "First, estimate the Henry's law constant for oxygen in water at the specified temperature of 30.0 °C (Figure 11.8 indicates the solubility at this temperature is approximately ~1.2 mol/L)."	General/pedagogical suggestion or question
Chapter 11 Solutions and Colloids: Section 11.3 Solubility	In the first step of the solution to Example 11.2, it says "First, compute the Henry's law constant for oxygen in water at the specified temperature of 30.0 °C (see Figure 11.19)." 1.) Just from the perspective of clarity, nothing in the reading to his point actually explains how to do this. 2.) The referenced Figure 11.19, has nothing to do with the Henry's Law. It is a picture of a laboratory distillation unit. 3.) There is a graph in Figure 11.8 (which would probably be the more appropriate figure to reference) that contains solubilities of gases in water. However, your Y-axis could probably stand to be presented differently if students are expected to use that. Going from a value of 1.0	Revise "compute" to "estimate". Replace the three occurrences of "1.15" with "1.2". Replace the two occurrences of 1.95" with "2.0". Replace "6.2" with "6.4".	Other factual inaccuracy in content

	x 10-3 mol/L to 2.0 x 10-3 mol/L makes it very difficult come back with a figure as precise as 1.15 x 10-3 mol/L, which is what was used in the solution.		
Chapter 11 Solutions and Colloids: Section 11.4 Colligative Properties	Example 11.5 it is 1.04 kg soln and not 1.02 kg solution	Replace “1.02” with “1.04”, replace “0.92” with “0.94”, and replace “0.60” with “0.59”.	Typo
Chapter 11 Solutions and Colloids: Section 11.4 Colligative Properties	Colligative Properties of Electrolytes section there are two equations after the first paragraph. These have the charges for the ions on the product side of each as subscripts. These should be superscripts.	Revise the indicated subscripts to superscripts.	Typo
Chapter 11 Solutions and Colloids: Section 11.4 Colligative Properties	Exercise 47b 0.0363M and not 0.363M	In the solution, "0.363" will be updated to "0.0363".	Typo
Chapter 11 Solutions and Colloids: Section 11.4 Colligative Properties	In example 11.10 the 0.30 M solution of glucose in water became 0.03mol/L in the solution to the problem.	Revise "0.03” to “0.30”.	Typo
Chapter 11 Solutions and Colloids: Section 11.4 Colligative Properties	Problem 57. The Kb in the problem (2.43) and the Kb (2.34) in the answer are reversed.	Revise the value of K_b in the problem from "2.43" to "2.34".	Incorrect answer, calculation, or solution
Chapter 11 Solutions and Colloids: Section 11.4 Colligative Properties	Near the end of Example 11.3 on page 619 in the PDF version the problem says "Finally, calculate molarity per its definition" when in this example we are calculating molality. The remainder of the problem correctly says molality, but there is an incorrect part that says we are looking for molarity.	Revise "calculate molarity" to "calculate molality".	Typo
Chapter 11 Solutions and Colloids: Section 11.4 Colligative Properties	Chapter 11 End-Of-Chapter 48 The solution has the incorrect power of 10 and the incorrect sig figs. The molar mass is given as 5700 (2sf), so the answer is limited to 2 sig figs. The correct answer is 4.3 x 10^03 atm (not -4). thanks SB	The solution will be updated.	Incorrect answer, calculation, or solution
Chapter 11 Solutions and Colloids: Section 11.4 Colligative Properties	Example 11.10. It should say 0.30 mol/L, but it instead says 0.03 mol/L.	Revise "0.03" to "0.30".	Typo
Chapter 12 Thermodynamics: Section 12.1 Spontaneity	Chapter 12 problem 2. Ozone decomposes... 2 O3 (g)--> 3 O2(g). The rate expression in the answer key is missing the 1/3 for the O2 portion.	The solution manual will be updated.	Incorrect answer, calculation, or solution

Chapter 12 Thermodynamics: Section 12.2 Entropy	17a While it is generally true that precipitation is an example of a loss of entropy, care needs to be taken with aqueous ions, whose presence decreases the entropy of water, as is often the case with insoluble ionic solids. If you look at the standard entropy values in Appendix G, you can see that PbS(s) has more entropy (91.2 J/mol K) than the sum of Pb2+(aq) (10.5 J/mol K) + S2-(aq) (22 J/mol K). As I understand it this is not uncommon with insoluble ionic compounds	The equation in part (a) will be updated.	Other factual inaccuracy in content
Chapter 12 Thermodynamics: Section 12.2 Entropy	In Check Your Learning, problem (d), the reactant is given as CaCO. It should be CaCO3.	Revise "CaCO" to "CaCO_3".	Typo
Chapter 12 Thermodynamics: Section 12.3 The Second and Third Laws of Thermodynamics	For Ch. 12, Problem #25. The questions should say values listed in Appendix G, calculate delta S degrees 298 for the following changes:	In exercise 25, add the delta symbol in front of "S degrees 298".	Typo
Chapter 12 Thermodynamics: Section 12.3 The Second and Third Laws of Thermodynamics	Problem 12.28 asks the student to determine the change in entropy for several chemical reactions using appendix G. Problem 12.29 states the following: "Use the standard entropy data in Appendix G to determine the change in entropy for each of the reactions listed in Exercise 12.28. All the processes occur at the standard conditions and 25 °C." The first issue is that problem 12.29, as it is currently written, is asking the student to re-do exactly what they did in problem 12.28. The second issue is that if one compares their answers from problem 16.28 and the solution to problem 16.29 in the back of the book, they are different. They should not be since, as it currently stands, problems 12.28 and 12.29 are identical. The answers in the answer key for problem 12.29 are ACTUALLY the correct answers to the chemical reactions found in problem 12.34. If one goes through and calculates the standard entropy (not free energy as requested in 12.34) for all the chemical reactions in 12.34, they would get exactly the answers found as the solution for problem 12.29.	In the question stem, update the exercise link to "Exercise 16.34".	Incorrect answer, calculation, or solution
Chapter 12 Thermodynamics: Section 12.3 The Second and Third Laws of Thermodynamics	In the part of Example 16.6 labelled "Check Your Learning" instead of the answer being 24.7 J K^-1 mol^-1 the answer should be 24.7 J/K (no moles)	Update the answer to "24.7 J/K".	Typo

Chapter 12 Thermodynamics: Section 12.4 Free Energy	Question 40 part c, there are no units on Kp.	Delete "atm" from the answer.	Other factual inaccuracy in content
Chapter 12 Thermodynamics: Section 12.4 Free Energy	Chapter 12 question 33 (f) has an answer of - 30 kJ spontaneous when the answer is actually - 154.25 kJ spontaneous. I have done the problem about 30 times to see if I could even get near -30 but if your appendix G values are correct there is no possibility of -30 kJ spontaneous being the correct answer. Hope someone can correct this as it was a homework problem for my chemistry class and it is incorrect. Thank you and all the best.	Revise the answer to "–154.3 kJ spontaneous".	Incorrect answer, calculation, or solution
Chapter 12 Thermodynamics: Section 12.4 Free Energy	The answer for number 42 part b is incorrect. The correct answer should be 98.9 kJ/mol. The textbook says the answer is 61.5 kJ/mol, but this is wrong because - (8.31425)(975)ln(0.000005) = 98.9 kJ/mol. The person that solved this problem accidentally did (0.00250)^2/0.0125 for K, instead of (0.000250)^2/(0.0125). This mistake is also in the student solutions manual. The student solutions manual says the molarity for Cl is 0.000250 M, but then proceeds to use the number 0.002550 in the calculations, leading to an incorrect answer.	Revise the answer to part (b) to "98.9 kJ/mol". The solution will also be updated.	Incorrect answer, calculation, or solution
Chapter 12 Thermodynamics: Section 12.4 Free Energy	On page 674 the answer for the 12.8 check your learning the answer is given negative and then nonspontaneous. Was that right because it is kind of confusing	In Example 12.8 Calculation of delta G 298, revise Check Your Learning answer as follows: (a) 140.8 kJ/mol, nonspontaneous (b) 141.5 kJ/mol, nonspontaneous	Typo
Chapter 12 Thermodynamics: Section 12.4 Free Energy	In the student solution guide for Chapter 12 (mod 4) #33c lists the free energy of S (g) as zero when it should actually be 238.25 kJ/mol. Therefore, the solution should be "[1mol(-53.6 kJ/mol)] - [1mol(0 kJ/mol) + 1mol(238.25 kJ/mol)] = -291.9 kJ". In the student solution guide Chapter 12 (mod 4) #33f, the incorrect standard free energy value is used for carbon tetrachloride. The value used is for the liquid, rather than for the gas, which is used in the original problem. Therefore, the solution should read "[1mol(-58.2 kJ/mol) + 1 mol(-29.25 kJ/mol)] - [1mol(66.8 kJ/mol) + 3mol (0 kJ/mol)] = -154.3 kJ".	Revise the solution to part (c) of exercise 33 from "-53.6 kJ" to "-291.9 kJ".	Incorrect answer, calculation, or solution
Chapter 12 Thermodynamics: Section 12.4 Free Energy	Ch. 12, Problem #45. Should be "77.1 kJ/mole". The "J" is missing in "kJ".	In exercise 45, revise "k/mole" to "kJ/mole".	Typo
Chapter 12 Thermodynamics:	In the solution to Example 12.8 (Calculation of delta G zero of yellow mercury (II) oxide), in the	Delete the S that appears in the first equation in the solution.	Typo

