

Chemistry Atoms First Release Notes 2018

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Errata:

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

Location	Detail	Resolution Notes	Error Type
Ch 1: Essential Ideas, Sec 4: Measurement s, Table 1.3	I suggest calling the H-1 atom the "most common isotope of hydrogen" not a "normal hydrogen atom".	Revise "what remains when a normal hydrogen atom" to "what remains when the most common isotope of hydrogen".	General/pedagogical suggestion or question
Ch 1: Essential Ideas, Sec 6: Mathematical Treatment of Measurement Results	In example 14.2 it should say "...as the hydronium ion concentration increases to 2.0×10^{-6} M."	In the solution, revise "as the hydrogen ion concentration" to "as the hydronium ion concentration".	Typo
Ch 1: Section 6: Mathematical Treatment of Measurement Results; Example 1.12	In the ICE table in Example 14.19 delete the "+" from the cell for the Change(M) for H ₂ O.	In the ICE table in Example 14.19, remove the "+" sign from the cell for the Change(M) for H ₂ O.	Typo
Ch 2 Atoms, Molecules, and Ions	On the first page of Chapter 13, the text of the introduction states "where the reaction between carbon dioxide and water forms carbonic acid (HCO ₃ ⁻) (Figure)." The formula given in the parenthesis is that for the bicarbonate anion, not carbonic acid which is H ₂ CO ₃ .	In the second paragraph, revise the formula given for carbonic acid to "H ₂ CO ₃ ".	Typo
Ch 2: Atoms, Molecules, and Ions, Sec 1:Early Ideas in Atomic Theory, Example 2.2	The common unit prefixes table entry for "giga" has the wrong units in the parentheses (8,000,000,000 Gyr instead of 8,000,000,000 yr).	In Table 1.3 Common Unit Prefixes, revise "(8,000,000,000 Gyr)" to "(8,000,000,000 yr)".	Typo
Ch 2: Atoms, Molecules, and Ions, Sec 3: Atomic Structure and Symbolism	Page 197: In the reaction below Figure 7.12, H ₂ should be in the gas phase (g), NOT the solid (s) phase.	In the reaction below Figure 7.12, revise the phase for H ₂ from "(s)" to "(g)".	Other factual inaccuracy in content

<p>Ch 2: Atoms, Molecules, and Ions, Sec 3: Atomic Structure and Symbolism, Exercise 25</p>	<p>Wrong formula for potassium acid phthalate, should be $\text{KHC}_8\text{H}_4\text{O}_4$. 94. Potassium acid phthalate, $\text{KHC}_8\text{H}_4\text{O}_4$, or KHP, is used in many laboratories, including general chemistry laboratories, to standardize solutions of base. KHP is one of only a few stable solid acids that can be dried by warming and weighed. A 0.3420-g sample of $\text{KHC}_8\text{H}_4\text{O}_4$ reacts with 35.73 mL of a NaOH solution in a titration. What is the molar concentration of the NaOH? $\text{KHC}_8\text{H}_4\text{O}_4(\text{aq}) + \text{NaOH}(\text{aq}) \rightarrow \text{KNaC}_8\text{H}_4\text{O}_4(\text{aq}) + \text{H}_2\text{O}(\text{aq})$</p>	<p>Revise the formula for potassium acid phthalate to "$\text{KNaC}_8\text{H}_4\text{O}_4$" throughout exercise 94.</p>	<p>Other factual inaccuracy in content</p>
<p>Ch 2: Atoms, Molecules, and Ions, Sec 4: Chemical Formulas</p>	<p>Page 343: Figure 4.8. I think that the arrow farthest to the right should not be double sided, but rather an arrow that points from top to bottom like the rest of the arrows in this figure. This type of arrow would agree better with the text written to the right of it ("Covalent character decreases; ionic character increases").</p>	<p>In Figure 4.8, remove the top arrowhead from the black arrow.</p>	<p>Other factual inaccuracy in content</p>
<p>Ch 2: Atoms, Molecules, and Ions, Sec 4: Chemical Formulas, Example 2.12</p>	<p>Page 339: Third sentence in section 7.2, I suggest cutting the word "equally", since covalent bonds can also result from the unequal sharing of electrons (i.e polar covalent bonds). I think it would be better if the wording was: "Atoms can also make chemical bonds by sharing electrons between each other. Such bonds are called covalent bonds."</p>	<p>Revise the 1st paragraph as follows: "Ionic bonding results from the electrostatic attraction of oppositely charge ions that are typically produced by the transfer of electrons between metallic and nonmetallic atoms. A different type of bonding results from the mutual attraction of atoms for a "shared" pair of electrons. Such bonds are called covalent bonds..."</p>	<p>Other factual inaccuracy in content</p>
<p>Ch 2: Atoms, Molecules, and Ions, Sec 4: Chemical Formulas, Example 2.12</p>	<p>Page 310: The term "degenerate orbitals" should be defined on this page somewhere after the definition of Hund's rule.</p>	<p>In the 1st paragraph after Figure 3.23, add a sentence after the 6th sentence as follows: "This is called a degeneracy, and the energy levels for the same principle quantum number, n, are called degenerate orbitals." Add degenerate orbitals as a Key Term with the following definition: "degenerate orbitals: orbitals that have the same energy"</p>	<p>General/pedagogical suggestion or question</p>

Ch 2: Atoms, Molecules, and Ions, Sec 4: Chemical Formulas, Exercise 55	Page 274: Third bullet point at start of section 6.1. What is meant by period? I would delete this word.	In the 3rd learning objective, delete the word "period" as follows: "Use appropriate equations to calculate related light-wave properties such as frequency, wavelength, and energy"	General/pedagogical suggestion or question
Ch 2: page 93, just above the "The Mole" in "Link to Learning" PDF format	Table 4.3 on page 104: The formula for ammonium chloride should be NH ₄ Cl.	In Table 4.3 Names of Some Polyatomic Ionic Compounds, revise the formula given for ammonium chloride to "NH ₄ Cl".	Other factual inaccuracy in content
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 6: The Periodic Table	The phase diagram of carbon dioxide contains two errors. The first error. The actual critical pressure of carbon dioxide occurs at 7390 kPa, but the figure indicates that it occurs all the way at or below the x-axis, which starts at 10 kPa. The second error. The critical temperature that is indicated on the x-axis is shifted slightly to the left of where the supercritical fluid region begins. Revise the Figure to the attached file.	Revise Figure 10.34 showing the phase diagram of carbon dioxide to more accurately depict the critical temperature and critical pressure.	Other factual inaccuracy in content
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 1: Electromagnetic Energy	Figure 10.38 - This compares an amorphous solid to a crystalline solid. To me, the amorphous solid looks more like a crystalline solid than the crystalline solid.	Revise Figure 10.38 to show the crystalline and amorphous structures of silicon dioxide, and update the preceding text and caption as follows: Some substances, such as silicon dioxide (shown in Figure 10.38)... "(a) Silicon dioxide, SiO ₂ , is abundant in nature as one of several crystalline forms of the mineral quartz. (b) Rapid cooling of molten SiO ₂ yields an amorphous solid known as "fused silica".	General/pedagogical suggestion or question
Ch 3: Electronic Structure and Periodic Properties of	p275 #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	Typo

Elements, Sec 1: Electromagnetic Energy, Example 3.3		temperature of the solution by 6.9 °C".	
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 1: Electromagnetic Energy, Figure 3.11	Chapter 12.4, Exercise 53 The question asks for changes in the value of the standard Gibbs energy of reaction as you change the partial pressure of reactants or products. The answer argues with LeChatelier to predict changes in K. This does not make sense, as the equilibrium constant does not depend on starting conditions, and standard energies are at standard conditions, not varying partial pressure or concentration. The problem would make sense if Q is exchanged for K, and Gibbs energy is exchanged for standard Gibbs energy	In the question for exercise 53, revise "delta G degrees 298" to "delta G". Revise the solution as follows: (a) Increasing the oxygen partial pressure will yield a decrease in Q and deltaG thus becomes more negative. (b) Increasing the oxygen partial pressure will yield a decrease in Q and deltaG thus becomes more negative. (c) Increasing the oxygen partial pressure will yield an increase in Q and deltaG thus becomes more positive.	Incorrect calculation or solution
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 1: Electromagnetic Energy, Waves, Figure 3.2	In 3.1 figure 2: A diagram of 3 waves at 3, 6, and 12 Hertz is shown. the text in the figure incorrectly says "4 cycles per second = 3 Hertz" "8 cycles per second = 6 Hertz" and "16 cycles per second = 12 Hertz. Since Hertz are cycles per second by definition, those should be "3 cycles per second = 3 Hertz", and similarly for the other two wave representations. Number of Hertz and cycles per second have to be the same.	In Figure 3.2 showing one-dimensional sinusoidal waves, revise the number given for cycles per second to match the number given for hertz.	Typo
Ch 3: Electronic Structure and Periodic Properties of Elements	The problem calculates the equilibrium T for liquid water boiling to make gaseous water. The problem states, the boiling point of a liquid is the temperature at which its solid and liquid phases are in equilibrium It should say, liquid and gas phases	In Example 13.12 Equilibrium Temperature for a Phase Transition, revise "solid and liquid phases" in the first sentence to "liquid and gaseous phases".	Typo
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 3: Development of Quantum Theory	Chapter 11, problem 8a. The solutions manual uses a molecular weight of 1.0079 for diatomic hydrogen. The molecular weight of diatomic hydrogen is twice this number (2.0158). The text book (page 654) gives the solution density of diatomic hydrogen in palladium as 1.8 g/cc yet the solutions manual uses 10.8 g/cc in solving the	In Exercise 8, revise "1.8 g/cm^3" to "10.8 g/cm^3" in parts a, b, and c.	Incorrect calculation or solution

	problem. Which one is it? 10.8 seems more likely.		
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 3: Development of Quantum Theory	In example 14.20, delete the brackets around acetic acid, water, and acetate ion in the reaction above the ICE table. Also, on the reactants side of the ICE table, there should be a separate column for acetic acid and a separate column for water. All of the values shown in the table on the reactants side should be in the column for acetic acid and all cells in the column for water should be left blank.	In Example 14.20, in the ICE table in Step 2, remove all brackets, and add a column for H ₂ O.	Typo
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 3: Development of Quantum Theory	Text running out of the box slightly.	Our reviewers accepted this change.	Typo
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 3: Development of Quantum Theory, Figure 3.24	Section 6.1, page 310 does not have any details about the MOLE CONCEPT even though the title of the section includes mole concept. This is an important topic and needs to be discussed before explaining other concepts that follows in this chapter and the subsequent ones.	Revise the title of section 6.1 to "Formula Mass". The mole concept is discussed in section 2.4 Chemical Formulas.	Other factual inaccuracy in content
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 6: The Periodic Table, Exercise 88	In chapter 2 there is an example calculating the number of carbon atoms in a given mass of saccharin. The final multiplication is $1.31 \times 10^{20} \times 7$ and the answer is listed as 9.20×10^{21} . The exponent should not have changed in this calculation.	Revise the final solution of Example 2.12 Deriving the Number of Atoms and Molecules from the Mass of a Compound to " 9.17×10^{20} C atoms".	Typo
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 6: The Periodic Table, Figure 3.39	In the directions for obtaining the molecular formula from the empirical formula, the equation has a typo (has an "x" where it should have a "y"). Current and incorrect: $(AxBy)_n = AnxBnx$. Correction: $(AxBy)_n = AnxBny$.	Revise the molecular formula to " $(AxBy)_n = AnxBny$ ".	Typo
Ch 3: Electronic Structure and Periodic Properties of	Under the explanation of beta decay, the first example has only an "X" when it should have "Xe" (for xenon-131). The second example is correct.	In the example after the explanation of beta decay, revise "X" to "Xe".	Typo

Elements, Sec 7: Molecular and Ionic Compounds, Exercises 99, 100			
Ch 3: Electronic Structure and Periodic Properties of Elements, Sec 7: Molecular and Ionic Compounds, Table 3.4	<p>Caption for figure re. photoelectric effect erroneously states electron kinetic energies are "proportional to" photon energies, recommend revision as shown below to correct this error and an presently: "...the kinetic energy of ejected electron will be proportional to the energy of the incoming photon..."</p> <p>change to: "... the kinetic energy of an ejected electron will increase linearly with the energy of the incoming photon..."</p>	<p>Revise the second sentence in the caption for Figure 3.11 as follows:</p> <p>"For any frequency of light above the threshold frequency, the kinetic energy of an ejected electron will increase linearly with the energy of the incoming photon."</p>	General/pedagogical suggestion or question
Ch 4: Chemical Bonding and Molecular Geometry, Sec 2: Covalent Bonding	Third sentence below figure 2: "The probability of finding the system in this configuration is or 6/16 or 3/8. Delete the second or.	In the 2nd sentence below figure 12.8, delete the duplicate "or" before "6/16 or 3/8".	Typo
Ch 4: Chemical Bonding and Molecular Geometry, Sec 2: Covalent Bonding, Subsec: Electronegativity and Bond Type, Figure 4.8	Below the Kc expression. In the x ² term, the "2" should be in superscript since this term is "x squared".	In the 2nd equation after the phrase "Setting up and solving the quadratic equation gives", revise "x ² " to "x ² ".	Typo
Ch 4: Chemical Bonding and Molecular Geometry, Sec 3: Chemical Nomenclature, Exercise 31	Ch. 13, Problem 25(b) should have phases for the reactants and products. All phases should be gas (g).	<p>Add phases for all reactants and products in exercise 25 part b as follows:</p> <p>(b) $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$</p>	Typo
Ch 4: Chemical Bonding and Molecular Geometry, Sec 3: Chemical Nomenclature, Section	Figure 13.7, right side "At equilibrium" image for mixture 3 is still incorrect, in both the 2015 and 2016 printings of the textbook. Using the values in the latest printing give an equilibrium constant that is the inverse of what it should actually be.	Revise Figure 13.7 to show the correct at equilibrium values for mixture 3.	Other factual inaccuracy in content

