

# Chemistry 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 2: Phases and Classificati on of Matter	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?	Revise figure as appropriate.	Other factual inaccuracy in content
Ch 1: Essential Ideas, Sec 4: Measurem ents, Table 1.3	There's a typo on pg. 311 within "Example 3.1". In the calculation of hydrogen, it states that $18 \times 1.008 = 18.114$ and it should be 18.144.	Revise "18.114" to "18.144".	Typo

Ch 1: Essential Ideas, Sec 6: Mathemati cal Treatment of Measurem ent Results	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 1: Section 6: Mathemati cal Treatment of Measurem ent Results; Example 1.12	In the webview, the intro module for Chapter 13 and Chapter 17 is titled "Opener" rather than "Introduction".	In the webview, ensure the intro module for Chapters 13 and 17 is titled "Introduction".	General/pedagogical suggestion or question
Ch 1: Section 6: Mathemati cal Treatment of Measurem ent Results; Example 1.12	There is a erroneous comma in the question for 47(b) after the formula of BaO that should be deleted.	Our reviewers accepted this change.	Typo
Ch 2: Atoms, Molecules, and Ions, Sec 1:Early Ideas in Atomic Theory, Example 2.2	In the ICE table in Example 14.19 delete the "+" from the cell for the Change(M) for H2O.	In the ICE table in Example 14.19, remove the "+" sign from the cell for the Change(M) for H2O.	Typo
Ch 2: Atoms, Molecules, and Ions, Sec 3: Atomic Structure and Symbolism	The "Check Your Learning" solution is incorrect. When calculating the mass of Zn, it appears that the volume (1650 cm <sup>3</sup> ) was divided by density, rather than multiplied by density. My answers are 1.18 x 10 <sup>4</sup> g and 1.37 x 10 <sup>6</sup> sec ~ 380 hours.	Revise the solution to the Check Your Learning as follows:  11.8 kg Zn requires 382 hours.	Incorrect calculation or solution
Ch 2: Atoms, Molecules, and Ions, Sec 4:	In problem #111, the formula for calcium phosphate should be Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	In Exericse 111, revise the formula for calcium phosphate from "Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>3</sub> " to "Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> ".	Typo

Chemical Formulas			
Ch 2: Atoms, Molecules, and Ions, Sec 5: The Periodic Table, Exercise 38	The last sentence in question #23 should say "What is the SO <sub>4</sub> <sup>2-</sup> concentration in such water?"	Revise the last sentence of Exercise 23 as follows:  "What is the concentration of SO <sub>4</sub> <sup>2-</sup> in such water?"	Typo
Ch 2: Atoms, Molecules, and Ions, Sec 5: The Periodic Table, Figure 2.27	There are still errors in the table titled "Solubilities of Common Ionic Compounds in Water". Ag <sup>+</sup> must be added as an exception to fluoride. Clearly this is an exception as indicated in the text later in this section. AgF is shown to be a precipitate. Also, Cl <sup>-</sup> , Br <sup>-</sup> , I <sup>-</sup> should not be called the "halide ions" or "halides" since F <sup>-</sup> is also a halide ion. This is confusing. I think it would be better to just call them by their individual names "chloride, bromide, and iodide". Also, in the bottom half of the table there is also confusing/ambiguous text. Saying "compounds of these anions with group 1..." in the exceptions column makes one think that you are referring to carbonate, chromate, phosphate, sulfide, and hydroxide. When you don't mean to include hydroxide. Overall I think this entire table could be laid out in a much more logical fashion that is less confusing to the students.	Revise Table 4.1 Solubilities of Common Ionic Compounds in Water as follows:  In the first cell in the first column: -remove the parentheses around "Cl <sup>-</sup> , Br <sup>-</sup> , and I <sup>-</sup> " in the second bullet -revise the third bullet to "the halide ion F <sup>-</sup> "  In the first cell in the second column: -add a first bullet that reads "none" -add a fourth bullet that reads "none"	Other factual inaccuracy in content
Ch 2: Atoms, Molecules, and Ions, Sec 6: Molecular and Ionic Compounds, Exercises 49, 50	The last sentence in the second paragraph states: "Their conjugate bases are stronger than the hydroxide ion, and if any conjugate base were formed, it would react with water to re-form the acid." I think this statement would make more sense if you replaced "water" with "hydronium"	In the 2nd paragraph after Figure 14.8, revise the last sentence as follows:  "Their conjugate bases are stronger than the hydroxide ion; if any conjugate base were formed, it would react with water to form the hydroxide ion."	Other factual inaccuracy in content
Ch 2:	In example 14.14 there is	In the ICE table in Example 14.14, delete the	Typo