Section 12.4 Free Energy	part (a) of the solution, in the first equation, there is a letter "S" that does not belong.		
Chapter 12 Thermodynamics: Section 12.4 Free Energy	In the student solution guide for chapter 12 (mod 4) #43b, the value substituted for [Cl2] should be 0.0124 M, rather than 0.0125 M since 1% of the original quantity dissociates. This changes the value of K to 0.000504, thus making the value of delta G = 61,500 J/mol, or 61.5 kJ/mol.	Revise the solution for exercise 43 part b to "61.5 kJ/mol".	Incorrect answer, calculation, or solution
Chapter 12 Thermodynamics: Section 12.4 Free Energy	In the student solution guide for chapter 12(mod 04) #49, the original problems says the concentration of G6P is 120 micromolar, however 128 was substituted into the equation. Also, the temperature for 37 C should be 310 K, not 335 K. The solution should read "delta G = 1.7 x 10^3 + (8.314 x 310 x ln 28/210) = -2.1 kJ"	Revise the solution for exercise 49 as follows: "delta G = 1.7 × 10^3 + (8.314 × 310 × ln 28/210) = –2.1 kJ"	Incorrect answer, calculation, or solution
Chapter 12 Thermodynamics: Section 12.4 Free Energy	There are no learning objectives listed for chapter 12.4	Add: "By the end of this section, you will be able to: Define Gibbs free energy, and describe its relation to spontaneity Calculate free energy change for a process using free energies of formation for its reactants and products Calculate free energy change for a process using enthalpies of formation and the entropies for its reactants and products"	General/pedagogical suggestion or question
Chapter 12 Thermodynamics: Section 12.4 Free Energy	There are three key equations listed at the end of 12.4. Of these, only the first one is addressed in this section. The second two equations relate delta G to K and Q, neither of which is addressed or defined until chapter 13. There are example problems at the end of this section that deal with those two equations, and they would be better placed later in the book, after introducing Q and K. The examples in the text of 12.4, and most of the practice problems, are fine.	The last two equations will be moved to Chapter 13.	Other
Chapter 12 Thermodynamics: Section 12.4 Free Energy	In the paragraph directly following Example 12.7 It is stated that “ΔG° is by definition zero for elemental substances under standard state conditions”. The last 4 words are confusing, referring either to standard states or to standard conditions. A better phrase might be “in their standard states”.	Revise "substances under standard state conditions" to "substances in their standard states".	General/pedagogical suggestion or question
Chapter 12 Thermodynamics: Section 12.4 Free Energy	A typo in example 12.7 of Chemistry: Atoms First 2e. The value for ΔH∘f(kJ/mol) of H2O(l) is listed/calculated in the example as 286.83, but the given value in Appendix G and from my google search shows it as 285.83. There are more errors like this in examples throughout the book via service ticket 65354	This example will be updated.	Typo

Chapter 13 Fundamental Equilibrium Concepts: Key Equations	There are equations with delta-G listed in the key equations that aren't covered until later in the book, and do not appear in the PDF.	Delete the two equations beginning with "ΔG".	Typo
Chapter 13 Fundamental Equilibrium Concepts: Section 13.1 Chemical Equilibria	in the rate of f (kf) is written as N-2O4 and it should be N2O4	Revise this to N2O4.	Typo
Chapter 13 Fundamental Equilibrium Concepts: Section 13.1 Chemical Equilibria	The chemical formula for dinitrogen tetroxide is represented by N-2O4 in two places. It should be N2O4.	Revise "N_−2" to "N_2".	Typo
Chapter 13 Fundamental Equilibrium Concepts: Section 13.2 Equilibrium Constants	Exercise 29 The question asks students to write the Q expression for the ionization of NH3 in water. The answer in the key is: Q = [NH4+][OH-]/[HN3]. The denominator is wrong and the expression should be: Q = [NH4+][OH-]/[NH3]	Revise the denominator to [NH3].	Typo
Chapter 13 Fundamental Equilibrium Concepts: Section 13.2 Equilibrium Constants	In "example 13.3", and the subsection "Check your learning", in part (a), it says: ...mol of Cl2(g), ... The 2 should be in the subscript, not written like it is.	Revise "Cl2" to "Cl_2".	Typo
Chapter 13 Fundamental Equilibrium Concepts: Section 13.2 Equilibrium Constants	The expression for Q in terms of partial pressures lists the superscripts from the stoichiometry in the wrong place. The superscripts should be on each of the "P"s. Highlighted in the screenshot.	This expression will be updated.	Typo
Chapter 13 Fundamental Equilibrium Concepts: Section 13.2 Equilibrium Constants	There are no learning objectives for chapter 13.2.	Add: "By the end of this section, you will be able to: Derive reaction quotients from chemical equations representing homogeneous and heterogeneous reactions Calculate values of reaction quotients and equilibrium constants, using concentrations and pressures Relate the magnitude of an equilibrium constant to properties of the chemical system"	General/pedagogical suggestion or question
Chapter 13 Fundamental Equilibrium Concepts: Section 13.3 Shifting	Exercise 49 The prompt states that alpha- and beta-analine of the same concentration will have different freezing points, implying that these stereo-isomers have different dissociation constants. This is factually incorrect in the absence of other chiral	This question will be replaced.	Other factual inaccuracy in content

Equilibria: Le Châtelier's Principle	compounds. (If this is correct, I would like to see the source data.) I suggest removing the question, or replacing the alanine with two different compounds that actually do have different freezing points at the same concentration.		
Chapter 13 Fundamental Equilibrium Concepts: Section 13.3 Shifting Equilibria: Le Châtelier's Principle	13.48 links to the EOC answer section and has a listed answer of (a). The question is an essay questions, not a multiple choice. The correct answer to 13.49 is (a), so either the link should be moved to 13.49 and the answer label changed to 13.49, or the answer to 13.48 should be included:(Saturated solutions are an example of dynamic equilibrium. Dissociation and precipitation do not completely halt in a saturated solution; they just occur at the same rate, so individual Ag+ ions (radioactive or not) can move back and forth between the solid and solution.	The answer for question 48 will be updated to "Though the solution is saturated, the dynamic nature of the solubility equilibrium means the opposing processes of solid dissolution and precipitation continue to occur (just at equal rates, meaning the dissolved ion concentrations and the amount of undissolved solid remain constant). The radioactive Ag^+ ions detected in the solution phase come from dissolution of the added solid, and their presence is countered by precipitation of nonradioactive Ag^+."	Incorrect answer, calculation, or solution
Chapter 13 Fundamental Equilibrium Concepts: Section 13.3 Shifting Equilibria: Le Châtelier's Principle	Chapter 13 end-of-chapter problem 35 should have an equilibrium arrow rather than a "one way" arrow as it is an equilibrium question.	The chemical equation will be updated.	Typo
Chapter 13 Fundamental Equilibrium Concepts: Section 13.3 Shifting Equilibria: Le Châtelier's Principle	CHEMISTRY IN EVERYDAY LIFE Box carbon dioxidey	Replace "dioxidey" with "dioxide".	Typo
Chapter 13 Fundamental Equilibrium Concepts: Section 13.3 Shifting Equilibria: Le Châtelier's Principle	Where is the following link supposed to go? It doesn't link to a PHET simulation. Link to Learning direct links to http://openstax.org/l/16chatelier But it redirects to Learnerstv.com | PPU Library library.ppu.edu	This Link to Learning box will be deleted.	Broken link
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	Solutions for exercise 90 (a and c) from Chapter 13 For a, the enthalpy value for the reaction should be positive and slightly larger according to the enthalpy value for F2O in the appendix. In the end, the value for K comes out to 1.1 x 10E-13. For c, the enthalpy value comes to -89.3 and the entropy value should be -20.43 with the values in the appendix. In the end, the value for K comes out to 2.73 x 10E4.	Revise the answers as follows: (a) K = 1.07 × 10^–13 (b) K = 2.42 × 10^–3 (c) K = 2.73 × 10^4 (d) K = 0.229	Incorrect answer, calculation, or solution

Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	Example 13.9, check your learning. Acetic acid plus ethanol to give the ester and water. The answer you provide for the 4 components gives a Kc of 0.24 but the given Kc is 4.0. The error is that you reversed the correct equilibrium amounts: 0.17M concentrations are the two reactants and the 0.36M concentrations are the 2 products of the reaction as written. As given, the reaction proceeds from right to left to react equilibrium. I suggest you switch the initial concentrations so that the reaction proceeds in the direction written.	Revise "0.37" to "0.18" and "0.18" to "0.37".	
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	Exercise #60 and #61 It is unclear what the rows are below each reaction initial (I), change (C), or equilibrium (E). This should be added to clarify.	Revise the question stem to "Complete the partial ICE tables below." Each table for each part will be revised to show a column on the left with "change" and "equilibrium" at the beginning or rows 2 and 3.	General/pedagogical suggestion or question
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	It seems really flawed to omit the initial row of an ICE table on principle (they're not called CE tables), and especially so given that equilibrium concentrations are found by adding change to initial. Presumably the answers shown in the answer key were derived by assuming all initial concentrations/pressures were 0, but this leads to all answers having the impossible condition of negative concentration or negative pressure at equilibrium. That concentrations and partial pressures cannot be negative is an important concept since it is the only way to rule out the incorrect root(s) of a quadratic (polynomial) equation used to find the changes to reach equilibrium.	The ICE tables will be updated for questions 60 and 61. The answers will also be updated.	Other factual inaccuracy in content
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	The "check your learning" example problem associated with Example 13.13 is an equilibrium constant determination associated with the synthesis of nitrogen dioxide to dinitrogen tetroxide. A student and two instructors can't recreate the answer in the textbook of 6.9. Based on a delta-G of formation for NO2 of 99.8 kJ/mol and for N2O4 of 51.3 kJ/mol, we determine a delta-G of reaction of -2.8 kJ/mol and an equilibrium constant K of 3.1.	Revise the equation right before the answer to "N_2O_4(g) ⇌ 2NO_2(g)". Revise the answer to "0.32".	Incorrect answer, calculation, or solution
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	(4th example in section, title of first problem is "Calculation of Concentration Changes as a Reaction Goes to Equilibrium") I believe the answers were added/subtracted to the wrong reverse values. When solving this expression, Q = 7.1, which is greater than K therefore the reaction moves towards the reactants. When solving for x (after taking the square root of both sides) x = 0.033 M. When adding to both reactants, acetic acid and ethanol, it is 0.15 M + 0.033 M = 0.18 M, and subtracting from both products, ethyl	Update the answer below Step 4 to [CH3CO2H] = 0.37 M, [C2H5OH] = 0.37 M, [CH3CO2C2H5] = 0.18 M, [H2O] = 0.18 M.	Incorrect answer, calculation, or solution

	acetate and water, it is 0.40 M - 0.03 M = 0.37 M. The answer stated is acetic acid and methanol 0.37 M, and ethyl acetate and water 0.17 M.		
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	The answer in the book and on-line are incorrect. If you plug the values into the equation for the equilibrium constant (K = [products]/[reactants]) they do not give the value of 4.0. The correct equilibrium concentrations of the reactants CH3CO2H and C2H5OH are 0.18 M, and of the products CH3CO2C2H5 and H2O are 0.37 M.	Revise the Answer line below the Check Your Learning after Step 4 in this example to [CH3CO2H] = 0.37 M, [C2H5OH] = 0.37 M, [CH3CO2C2H5] = 0.18 M, [H2O] = 0.18 M.	Incorrect answer, calculation, or solution
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	Exercise 13.52 answer keyThe first part of the equation shows the concentration values with the exponents. The second part of the solution has squared and cubed the relevant reagents, but the square and cube superscripts are still there. These need to be removed.	This solution will be updated.	Typo
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	Paired with Example 13.8 is a "Check your Learning" problem: reaction of acetic acid with ethanol to produce ethyl acetate and water. Based on the balanced equation mole ratios and the given equilibrium constant (K=4), the equilibrium concentrations of products should be .37 M and reactants .18 M. The change in concentration is 0.03333333333333 which rounds to 0.03 with sig figs making the substituted K .37^2/.18^2=4.225. However, when the nonterminal decimal is carried through the calculations substituted K is (0.3666666666666)^2/(0.18333333333333)^2 = 4. The text shows the equilibrium concentration of reactants (left side of equation) as 0.37M and products (right side of equation) as 0.18M which seems to be simple mix up of which side has which values at equilibrium. Incidentally, evaluating these concentrations yields an equilibrium constant of K=(0.18)^2/(0.37)^2=0.2366691015 which seems to be the reciprocal of the given K value of 4.	Revise "0.37" terms to "0.18" and "0.18" terms to "0.37".	Incorrect answer, calculation, or solution
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	example 13.5 Check your learning letter C shows a reversible reaction of ammonia with water. The reaction is not balanced as it has 26 hydrogen atoms on the left side but only 12 hydrogen atoms on the right side. Also, there are 7 oxygen atoms on the left side, but a total of 14 oxygen atoms on the right side.	Revise "7H_2O" to "7O_2".	Other factual inaccuracy in content
Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	In the short paragraph between Example 13.13 and the Figure 13.14, it refers to a plot of the “free energy change" versus extent of reaction. Of course it is “free energy”, not the change which is plotted here.	Delete the word "change" in the sentence "As may be shown by plotting the free energy change versus the extent...."	General/pedagogical suggestion or question

Chapter 13 Fundamental Equilibrium Concepts: Section 13.4 Equilibrium Calculations	Q90 I am pretty sure I have been doing these thermodynamic problems correctly but when I check the student solution manual it says that I am wrong. I don't think the solution manual that I have downloaded from your website includes the correct values being used. I am under the impression that question # 43 (as well as other previous questions) is asking for the student to use Appendix G in order to answer the problem using the constants found for delta H and delta S in order to find delta G to use in another formula. However, when you use those constants to do the problem, it seems that the solution manual is using a different constant that isn't anywhere in the appendix.	The solution for question 90 will be updated as follows: (a) K = 1.07 × 10^–13; (b) K = 2.42 × 10^–3; (c) K = 2.73 × 10^4; (d) K = 0.229 (e) K = 16.1.	Incorrect answer, calculation, or solution
Chapter 13.2 -13.4	There are several superscripting and subscripting errors throughout the chapter.	These superscripting and subscripting errors will be corrected.	Typo
Chapter 14 Acid-Base Equilibria: 14.3 Relative Strength of Conjugate Acids and Bases	On the Kb constant appears [OH], it should be [OH-].	Revise to [OH^–].	Typo
Chapter 14 Acid-Base Equilibria: Introduction	On the first sentence of the paragraph, there is a typo on OH. It should be OH^-, not OH^a,.	Revise to "OH^–".	Typo
Chapter 14 Acid-Base Equilibria: Section 14.1 Brønsted-Lowry Acids and Bases	In the first equation of example 14.1, Kw should be equal to x*x instead of x.	Revise x to (x)(x) = x^2.	Incorrect answer, calculation, or solution
Chapter 14 Acid-Base Equilibria: Section 14.2 pH and pOH	Exercise 19 Calculate the pH and pOH of b) 0.21 M NaOH and d)2.5 M KOH. Both questions have answers for which the pH and pOH are reversed. (These strong bases have pH's over 7, not under 7.)	For part b) and d), revise "pH" to "pOH" and vice versa.	Incorrect answer, calculation, or solution
Chapter 14 Acid-Base Equilibria: Section 14.3 Relative Strengths of Acids and Bases	60 a and b The first several lines of the solutions are correct, but at the final concentrations things fell apart. a) [H3O+] = [ClO-] = 1.6 x 10^-5 (missing charge on ion, wrong conc) [HClO] = 0.0092 M (an extra zero in current answers) b) wrong ion [C6H5NH3+] (not CH3CO2-) and wrong conc [C6H5NH2] = 0.0784 M	The answer will be updated.	Incorrect answer, calculation, or solution
Chapter 14 Acid-Base Equilibria: Section 14.3 Relative Strengths of Acids and Bases	58b, c, e Answers have the wrong powers of 10. b) Should be Ka= 1.6 x 10^-10 c) Should be Kb = 5.9 x 10^-8 (And ion should have been HAsO4^2-). e) Should be Kb = 2.3 x 10^-5	In the question stem, revise part (c) to "HAsO_4^2− (as a base)". Revise the answers to: b) K_a = 1.6 × 10^−10 c) K_b = 5.9 × 10^−8 e) K_b = 2.3 × 10^−5	Incorrect answer, calculation, or solution