Summary			
Ch 4: Chemical Bonding and Molecular Geometry, Sec 3: Chemical Nomenclature, Subsec: Compounds Containing Polyatomic Ions	The Answer to Ch. 20 47(c) has an error. The symbol for the neutron needs to be corrected.	In the answer to exercise 47 part c, revise "4 n 0" to "4 [1 over 0] n".	Typo
Ch 4: Chemical Bonding and Molecular Geometry, Sec 3: Chemical Nomenclature, Table 4.3	I believe the correct answer to Ch. 12 #43(a) should be 22.1 kJ NOT -22.1 kJ.	Revise the answer to exercise 43 part a to "22.1 kJ".	Typo
Ch 4: Chemical Bonding and Molecular Geometry, Sec 4: Lewis Symbols and Structures, Subsec: Electron-deficient Molecules	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
Ch 5: Advanced Theories of Bonding, Sec 1: Valence Bond Theory, Example 5.1	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
Ch 5: Advanced Theories of Bonding, Sec 1: Valence Bond Theory, Subsec: Atomic Orbital Overlap	Chapter 14, Problem #44. Should say See Table 14.2	In exercise 44, revise the link to Table 14.2 Ionization Constants of Some Weak Acids.	Typo
Ch 5: Advanced Theories of Bonding, Sec 4: Molecular Orbital Theory,	Correct answer to Ch. 13 #87 is 33 g CaCO3	Revise the solution to exercise 87 to "33 g".	Typo

Subsec: The Diatomic Molecules of the Second Period			
Ch 5: Advanced Theories of Bonding, Sec: Valence Bond Theory, Example 5.2	Answer to Ch. 13 79) should be $[PCl_3] = [Cl_2] = 0.195\text{ M}$, $[PCl_5] = 1.81\text{ M}$	Revise the first part of the solution to exercise 79 to " $[PCL_5] = 1.80\text{ M}$ ".	Typo
Ch 5: Thermochemistry, Sec 2: Calorimetry	Section 7.5 #92 - equation not balanced (looks like it was "supposed to be" and teacher answer key does not balance to solve problem)...should have a coefficient of 2 in front of the butanoic acid (which they call propanoic acid in the question)	Revise exercise 92 as follows: 92. What mass of $Ca(OH)_2$ will react with 25.0 g of butanoic to form the preservative calcium butanoate according to the equation? In the equation, add a "2" before "Ca" on the righthand side.	Typo
Ch 6: Composition of Substances and Solutions, Sec 1: Formula Mass and the Mole Concept	In the answer to Problem 2.25, the fractional abundances are given when the percent abundances are what was asked for. revise Turkey source: 0.2649 (of 10.0129 amu isotope); US source: 0.2537 (of 10.0129 amu isotope) to Turkey source: 26.49% (of 10.0129 amu isotope); US source: 25.37% (of 10.0129 amu isotope)	Revise the solution to exercise 25 as follows: "Turkey source: 26.49% (of 10.0129 amu isotope); US source: 25.37% (of 10.0129 amu isotope)"	Typo
Ch 6: Composition of Substances and Solutions, Sec 2: Determining Empirical and Molecular Formulas, Exercise 8	Back of the book answer has a small typo: Chapter 7 Problem 3 F Reads: " $(NH_4)_2Cr_5O_7(s)$ " Ought to read: " $(NH_4)_2Cr_2O_7(s)$ " There's an extra '2'	In exercise 3, replace "Cr_5" with "Cr_2" and delete the fullsize "2" before "Cr_2" in the answer to part f as follows: $(NH_4)_2Cr_2O_7(s)$	Typo
Ch 6: Composition of Substances and Solutions, Sec 2: Determining Empirical and Molecular Formulas, Subsec:	problem 63: The phases change in the two given chemical rxns for $SbCl_3$. Going between Solid and Gas; however, these should be in the same phase (probably Gas). The solutions guide also needs to be corrected for this as well.	In the second equation given in exercise 63, revise " $SbCl_3(g)$ " to " $SbCl_3(s)$ ".	Typo

Derivation of Molecular Formulas			
Ch 7: Stoichiometry of Chemical Reactions, Sec 1: Writing and Balancing Chemical Equations, Exercise 3	Missing a "K" on page 507 (2016 ed) Chapter 9 Problem 69 A. Reads "875 degree" should read "875 K" (without the degree and Kelvin added.)	In exercise 69, revise "875 degrees" to "875 K".	Typo
Ch 7: Stoichiometry of Chemical Reactions, Sec: 1: Writing and Balancing Chemical Equations, Exercise 3	p. 222 Chapter 4 Problem 83. The question talks about GaBr ₂ - however, it ought to read GaBr ₃ .	In exercise 83, revise "GaBr ₂ " to "GaBr ₃ " (2 times).	Typo
Ch 7: Stoichiometry of Chemical Reactions, Sec 1: Writing and Balancing Chemical Equations, Exercise 3	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 " $\Delta G = 1.7 \times 10^3 + (8.314 \times 310 \times \ln 28/210) = -2.1 \text{ kJ}$ "	Revise the solution for exercise 49 as follows: " $\Delta G = 1.7 \times 10^3 + (8.314 \times 310 \times \ln 28/210) = -2.1 \text{ kJ}$ "	Incorrect calculation or solution
Ch 7: Stoichiometry of Chemical Reactions, Sec 2: Classifying Chemical Reactions	In the student solution guide for chapter 12 (mod 4) #43b, the value substituted for [Cl ₂] 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 $\Delta G = 61,500 \text{ J/mol}$, or 61.5 kJ/mol .	Revise the solution for exercise 43 part b to " 61.5 kJ/mol ".	Incorrect calculation or solution
Ch 7: Stoichiometry of Chemical Reactions, Sec 2: Classifying Chemical Reactions, Example 7.7	Chapter 12 #35 has an error with the phases of P ₄ O ₁₀ . In order for them to cancel out, the phases should match. For the free energy values listed, the phase P ₄ O ₁₀ should be solid in both instances. That is, the final reaction should be written $6 \text{ H}_2\text{O} (\text{g}) + \text{P}_4\text{O}_{10} (\text{s}) \rightarrow 4 \text{ H}_3\text{PO}_4 (\text{l})$ with $\Delta G = -428.66 \text{ kJ/mol}$.	In the last equation given in exercise 35, revise "P ₄ O ₁₀ (g)" to "P ₄ O ₁₀ (s)".	Typo
Ch 7: Stoichiometry of Chemical Reactions, Sec 2: Classifying Chemical Reactions, Table 7.1	In Chapter 12 #53b, the equation is not balanced. There should be 2 equivalents of sulfur trioxide, so the final equation is $2 \text{ SO}_2 + \text{O}_2 \rightarrow 2 \text{ SO}_3$. This error is also copied in the student solution guide Chapter 12 (mod 4). However, the answer remains correct.	Revise the equation for exercise 53 part b as follows: (b) $2\text{SO}_2 (\text{g}) + \text{O}_2 (\text{g}) \rightarrow 2\text{SO}_3 (\text{g})$	Incorrect calculation or solution
Ch 7: Stoichiometry	In the student solution guide for Chapter 12 (mod 4) #33c lists the free energy of	Revise the solution to part (c) of exercise 33	Incorrect calculation or

<p>of Chemical Reactions, Sec 4: Reaction Yields</p>	<p>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".</p> <p>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".</p>	<p>from "-53.6 kJ" to "-291.9 kJ".</p>	<p>solution</p>
<p>Ch 7: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis, End of Chapter Exercises</p>	<p>Revise the answer to Check Your Learning Example 13.13 to be -41.7 kJ; yes.</p> <p>Using the equations:</p> $2 \text{ NH}_3 \rightarrow 3 \text{ H}_2 + \text{ N}_2$ <p>and</p> $(\Delta)G = (\Delta)G(\text{standard}) + RT \ln Q$ <p>and the given values:</p> $(\Delta)G(\text{standard}) = 33.0 \text{ kJ/mol}$ $R = 8.3144 \text{ J/(mol K)} = 8.3144 \times 10^{-3} \text{ kJ/(mol K)}$ $T = 875 \text{ degC} + 273 = 1148 \text{ K}$ $[\text{NH}_3] = [\text{H}_2] = [\text{N}_2] = (0.100 \text{ mol} / 5.00 \text{ L})$ <p>where:</p> $Q = \frac{[\text{H}_2]^3 [\text{N}_2]}{[\text{NH}_3]^2}$ <p>we have:</p> $(\Delta)G = 33.0 \text{ kJ/mol} + (8.3144 \times 10^{-3} \text{ kJ/(mol K)})(1148 \text{ K}) \ln \left\{ \frac{(0.100/5.00)^3 (0.100/5.00)}{(0.100/5.00)^2} \right\}$ <p>carrying out the math:</p> $(\Delta)G = -41.7 \text{ kJ/mol}$ <p>or</p> $(\Delta)G = -41.7 \text{ kJ for the reaction as written}$	<p>Revise the solution to the Check Your Learning in Example 13.13 Calculating DeltaG under Nonstandard Conditions from "-136 kJ; yes" to "-47 kJ/mol; yes".</p>	<p>Incorrect calculation or solution</p>

Ch 7: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis, Exercise 91	image table in section Calculation of an Equilibrium Constant has extraneous text. Should be just numbers, not [.....]i. One never puts numbers into an "initial concentration" bracket.	In Example 13.6 Calculation of an Equilibrium Constant, revise the first ICE table as follows: In the last row, remove brackets and subscript i's.	Typo
Ch 7: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis, Exercise 92	The last sentence of Key Concepts and Summary Chapter 4.3 it says "Oxyacids are named by changing the ending of the anion to ic, and adding acid; H ₂ CO ₃ is carbonic acid." I might add "or -ous" after -ic. So it would read Oxyacids are named by changing the ending of the anion to ic or -ous, and adding acid; H ₂ CO ₃ is carbonic acid.	Revise to "Oxyacids are named by changing the ending of the anion (-ate to -ic and -ite to -ous), and adding "acid;" H ₂ CO ₃ is carbonic acid".	General/pedagogical suggestion or question
Ch 7: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis, Exercise 94	g/L is not density "rho" m/V (mass over volume) is rho Please do not use units in a mathematical expression as though they were variables.	Revise "g/L" to "m/V" in step 4 of Example 8.11 Derivation of a Density Formula from the Ideal Gas Law.	Typo
Ch 7: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis, Figure 7.15	I don't know if I am just misunderstanding, or if this is an actual error - Table 9.4 on page 367 of the textbook is supposed to show the enthalpy of formation for cesium chloride, but there is information in the table for the formation of sodium chloride.	Revise Table 9.4 to show the enthalpy of formation for cesium fluoride.	Other factual inaccuracy in content
Ch 8: Gases, Sec 1: Gas Pressure, Exercise 9	In section 20.2 (nuclear equations) Figure 1, the first beta particle symbol is incorrect.	In Figure 20.4, in the first symbol for the beta particle, revise "1" to "-1" as follows: beta particle: $0/-1 e$ or $0/-1\beta$	Typo
Ch 8: Gases, Sec 1: Gas Pressure, Figure 8.4	Chapter 7 Problem 3 f The (NH ₄) ₂ Cr ₂ O ₇ ought to read (NH ₄) ₂ Cr ₂ O ₇ . I think that the extra 5 is a simple typo	Revise the solution to exercise 3 part f as follows (delete the fullsize "2" in front of "O_7"): (f) (NH ₄) ₂ Cr ₂ O ₇	Typo
Ch 8: Gases, Sec 3: Stoichiometry of Gaseous Substances, Mixtures, and Reactions,	Section 3.1, Check Yourself Problem 3.3 Calculate the threshold energy in kJ/mol of electrons in aluminum, given that the lowest frequency photon for which the photoelectric effect is observed is 9.87 10 ¹⁴ Hz.	In the Check Your Learning for Example 3.3 Photoelectric Effect, revise the solution from "3.94 x 10 ⁵ kJ/mol" to "394 kJ/mol".	Typo