<p>Atoms, Molecules, and Ions, Sec 6: Molecular and Ionic Compounds, Table 2.5</p>	<p>an extra ")" that should not be there in the ICE table. This is in the cell for the equilibrium concentration for HSO<sub>4</sub><sup>-</sup>. 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.</p>	<p>extraneous parenthesis.</p>	
<p>Ch 2: Atoms, Molecules, and Ions, Sec 7: Chemical Nomenclature, Subsec: Compounds Containing Polyatomic Ions</p>	<p>About half way down page 778, a paragraph begins with the following sentence "As shown in the previous chapter on equilibrium, the K expression for a chemical equation derived from adding two or more other equations is the mathematical product of the other equations' K expressions." The problem is that the rule of multiple equilibria is never discussed in Ch. 13. I think it would be nice if the rule of multiple equilibria was discussed in Ch. 13 along with the rules for reversing a reaction and multiplying a reaction by a factor and how this impacts K, but this is never mentioned in Ch. 13. Most textbooks include this information so I believe it would be worth adding this material to Ch. 13, but at the very least this inaccurate statement should be removed from Ch. 14.</p>	<p>Revise the paragraph discussing the K expression as follows:  "Because of the way mass-action expressions are defined, the K expression for any chemical equation that is derived by adding together two or more other equations is equal to the mathematical product of the other equations' K expressions. Multiplying the mass-action expressions together and cancelling common terms, we see that: "</p>	<p>Other factual inaccuracy in content</p>
<p>Ch 2: Atoms, Molecules, and Ions, Sec 7: Chemical Nomenclature, Table 2.7</p>	<p>Page 1304: In the answer for Ch. 14 3(b) the phase on HCl should be (aq), NOT (l).</p>	<p>In the solution to part b of exercise 3, revise "HCl(l)" to "HCl(aq)".</p>	<p>Typo</p>
<p>Ch 2: Section 5</p>	<p>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-</p>	<p>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".</p>	<p>General/pedagogical suggestion or question</p>

	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.		
Ch 2 End of Chapter problems	At the start of section 14.5 the chemical equation is shown for the reaction of HCN in water. The reaction arrow ( $\rightarrow$ ) should be replaced with an equilibrium arrow ( $\rightleftharpoons$ ) for the HCN reaction because HCN is a weak acid.	At the start of section Polyprotic Acids, revise the reaction arrow to an equilibrium arrow in the equation for the reaction of HCN in water.	Other factual inaccuracy in content
Ch 3: Composition of Substances and Solutions, Sec 1: Formula Mass and the Mole Concept	Page 1297: I believe the answer to Ch. 11 #21 should have two significant figures and therefore by 2.8 g.	Revise the solution to exercise 21 from "2.80 g" to "2.8 g".	Incorrect calculation or solution
Ch 3: Composition of Substances and Solutions, Sec 1: Formula Mass and the Mole Concept	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 $l = 2$ , 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 3: Composition of Substances and Solutions, Sec 1: Formula Mass and the Mole Concept, Example 3.8	Text running out of the box slightly.	Our reviewers accepted this change.	Typo