Chapter 14 Acid-Base Equilibria: Section 14.3 Relative Strengths of Acids and Bases	54c The answer in the back of the book is incorrect. It should be 6.4 x 10^-5 and not 7.4 x 10^-5. SB	Revise the answer to "6.4 × 10^−5".	Incorrect answer, calculation, or solution
Chapter 14 Acid-Base Equilibria: Section 14.3 Relative Strengths of Acids and Bases	# 28 I assume the intent of part b) and c) is to determine the weak acids and weak bases from the list in the problem prompt. As written this is not clear since in part a) the strong acids and bases are identified, it would seem to indicate from the set of strong acids and bases identify which are weak, which is not possible. Currently: (a) Identify the strong Brønsted-Lowry acids and strong Brønsted-Lowry bases. (b) List those compounds in (a) that can behave as Brønsted-Lowry acids with strengths lying between those of H3O+ and H2O. (c) List those compounds in (a) that can behave as Brønsted-Lowry bases with strengths lying between those of H2O and OH−. Proposed correction: (a) Identify the strong Brønsted-Lowry acids and strong Brønsted-Lowry bases. (b) List the compounds, not already in (a), that can behave as Brønsted-Lowry acids with strengths lying between those of H3O+ and H2O. (c) List the compounds, not already in (a), that can behave as Brønsted-Lowry bases with strengths lying between those of H2O and OH−.	In the question stem, delete "CaO" and "CO_2". In parts (b) and (c), revise "List those compounds in (a)..." to "Identify the compounds...". The solution will also be updated.	General/pedagogical suggestion or question
Chapter 14 Acid-Base Equilibria: Section 14.3 Relative Strengths of Acids and Bases	14.33 This problem asks for a balanced equation and to identify the conjugate pairs. In the answers at the back of the book the CA and CB are misidentified. Perhaps it is just a spacing issue and you need to move the labels under the Cl- and H2O.	The alignment will be updated.	Incorrect answer, calculation, or solution
Chapter 14 Acid-Base Equilibria: Section 14.3 Relative Strengths of Acids and Bases	Exercise 58c The original ion had the incorrect "3-" charge. It has been updated online incorrectly to "2" rather than to "2-" SB	Revise the superscript "2" to superscript "2−".	Typo
Chapter 14 Acid-Base Equilibria: Section 14.3 Relative Strengths of Acids and Bases	Chapter 14 End-of-Chapter Exercise 58c The original ion had the incorrect "3-" charge. It has been updated online incorrectly to "2" rather than to "2-" SB	Revise the superscript "2" to superscript "2−".	Typo
Chapter 14 Acid-Base Equilibria: Section 14.4 Hydrolysis of Salts	Example 14.7, Solution Kb of F- should be 1.6x10^-11 instead of 1.4x^-11, since 1x10^-14/6.4x10^-4 = 1.6x10^-11. The Ka of HF is 6.4x10^-4.	Revise "1.4 × 10^−11" to "1.6 × 10^−11".	Incorrect answer, calculation, or solution
Chapter 14 Acid-Base Equilibria:	The equation is written without reaction arrow and the charge for the sodium is not written as a superscript.	Revise so the "+" charge after Na is set as a superscript.	Other

Section 14.4 Hydrolysis of Salts			
Chapter 14 Acid-Base Equilibria: Section 14.4 Hydrolysis of Salts	In Example 14.15 the formula of anilinium chloride in the first line of the problem either needs to have the positive charge within the brackets removed or the negative sign added after the Cl. The compound is not an ion as is currently shown. SB	Remove the superscripted "+".	Typo
Chapter 14 Acid-Base Equilibria: Section 14.4 Hydrolysis of Salts	After the 3rd equation in this section, "ammonia, NH3;" the 3 must be subscripted. SB	Set the "3" as subscript.	Typo
Chapter 14 Acid-Base Equilibria: Section 14.4 Hydrolysis of Salts	The first two paragraphs in the Salts with Acidic Ions subsection (the explanation of acid hydrolysis) are repeated successively.	The repeated content will be deleted.	Typo
Chapter 14 Acid-Base Equilibria: Section 14.5 Polyprotic Acids	Example 14.19 The question and solution use the Ka2 of H2CO3 value given in Appendix H (4.7 x 10^-11), which is also the answer for the [CO3^2-]. The summary section at the end then lists the [CO3^2-] as 5.6 x 10^-11, which is a value for the Ka2 of H2CO3 given in other textbooks (like McMurry).	Revise "5.6 × 10^−11 M" to "4.7 × 10^−11 M".	Incorrect answer, calculation, or solution
Chapter 14 Acid-Base Equilibria: Section 14.5 Polyprotic Acids	In the last equation Bicarbonate ion is written as HCO^3-, it should be HCO3^-1	Revise "HCO^3−" to "HCO_3^−".	Typo
Chapter 14 Acid-Base Equilibria: Section 14.6 Buffers	Figure 14.14 caption: The (un)buffered solution on the left and the ()buffered solution on the right	Revise "The buffered solution on the left and the unbuffered solution on the right..." to "The unbuffered solution on the left and the buffered solution on the right..."	Typo
Chapter 14 Acid-Base Equilibria: Section 14.6 Buffers	Example 14.20 Calculation (c), the equation between the hidronium and hydroxide is missing the arrows.	Add arrows after "(aq)".	Typo
Chapter 14 Acid-Base Equilibria: Section 14.6 Buffers	Example 14.20 Calculation (c), says "hydrogen ion", it should say "hidronium" ion.	Revise "hydrogen ion" to "hydronium ion".	Typo
Chapter 14 Acid-Base Equilibria: Section 14.6 Buffers	The solution to part c of 14.90 makes no sense. There is a calculation for NH4Cl which is not in the problem at all. The volume changes from 0.200 liters in the problem to 0.5. It is just a mess. Also, there is really no reason at his level not to use the Henderson Hasselbalch Equation to solve this problem. The whole point of this exercise is that adding acid doesn't really change the pH significantly. That gets lost in the mess.	This solution will be updated.	Incorrect answer, calculation, or solution