Example 8.11	Answer: 3.94 10 ⁵ kJ/mol should be 394 kJ/mol		
Ch 8:: Gases, Sec 5: The Kinetic- Molecular Theory, Exercise 95	The solution includes the square of 0.25 in the rate calculation with the answer of 0.675 instead of 0.625.	In the solution manual, revise "0.0675" in the numerator to "0.0625". Final answer is correct.	Typo
Ch 8: Gases, Sec 3: Stoichiometry of Gaseous Substances, Mixtures, and Reactions, Exercise 69	The three values listed in the image above as K _a values are actually pK _a values. (This makes a big difference.) Also, the value for the Cu complex should not be negative.	In the last paragraph, revise "K _a " to "pK _a " for the examples of the first stage of hydrated metal ions ionization.	Typo
Ch 9: Thermochemi stry, End of Chapter Exercises, Exercises 7, 25, 55, and 67	In the paragraph above Figure 3, the second-to-last sentence currently reads "Hydrogen is a unique, nonmetallic element with properties similar to both group 1 and group 7 elements." The last part of the second-to-last sentence should be changed to "properties similar to both group 1 and group 17 elements."	In the paragraph above Figure 3.39, revise the 2nd to last sentence as follows: "Hydrogen is a unique, nonmetallic element with properties similar to both group 1 and group 17 elements."	Typo
Ch 9: Thermochemi stry, Sec 1: Energy Basics, Example 9.1	On page 405 of the most recent version of 'Chemistry', there is a mangled sentence: As the Lewis structures in suggest, O ₂ contains a double bond, and N ₂ contains a triple bond.	In the paragraph above Example 5.1, revise the 2nd sentence as follows: "As the Lewis structures below suggest, O ₂ contains a double bond, and N ₂ contains a triple bond."	Typo
Ch 9: Thermochemi stry, Sec 1: Energy Basics, Example 9.1	The word principal in the phrase "principal quantum number" is misspelled in a few locations in chapter 3. The adjective should be "principal" and not "principle," on as on page 205.	Ensure that "principal quantum number" is spelled correctly throughout.	Typo
Ch 9: Thermochemi stry, Sec 1: Energy Basics, Subsec: Thermal Energy, Temperature, and Heat	The formula for Butadiene is listed as C ₆ H ₆ in example 8.1 on page 417. The correct formula for Butadiene is C ₄ H ₆ .	In Example 5.1 Counting sigma and pi bonds, revise the formula for butadiene in the 1st sentence to "C ₄ H ₆ ".	Typo
Ch 9: Thermochemi stry, Sec 2: Calorimetry	When a single p orbital contains a pair of electrons, the act of pairing the electrons raises the energy of the orbital. Thus the 2p orbitals for O, F, and Ne are higher in energy than the 2p orbitals for Li, Be, B, C, and N.	Revise the 5th paragraph of section The Diatomic Molecules of the Second Period as follows:	General/pedagogical suggestion or question

	<p>The electrons in the 2p orbitals of O, F, and Ne are not higher in energy than those of Li, Be, B, C, and N. This statement is much too overgeneralized and leads to a gross misunderstanding of how to think about atomic energy levels and the consequent effects of combining them. The only case where double occupancy increases the apparent energy is evidenced by the slightly lower IE1 of O compared to that of N. The second ionization energy of O, however, is much greater than that of N, which means that the 2p orbital electrons of O are not all at a higher level. Further, and perhaps more germane is that IE1 of F and Ne are both greater than that of N so this makes the statement quoted above false, as IE1 clearly indicates that the singly occupied 2p orbitals of N are at a higher energy level than the doubly occupied 2p orbitals of F and Ne.</p> <p>The correct explanation for this difference in s and p energy levels is that as effective nuclear charge becomes stronger, there is an increased separation/difference in the energy levels of 2s and 2p electrons. This is the better explanation for the observations of O where even though the double occupancy leads to a higher IE1 as compared to N with its singly occupied 2p orbitals (suggesting double occupancy leads to higher energy), the 2s electrons of O are at a much lower energy level than the 2s electrons of N, thus there is too big of an energy gap between those electrons for mixing to occur. This energy gap increases for elements to the right of O as their $Z_{\text{effective}}$ also increases. Conversely, the 2s and 2p energy levels of N and all 2nd period elements prior to exhibit decreasingly smaller gaps between 2s and 2p moving to the left across the period just as Z_{eff} decreases.</p>	<p>"s-p mixing occurs when the s and p orbitals have similar energies. The energy difference between 2s and 2p orbitals in O, F, and Ne is greater than that in Li, Be, B, C, and N. Because of this, O₂, F₂, and Ne₂ exhibit negligible s-p mixing..."</p>	
<p>Ch 9: Thermochemistry, Sec 2: Calorimetry, Exercise 28</p>	<p>The text states "Conversely, if $Q < K$, the process will proceed in the reverse direction until equilibrium is achieved". It should say "$Q > K$".</p>	<p>In section Free Energy and Equilibrium, revise the last sentence in the 2nd paragraph as follows:</p> <p>"Conversely, if $Q > K$, the process will proceed in the reverse direction until equilibrium is achieved".</p>	<p>Typo</p>

Ch 9: Thermochemistry, Sec 3: Enthalpy, Exercise 43	The answer to question 91 of the chapter 7 review questions at the back of the chapter in "Chemistry: Atoms First" is incorrect. The answer key gives an answer of 1.22M, but the correct answer is 0.0122M.	Revise the solution for exercise 91 to "0.0122 M".	Incorrect calculation or solution
Ch 9: Thermochemistry, Sec 3: Enthalpy, Exercise 63	On the Figure 3 chart in Chapter 14 section 3 on the base side of the chart the ammonia is listed as HN3 but should it not read NH3?	In Figure 14.8, revise the formula given for ammonia from "HN3" to "NH3".	Typo
Ch 9: Thermochemistry, Sec 3: Enthalpy, Exercise 63	On page 674 the answer for the 12.8 check your learning the answer is given negative and then nonspontaneous.	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
Ch 9: Thermochemistry, Sec 4: Strengths of Ionic and Covalent Bonds, Table 9.4	The figure caption has a typo. It states the figure (b) is for 0.100 M HCl, but it should be 0.100 M CH3CO2H (weak acid), which is a weak acid, specifically acetic acid, as the title for (b) states.	Revise the caption of Figure 14.21 showing titration curves as follows: "(b) The titration curve for the titration of 25.00 mL of 0.100 M acetic acid (weak acid) with 0.100 M NaOH (strong base) has an equivalence point of 8.72 pH."	Typo
Ch 10: Liquids and Solids, Sec 1: Intermolecular Forces, Exercise 19	In example 14.14 there is an extra ")" that should not be there in the ICE table. This is in the cell for the equilibrium concentration for HSO4-. Also, I know that the issue has been raised already, but I think it would be really great if the typos in the ICE tables in examples 14.11 and 14.12 were corrected soon.	In the ICE table in Example 14.14, delete the extraneous parenthesis.	Typo
Ch 10: Liquids and Solids, Sec 1: Intermolecular Forces, Exercise 21	In the opening paragraph the phrase "thermodynamically favorable" should not be used since Thermodynamics is not until Ch. 16.	Revise "that are thermodynamically favorable" to "that are energetically favorable".	General/pedagogical suggestion or question
Ch 10: Liquids and Solids, Sec 3: Phase Transitions	The students have not taken organic chemistry yet so the terms alkane, alkene, and saturated (in the organic chemistry sense) have no meaning yet. These words are used in the opening paragraph.	Revise the introductory paragraph as follows: ... when a catalyst is present. One example is hydrogenation, a process used in food industries to convert unsaturated fats to saturated fats. A	General/pedagogical suggestion or question

		comparison of the reaction coordinate diagrams (also known as energy diagrams) for catalyzed and uncatalyzed hydrogenation of a simple hydrocarbon molecule is shown in Figure 12.21.	
Ch 10: Liquids and Solids, Sec 3: Phase Transitions, Figure 10.22	I think that Figure 12.21 would be more clear to the students if the curves for the catalyzed and uncatalyzed reactions were a different color as they are in Figure 12.22. Also, I think it would be a good idea to label the x-axis as "Extent of Reaction" like it is in Figures 12.16 and 12.22 instead of "Reaction coordinate". I do not think reaction coordinate is mentioned anywhere in the text. Also, the captions "activation energy of uncatalyzed reaction" and "activation energy of catalyzed reaction" should point to the double headed arrows, not the curves.	In Figure 12.21, update the curves to be colored, label the x-axis "Extent of Reaction", and adjust the leader lines for labels "Activation energy of uncatalyzed reaction" and "Activation energy of catalyzed reaction".	General/pedagogical suggestion or question
Ch 10: Liquids and Solids, Sec 4: Phase Diagrams, Exercise 57	"...react to reach compositions adhering to the same equilibrium (the value of Q_c changes until it equals the value of K_c)."	In the 2nd paragraph after Example 13.2, revise "adhering to the same equilibrium" to "adhering to the same equilibrium constant".	General/pedagogical suggestion or question
Ch 10: Liquids and Solids, Sec 4: Phase Diagrams, Figure 10.34	Example 13.3 Check Learning part (b), I get 0.24 for the reaction quotient.	Revise the Check Your Learning solution from "0.12 shifts left" to "0.23 shifts left".	None
Ch 10: Liquids and Solids, Sec 5: The Solid State of Matter, Figure 10.38	Exercise 27 should refer reader to Appendix E.	Revise to "What is the value of the equilibrium constant expression for the change $H_2O(l) \rightleftharpoons H_2O(g)$ at 30 °C (see Appendix E)?"	None
Ch 10: Liquids and Solids, Sec 6: Lattice Structures in Crystalline Solids, Figure 10.53	The balanced reaction is incorrect. The carbonate should be expressed as CO_3^{2-} (aq).	In the solution, revise the last part of the reaction to " CO_3^{2-} (aq)".	Typo
Ch 10: Liquids and Solids, Sec 6: Lattice Structures in Crystalline Solids, Figure 10.56	For mixture 3 in the graph on the right, the numbers are finally correct, but this bar is still not drawn to scale. Why is the section of the bar for H_2O (0.00909 M) larger than the section of the bar for CO (0.0231 M)? CO has the largest concentration and should be larger than each of the other three. This bar and all bars in this figure should be drawn to	In Figure 13.7, ensure that for mixture 3 in the rightmost graph, the scale of the bars are reflective of the values.	Other factual inaccuracy in content

	scale and reflect the concentrations labeled on the y-axis.		
Ch 11: Solutions and Colloids, Sec 1: The Dissolution Process, Exercise 5	Exercise 5, the initial concentration of reactant should be 2.00 mol L ⁻¹ . This affects answers for other parts of the question as well.	Revise the table as follows: Time (s) 0.0 5.0 10.0 15.0 20.0 25.0 35.0 [A] (M) 1.00 0.775 0.625 0.465 0.360 0.285 0.230 Revise the solution as appropriate.	General/pedagogical suggestion or question
Ch 11: Solutions and Colloids, Sec 1: The Dissolution Process, Exercise 8	There is a grammatical error, where "related" should be replaced with "relate."	In the 2nd paragraph, revise "used to related reactant" to "used to relate reactant".	General/pedagogical suggestion or question
Ch 11: Solutions and Colloids, Sec 1: The Dissolution Process, Exercise 8	At the bottom of the page, before Figure 12.5, the denominator of the ratio is not correct, and should be 9.70 × 10 ⁻⁷ mol L ⁻¹ s ⁻¹	In the equation before Figure 12.5, revise the denominator to "9.70 × 10 ⁻⁷ M/s".	Other factual inaccuracy in content
Ch 11: Solutions and Colloids, Sec 2: Electrolytes, Exercise 11	In Figure 12.2, the format of the rate of decomposition values do not agree with the text. The text states that rates should always be positive quantities, even if they are expressed in terms of reactants. In this table, all rate of decomposition values should be changed to positive.	In Figure 12.2, remove the negative signs from the rightmost column.	Other factual inaccuracy in content
Ch 11: Solutions and Colloids, Sec 2: Electrolytes, Exercise 13	There are many errors in the Ch. 21 answers. For instance the equation in 13(b) is missing subscripts and superscripts in the reactants and there are errors. The same goes for the equation in 15(a). In the equation for 15(b) the "N" in the products should be replaced with "C".	Update equations as appropriate.	None
Ch 11: Solutions and Colloids, Sec 2: Electrolytes, Subsec: Covalent Electrolytes	The caption to the link to learning on this page has a typo and should say: "Phosphorous burns rapidly in air, but it will burn even more rapidly when the concentration of oxygen is increased."	Revise "concentration of oxygen in is higher" to "concentration of oxygen is higher".	Typo
Ch 11: Solutions and Colloids, Sec 3: Solubility	In the discussion of the bomb calorimeter, to be consistent with previous discussions of heat flow, maybe it should be said that "The energy produced by the reaction is absorbed by the steel bomb and the surrounding water. " rather than saying "trapped in".	In the 2nd paragraph after Example 5.6, revise "the reaction is trapped in" to "the reaction is absorbed by".	General/pedagogical suggestion or question
Ch 11:	In the sentence: "Example 13.6 showed	Revise to "Example 13.2	Broken link

Solutions and Colloids, Sec 4: Colligative Properties	us how to determine the equilibrium constant of a reaction if we know the concentrations of reactants and products at equilibrium. " I think it is suppose to say in Example 13.2.	showed us how to determine the equilibrium constant of a reaction if we know the concentrations of reactants and products at equilibrium."	
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Example 11.10	There are typos in the answers to Ch. 13 #57 and #69. For #57 the answer should just be $K_p = 1.9 \times 10^3$. Delete the words "the equilibrium equation is". For #69 the final answer should have three significant figures and be 2.04×10^{-4} M.	Revise the solutions as follows: 57. $K_p = 1.9 \times 10^3$ 69. $[CO] = 2.04 \times 10^{-4}$ M	None
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Example 11.2	http://openstaxcollege.org//16isomers goes to https://nieonline.com/pjacs/	This shortlink is currently set to redirect to https://science360.gov/o/bj/tkn-video/3e4cad94-222e-4a04-8102-5bb5242040ea	Broken link
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Example 11.9	The Body-centered unit cell structure is still not correct in the Web View.	Revise Figure 10.56 to correct the body-centered unit cell structure.	Other factual inaccuracy in content
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Exercise 33	Figure 3.39 has a mistake. Group 12 elements are color coded as transition metals, but also appear within the outline for the main group elements. This figure needs to be fixed so that Group 12 is not within the outline of the main group elements as in the text they are defined to be transition metals.	In Figure 3.39, remove Group 12 from the main group elements.	Other factual inaccuracy in content
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Exercise 39	The nuclide symbol for fluorine needs to have the atomic number (9) moved and subscripted below the atomic mass number (19).	Revise "9 19 F" to "19 9 F".	Typo
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Exercise 66	Example 3.11 asks "What is the electron configuration and orbital diagram of:" but orbital diagrams are never given in the solution. Only electron configurations are shown.	Revise the 1st sentence of the example to "What is the electron configuration of:".	Other factual inaccuracy in content
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Table 11.2	"The conjugate acid of the strong base is a weaker acid than water and has no effect on the acidity of the resulting solution." But most often the reacting species in the strong base is OH^- , meaning that the conjugate acid is water.	Revise as follows: 2. A strong acid and a weak base yield a weakly acidic solution. The products of this neutralization reaction are the conjugate base of the strong acid ($K_b \approx 0$, so it doesn't affect pH) and the conjugate acid of the weak base	Other factual inaccuracy in content