<p>Ch 3: Compositio n of Substance s and Solutions, Sec 2: Determinin g Empirical and Molecular Formulas, Example 3.10</p>	<p>The following link needs a new target: (<a href="http://openstaxcollege.org/l/16commonion">http://openstaxcollege.org/l/16commonion</a>)</p>	<p>Revise the URL for <a href="https://openstax.org/l/16commonion">https://openstax.org/l/16commonion</a> to: <a href="http://employees.oneonta.edu/viningwj/sims/common_ion_effect_s1.html">http://employees.oneonta.edu/viningwj/sims/common_ion_effect_s1.html</a></p> <p>Revise the text as follows: "View this simulation to see how the common ion effect works with different concentrations of salts."</p>	<p>Broken link</p>
<p>Ch 3: Compositio n of Substance s and Solutions, Sec 2: Determinin g Empirical and Molecular Formulas, Subsec: Derivation of Molecular Formulas</p>	<p>I am working the examples from the text. The last example from section 10.3 The Total Heat Needed to Change Temperature and Phase for a Substance I have worked and in the example part I got the answer shown, but for the Check Your Learning part, I do not get the answer that is a part of the text. I have checked to see if I did something wrong by going to other sites and checking my work. Those sites returned answers that I calculated. The difference is too large to be rounding errors.</p>	<p>Revise the solution for the Check Your Learning in Example 10.10 Total Heat Needed to Change Temperature and Phase for a Substance as follows: 68.7 kJ</p>	<p>Incorrect calculation or solution</p>
<p>Ch 3: Compositio n of Substance s and Solutions, Sec 3: Molarity, Figure 3.17</p>	<p>I worked the problem in the Openstax textbook Estimating Enthalpy of Vaporization and the Check Your Learning under that gives T1 as 20.0 C, P1 as 5.95 kPa, T2 as 63.5 C, and P2 as 53.3 kPa. The Check Your Learning part asks you to find the enthalpy of vaporization for ethanol.</p> <p>I worked the problem several times and always go the answer 41,358.42 J/mol or 41.4 kJ/mol. I also looked online at other sites to confirm my answer and they also arrived at 41.4 kJ/mol. The Openstax answer for that problem reads 47,782 J/mol = 47.8 kJ/mol.</p>	<p>Revise the answer for the Check Your Learning in Example 10.7 Estimating Enthalpy of Vaporization as follows: 41,360 J/mol or 41.4 kJ/mol</p>	<p>Incorrect calculation or solution</p>
<p>Ch 3: Section 3</p>	<p>On page 140, just below Figure 3.6, the mass of</p>	<p>In the table below Figure 3.6, revise the mass of chlorine from "33.45" to "35.45"</p>	<p>Other factual inaccuracy</p>

	chlorine is reported as 33.45 and should be 35.45.	throughout.	in content
Ch 4: Section 1	In the "Solution: Using the Equation" For consistency, 2 mol HNO <sub>3</sub> should be replaced with 2 mol HNO <sub>3</sub> (aq)	In the Solution: Using the Equation of Example 5.15 Using Hess's Law, revise "2 mol HNO <sub>3</sub> " to "2 mol HNO <sub>3</sub> (aq)" in the second equation.	Typo
Ch 4: Section 2	In the "Solution: Using this Equation" it should be noted that the change in enthalpy of formation values were obtained from Appendix G or else students will likely be confused where those numbers came from.	Revise the first sentence of Solution: Using the Equation of Example 5.15 Using Hess's Law as follows:  "Use the special form of Hess's law given previously, and values from Appendix G:"  The reference to Appendix G should be a link.	General/pedagogical suggestion or question
Ch 4: Section 2	The link does not open properly. We have flash installed and updated but the link does not work and we get a message that this type of file is not supported.	Revise the URL for <a href="https://openstax.org//16plasma">https://openstax.org//16plasma</a> to: <a href="https://www.youtube.com/watch?v=2osF6l6-zWg">https://www.youtube.com/watch?v=2osF6l6-zWg</a>	Broken link
Ch 4: Stoichiometry of Chemical Reactions, Sec 1: Writing and Balancing Chemical Equations	The notion for the isotopes of carbon and nitrogen are incorrect. The A-Z-X notation is backward and the number of protons for nitrogen should be seven, not six.	Revise the notation for carbon to " <sup>14</sup> 6C" and the notation for nitrogen to " <sup>14</sup> 7N". " <sup>14</sup> " should be on the top in both notations.	Other factual inaccuracy in content
Ch 4: Stoichiometry of Chemical Reactions, Sec 2: Classifying Chemical Reactions	Example 5.5, page 240: There are a few issues with this problem. 1) "surroundings" should be changed to "outside environment". 2) The final answer should have 2 sig figs and therefore be $-2.9 \times 10^3$ J, the intermediate answer to q <sub>solution</sub> should also have 2 sig figs. 3) In the calculation for q <sub>solution</sub> the specific heat of water has 4 sig figs, but directly above it this value has 3 sig figs. This should be consistent as students get confused. I suggest using 4.184 throughout this solution.	In the solution to Example 5.5 Heat Produced by an Exothermic Reaction, revise "its surroundings" to "the outside environment".  Revise the specific heat of water to "4.184 J/g degrees C", and revise the solution accordingly to " $2.9 \times 10^3$ J".	Incorrect calculation or solution
Ch 4: Stoichiometry of Chemical	Page 238, Example 5.3: In the solution portion of this example. I think the word "surroundings" should be	In the solution to Example 5.3 Heat Transfer between Substances at Different Temperatures, revise "surroundings" to "outside environment".	General/pedagogical suggestion or question