Chapter 14 Acid-Base Equilibria: Section 14.6 Buffers	Solution to Exercise 80 In the ICE table, the concentration of acetate at equilibrium is listed as 0.030-x it should be 0.030+x This doesn't change the results since we ignore x. But it would be confusing to students.	This solution will be updated.	Typo
Chapter 14 Acid-Base Equilibria: Section 14.7 Acid-Base Titrations	In Acid-Base Indicators after explaining the use of the Henderson-Hasselbach equation for a methyl orange solution, when explaining that the log term of the equation should be negative if pH<pKa is wrongly written as pH>pKa. This is written correctly in the first sentence where the log term is positive, thus, pH>pKa.	Revise "pH > pK_a" to "pH < pK_a".	Typo
Chapter 14 Acid-Base Equilibria: Section 14.7 Acid-Base Titrations	part D of Example 14.21. During the equation a 35.70 was put in instead of 37.50 which caused the answer to be incorrect.	Revise as indicated.	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	Ch15, Q7 This is a question about which of a series of salts would likely be affected by hydrolysis of the anion. The candidates include both PbS and ZnS, but only ZnS is indicated in the answer key as such a salt. I'm no inorganic chemist, but I can't see why the anions would differ in this case. I imagine that lead(II) might be able to form hydroxide complexes that zinc maybe doesn't, but as far as the sulfide goes, I think they would be treated similarly. My feeling is that the question writer intended to write either ZnS or PbS, but not both. More generally, I'm not sure where in the chapter this topic is discussed.	Delete ", PbS" from the end of question 7.	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	The answer key gives the hydroxide concentration here as 4.5e-5. I think it's 4.5e-6. Appendix J gives the Al(OH)3 Ksp as 2e-32. The molar solubility of the compound is reported as 2.2e-20, which doesn't appear to work for that Ksp with either 4.5e-5 or 4.5e-6. I think it's 2.2e-16.	Revise "10^−5" to "10^−6" and "10^−20" to "10^−16".	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	Chapter 15, Exercise 34 requires the use of Ksp for strontium fluoride, SrF2, but there is no value for the Ksp for strontium fluoride in Appendix J	Revise SrF_2 to SrCrO_4 and revise F_− to CrO_4^2−. The solution will be updated.	Other
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	End of Chapter question 59. (1) The listed Ksp values for the five salts are all different from the values listed in Appendix J. (2) Based on the given values, the answer should be e, but the given answer key was c.	Revise "MnCO3" to "MgCO3".	Incorrect answer, calculation, or solution

Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	The answer to Chapter 15 #59 states "MnCO3 will form first, since it has the smallest Ksp value it is the least soluble. MnCO3 will be the last to precipitate, it has the largest Ksp value." Obviously MnCO3 cannot have simultaneously the largest and smallest value! BaCO3 will be the last to precipitate since it has the largest Ksp value.	Revise the question to: The carbonate ion concentration is gradually increased in a solution containing equal concentrations of the divalent cations of magnesium, calcium, strontium, barium, and manganese. Which of the following carbonates will precipitate first? Which will precipitate last? Explain. (a) MgCO_3•3H_2O K_sp = 1 × 10^−5 (b) CaCO_3 K_sp = 8.7 × 10^−9 (c) SrCO_3 K_sp = 7 × 10^−10 (d) BaCO_3 K_sp = 1.6 × 10^−9 (e) MnCO_3 K_sp = 8.8 × 10^−11 Revise the answer to "MnCO_3 will form first since it has the smallest K_sp value among these homologous compounds and is therefore the least soluble. MnCO_3•3H_2O will be the last to precipitate since it has the largest K_sp value and is the most soluble."	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	15.1 Exercise 1d Formatting error in that "x" is not under 3Mg^2+ but is with the blank line under 2PO4^3-. Additionally, the solutions use 3x as the "answer" and 2x as the given.	The alignment will be updated. Also update the answer to "x" and "2/3x".	Typo
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	The error is in the worked out solution to Precipitation of Silver Halides towards the end of 15.1 (using the online text version). The concentration substituted for iodide ions should be 0.0010 M and not 0.10 M.	While the example itself is correct, there are a few typos that will be corrected. Revise Q to Q_sp = K_sp.	Typo
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	Example 15.13 Answer given is 1.10x10^-10 M. This is actually the value for the concentration of OH- at which Al(OH)3 begins to precipitate, but the question is asking for the molar solubility of Al(OH)3. The correct answer should be 3.67x10^-11 M.	Revise the answer to "4 × 10^−11 M".	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	Example 15.5 The answer of the solubility is written as 2.08x10^-4, whereas it should be 1.7x10^-4 since the molarity of any of both ions is 1.3x10^-2. (1.3x10^-2)(1.3x10^-2)=1.7x10^-4	Revise the answer to "1.69 × 10^−4".	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	Example 15.12 There are 7 total answers to this example, whereas there should be only 4. There is (a), (b), (c) and on the last one the last sentence is interrupted, then continues another (a), then another (b) and another (c). It finishes with one (d).	Delete the first (a), (b), and (c) and associated text in the solution.	Other

Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	After the introduction Common Ion Effect it provides two "links to learning" that take you to the same page.	Delete the second Link to Learning box.	Other
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	After calculating the Q, it says “AgI”, it should say AgBr.	Revise "AgI" to "AgBr".	Typo
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	In the calcium carbonate equilibrium reaction, the carbonate ion superscript isn`t written as a superscript, just as an ordinary number.	Revise so that "2–" is set as a superscript.	Typo
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	Example 15.15 There are a couple of typo: 1. Ca should be Al. 2. molar solubility in water should be 1/4. 3. [Al2+] should be [Al3+]	Revise "Ca" to "Al", "1/3" to "1/4", “9 × 10^–12 M” to “5 × 10^–9 M”, and “Al^2+” to “Al^3+”.	Typo
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	There are numerous typos in examples 15.15 and 15.16. In example 15.15, a solubility calculation is performed for aluminum hydroxide, but in the first line, this compound is written Ca(OH)2, and two lines later, is called calcium fluoride. In example 15.16, in line 6 of the solution, the bromide ion is written incorrectly with the negative charge as a subscript rather than a superscript. Also, that line gives a number of moles of 0.00532 mol, which is incorrectly written as 0.00521 mol on the following lines. Also, the thiosulfate ion in several places and silver thiosulfate in one place is written incorrectly, again confusing subscripts and superscripts.	These examples will be updated.	Typo
Chapter 15 Equilibria of Other Reaction Classes: Section 15.1 Precipitation and Dissolution	Example 15.12 Check your learning the solubility of Al(OH)3 is calculated incorrectly	Revise the answer to "1.10 × 10^–10".	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.2 Lewis Acids and Bases	Answer to question 64 The concentration of 0.001 mol of [Cd2+] ions in the resulting 1.250 L solution should be 8 x 10^-4 (not 8 x 10^-5).	Revise "1.150 L" to "0.150 L" in the question. Revise the answer to "1.8 × 10^–5 M".	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes:	The "check your learning" portion of Example 15.14 The answer is listed as 2.5e-22 M, however the correct answer should be 2.9e-	Revise "2.5" to "2.9" in the answer.	Incorrect answer,

Section 15.2 Lewis Acids and Bases	22M. Assuming AgNO3 is the limiting reagent and the reaction goes to completion, you would need to consume a total of 0.012 M of KCN. Since you start with 0.154M of KCN, the leftover KCN should be 0.142M of KCN. Setting up the ICE table and going through the calculations yields a silver ion concentration of 2.9e-22M. The answer listed in the solution is 2.5e-22M. I believe that the book authors arrived at this solution by using 0.154M of KCN in the ice table instead of 0.142M of KCN (ie it did not subtract the amount of CN used to make Ag(CN)2-. If you set up the ICE table and use 0.154M of KCN, you would get exactly 2.5e-22M.		calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.3 Coupled Equilibria	Exercise 105 HPO4- should be HPO4^2-	Revise "HPO_4^−" to "HPO_4^2−".	Typo
Chapter 15 Equilibria of Other Reaction Classes: Section 15.3 Coupled Equilibria	#99 In the problem Ksp for MnS should be listed as 2.3 x 10^(-13) as per Appendix J. In the problem K should be listed as 8.9 x 10^(-27) if calculated from from K_a1 and K_a2 for hydrogen sulfide, as given in Appendix H	Revise the Ksp = value to "2.3 × 10^−13".	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.3 Coupled Equilibria	There are some serious problems with Example 15.16. In the first part, they calculate the Br- concentration of the fully dissolved AgBr. That is fine and 0.0532 is the correct result. The second part is mathematically correct but would only be chemically correct if there were still some AgBr solid present. That means that there is still some film that has not been fixed at this point. The problem is unclear since it sounds like you are dissolving all the AgBr. The problem only works as they solve it, if there is still some undissolved AgBr present As soon as the precipitate is completely dissolved, then the free Ag+ ion concentration is only controlled by the thiosulfate equilibrium. Since the Br- concentration is based on the total amount of AgBr dissolving, this is inconsistent. I suppose they are assuming that there is still some AgBr in the film that has not dissolved. The next step is wierd becaue the math doesn't work. 0.00532 - 9.4x10^-11 is still 0.00532 I have no idea where the value 000521 comes from. If there is still AgBr undissolved on the film, then the free Ag+ must come from the AgBr solubility and will be the 9.4x10^-11 that is calculated here. One can then put this into the formation constant equilibrium expression and determine the free thiosulfate that is not complexed with silver. Using the correct 0.00532 for the silver complex, the math gives 1.09x10^-3 = 1.1x10^-3 M thiosulfate	This example will be updated.	Incorrect answer, calculation, or solution