		<p>($K_a > 0$, so it ionizes to make the solution acidic).</p> <p>3. A weak acid and a strong base yield a weakly basic solution. The products of this neutralization reaction are the conjugate acid of the strong base ($K_a \approx 0$, so it doesn't affect pH) and the conjugate base of the weak acid ($K_b > 0$, so it ionizes to make the solution basic).</p>	
Ch 11: Solutions and Colloids, Sec 5: Colloids, Chemistry in Everyday Life: Deepwater Horizon Oil Spill	I think the second nuclear equation after Example 20.4 should use the same alpha particle symbol, ${}^4_2\text{He}$, that is used everywhere else on this page instead of the symbol ${}^4_2\alpha$.	In the 2nd equation after Example 21.4, revise " α " to " He ".	General/pedagogical suggestion or question
Ch 12 Thermodynamics, Section 4 Free Energy, Exercise 31	I think the first sentence in the second paragraph after Figure 20.4 would be more clear if it was re-worded to say: "As seen in the chapter discussing light and electromagnetic radiation, gamma rays are short wavelength, high-energy electromagnetic radiation that can behave as particles in the wave-particle duality sense. Gamma rays and are (much) more energetic than better-known X-rays."	Revise the 2nd paragraph after Figure 20.4 as follows: Gamma rays are a type of high energy electromagnetic radiation produced when a nucleus undergoes a transition from a higher to a lower energy state, similar to how a photon is produced by an electronic transition from a higher to a lower energy level. ...	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 2: Entropy	In Example 15.15 Check your learning the equilibrium " $\text{Ag}(s) \rightleftharpoons \text{Ag}^+(aq) + \text{Cl}^-(aq)$ " should be replaced with " $\text{AgCl}(s) \rightleftharpoons \text{Ag}^+(aq) + \text{Cl}^-(aq)$ ".	In the Check Your Learning, revise " $\text{Ag}(s)$ " to " $\text{AgCl}(s)$ ".	Typo
Ch 12: Thermodynamics, Sec 2: Entropy	Incorrect/inconsistent numbers are used in Example 15.11. At the start of the problem the K_{sp} value for AgI is given as 1.5×10^{-16} , yet in the solution it is changed to 1.8×10^{-10} . Later a $[\text{Ag}^+]$ concentration of 1.6×10^{-9} is calculated yet the answer says " $[\text{Ag}^+]$ is $1.5 \times 10^{-13} \text{ M}$ ". In the next part, at the start the K_{sp} value of AgCl is given as 1.6×10^{-10} , yet in the solution it is changed to 1.8×10^{-10} . These inconsistencies need to be fixed.	Revise the solution to Example 15.11 as appropriate.	None
Ch 12: Thermodynamics, Sec 2:	There are numerous mistakes in Example 12.8. In the solution to part (a): " ΔG°_f " is the symbol that should be	In the solution of Example 12.8, revise " ΔG°_{298} " to " ΔG°_f " and	None

Entropy	used for the free energy of formation, NOT " ΔG°_{298} ". Also, in the first equation " G°_{298} " should be replaced with " ΔG°_f ". In the solution to part (b): The symbol for the standard enthalpy of formation is " ΔH°_f ", NOT " ΔH°_{298} ".	" ΔH°_{298} " to " ΔH°_f " where appropriate.	
Ch 12: Thermodynamics, Sec 2: Entropy, Exercise 17	For the mercury barometer on the left, the correct column height is 760 mm, not 790 mm.	In Figure 8.4, revise "790 mm" to "760 mm".	Typo
Ch 12: Thermodynamics, Sec 2: Entropy	The statement "Underneath the reaction the initial concentrations of the reactants and products are listed—these conditions are usually provided in the problem and we consider no shift toward equilibrium to have happened." is unclear.	Revise as follows: ... A chart is generated beginning with the equilibrium reaction in question. The initial concentrations of the reactants and products are provided in the first row of the ICE table (these essentially time-zero concentrations that assume no reaction has taken place). The next row of data ...	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 2: Entropy	Calculation of an Equilibrium Constant: The statement "Since the law of mass action is the only equation we have to describe the relationship between K_c and the concentrations of reactants and products, any problem that requires us to solve for K_c must provide enough information to determine the reactant and product concentrations at equilibrium." kind of goes around in circles and is unclear.	Revise the 1st paragraph as follows: In order to calculate an equilibrium constant, enough information must be available to determine the equilibrium concentrations of all reactants and products. Armed with the concentrations, we can solve the equation for K_c , as it will be the only unknown.	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 3: The Second and Third Laws of Thermodynamics, Exercise 25	Example 13.3 Check Learning part (b), I get 0.24 for the reaction quotient.	Revise the Check Your Learning solution from "0.12 shifts left" to "0.23 shifts left".	None
Ch 12: Thermodynamics, Sec 3: The Second and Third Laws of Thermodynamics, Exercises 22-23 and 28-29	"...react to reach compositions adhering to the same equilibrium (the value of Q_c changes until it equals the value of K_c)."	In the 2nd paragraph after Example 13.2, revise "adhering to the same equilibrium" to "adhering to the same equilibrium constant".	General/pedagogical suggestion or question

<p>Ch 12: Thermodynamics, Sec 4: Free Energy</p>	<p>Exercise 62(f), the chemical equation is not balanced; should be iron pentacarbonyl in the product, not tetracarbonyl.</p> <p>Exercise 69 answer should have three sig figs $2.04 \times 10^{-2} \text{ mol L}^{-1}$.</p> <p>Exercise 73 seems to have a follow up question (involving a cubic equation!) that does not have an answer in the appendix.</p> <p>Exercise 91(b) solution has a spurious superscript 2.</p> <p>Exercise 97, the kinetics discussion seems extraneous.</p>	<p>Exercise 62: In part f, revise "Fe(CO)₄(g)" to "Fe(CO)₅(g)".</p> <p>Exercise 69: Revise the solution to "$2.04 \times 10^{-4} \text{ M}$".</p> <p>Exercise 73: Delete the following: "What are the equilibrium concentrations of all species in a mixture that was prepared with $[\text{SO}_3] = 0.500 \text{ M}$, $[\text{SO}_2] = 0 \text{ M}$, and $[\text{O}_2] = 0.350 \text{ M}$?"</p> <p>Exercise 91: In the solution, revise "$[\text{CO}]^2$" to "$[\text{CO}_2]$".</p>	<p>None</p>
<p>Ch 12: Thermodynamics, Sec 4: Free Energy, Example 12.7</p>	<p>Exercise 27 should refer reader to Appendix E.</p>	<p>Revise to "What is the value of the equilibrium constant expression for the change $\text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{H}_2\text{O}(\text{g})$ at 30°C (see Appendix E)?"</p>	<p>None</p>
<p>Ch 12: Thermodynamics, Sec 4: Free Energy, Example 12.8</p>	<p>Section 13.4 summary, X is used, but should be x to be consistent with the main text.</p>	<p>In the Summary, revise "the coefficient of X" to "the coefficient of x".</p>	<p>General/pedagogical suggestion or question</p>
<p>Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 43</p>	<p>The section "Calculation of Changes in Concentration" I think would be better named "Calculation of Equilibrium Concentrations". This is what this type of calculation is called earlier in the module.</p>	<p>Revise the subsection title "Calculation of Changes in Concentration" to "Calculation of Equilibrium Concentrations from Initial Concentrations".</p>	<p>General/pedagogical suggestion or question</p>
<p>Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 49</p>	<p>Example 13.7 should more clearly state that the given concentrations of nitrogen and oxygen are at equilibrium. A "=" is missing between $[\text{O}_2]$ and 0.0089 mol/L. It should say $[\text{O}_2] = 0.0089 \text{ mol/L}$.</p>	<p>Revise the last sentence of the instructions as follows: Calculate the equilibrium concentration of $\text{NO}(\text{g})$ in air at 1 atm pressure and 2000°C. The equilibrium concentrations of N_2 and O_2 at this pressure and temperature are 0.036 M and 0.0089 M, respectively.</p>	<p>General/pedagogical suggestion or question</p>
<p>Ch 12: Thermodynamics, Sec 4: Free Energy, Subsec: Calculating Free Energy</p>	<p>"The next row of data is the change that occurs as the system shifts toward equilibrium—do not forget to consider the reaction stoichiometry as described in a previous section of this chapter." This should say "The next row of data is the change that occurs as the system</p>	<p>Revise the 2nd to last sentence of the 2nd paragraph as follows: The next row of the table contains the changes in concentrations that result when the reaction</p>	<p>General/pedagogical suggestion or question</p>

Change	shifts toward equilibrium—do not forget to consider the reaction stoichiometry as described earlier in this module.”	proceeds toward equilibrium (don't forget to account for the reaction stoichiometry).	
Ch 12: Thermodynamics, Sec 4: Free Energy, Example 12.7	Figure 13.5 caption; I would suggest “reddish brown” gas to replace “orange” gas.	In the caption, revise "orange" to "reddish-brown".	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 4: Free Energy, Example 12.8	The chemical equations $2 \text{NO}_2(\text{g}) \rightarrow \text{N}_2\text{O}_4(\text{g})$ and $\text{N}_2\text{O}_4(\text{g}) \rightarrow 2 \text{NO}_2(\text{g})$ should switch places.	Switch the two chemical equations.	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 33	The sentence “In this chapter, you will learn how to predict the position of the balance and the yield of a product of a reaction under specific conditions, how to change a reaction's conditions to increase or reduce yield, and how to evaluate an equilibrium system's reaction to disturbances.” seems unpolished and not very clear.	Revise as follows: This chapter provides a thorough introduction to the essential aspects of chemical equilibria.	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 35	Exercise 58, the problem seems insolvable unless one assumes something like the rate doubles for every 10 °C. Unless I am mistaken, then the problem should state this as a hint. Exercise 61, perhaps the text should state “in blood serum” instead of “in the serum.”	Exercise 58: Add a hint as follows: (Hint: Assume the rate doubles for each 10 °C rise in temperature.) Exercise 61: Revise "the serum" to "human serum".	None
Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 35	Exercise 23, the solution's rate law has a typo in chemical formula, however, the numerical answer is correct. Exercise 25, the solution's rate constant should only have two significant figures. Exercise 31, the rate for trial 2 should be $6.10 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$ and the solution rate law has a typo in chemical formula, however, the numerical answer is correct.	Exercise 23: This issue was addressed in another report: 4221. Exercise 25: Revise "9.12" to "9.1". Exercise 31: Revise "[OCI^-1]" to "[OCI^-]".	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 43	Exercise 5, the initial concentration of reactant should be 2.00 mol L ⁻¹ . This affects answers for other parts of the question as well.	Revise the table as follows: Time (s) 0.0 5.0 10.0 15.0 20.0 25.0 35.0 [A] (M) 1.00 0.775 0.625 0.465 0.360 0.285 0.230 Revise the solution as appropriate.	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 43	Chemistry in Everyday Life, the phrase, “conversion nitric oxide into dinitrogen and oxygen,” is missing the word “of.”	Revise “conversion nitric oxide into dinitrogen and oxygen” to “conversion of nitric oxide into dinitrogen and oxygen”.	General/pedagogical suggestion or question

Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 45	In Figure 17.28 parts (b) and (c) it appears as though the C=C bond is completely broken, not just the pi bond. According to the text, only the pi bond is broken meaning that the C atoms should still be connected by a single bond when the substrate is on the Ni surface. Also, carbon atoms in ethylene are gray; however, they are black in Ni-CH ₂ and ethane.	Revise Figure 17.28 to show a single bond between the C atoms, and revise gray carbon atoms to black.	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 49	Figure 17.25 caption uses "NAPDH" but this should be "NADPH".	In Figure 17.25, revise "NAPDH" to "NADPH".	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 53	The students have not taken organic chemistry yet so the terms alkane, alkene, and saturated (in the organic chemistry sense) have no meaning yet. These words are used in the opening paragraph.	Revise the introductory paragraph as follows: ... when a catalyst is present. One example is hydrogenation, a process used in food industries to convert unsaturated fats to saturated fats. A comparison of the reaction coordinate diagrams (also known as energy diagrams) for catalyzed and uncatalyzed hydrogenation of a simple hydrocarbon molecule is shown in Figure 17.21.	General/pedagogical suggestion or question
Ch 12: Thermodynamics, Sec 4: Free Energy, Exercise 53	In the opening paragraph the phrase "thermodynamically favorable" should not be used since Thermodynamics is not until Ch. 16.	Revise "that are thermodynamically favorable" to "that are energetically favorable".	General/pedagogical suggestion or question
Ch 13: Fundamental Equilibrium Concepts, Introduction	The first three sentences in the key concepts do not correspond to this module.	In the Summary, delete the 1st two sentences.	General/pedagogical suggestion or question
Ch 13: Fundamental Equilibrium Concepts, Introduction	The question in Example 17.9 should specifically reference the reaction in Example 17.8.	Revise the 1st sentence of Example 17.9 to "The data below are for the same reaction described in Example 17.8. Test these data to confirm that this dimerization reaction is second-order."	General/pedagogical suggestion or question
Ch 13: Fundamental Equilibrium Concepts, Sec 1: Chemical	Example 17.8 is correct. Check Learning has a small rounding error—answer should be 0.0195 mol L ⁻¹ .	Revise the Check Your Learning solution to "0.0195 mol/L".	None

Equilibria			
Ch 13: Fundamental Equilibrium Concepts, Sec 1: Chemical Equilibria	In the key concepts, the word “amount” should be replaced with “concentration”. It is the relative amounts of reactants that influence the rate not the absolute amounts.	In the summary, revise “amount” to “concentration” twice.	Other factual inaccuracy in content
Ch 13: Fundamental Equilibrium Concepts, Sec 1: Chemical Equilibria, Figure 13.5	At the bottom of the page, before Figure 17.5, the denominator of the ratio is not correct, and should be $9.70 \times 10^{-7} \text{ mol L}^{-1} \text{ s}^{-1}$	In the equation before Figure 17.5, revise the denominator to “ $9.70 \times 10^{-7} \text{ M/s}$ ”.	Other factual inaccuracy in content
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants	Exercise 66, the triple point temperature of water is 273.16 K, not 273.15 K	Revise “273.15 K” to “273.16 K”.	None
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants	Exercise 39, no sig fig concerns but same histamine error as in Exercise 33.	In part d, revise “histamine” to “tetrahydropyridine”.	None
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants, Example 13.3	Exercise 33, there were a couple of sig fig issues; more importantly, the formula listed for histamine is incorrect, it should be $\text{C}_5\text{H}_9\text{N}_3$ and I would guess the answer in the back of the book is based on the incorrect formula.	In part d, revise “histamine” to “tetrahydropyridine”.	None
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants, Example 13.3	Exercise 13(d), should be $\text{NH}_3(\text{aq})$, not $\text{NH}_3(\text{l})$	In part d, revise “ $\text{NH}_3(\text{l})$ ” to “ $\text{NH}_3(\text{aq})$ ”.	None
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants, Exercise 10	Exercise 8 Move (solution density = 10.8 g cm^{-3}) to the problem narrative.	At the end of the question stem, add the phrase “(solution density = 10.8 g cm^{-3})”. Remove the phrase from parts a through c.	None
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants, Exercise 10	Exercise 5(d), $\text{HCl}(\text{aq})$ should not use an aq phase label when benzene is the solvent.	In part d, revise “ $\text{HCl}(\text{aq})$ ” to “ $\text{HCl}(\text{g})$ ”.	None
Ch 13: Fundamental Equilibrium	Chemistry Life, the phrase, “in the history of the petroleum,” is likely missing the word “industry.”	Revise to “in the history of the petroleum industry.”	Typo

Concepts, Sec 2: Equilibrium Constants, Exercise 25			
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants, Exercise 27	Example 11.10 is correct. Check Your Learning answer should have only one sig fig given the precision of the sample mass.	Revise the Check Your Learning solution to "3 x 10 ⁴ g/mol".	None
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants, Exercise 27	The phrase, "where m is the molal concentration of the solute in the solvent and..." should be simplified to just, "where m is the molal concentration of the solute and..."	In the paragraph before Example 11.7, revise "the molal concentration of the solute in the solvent" to "the molal concentration of the solute".	General/pedagogical suggestion or question
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants, Figure 13.7	In the drawings in Figure 8.4, the parentheses labeling the height of the liquid columns should start from the surface of the pool at the bottom, not from the bottom of the tube. Pressure is measured by the height of the column supported by the gas pressure, not by the length of the tube.	Revise Figure 8.4 so that the brackets labeling the height of the liquid columns start from the surface of the pool at the bottom.	Other factual inaccuracy in content
Ch 13: Fundamental Equilibrium Concepts, Sec 2: Equilibrium Constants, Figure 13.7	The concentrations used to calculate the K _{sp} value for CaF ₂ (2.1 x 10 ⁻⁴ M and 4.2 x 10 ⁻⁴ M) are not the same concentrations provided in the question (2.15 x 10 ⁻⁴ M and 4.30 x 10 ⁻⁴ M). These concentration values should align.	In the solution, revise the final equation as follows: $K_{sp} = [Ca^{2+}][F^{-}]^2 = (2.15 \times 10^{-4})(4.30 \times 10^{-4})^2 = 3.98 \times 10^{-11}$	None
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations	In Example 15.1, Check your learning part (c): The product for the dissolution of Al(OH) ₃ reaction should be "Al ³⁺ " NOT "Al ²⁺ ".	In the Check Your Learning solution part c, revise "Al ²⁺ " to "Al ³⁺ ".	None
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations	In Example 14.22, the solution to part (c) says: "In (a), 25.00 mL of the NaOH solution was added,..." (a) should be changed to (b).	In part c of the solution, revise "In (a), 25.00 mL" to "In (b), 25.00 mL".	Typo
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations	In the web view version of module 13.4, in the section on Calculations Involving Equilibrium Concentrations the topics are not numbered like they are in the PDF version of the textbook. The numbers are missing in the web view version.	Number the topics in the web view version to match PDF.	Typo
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium	The end of chapter answer to Ch. 10 #19 is still not fixed. Replace "DNA" with "protein".	In the solution, revise "DNA" to "protein".	None

Calculations, Example 13.12			
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Example 13.6	I believe that many of the answers to Ch. 10 #57 are incorrect. I think the answers should be a) gas b) gas c) gas d) gas e) solid f) liquid	Revise the solution to "(a) gas; (b) gas; (c) gas; (d) gas; (e) solid; (f) gas".	None
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Example 13.7	I suggest calling the H-1 atom the "most common isotope of hydrogen" not a "normal hydrogen atom".	Revise "what remains when a normal hydrogen atom" to "what remains when the most common isotope of hydrogen".	General/pedagogical suggestion or question
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Exercise 79	In example 14.2 it should say "...as the hydronium ion concentration increases to 2.0×10^{-6} M."	In the solution, revise "as the hydrogen ion concentration" to "as the hydronium ion concentration".	Typo
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Exercise 79	Not really an error in content but more an error in formatting. This data table from Chapter 7 of the Chemistry text, should be adjusted so that the bullets line up. Because the first bullet (group 1 metal cations) wraps to a second line, the bullets in the second column don't line up correctly. As a result, I read the "exception" for the fluorides as being an exception for the second bulleted item on the left.	Ensure that bullets align horizontally.	General/pedagogical suggestion or question
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Exercise 87	In the second paragraph, the formula for carbonic acid is still incorrect. There should not be a minus charge. It is a neutral substance. The formula should be H ₂ CO ₃ .	Revise the formula to "(H ₂ CO ₃)".	Typo
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Exercises 62, 69, 73, 91, and 97	There are typos in the answers to Ch. 13 #57 and #69. For #57 the answer should just be $K_p = 1.9 \times 10^3$. Delete the words "the equilibrium equation is". For #69 the final answer should have three significant figures and be 2.04×10^{-4} M.	Revise the solutions as follows: 57. $K_p = 1.9 \times 10^3$ 69. $[CO] = 2.04 \times 10^{-4}$ M	None
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec:	In the sentence: "Example 13.6 showed us how to determine the equilibrium constant of a reaction if we know the concentrations of reactants and products at equilibrium. " I think it is suppose to say in Example 13.2.	Revise to "Example 13.2 showed us how to determine the equilibrium constant of a reaction if we know the concentrations of reactants and products	Broken link

Calculation of an Equilibrium Constant		at equilibrium."	
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec: Calculation of an Equilibrium Constant	Answers to Ch. 5 #7, 25, 55, and 67 have typos or are incorrect. These answers should be: 7) 1310 J; 313 cal 25) -2.2 kJ; The heat produced shows that the reaction is exothermic. 55) Yes (Standard enthalpy of formation values are for the formation of one mole of compound and this reaction is for the formation of two moles of compound) 67) 90.25 kJ/mol	Revise solutions as follows: 7. 1310 J; 313 cal 25. -2.2 kJ; The heat produced shows that the reaction is exothermic. 55. Yes. 67. 90.3 kJ/mol	None
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec: Calculation of an Equilibrium Constant	In the discussion of the bomb calorimeter, to be consistent with previous discussions of heat flow, maybe it should be said that "The energy produced by the reaction is absorbed by the steel bomb and the surrounding water. " rather than saying "trapped in".	In the 2nd paragraph after Example 9.6, revise "the reaction is trapped in" to "the reaction is absorbed by".	General/pedagogical suggestion or question
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec: Calculation of an Equilibrium Constant	I noticed that in section 6.2, under Determining Percent Composition from Formula Mass, in the practice problem, the subscript for H is 8 in the problem, but is 18 throughout the solution.	Ensure the subscript for H is 8 throughout: "H ₈ ".	None
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec: Calculation of an Equilibrium Constant	It says burets typically allow measurement to the nearest "0.1 mL". It should read "0.01 mL", which is 1/10th of the smallest division on the buret.	In the caption, revise "0.1 mL" to "0.01 mL".	Typo
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec: Calculation of Changes in Concentration	The balanced reaction is incorrect. The carbonate should be expressed as CO ₃ ²⁻ (aq).	In the solution, revise the last part of the reaction to "CO ₃ ²⁻ (aq)".	Typo
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations,	The caption to the link to learning on this page has a typo and should say: "Phosphorous burns rapidly in air, but it will burn even more rapidly when the concentration of oxygen is increased."	Revise "concentration of oxygen in is higher" to "concentration of oxygen is higher".	Typo

Subsec: Calculation of Changes in Concentration			
Ch 13: Fundamental Equilibrium Constants, Sec 4: Equilibrium Calculations, Subsec: Free Energy and Equilibrium	The answer to Ch. 12, question 25 has a typo. The rate law should be "rate = $k[\text{NO}]^2[\text{Cl}_2]$ "	In the solution, revise " $[\text{Cl}]_2$ " to " $[\text{Cl}_2]$ ".	None
Ch 13: Sec 4: Equilibrium Calculations, Example 13.13	NO is named incorrectly. It is a molecular compound and according to the nomenclature rules in Ch. 2, it should be called "nitrogen monoxide" NOT "nitrogen(II) oxide".	Revise "nitrogen(II) oxide" to "nitrogen monoxide".	Other factual inaccuracy in content
Ch 13: Fundamental Equilibrium Concepts, End of Chapter Exercises, Exercises 57 and 69	The first sentence in the third paragraph after Figure 12.16 states: "Both postulates of the collision theory of reaction rates are accommodated in the Arrhenius equation." But there are three postulates of collision theory, and aren't all three accommodated in the Arrhenius equation? Maybe the sentence should say "All three postulates of the collision theory are accommodated in the Arrhenius equation." At the end of the same paragraph, I suggest a wording change to "collisions that possess adequate energy..."	After Figure 17.16, revise as follows: "The postulates of collision theory are accommodated in the Arrhenius equation. The frequency factor A..."	General/pedagogical suggestion or question
Ch 13: Fundamental Equilibrium Concepts, End of Chapter Exercises, Exercises 57 and 69	"Activation energy" should not be used in the text before it is defined. The second sentence after Figure 17.14 could simply say: "Every collision between reactants requires a certain amount of energy in order to result in product formation."	After Figure 17.14, revise as follows: If the collision does take place with the correct orientation, there is still no guarantee that the reaction will proceed to form carbon dioxide. In addition to a proper orientation, the collision must also occur with sufficient energy to result in product formation. When reactant species collide with both proper orientation and adequate energy, they combine to form an unstable species called an activated complex or a transition state. As an example, Figure 12.15	General/pedagogical suggestion or question

		depicts the structure of possible transitions states in the reaction between CO and O ₂ to form CO ₂ .	
Ch 14: Acid-Base Equilibria, Sec 1: Brønsted-Lowry Acids and Bases	There is a typo in the answer to Ch. 17, #23. The rate law should be "rate = $k[\text{NOCl}]^2$ "	In the solution, revise "NOC" to "NOCl".	None
Ch 14: Acid-Base Equilibria, Sec 1: Brønsted-Lowry Acids and Bases	I believe the answer to Chapter 10 Questions 21(a) should be "hydrogen bonding, dipole-dipole attraction, and dispersion forces".	Revise the solution to part a to "hydrogen bonding, dipole-dipole attraction, and dispersion forces".	None
Ch 14: Acid-Base Equilibria, Sec 1: Brønsted-Lowry Acids and Bases, Example 14.2	The third sentence in the section on Thermal Energy, Temperature, and Heat would be more consistent with the previous sentence if it said: "When the atoms and molecules are moving slowly, they have lower average KE, and we say that the object is "cold".	Revise "they have lower KE" to "they have lower average KE".	General/pedagogical suggestion or question
Ch 14: Acid-Base Equilibria, Sec 1: Brønsted-Lowry Acids and Bases, Example 14.2	In Example 11.9 there are inconsistencies in steps 2-4. The molality calculated in step 2 (0.63 m) is not the molality used in step 3 (0.62 m). The moles calculated in step 3 (0.035 mol) is not the moles used in step 4 (0.034 mol). These inconsistencies should be fixed.	In Step 3 of the solution, revise "0.62 mol solute" to "0.63 mol solute" in the numerator. In Step 4 of the solution, revise "0.034 mol" to "0.035 mol" in the denominator. Revise the final solution to " $1.1 \times 10^2 \text{ g/mol}$ ".	None
Ch 14: Acid-Base Equilibria, Sec 3: Relative Strengths of Acids and Bases, Example 14.14	I believe the answer to Ch. 9, #9 should be Earth: 14.7 psi; Venus: 1.31×10^3 psi. The answer for Venus has the decimal place in the wrong location.	Revise the solution to "Earth: 14.7 psi; Venus: 1.31×10^3 psi	None
Ch 14: Acid-Base Equilibria, Sec 3: Relative Strengths of Acids and Bases, Example 14.14	In problem #95. I think the temperature in the question is suppose to be 546 K. I believe that would result in a doubling of the temperature. 273 K to 546 K.	In the solution, revise "546 °C" to "546 K".	Typo
Ch 14: Acid-Base Equilibria, Sec 3: Relative Strengths of Acids and	The first sentence under the link to learning should say: "The entropy of a substance is influenced by the structure of the particles (atoms or molecules) that comprise the substance. "	After the link to learning, revise "influenced by structure" to "influenced by the structure".	Typo