	uncomplexed. The problem in the text incorrectly has 1.15x10^-3 instead because they use 0.00521 for the silver complex. Both end up with 1.1x10^-3. The final step for the problem is incomplete. The final solution that has dissolved the 1.0 g AgBr must contain 1.1x10^-3 molar thiosulfate that is free, not complexed with silver. The formation constant equilibrium requires that to keep the AgBr dissolved. It takes 1.7 g of sodium thiosulfate to reach this concentration in the absence of AgBr. however, it takes another 0.00532x2 moles of thiosulfate to form the complex. So that requires 0.0106 moles of additional thiosulfate or 1.68 g. So the total thiosulfate required is twice the amount in the problem. It takes 1.7 g to form the complex and an excess of 1.7 g to reach the free thiosulfate concentration required.		
Chapter 15 Equilibria of Other Reaction Classes: Section 15.3 Coupled Equilibria	The first error is a typo in the molarity of Silver ion (also the molarity of Silver Thiosulfide complex ion). The third step of the calculation shows the Ag(S2O3)2 3- concentration as 0.00532 M. The fourth step and fifth step uses 0.00521 M with no explanation given for the change in molarity. The overall answer is also incorrect - 1.00L of 1.1x10^-3 M Sodium Thiosulfate should have a mass of 0.17 grams. The answer says 1.7 grams which seems like 1.1x10^-2 M solution was present.	Replace two occurrences of “0.00521” with “0.00532”. Replace “1.15 x 10^−6” with “1.18 x 10^−6”. Replace two occurrences of “1.1 x 10^−3” with “1.08 x 10^−3”. Replace two occurrences of “1.7” with “0.17”.	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.3 Coupled Equilibria	15.91 At the end of the fourth line (solving for Kf), the denominator has the term (0.025 + 6Delta). This needs to be raised to the 6th power as it is shown earlier in the same line in the Kf expression. Unfortunately, when solved using the x-is-small approximation, there is no valid solution. So students would have to expand a 6th-order polynomial, and then carry out the remaining operations on all those terms in order to solve this properly. Keeping similar numbers, use 0.0100 mol of the complex ion salt. Use 0.25 M ammonia. the solution will be [Co2+] = 3.2 x 10^-4	In the question, revise "0.100" to "0.010" and "0.025" to "0.25". The solution will also be updated.	Incorrect answer, calculation, or solution
Chapter 15 Equilibria of Other Reaction Classes: Section 15.3 Coupled Equilibria	Q99 Ksp should be 4.3 x 10^-22 and not 2.3 x 10^-13. k should be 1 x 10^-26 and not 8.9 x 10^-27, answer should be calculated based on the Ksp and k values above	The values will be updated in webview to match the current solution manual.	Typo
Chapter 16 Electrochemistry: Key Equations	the fifth bullet is only the right side of the equation. there should be an E(cell) = to the left of the text that is included.	Add "E_cell =" before the current equation.	Typo
Chapter 16 Electrochemistry: Section 16.1 Review of Redox Chemistry	Example 16.2 There's a missing plus sign after the chromate ion.	Add "+" before "H+(aq)".	Typo

Chapter 16 Electrochemistry: Section 16.1 Review of Redox Chemistry	Example 16.1 Step 7: After the nitrogen monoxide gas, there is a plus sign missing before the 4 molecules of water.	Add "+" before "4H2O(l)".	Typo
Chapter 16 Electrochemistry: Section 16.1 Review of Redox Chemistry	Exercise 3 solution to part d. MnO4 ion is missing its charge (-1)	Revise "MnO4" to "MnO_4^–".	Typo
Chapter 16 Electrochemistry: Section 16.2 Galvanic Cells	Example 16.3 In the Solution, in the half-reactions, the cathode is mislabeled as “(oxidation)”, whereas it should be “(reduction”.	Revise "cathode (oxidation)" to "cathode (reduction)".	Typo
Chapter 16 Electrochemistry: Section 16.3 Electrode and Cell Potentials	example 16.5 Check Your Learning The first equation (from top to bottom) should be non-spontaneous since the bromide ion experiments an oxidation to bromine (anode). Hence the negative sign. The second should be corrected too following the explanation.	Revise "+0.5518 V (spontaneous)" to "–0.5518 V (nonspontaneous)" and "–0.5518 V (nonspontaneous)" to "+0.5518 V (spontaneous)".	Incorrect answer, calculation, or solution
Chapter 16 Electrochemistry: Section 16.3 Electrode and Cell Potentials	Question 17.25 labels both half cells as anodes. The solution assumes the aluminum is the cathode. The question should either state the reaction will be spontaneous/non-spontaneous. Or it should combine one each of a cathode and anode.	Revise "an anode" to "a cathode".	Typo
Chapter 16 Electrochemistry: Section 16.4 Free Energy	Tthe answer for the 16.8 check your learning the answer is given negative and then nonspontaneous. Was that right because it is kind of confusing	In Example 16.8 Calculation of delta G 298, revise Check Your Learning answer as follows: (a) 140.8 kJ/mol, nonspontaneous (b) 141.5 kJ/mol, nonspontaneous	Typo
Chapter 16 Electrochemistry: Section 16.4 Free Energy	In the student solution guide for chapter 12(mod 04) #62, the original problems says the concentration of G6P is 120 micromolar, however 128 was substituted into the equation. Also, the temperature for 37 C should be 310 K, not 335 K. The solution should read "delta G = 1.7 x 10^3 + (8.314 x 310 x ln 28/210) = -2.1 kJ"	Revise the solution for exercise 62 as follows: "delta G = 1.7 × 10^3 + (8.314 × 310 × ln 28/210) = –2.1 kJ"	Incorrect answer, calculation, or solution
Chapter 16 Electrochemistry: Section 16.4 Free Energy	before example 16.7 The last equation is written with an minus sign for the normal potential of the cell, this should be positive.	Revise "lnQ" to "logQ" in the equation right before Example 16.7.	Typo
Chapter 16 Electrochemistry: Section 16.4 Free Energy	Under "Potentials at Nonstandard Conditions: The Nernst Equation", where the base-10 logarithm version is presented. Somehow a minus sign has snuck in, in front of E_{cell}^{0} on the right side of the equation. The equation should use $log_{10} Q$ instead of $ln Q$ to avoid confusion. I'd also like to add that the text doesn't specify that the 0.0592V "constant" is derived at the absolute temperature 298.15K (= 25 degrees C). This should be included in the edit to avoid erroneous use at other temperatures.	Revise the sentence before the equation to "A convenient form of the Nernst equation for most work is one in which values for the fundamental constants (R and F) and standard temperature (273.15 K), along with a factor converting from natural to base-10 logarithms, have been included:" The equation will be updated in errata 11706.	Other factual inaccuracy in content