Bases, Exercise 44			
Ch 14: Acid-Base Equilibria, Sec 3: Relative Strengths of Acids and Bases, Figure 14.8	I found two errors in Example 11.2. 1) The answer to the mole fraction of ethylene glycol should be 0.244. 2) In the question, the mass of water is expressed as 2.00×10^3 g (3 sig figs) but in the solution, the mass of water is expressed incorrectly as 2000 g (1 sig fig). This should be corrected when calculating moles of water. This also should be corrected when calculating kg of water, resulting in 2.00 kg of water, which also needs to be corrected in the molality calculation.	In Example 11.2, revise "2000 g" to " 2.00×10^3 g" throughout. Revise "2220 g" to " 2.22×10^3 g" throughout. Revise "0.245" to "0.244". Revise "2 kg" to "2.00 kg".	Typo
Ch 14: Acid-Base Equilibria, Sec 4: Hydrolysis of Salt Solutions	In the key concepts for section 11.3 there is a typo in the second sentence. It should say: "This tendency to dissolve is quantified as a substance's solubility,..."	Revise "quantified as substance's solubility" to "quantified as a substance's solubility".	Typo
Ch 14: Acid-Base Equilibria, Sec 4: Hydrolysis of Salt Solutions, Subsec: Acid-Base Neutralization	Revise the 2nd sentence of the caption for Figure 17.16 as follows, currently there is a typo: The dashed portion of the curve represents the energy of the system with a molecule of A and a molecule of B present, and the solid portion represents the energy of the system with a molecule of C and a molecule of D present.	In the caption, revise "ppresent" to "present".	Typo
Ch 14: Acid-Base Equilibria, Sec 4: Hydrolysis of Salt Solutions, Subsec: The Ionization of Hydrated Metal Ions	In bullet point 4 under the section on acid-base neutralization it states "Occasionally the weak acid and the weak base will have the same strength, so their respective conjugate base and acid will have the same strength, and the solution will be neutral." but in the section on Equilibrium in a Solution of a Salt of a Weak Acid and a Weak Base only examples where the salt solution is acidic or basic are mentioned. I suggest cutting the above statement from section 4 for consistency purposes. If this change is made, then the first sentence in bullet point 4 should read "A weak acid plus a weak base can yield either an acidic or basic solution."	Revise 4. as follows: A weak acid plus a weak base can yield either an acidic or basic solution. This is the most complex of the four types of reactions. When the conjugate acid and the conjugate base are of unequal strengths, the solution can be either acidic or basic, depending on the relative strengths of the two conjugates. To predict whether a particular combination will be acidic or basic, tabulated K values of the conjugates must be compared. (Note: occasionally the weak acid and the weak base can have the same strength, so their respective conjugate base and acid will have the same strength, and the solution will be	General/pedagogical suggestion or question

		neutral.)	
Ch 14: Acid-Base Equilibria, Sec 5: Polyprotic Acids, Example 14.19	The last sentence in the 4th paragraph of section The Solubility Product Constant should say: "Solids and liquids are assigned term values of one and thus do not appear in equilibrium constant expressions."	Revise the sentence "There is no denominator representing the reactants in this equilibrium expression since the reactant is a pure solid; therefore [AgCl] does not appear in the expression for Ksp." to "Solids and liquids are assigned concentration values of one and thus do not appear in equilibrium constant expressions; therefore [AgCl] does not appear in the expression for Ksp."	Typo
Ch 14: Acid-Base Equilibria, Sec 6: Buffers, Example 14.20	In the last sentence on this page an H ⁺ ion is called a proton. I do not think the explanation as to why an H ⁺ ion is called a proton is until section 14.1. This leads to student confusion. The sentence should say: "Water ionizes when one molecule of water gives up an H ⁺ ion to another molecule of water, yielding hydronium and hydroxide ions."	In the 1st paragraph, revise "gives up a proton" in the 2nd sentence to "gives up a proton (H ⁺ ion)".	General/pedagogical suggestion or question
Ch 14: Acid-Base Equilibria, Sec 6: Buffers, Example 14.20	In the answer for Ch. 11, #11(a) there should not be parentheses around the nitrate ion, NO ₃ ⁻ . The answer should say: " (a) Fe(NO ₃) ₃ is a strong electrolyte, thus it should completely dissociate into Fe ³⁺ and NO ₃ ⁻ ions. Therefore, (z) best represents the solution. "	In the solution, remove the parentheses from around NO ₃ ⁻ .	Typo
Ch 14: Acid-Base Equilibria, Sec 7: Acid-Base Titrations, Example 14.22	In table 11.2, the degree symbol (°) is missing from the units for Kb and Kf in the first row of the third and fifth columns. These units should be °C/m or °C m ⁻¹ .	For Kb and Kf columns, revise "C" to "°C".	Typo
Ch 14: Acid-Base Equilibria, Sec 7: Acid-Base Titrations, Figure 14.21	In the second sentence of the last paragraph before Table 2.2, there is a missing closing parenthesis as follows: "The electron has a charge of 1 ⁻ and is a much lighter particle with a mass of about 0.00055 amu (it would take about 1800 electrons to equal the mass of one proton." Note that there is no closing parenthesis before the closing quote mark. I checked and this error exists in both	Add a closing parenthesis as follows: "...with a mass of about 0.00055 amu (it would take about 1800 electrons to equal the mass of one proton)."	Typo

	the print textbook (revision C-2016-002(04/20)-BB) and in the version embedded in my chemistry course through Georgia eCore.		
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution	In two sentences, "ln A" should be replaced with just "A". The second to last sentence on page 539 should say: "...where ΔH_{vap} is the enthalpy of vaporization for the liquid, R is the gas constant, and A is a constant whose value depends on the chemical identity of the substance." The second paragraph on page 540 should say: "Since the constant, A, is the same, these two equations may be rearranged to isolate ln A and then set them equal to one another." Also somewhere on these two pages I think it is worth mentioning that in the Clausius-Clapeyron equation the temperature must be in Kelvin.	Revise the 1st paragraph after Example 10.6 as follows: The quantitative relation... R is the gas constant, and A is a constant whose value depends on the chemical identity of the substance. Temperature T must be in Kelvin in this equation. This equation is often rearranged into logarithmic form to yield the linear equation: Revise "ln A" to "A" twice.	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution, Chemistry in Everyday Life: The Role of Precipitation in Wastewater Treatment	The left-hand side of Figure 10.22 should say "Molecules escape from the liquid's surface to form vapor"	In figure 10.22, revise the left-hand label to "Molecules escape liquid's surface to form vapor".	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution, Example 15.1	The lettered list skips choice "g". It goes straight from "f" to "h". Screen shot attached.	Renumber exercise and solution as appropriate.	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution, Example 15.11	"f you plug in 0 (the freezing point of water in celcius) you do not obtain an answer of 32 (the freezing point of water in fahrenheit). Again, this is for the bottom equation only. The top one is good. "	Revise the equation given for the relation of temperature scales as follows: $T^{\circ} F = (9/5 \times T^{\circ} C) + 32.$ $T^{\circ} C = (5/9 \times T^{\circ} F) - 32.$ Ensure this is updated in the Key Equations section.	None

<p>Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution, Example 15.2</p>	<p>After the overall balanced redox reaction involving Cu^{2+} and H_2 on page 928 and the overall balanced redox reaction involving Ag^+ and H_2 on page 929 the following incorrect statement is made "The standard reduction potential can be determined by subtracting the standard reduction potential for the reaction occurring at the anode from the standard reduction potential for the reaction occurring at the cathode." The statement should say "The standard cell potential, E°_{cell}, can be determined by subtracting the standard reduction potential for the reaction occurring at the anode from the standard reduction potential for the reaction occurring at the cathode."</p>	<p>In the 3rd paragraph after Figure 16.6, revise as follows: The standard cell potential, E°_{cell}, can be determined by subtracting the standard reduction potential for the reaction occurring at the anode from the standard reduction potential for the reaction occurring at the cathode. The minus sign is necessary because oxidation is the reverse of reduction.</p> <p>In the 3rd paragraph after Figure 16.8, revise as follows: The standard cell potential, E°_{cell}, can be determined by subtracting the standard reduction potential for the reaction occurring at the anode from the standard reduction potential for the reaction occurring at the cathode. The minus sign is needed because oxidation is the reverse of reduction.</p>	<p>Other factual inaccuracy in content</p>
<p>Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution, Examples 15.3, 15.4, 15.6, and 15.12</p>	<p>I think the last sentence on this page should read: "This voltage is defined as zero for all temperatures."</p>	<p>In the 2nd paragraph, revise the last sentence as follows: "This voltage is defined as zero for all temperatures."</p>	<p>Typo</p>
<p>Ch 15: Equilibria of Other Reaction Classes, Sec 2: Lewis Acids and Bases</p>	<p>A little below figure 16.3 it says "The copper is undergoing oxidation; therefore, the copper electrode is the anode." A couple of sentences later it says "The silver is undergoing reduction; therefore, the silver electrode is the cathode." I don't think that anodes or cathodes were defined yet at any point in the textbook, let alone how they relate to oxidation or reduction so these statements are going to be confusing to students. I recommend modifying this</p>	<p>After Figure 16.3, revise as follows: ...The copper is undergoing oxidation; and the copper electrode is referred to as the anode. ... The silver is undergoing reduction; and the silver electrode is referred to as the cathode. ...</p>	<p>General/pedagogical suggestion or question</p>

	paragraph.		
Ch 15: Equilibria of Other Reaction Classes, Sec 2: Lewis Acids and Bases	The third to last paragraph on this page contains a typo in the third sentence (arrows should be singular). Also the second sentence is a bit awkward. Maybe the paragraph should read: "Note that both sides of the equation show water. Simplifying should be done when possible. In this case, it is necessary to remove one H ₂ O from each side of the reaction arrow."	Revise as follows: Note that both sides of the equation show water. Simplifying should be done when possible. In this case, it is necessary to remove one H ₂ O from each side of the reaction arrow.	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 2: Lewis Acids and Bases	I find the second sentence in the third paragraph to be confusing. Maybe it would be better if this sentence was cut. I think the correct point will still be made without this sentence. The sentence I am referring to is "This will work if the acidic and basic reactants and products are the same or if the basic reactants and products are used before the conversion from acidic or basic."	In the 3rd paragraph, delete the 2nd sentence "This will work if the acidic and basic reactants and products are the same or if the basic reactants and products are used before the conversion from acidic or basic."	General/pedagogical suggestion or question
Ch 15: Equilibria of Other Reaction Classes, Sec 2: Lewis Acids and Bases	The 3rd to last and 2nd to last sentences are confusing and I think should say: "Batteries use spontaneous chemical reactions to produce electricity that can be converted into useful work. All electrochemical systems involve the transfer of electrons."	Revise the second half of the paragraph as follows: Batteries use spontaneous chemical reactions to produce electricity that can be converted into useful work. All electrochemical systems involve the transfer of electrons. In many systems, the reactions occur in a region known as the cell, where the transfer of electrons occurs at electrodes.	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 2: Lewis Acids and Bases, Example 15.13	The two sentences after the volt equation does not agree with the equation itself and need to be fixed. The sentences I am referencing are "In this equation, A is the current in amperes and C the charge in coulombs. Note that volts must be multiplied by the charge in coulombs (C) to obtain the energy in joules (J)." One issue is that A does not even appear in the equation and the second sentence is real confusing to the students.	Delete the sentences "In this equation, A is the current in amperes and C the charge in coulombs. Note that volts must be multiplied by the charge in coulombs (C) to obtain the energy in joules (J)."	Other factual inaccuracy in content
Ch 15: Equilibria of Other Reaction Classes, Sec 2: Lewis Acids and Bases, Table 15.2	In the key concepts for section 16.3, the second to last sentence is missing the word potential and should say "The reduction reactions are reversible, so standard cell potentials can be calculated by subtracting the standard reduction potential for the reaction at the anode from the standard reduction potential for the reaction at the	Revise the 2nd to last sentence of the summary as follows: "The reduction reactions are reversible, so standard cell potentials can be calculated by subtracting the standard reduction potential for	Typo

	cathode."	the reaction at the anode from the standard reduction potential for the reaction at the cathode."	
Ch 15: Equilibria of Other Reaction Classes, Sec 3: Multiple Equilibria	The third sentence in section 20.4 should say: "Scientists learned how to create new substances, and certain isotopes of certain elements were found to possess the capacity to produce unprecedented amounts of energy,..."	Revise "Science" to "Scientists".	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 3: Multiple Equilibria	The second and third nuclear equations on the top of this page each have an erroneous half-life symbol ($t_{1/2}$) at the end of the reaction next to the beta particle symbol. These half-life symbols should be deleted.	Delete " $t_{1/2}$ " from both equations.	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 3: Multiple Equilibria	The first paragraph after Example 12.7 contains typos. It should read: "The standard free energy change for a reaction may also be calculated from standard free energy of formation (ΔG°_f) values of the reactants and products involved in the reaction. The standard free energy of formation is the free energy change that accompanies the formation of one mole of a substance from its elements in their standard states. Similar to the standard enthalpy of formation, ΔG°_f is by definition zero for elemental substances under standard state conditions. The approach used to calculate ΔG° for a reaction from ΔG°_f values is the same as that demonstrated previously for standard enthalpy and entropy changes. For the reaction"	Revise the 1st paragraph after Example 12.7 as follows: The standard free energy change for a reaction may also be calculated from standard free energy of formation (ΔG°_f) values of the reactants and products involved in the reaction. The standard free energy of formation is the free energy change that accompanies the formation of one mole of a substance from its elements in their standard states. Similar to the standard enthalpy of formation, ΔG°_f is by definition zero for elemental substances under standard state conditions. The approach used to calculate ΔG° for a reaction from ΔG°_f values is the same as that demonstrated previously for enthalpy and entropy changes. For the reaction...	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 3: Multiple Equilibria,	I think using the word "present" twice in the sentence right before Figure 13.11 makes for an awkward sentence. Maybe it should read: "If a system consists of reactants and products in non-equilibrium amounts ($Q \neq K$), the reaction will proceed spontaneously in	Revise the sentence before Figure 13.11 as follows: "If a system consists of reactants and products in nonequilibrium amounts ($Q \neq K$), the reaction... "	General/pedagogical suggestion or question

Example 15.14	the direction necessary to establish equilibrium."		
Ch 15: Equilibria of Other Reaction Classes, Sec 3: Multiple Equilibria, Example 15.15	I think the paragraph under the heading "Calculating Free Energy Change" is ambiguous and I suggest changing it to the following: "The change in free energy is a state function, so its value depends only on the conditions of the initial and final states of the system that have undergone some change. A convenient and common approach used to calculate free energy changes for physical and chemical reactions is by use of widely available standard state thermodynamic data. One method, illustrated in Example 16.7, involves the use of standard enthalpies of formation and standard entropies to determine the standard change in enthalpy (ΔH°) and standard change in entropy (ΔS°) for a process. The standard free energy change (ΔG°) for the process can then be found by using the following equation:	Revise the 1st sentence as follows: "Free energy is a state function, so its value depends only on the conditions of the initial and final states of the system."	General/pedagogical suggestion or question
Ch 16: Electrochemistry, Introduction	The last sentence on this page is not clear to the students. I think it would be better if it said: "As noted earlier, a ΔG of zero describes a system at equilibrium."	Revise the sentence as follows: "As noted earlier, the condition of $\Delta G = 0$ describes a system at equilibrium."	General/pedagogical suggestion or question
Ch 16: Electrochemistry, Sec 1: Balancing Oxidation-Reduction Reactions	The heading at the top of Example 16.7 should say: "Evaluation of ΔG° from ΔH° and ΔS° " The word change is redundant.	Revise the title to "Evaluation of ΔG° from ΔH° and ΔS° ".	Typo
Ch 16: Electrochemistry, Sec 1: Balancing Oxidation-Reduction Reactions	In the last sentence before Table 15.2: "In general, the larger the formation constant, the more stable the complex; however, as in the case of K_{sp} values, the stoichiometry of the compound must be considered." I think the part of the sentence which says "...however, as in the case of K_{sp} values, the stoichiometry of the compound must be considered." is not going to be clear to the students and should be cut from this sentence. Was K_{sp} values, stability, and stoichiometry even discussed in section 15.1?	Before Table 15.2, revise the last sentence as follows: In general, the larger the formation constant, the more stable the complex.	General/pedagogical suggestion or question
Ch 16: Electrochemistry, Sec 2: Galvanic Cells	I think the fourth sentence in the second paragraph is not clear and needs to be re-worded. I think it should read: "The ligands form bonds with the central atom, creating a new ion with a charge equal to the sum of the charges of the ligands and the central atom."	Revise the 4th sentence in the 2nd paragraph as follows: The ligands form bonds with the central atom or ion, creating a new ion with a charge equal to the sum of the charges of the ligands and the	Typo

		central atom or ion.	
Ch 16: Electrochemistry, Sec 2: Galvanic Cells	I find the second paragraph in the summary of section 16.2 confusing, especially the first sentence. I think this paragraph should say: "For a given substance, its entropy depends on its phase with $S_{\text{solid}} < S_{\text{liquid}} < S_{\text{gas}}$. For different substances in the same physical state at a given temperature, entropy is typically greater for heavier atoms or more complex molecules. Entropy increases when a system is heated and when solutions form. Using these guidelines, the sign of entropy changes for some chemical reactions and physical changes may be reliably predicted."	Revise the summary as follows: For a given substance, its entropy depends on its phase with $S_{\text{solid}} < S_{\text{liquid}} < S_{\text{gas}}$. For different substances in the same physical state at a given temperature, entropy is typically greater for heavier atoms or more complex molecules. Entropy increases when a system is heated and when solutions form. Using these guidelines, the sign of entropy changes for some chemical reactions and physical changes may be reliably predicted.	Typo
Ch 16: Electrochemistry, Sec 3: Standard Reduction Potentials	I think the last sentence in the first paragraph under the link to learning should read: "For molecules, greater numbers of atoms (regardless of their masses) increase the ways in which the molecules can vibrate and thus the number of possible microstates and the entropy of the system"	Revise the sentence to "For molecules, greater numbers of atoms (regardless of their masses) increase the number of ways in which the molecules can vibrate and thus the number of possible microstates and the entropy of the system."	Typo
Ch 16: Electrochemistry, Sec 3: Standard Reduction Potentials	The first equation directly under "Thus $0.10 - x$ is approximated as 0.10 :" should only have 0.10 in the numerator, rather than be a repeat of the exact equation shown in the previous step.	In Step 3 of the solution, after "Thus $0.10 - x$ is approximated as 0.10 :", revise " $0.10 - x$ " to " 0.10 " in the numerator.	None
Ch 16: Electrochemistry, Sec 3: Standard Reduction Potentials	All of the reactions on page 857 after the words "The equations for the dissolution of AgCl in a solution of NH ₃ are:" and all of the reactions on page 858 should contain an equilibrium arrow, \rightleftharpoons , rather than a normal forward reaction arrow.	In all of the reactions after the sentence ""The equations for the dissolution of AgCl in a solution of NH ₃ are:", revise the forward reaction arrows " \rightarrow " to equilibrium arrows " \rightleftharpoons ".	Typo
Ch 16: Electrochemistry, Sec 4: The Nernst Equation	The last chemical equation on page 861, the one involving the dissolution of hydroxylapatite, should contain an equilibrium arrow, \rightleftharpoons , rather than a forward reaction arrow. In the text this process is described as an equilibrium.	Revise the arrow in the chemical equation starting " $\text{Ca}_5(\text{PO}_4)_3\text{OH}(\text{s}) \rightarrow \dots$ " to an equilibrium arrow " $\text{Ca}_5(\text{PO}_4)_3\text{OH}(\text{s}) \rightleftharpoons \dots$ ".	Typo
Ch 17: Kinetics, Sec	The third sentence in the text after Figure 12.8 should read: "The least	Revise "corresponding to distributions (a) and	Typo

1: Chemical Reaction Rates, Exercise 5	probable configuration of the system is one in which all four particles are in one box, corresponding to distributions (a) and (e), each with a probability of 1/16.	(d)" to "corresponding to distributions (a) and (e)".	
Ch 17: Kinetics, Sec 1: Chemical Reaction Rates, Subsec: Relative Rates of Reaction	Question #43 should say "Determine ΔG° for the following reactions."	Revise " ΔG " to " ΔG° ".	Typo
Ch 17: Kinetics, Sec 1: Chemical Reaction Rates, Exercise 5	The third sentence in the section on Balancing Nuclear Equations states: "A balanced nuclear reaction equation indicates that there is a rearrangement during a nuclear reaction, but of subatomic particles rather than atoms." But in a chemical reaction, electrons are re-arranged and electrons are subatomic particles. I think the wording should be changed so that it specifies that a nuclear reaction involves changes to the nucleus. This would serve as a more clear distinction between a chemical reaction and a nuclear reaction.	Revise "but of subatomic particles rather than atoms" to "but of nucleons (subatomic particles within the atoms' nuclei) rather than atoms".	General/pedagogical suggestion or question
Ch 17: Kinetics, Sec 1: Chemical Reaction Rates, Subsec: Relative Rates of Reaction	The solution to Ch. 16, #63(b) should not contain the $\Delta G^\circ = -RT \ln K$ equation. It is not used to solve this problem.	Revise " $\Delta G^\circ = -RT \ln K$ " to " $\Delta G = \Delta G^\circ + RT \ln Q$ ".	None
Ch 17: Kinetics, Sec 1: Chemical Reaction Rates, Subsec: Relative Rates of Reaction	The series of reactions between the phosphate ion and the hydronium ion contains numerous errors. It should be: $PO_4^{3-} + H_3O^+ \rightarrow HPO_4^{2-} + H_2O$; $HPO_4^{2-} + H_3O^+ \rightarrow H_2PO_4^- + H_2O$; $H_2PO_4^- + H_3O^+ \rightarrow H_3PO_4 + H_2O$. In all of the reactions everything should be in the aqueous phase, except water which should be in the liquid phase.	After the sentence "When exposed to acid, phosphate ions react with hydronium ions to form hydrogen phosphate ions and ultimately, phosphoric acid:" add phases throughout the reactions, and revise " PO_4^{2-} " to " $H_2PO_4^{2-}$ " in the 2nd reaction.	Other factual inaccuracy in content
Ch 17: Kinetics, Sec 2: Factors Affecting Reaction Rates	The title of Table 15.2 "Common Complex Ions by Decreasing Formation Constants" is inaccurate because the values are not listed in order of decreasing value. This table title should be corrected.	Reverse the order of the rows in Table 15.2, so AlF_6^{3-} comes first, and $CdCN_4^{2-}$ comes last. Remove brackets from substances.	Typo
Ch 17: Kinetics, Sec 2: Factors Affecting	The answer to 35(a) should be reworded to say "-1124.3 kJ/mol is the standard free energy of formation."	Revise the solution to "The standard free energy of formation is -1124.3 kJ/mol."	None

Reaction Rates			
Ch 17: Kinetics, Sec 3: Rate Laws	In problems 22, 23, 28, and 29 on this page, it is the "standard entropy change" that must be calculated, not the "entropy change" or "change in entropy". I think it is important that these questions are re-worded to be made more specific.	In exercises 22 and 23, revise "standard state conditions" to "the standard conditions". In exercises 28 and 29, revise "All are run under standard state conditions" to "All the processes occur at the standard conditions".	Other factual inaccuracy in content
Ch 17: Kinetics, Sec 3: Rate Laws, Exercise 15	I am a physical chemist and do quantum chemistry as part of my research. Figure 6.24 perpetuates a common misconception about spin that shows up in a lot of general chemistry texts and then has to be corrected for students in later classes. As it keeps getting put in general chemistry texts, it appears that most chemists did not actually replace the misconception with the best interpretation. Electrons do not spin! They are quantum objects that exist as a standing waves about the nucleus. The only reason 'spin' was used to denote the quantum quantity is that it behaves as an angular momentum. I request this figure be removed from the text. The angular momentum of an electron actually results from relativistic effects and falls out of Dirac's relativistic formulation of quantum mechanics (See Quantum Mechanics by Schiff Section 5.2). Electron spin is more closely related to the magnetic field created by a current (also a relativistic effect), than it is to a spinning ball.	Revise the text describing Figure 3.24 as follows: The other three quantum numbers... Electron spin describes an intrinsic electron "rotation" or "spinning." Each electron acts as a tiny magnet or a tiny rotating object with an angular momentum, or as a loop with an electric current, even though this rotation or current cannot be observed in terms of spatial coordinates.	Other factual inaccuracy in content
Ch 17: Kinetics, Sec 3: Rate Laws, Exercise 23	Phases should be included in the reactions that are shown in the ICE tables in Examples 15.3, 15.4, 15.6, and 15.12. The reactant should be in the (s) phase and the products should be in the (aq) phase. This is important because it helps to stress why the concentration of the reactant is not tracked in the table and why the reactant is not present in the Ksp expression.	In Examples 15.3, 15.4, 15.6, and 15.12, add phases to all ICE tables.	General/pedagogical suggestion or question
Ch 17: Kinetics, Sec 3: Rate Laws, Exercise 25	In example 14.20, delete the brackets around acetic acid, water, and acetate ion in the reaction above the ICE table. Also, on the reactants side of the ICE table, there should be a separate column for acetic acid and a separate column for water. All of the values shown in the table on the reactants side should be in the column for acetic acid	In Example 14.20, in the ICE table in Step 2, remove all brackets, and add a column for H ₂ O.	Typo