Chapter 16 Electrochemistry: Section 16.4 Free Energy	EOC problem #29(c). The words "bromine ion" are confusing. It says "aqueous bromide is oxidized to 0.11 M bromine ion" - bromine is not the ion in this case and it is confusing. Leaving out "ion" would be sufficient to correct this error.	Revise the answer to part (c) to "The cell comprised of a half-cell in which aqueous bromine (1.0 M) is being oxidized to bromide ion (0.11 M) and a half-cell in which Al^3+ (0.023 M) is being reduced to aluminum metal."	Typo
Chapter 16 Electrochemistry: Section 16.5 Batteries and Fuel Cells	Under the section that is discussing the lead acid battery, the set of reactions shown pertain to the lithium ion battery. The resolution is to replace those reactions with the lead/lead oxide reaction with sulfuric acid. I believe this is a "chemical typo."	This set of reactions will be updated.	Other factual inaccuracy in content
Chapter 16 Electrochemistry: Section 16.5 Batteries and Fuel Cells	In the section 16.5 on lithium ion batteries, while the figure is correct, the equations for the anode and cathode given are actually for the charging process rather than the discharging process.	This reaction will be updated.	Typo
Chapter 17 Electrochemistry: Section 17.5 Batteries and Fuel Cells	one of the errors that I found in the Chem 2 text that gave me fits last night was Example 17.5 on page 910. The Standard cell potential of Chromium is given as -0.774, and the actual value in the table is -0.744. The math as shown in the example is incorrect. Hope this helps!	Revise "–0.774" to "–0.744".	Incorrect answer, calculation, or solution
Chapter 17 Kinetics: Section 17.1 Chemical Reaction Rates	The sentence preceding the 2NH3 -> N2 + H2 reaction appears to have been cut off, and reads only 'the reaction represented by the following equation:' . A possible complete sentence would be: 'For example, consider the decomposition of ammonia, represented by the following equation:'.	Revise "the reaction represented by..." to "Consider the reaction represented by..."	Other
Chapter 17 Kinetics: Section 17.2 Factors Affecting Reaction Rates	2 minor errors: a) in 'Link to Learning', phosphorus is spelled wrong (i.e. phosphorous instead of phosphorus). b) Under the 'Presence of a Catalyst' section, the chemical reaction indicates that dilute hydrogen peroxide (H2O2) is liquid (l) rather than aqueous (aq). The reaction should read: 2H2O2 (aq) -> 2H2O(l) + O2(g)	Error a) was addressed in a previous report and is correct in webview. For error b), revise "(l)" to "(aq)".	Typo
Chapter 17 Kinetics: Section 17.3 Rate Laws	Exercise 25. The units in the table are given as mol/L rather than the more standard mol L^-1. This is ok, but in the first set of units there is an extra power of 1 (very nonstandard). SB	Delete superscript "1" in the first column.	Typo
Chapter 17 Kinetics: Section 17.4 Integrated Rate Laws	Example 17.12 The half-life of the second order reaction was incorrectly calculated. The product k[A]o was calculated as 0.01152 min^-1 but the author forgot to take the reciprocal of this product, which should be 86.8 min. Because the half-life is best expressed in minutes, the introductory text should read: "What is the half-life for the butadiene dimerization reaction described in Example 17.8?"	Delete "(ms)" in the first sentence. Revise the answer to "86.8 min".	Incorrect answer, calculation, or solution

	and not "What is the half-life (ms) for the butadiene dimerization reaction described in Example 17.8?"		
Chapter 17 Kinetics: Section 17.4 Integrated Rate Laws	Answer for Chapter 17 #44 for half life is given as: 1.67 × 10^3 s. The answer in the instructors solution manual is give as: 1.16 x 10^3. The instructors solution manual is correct, the answer in the text book is incorrect.	Revise the answer from "1.67" to "1.16".	Incorrect answer, calculation, or solution
Chapter 17 Kinetics: Section 17.4 Integrated Rate Laws	Example 12.12 There is an arithmetical error. 1/(0.0576 L/mol/min *0.200 mol/L) = 86.8 min. The example erroneously shows 0.0115 min, which is the reciprocal of the correct solution. The example then converts the incorrect solution to ms, which doesn't make sense given that the correct solution is more convenient in minutes.	Revise "0.0115 min" to "86.8 min". Delete the second equation in the solution.	
Chapter 17 Kinetics: Section 17.4 Integrated Rate Laws	The answer given for the Check Your Learning problem after Example 17.2 is incorrect. The answer should be 18 minutes (not 86.8 minutes).	Revise the answer to "18 min".	Incorrect answer, calculation, or solution
Chapter 17 Kinetics: Section 17.6 Reaction Mechanisms	Chapter 12 End-of-Chapter 71c The equation given is not a balanced equation which makes the question moot and the answer provided incorrect. SB	Revise "O" to "O_2".	Incorrect answer, calculation, or solution
Chapter 17 Kinetics: Section 17.6 Reaction Mechanisms	Example 17.14 The reaction mechanism sums to the overall reaction in this example correctly. But the slow step will impart a one headed arrow on the overall reaction, so the equilibrium arrow should be switched for a one-headed arrow in the overall reaction.	Revise "⇌' to "⟶".	Typo
Chapter 17 Kinetics: Section 17.6 Reaction Mechanisms	The example includes 3 places where reaction arrows are incorrect. Each is highlighted in the attached pdf. In two places, equal signs should be replaced with equilibrium reaction arrows. In one place, the reaction arrow is missing completely. The reactions are: NO(g) + Cl2(g) [EQUILIBRIUM ARROWS] NOCl2 (g), then 2NO(g) +Cl2(g) [ONE-HEADED ARROW] 2NOCl(g), finally F2(g) [EQUILIBRIUM ARROWS] 2F(g)	Replace the equal sign (=) with equilibrium arrows (⇌) as indicated and add the missing equilibrium arrows.	Typo
Chapter 17 Kinetics: Section 17.7 Catalysis	Figure 17.25 One of the arrows in figure b, says "Ethylene absorbed" where it should say "Ethylene adsorbed" (with a "d" instead of a "b"). I guess it is a typo, but it changes the meaning and can cause misunderstandings.	This figure will be updated.	Typo
Chapter 18 Representative Metals, Metalloids, and Nonmetals: Section 18.3 Structure and	In q41 The students are referred to Appendix I instead of to Appendix G, which contains the thermodynamic values needed to solve the problem.	This link will be updated to direct to Appendix G.	Typo

General Properties of the Metalloids			
Chapter 19 Transition Metals and Coordination Chemistry: Section 19.2 Coordination Chemistry of Transition Metals	Example 19.5, Figure 19.22 This example is describing cis and trans isomerism in coordination complexes. The trans-[Pt(NH3)2Cl2] should contain wedges and dashes - equivalent to how the cis isomer is shown in Figure 19.20. If the wedges and dashes are omitted, then the angles should be corrected to 90 degrees. (Wedges and dashes are preferable.)	This figure will be updated.	Typo
Chapter 19 Transition Metals and Coordination Chemistry: Section 19.2 Coordination Chemistry of Transition Metals	Table 19.5 [Ni(Cl)4]2- is TETRAHEDRAL, not square planar. Cl- is a weak field ligand	Revise "NiCl_4" to "Ni(CN)_4".	Incorrect answer, calculation, or solution
Chapter 19 Transition Metals and Coordination Chemistry: Section 19.2 Coordination Chemistry of Transition Metals	In Table 19.1, the last entry reads that CO2^2- is an anionic ligand with the name carbonato. The number of oxygens in the entry is incorrect. The carbonate ion (which is the carbonato ligand) is CO3^2-	Revise CO_2 to CO_3.	Typo
Chapter 19 Transition Metals and Coordination Chemistry: Section 19.2 Coordination Chemistry of Transition Metals	On pg 1051 the text states that "Transition metals often form geometric isomers, in which...etc." The text should read "Coordination complexes" rather than "Transition metals".	Revise "Transition metals often form..." to "Transition metal complexes often exist as..."	Other factual inaccuracy in content
Chapter 19 Transition Metals and Coordination Chemistry: Section 19.3 Spectroscopic and Magnetic Properties of Coordination Compounds	In Example 19.9 the frequency is represented as the greek letter nu. In the next line, the frequency is represented as "nu".	Revise "nu" to "v".	Typo
Chapter 19 Transition Metals and Coordination Chemistry: Section 19.3 Spectroscopic and Magnetic Properties of Coordination Compounds	In the second line of text, the symbol for the crystal field splitting energy is given. The 'oct' should be subscript. In the spectrochemical series, the caption reads '...in order of increasing field trength...'. It should read '...in order of increasing field strength...'	Revise to set "oct" as subscript. The typo in strength is correct in webview.	Typo
Chapter 19 Transition Metals and Coordination	When the Example 19.8 box continues from pg 1063 to pg 1064, the gray box for the example stops before the end of the example. The	Revise the text before the image to "...more complicated pattern, as	Other