	and all cells in the column for water should be left blank.		
Ch 17: Kinetics, Sec 4: Integrated Rate Laws	In example 14.14 there is an extra ")" that should not be there in the ICE table. This is in the cell for the equilibrium concentration for HSO ₄ ⁻ . Also, I know that the issue has been raised already, but I think it would be really great if the typos in the ICE tables in examples 14.11 and 14.12 were corrected soon.	In the ICE table in Example 14.14, delete the extraneous parenthesis.	Typo
Ch 17: Kinetics, Sec 4: Integrated Rate Laws, Example 17.8	I think that Figure 17.21 would be more clear to the students if the curves for the catalyzed and uncatalyzed reactions were a different color as they are in Figure 12.22. Also, I think it would be a good idea to label the x-axis as "Extent of Reaction" like it is in Figures 12.16 and 12.22 instead of "Reaction coordinate". I do not think reaction coordinate is mentioned anywhere in the text. Also, the captions "activation energy of uncatalyzed reaction" and "activation energy of catalyzed reaction" should point to the double headed arrows, not the curves.	In Figure 17.21, update the curves to be colored, label the x-axis "Extent of Reaction", and adjust the leader lines for labels "Activation energy of uncatalyzed reaction" and "Activation energy of catalyzed reaction".	General/pedagogical suggestion or question
Ch 17: Kinetics, Sec 4: Integrated Rate Laws, Example 17.9	For problem #79 there are typos in the answer. The answer should be [PCl ₃] = [Cl ₂] = 0.195 M, [PCl ₅] = 1.81 M	Revise the solution to exercise 79 as follows: [PCl ₅] = 1.80 M; [Cl ₂] = 0.195 M; [PCl ₃] = 1.97 M	Typo
Ch 17: Kinetics, Sec 5: Collision Theory	In the sixth full sentence on this page, "ml" should be changed to "l". The sentence should read "Thus, there is one s-orbital for l = 0, there are three p-orbitals for l = 1, five d-orbitals for m = 2, seven f-orbitals for l = 3, and so forth."	In the paragraph discussing the magnetic quantum number, revise "ml" to "l" in the 9th sentence as follows: "Thus, there is one s-orbital for l = 0, there are three p-orbitals for l = 1, five d-orbitals for l = 2, seven f-orbitals for l = 3, and so forth."	Typo
Ch 17: Kinetics, Sec 5: Collision Theory	On page 95, the mass of chlorine is reported as 33.45 and should be 35.45.	In the table below Figure 2.26, revise the mass of chlorine from "33.45" to "35.45".	Other factual inaccuracy in content
Ch 17: Kinetics, Sec 5: Collision Theory, Exercises 58 and 61	Page 190: Example 7.7 has several typos. In step 4, the half reaction involving Cr has an extra "+" sign after 14H ⁺ , which should be deleted. In step 5, it should say "...Adding one electron to the right side brings that side's total charge" "brings" must end with an "s". Also in step 5, in the text (2 x 3+) = 6+. There should not be a space between "6" and	In Example Balancing Redox Reactions in Acidic Solution, revise as follows: In step 4, delete the extra "+" sign. In step 5, in the 3rd sentence of the 1st paragraph revise "bring"	Typo

	“+”.	to "brings". In the 2nd sentence of the 2nd paragraph, delete the space between "6" and the "+" sign.	
Ch 17: Kinetics, Sec 5: Collision Theory, Figure 17.16	Page 122 – Problems 99 and 100. The questions should read the following. “For each of the following pairs of ions, write the formula of the compound they will form:”	Revise the instructions for exercises 49 and 50 to "For each of the following pairs of ions, write the formula of the compound they will form:”	Typo
Ch 17: Kinetics, Sec 7: Catalysis	The structure for the complex ion, $\text{Cu}(\text{CN})_2^-$, should be surrounded by brackets and have the charge shown. Similar to the structure for $\text{Al}(\text{OH})_4^-$ earlier in the section.	Our reviewers accepted this change.	Other factual inaccuracy in content
Ch 17: Kinetics, Sec 7: Catalysis	"At standard temperature (298.15 K), it is possible to write the above equations as"...."If the temperature is not 273.15 K, it is necessary to recalculate the value of the constant." The second temperature should be changed to "298.15 K". This confusion likely results from calling 298.15 K standard temperature, when in fact 273.15 K is standard temperature. In several other locations in the textbook 298.15 K (25 C) is incorrectly called standard temperature.	In the paragraph above Example 16.6, revise "If the temperature is not 273.15 K" to "If the temperature is not 298.15 K".	Other factual inaccuracy in content
Ch 17: Kinetics, Sec 7: Catalysis, Figure 12.21	There are incorrect/inconsistent numbers used in the solution to Example 15.14. In Step 1, a hydroxide concentration of $9.4 \times 10^{-6} \text{ M}$ is calculated yet below this the hydroxide concentration is incorrectly referred to as $1.2 \times 10^{-5} \text{ M}$ in multiple locations.	In the solution, in the final answer of Step 1 and in the 1st line of Step 2, revise from " $1.2 \times 10^{-5} \text{ M}$ " to " $9.4 \times 10^{-6} \text{ M}$ ".	None
Ch 17: Kinetics, Sec 7: Catalysis	Back of the book answer has a small typo: page 1262 of the 2016 ed, Chapter 4 Problem 3 F Reads: " $(\text{NH}_4)_2\text{Cr}_2\text{O}_7(\text{s})$ " Ought to read: " $(\text{NH}_4)_2\text{Cr}_2\text{O}_7(\text{s})$ " There's an extra '5'	In the solution for exercise 3 part f, revise the first half of the equation as follows: (f) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$	Typo
Ch 17: Kinetics, Sec 7: Catalysis, Chemistry in Everyday Life: Automobile Catalytic Converters	Chapter 5 page 268 (2016 ed) problem 63: The phases change in the two given chemical rxns for SbCl_3 . Going between Solid and Gas; however, these should be in the same phase (probably Gas). The solutions guide also needs to be corrected for this as well.	Change " $\text{SbCl}_3(\text{g})$ " to " $\text{SbCl}_3(\text{s})$ ".	Typo

<p>Ch 17: Kinetics, Sec 7: Catalysis, Figure 17.21</p>	<p>Atom sizes and placements vary making this figure wonky and misleading. In the side view at left, purple layer A atoms are smaller than atoms in layers B and C so there are too many purple atoms shown. In the top view in the middle, the purple and green atoms are shown on top of each other across the bottom of the image but they should be alternating as shown across the top of the image. In the rotated view at right, there are four green atoms shown in the top right face of the cube where there should be just three. Finally, the rotated view is not rotated, it just shows a superimposed cubic outline. Why not show just one FCC unit cell (1,3,1 across any face instead of 1,3,5,3,1) and actually rotate it so students can see that a flat layer from the other two views goes across the diagonal of the cube?</p>	<p>Revise figure as appropriate.</p>	<p>Other factual inaccuracy in content</p>
<p>Ch 17: Kinetics, Sec 7: Catalysis, Figure 17.27</p>	<p>Exercise 12.31. The second word "reactions" should be "reaction."</p>	<p>Our reviewers accepted this change.</p>	<p>Typo</p>
<p>Ch 17: Kinetics, Sec 7: Catalysis, Figure 17.28</p>	<p>There's a typo on pg. 311 within "Example 6.1". In the calculation of hydrogen, it states that $18 \times 1.008 = 18.114$ and it should be 18.144.</p>	<p>Revise "18.114" to "18.144".</p>	<p>Typo</p>
<p>Ch 17: Kinetics, End of Chapter Exercises, Exercise 25 and 74</p>	<p>I believe the word "laundry" should be replaced with "laundromat" in the first sentence of the second paragraph in the section on Dissolution versus Weak Electrolyte Formation. I think the sentence should read: "This could be important to a laundromat because clothing washed in water that has a manganese concentration exceeding 0.1 mg per liter may be stained by the manganese."</p>	<p>Revise "This could be important to a laundry because" to "This could be important to a laundromat because".</p>	<p>Typo</p>
<p>Ch 20: Nuclear Chemistry, Sec 2: Nuclear Equations</p>	<p>Page 104: Under the heading "Compounds Containing Polyatomic Ions" I suggest re-wording the text prior to Table 4.3 to the following: "Compounds containing polyatomic ions are named similarly to those containing only monatomic ions, the cation is named first followed by the anion. Never add the -ide ending to the name of a polyatomic ion. This is true even when the polyatomic ion is an anion. Just simply use the name as it appears in Table 2.5. Examples of naming compounds containing polyatomic ions are shown in Table 4.3." To me the original text suggests that the</p>	<p>Revise the 1st sentence in section Compounds Containing Polyatomic Ions as follows: "Compounds containing polyatomic ions are named similarly to those containing only monatomic ions, i.e., by naming first the cation and then the anion."</p>	<p>Typo</p>

	suffix "ide" is present in the name of all polyatomic ions. I also think the original text implies that polyatomic ions are always anions, while some are cations.		
Ch 20: Nuclear Chemistry, Sec 2: Nuclear Equations	Page 138 – Answer to example 3.8 should be "9.17 x 10 ²⁰ C atoms"	In Example 2.12 Deriving the Number of Atoms and Molecules from the Mass of a Compound, revise the final answer of the solution as follows: "9.17 x 10 ²⁰ C atoms"	Incorrect calculation or solution
Ch 20: Nuclear Chemistry, Sec 2: Nuclear Equations, Exercise 17	In Table 3.4 on page 98: Oxide (O ²⁻) should be excluded from the list of polyatomic ions. Oxide is composed of just one atom and is therefore a monoatomic ion.	Remove the row with oxide from Table 3.4 Common Polyatomic Ions.	Other factual inaccuracy in content
Ch 20: Nuclear Chemistry, Sec 2: Nuclear Equations, Figure 20.4	Change: "This means that A and B are different compounds, with A having one-half as much carbon per amount of oxygen (or twice as much oxygen per amount of carbon) as B. A possible pair of compounds that would fit this relationship would be A = CO ₂ and B = CO. " to " This means that A and B are different compounds, with A having one-half as much oxygen per amount of carbon (or twice as much carbon per amount of oxygen) as B. A possible pair of compounds that would fit this relationship would be A = CO and B = CO ₂ . "	Revise the last paragraph in the solution to Example 2.2 Laws of Definite and Multiple Proportions as follows: "This supports the law of multiple proportions. This means that A and B are different compounds, with A having one-half as much oxygen per amount of carbon (or twice as much carbon per amount of oxygen) as B. A possible pair of compounds that would fit this relationship would be A = CO and B = CO ₂ ."	Incorrect calculation or solution
Ch 20: Nuclear Chemistry, Sec 2: Nuclear Equations, Subsec: Balancing Nuclear Reactions	Referring to the symbol "v" for velocity in the de Broglie equation, as opposed to the greek letter nu, for frequency, the text reads "Although these two symbols are identical, they mean very different things." This is inaccurate - a v is not the same as a nu, and I would suggest changing it to read "although these two symbols are visually very similar"	Revise the sentence referring to the symbol v in the de Broglie equation as follows: "Unlike the other values of lambda discussed in this chapter, the de Broglie wavelength is a characteristic of particles and other bodies, not electromagnetic radiation (note that this equation involves velocity [v, m/s], not frequency [v, Hz]. Although these two symbols appear nearly	Other factual inaccuracy in content

		identical, they mean very different things)."	
Ch 20: Nuclear Chemistry, Sec 3: Radioactive Decay, Subsec: Types of Radioactive Decay	On page 218 of the 2016 printing. In section 4.4 on Electron deficient molecules. The second sentence should say. "...with central atoms from groups 2 and 13, outer atoms..." NOT "groups 2 and 12"	In subsection Electron-deficient Molecules, revise the second sentence as follows: "Generally, these are molecules with central atoms from groups 2 and 13, outer atoms that are hydrogen, or other atoms that do not form multiple bonds."	Typo
Ch 20: Nuclear Chemistry, Sec 4: Transmutation and Nuclear Energy	Please include all information necessary to solve problems in the problem. Specifically, in chapter 9, problem 43 ("Calculate the enthalpy of solution (ΔH for the dissolution) per mole of CaCl_2 ") please at least point to problem 25 as the location from which the necessary data can be obtained - not all professors assign all the odd-numbered problems, and not all professors actually look at what they assign.	Revise exercise 43 as follows: 43. Calculate the enthalpy of solution (ΔH for the dissolution) per mole of CaCl_2 (refer to exercise 25).	General/pedagogical suggestion or question
Ch 20: Nuclear Chemistry, Sec 4: Transmutation and Nuclear Energy	On page 231-232 on openstax for general chemistry, the answer you guys wrote for 5.1 example is wrong. The answer you guys got was 210,000, but I got 217,568 when I calculated it myself. And the practice question underneath, I got 50737.5, not 5.05×10^4 .	In Example 9.1 Measuring Heat, revise the answer to Check Your Learning to " $5.07 \times 10^4 \text{ J}$ ".	Typo
Ch 20: Nuclear Chemistry, Sec 4: Transmutation and Nuclear Energy, Exercise 47	In Figure 8.5, the equation reads $P_{\text{atm}} = P_{\text{gas}} + \rho h g$. The ρ should be the greek letter rho, or should somehow be marked to make it clear that this ρ is equal to density, not to a pressure.	In Figure 8.5 showing manometers, revise the ρ in $\rho h g$ to the greek letter rho for clarity.	Typo
Ch 21: Nuclear Chemistry, End of Chapter Exercises, 13, 15	The answer for Example 12.7 should be 9.6 kJ/mol. There's a typo in the calculation for ΔH at the bottom of page 917. -285.83 kJ/mol was used for ΔH of $\text{H}_2\text{O}(\text{l})$ instead of -286.83 as provided in the table for the problem. This resulted in the erroneous answer for the problem as 8.6 kJ/mol.	Revise Example 12.7 Evaluation of ΔG degrees Change from ΔH degrees and ΔS degrees to use the value "- 2.86.83" for ΔH degrees throughout. Revise the final answer to "9.6 kJ/mol" accordingly.	Typo