Chemistry: Section 19.3 Spectroscopic and Magnetic Properties of Coordination Compounds	content from the top of the page until (and not including) the "Magnetic Moments of Molecules and Ions" should be part of the example. The figure for the example is missing the ligand locations, and missing the x and y axes labels for the dz^2 diagram. It appears the authors meant to show where the ligands would be located in this geometry but failed to do so. The text reads "This results in the octahedral t2g and the eg sets splitting and gives a more complicated pattern with no simple (delta)oct." This text is ambiguous because it's unclear why the splitting energy would be called (delta)oct rather than (delta)sqp. Furthermore, the "pattern" referred to is this sentence is not the "pattern" referred to in the next sentence that refers to the d-orbital diagrams.	depicted below:". The image will also be updated.	
Chapter 20 Nuclear Chemistry: Section 20.1 Nuclear Structure and Stability	Example 20.1 The solution for part (b) of this example compares the density of a neutron star to the density of a U-235 nucleus. The calculations appear correct, however, in summing up the answer by stating the comparison, your text says "These values are fairly similar (same order of magnitude), but the nucleus is more than twice as dense as the neutron star". According to your calculations, it should be the other way around, and it should state .."the neutron star is more than twice as dense than a U-235 nucleus."	Revise the last sentence before "Check Your Learning" to "These values are fairly similar (same order of magnitude), but the neutron star is more than twice as dense as the U-235 nucleus."	Incorrect answer, calculation, or solution
Chapter 20 Nuclear Chemistry: Section 20.2 Nuclear Equations	The incorrect table was uploaded to the website for Chapter 20.2.Tables 20.4 and 20.7 are identical on the web, though different in the hard copy and in their table description. Table 20.4 should show the names of the particles, their symbols, etc. This is what the hardcopy of the book and the Figure 20.4 text indicate. However, the table shown is that from section 20.3, Table 20.7 of nuclear equations.	Figure 20.4 will be updated.	Incorrect answer, calculation, or solution
Chapter 20 Nuclear Chemistry: Section 20.2 Nuclear Equations	In figure 20.7 none of the --> arrows are present in the print version. In the online version this has been partially corrected. Unfortunately, for Electron capture the arrow has been incorrectly placed. Electron capture should have the electron on the reactant side of the equation. As is, it is whowing Beta decay.	This figure will be updated.	Typo
Chapter 20 Nuclear Chemistry: Section 20.3 Radioactive Decay	At the Dead Sea Scrolls, the calculations are correct, but the equation is not, due to the fact that it should be ln((N0/N(t)) instead of ln (N(t)/N0). In terms of answer, the right equation was taken into account, but it was written wrong. Please accept my humble opinion	While our reviewers determined there is no error with the equation or the computed result, a revision is needed to the related text narrative. Revise "−kt" to "−λt".	General/pedagogical suggestion or question

Chapter 20 Nuclear Chemistry: Section 20.3 Radioactive Decay	Figure 20.7 In the second column of the table all of the arrows are missing. In addition, in the bottom two rows the species "Y" is listed on the right hand side with mass number A and charge Y-1. The charge should be Z-1 rather than Y-1.	This figure will be updated.	Typo
Chapter 20 Nuclear Chemistry: Section 20.4 Transmutation and Nuclear Energy	On page 1151, I find this phrase: "Plutonium is now mostly formed in nuclear reactors as a byproduct during the decay of uranium. Some of the neutrons that are released during U-235 decay combine with U-238 nuclei to form uranium-239...." In fact, neutrons are released during fission of uranium, not during radioactive decay. I suggest replacing both instances of the word "decay" with "fission".	Revise the paragraph beginning "Plutonium is now mostly formed..." to "Plutonium is now mostly formed in nuclear reactors as a byproduct during the fission of U-235. Additional neutrons are released during this fission process (see the next section), some of which combine with U-238 nuclei to form uranium-239; this undergoes β decay to form neptunium-239, which in turn undergoes β decay to form plutonium-239 as illustrated in the preceding three equations. These processes are summarized in the equation:".	Other factual inaccuracy in content
Chapter 21 Organic Chemistry: Section 21.1 Hydrocarbons	11 g exercise. Incorrect answer key 4-methyl-1-pentene instead of 5-methyl-1-pentene	Revise "5-methyl-1-pentene" to "4-methyl-1-pentene".	Incorrect answer, calculation, or solution
Chapter 21 Organic Chemistry: Section 21.3 Aldehydes, Ketones, Carboxylic Acids, and Esters	Figure 21.15 The structures for butyl acetate and propyl isobutyrate are not correct (the chains are switched around to make methyl butyrate and isobutyl propionate, respectively).	This figure will be updated.	Other factual inaccuracy in content
Chapter 21 Organic Chemistry: Section 21.4 Amines and Amides	Problem 57 Geometry about the nitrogen in pyridine is bent, not trigonal planar. Or you could ask what the electron geometry is in the problem.	Revise the second sentence in the question stem to "What are the hybridizations, electron domain geometries, and molecular geometries about the nitrogen atoms in pyridine and in the pyridinium ion?" The figure in the answer will also be updated.	Incorrect answer, calculation, or solution

Throughout	141 Efina 401 1 atm used as standard ? 409 Fig.8.11 Celsius to Kelvin conversion 441 Fig. 8.32 axis label: 'speed u' instead of 'velocity v', peak at Up, not Vp. 442 Fig. 8.33 axis label: 'speed u' instead of 'velocity v'. 443 Fig. 8.34 axis label: 'speed u' instead of 'velocity v'. 466 Fig. 9.4 Hot/cold liquid rather than water due to anomalies 471 Tfina 472 2x Tfina 505 Example 9.16 2x units of kJ missing 510 Tfina 583 Fig. 10.64 for destructive interference case, rays of diffracted beam are in phase. 670 Table 12.2 standard at 1 atm ? 671 Example 12.6 units of J K-1 mol-1 missing 675 Key Equations last two: Q and K not in this chapter 12 736 Ch. 14.1 Arrhenius acid is based on work by Swante Arrhenius, not Carl Axel Arrhenius 742 Fig. 14.2 caption [H3O+] instead of H3O+ 757 Example 14.12 table in 'step 1': should be col 1 for HCO2H, col 2 for H3O+, col 3 for HCO2–. 757 Example 14.12 2 times x2+ instead of x2 787 Fig. 14.21 caption (b) should be acetic acid, not HCl 814 Example 15.4 answer for molar solubility of Ca(OH)2 should be 6.9×10–3 M, not 1.3×10–2 M. 872 Example 16.6 should read Ecell = – 0.14 V, not Ecell = – 0.014 V 895 prob. 24(b) should be 3 Cu(s), not 2 Cu(s) 915 third rxn scheme must be 2 N2O5 → 4 NO2 + O2 to balance. 958 Exercise 46 should read '918F →818O + e+', not '5189F →188O + e–' 1114 Figure 20.4 beta particle should be '-10e', not '10e' 1121 first-order equ. should read 'Nt = N0 e–λt ', not 'Nt = N0 e–kt ' 1122 Example 20.5 (b) exponent should read (15 y), not (15/y) 1123 carbon-14 decay should read '614C →714N + -10e', not '614C →712N + -10e' 1129 first rxn scheme twice t1/2 misplaced 1140 end of page should read '2 +10 e' or '2 +10 β', not '2 +10 ' 1141 line 5 should read ', 12 H and triton 13 H', not ', 12 and triton 13' 1161 Exercise 17 should read '919 F', not '919 F' 1247 Appendix G HgSO4 : S298 = 0 ? 1321 Ch.16: 5d should be MnO4–, not MnO4. 1336 Sol. 13 b) should read '24 He', not He2'	Some of these revisions were implemented in the 2e update. The remaining will be updated accordingly.	Typo

Appendix B | Essential Mathematics	In the problem of the example B2 (3.6 × 10^5 by 6.0 × 10^−4) , the minus sign of the power of ten in the numerator is missing. Correction: (3.6 × 10^−5 by 6.0 × 10^−4).	Our reviewers accepted this change.	Typo
Appendix B | Essential Mathematics	In explaining the usefulness of the exponential notation, just before the last line at page 1199, it's written "every large" instead of "very large".	Our reviewers accepted this change.	Typo
Appendix B | Essential Mathematics	At "EXAMPLE B4": It says "Divide 3.6 × 10^5", but it continues as if it said "... 10^-5"	Revise “5” to “–5”.	Incorrect answer, calculation, or solution
Appendix G | Standard Thermodynamic Properties for Selected Substances	The Delta G of formation for liquid sulfuric acid, H2SO4 (l), is listed as positive 690.00 kJ/mol, but it should be negative, as in -690.00 kJ/mol.	Revise “690.00” to “–690.00”.	Typo
Appendix G | Standard Thermodynamic Properties for Selected Substances	entry for HNO3 The phase is not listed. It should be HNO3(aq). This value should be listed with the compounds of nitrogen after HNO3(l) and HNO3(g). Example 5.15 is the first example using standard enthalpy of formation and Appendix G. It is important to have these values listed clearly and with their phase.	A new row for HNO3(aq) will be added to the table.	Typo