Reactions, Sec 2: Classifying Chemical Reactions, Example 4.7	replaced with "outside environment" because earlier in this section the surroundings was defined to be "the other components of the measurement apparatus that serve to either provide heat to the system or absorb heat from the system. " so calling the area outside of the calorimeter the surroundings creates confusion.		
Ch 4: Stoichiometry of Chemical Reactions, Sec 2: Classifying Chemical Reactions, Table 4.1	Page 231-232: In example 5.1, in the equation for calculating q, I think it would be best to keep the mass of water as $8.0 \times 10^2$ g like it is in the question, as this helps to emphasize why the final answer has two sig figs and not one.	In Example 5.1 Measuring Heat, ensure that the amount of water is referred to as " $8.0 \times 10^2$ g" throughout.  Revise the final answer to " $2.1 \times 10^2$ kJ".	General/pedagogical suggestion or question
Ch 4: Stoichiometry of Chemical Reactions, Sec 2: Classifying Chemical Reactions, Table 4.1	Page 208: In Example 4.16 when converting grams of CO <sub>2</sub> to moles of CO <sub>2</sub> , the conversion factor has incorrect units in the denominator. The units on 44.01 should be "g" NOT "g/mole" since 1 mol CO <sub>2</sub> is already in the numerator. The conversion factor should be: 1 mol CO <sub>2</sub> /44.01 g. There is a similar mistakes when converting grams of H <sub>2</sub> O to moles of H <sub>2</sub> O. The conversion factor should be: 1 mol H <sub>2</sub> O/18.02 g	In Example 4.16 Combustion Analysis, revise "g/mol" to "g" in the second to last equations.	Incorrect calculation or solution
Ch 4: Stoichiometry of Chemical Reactions, Sec 4: Reaction Yields	Page 206: The questions to example 4.15 should say "What is the concentration (mass percent) of MgSO <sub>4</sub> in the mixture?" There are many types of concentrations that are percents (volume percent, etc.), so the exact type should be specified.	In the instructions for Example 4.15 Gravimetric Analysis, revise the last sentence as follows:  "What is the concentration (mass percent) of MgSO <sub>4</sub> in the mixture?"	Other factual inaccuracy in content
Ch 4: Stoichiometry of Chemical Reactions, Sec 5: Quantitative	Page 197: In the reaction below Figure 4.12, H <sub>2</sub> should be in the gas phase (g), NOT the solid (s) phase.	In the reaction below Figure 4.12, revise the phase for H <sub>2</sub> from "(s)" to "(g)".	Other factual inaccuracy in content



e Chemical Analysis			
Ch 4: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis, Example 4.15	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? $\text{KHC}_8\text{H}_4\text{O}_4(\text{aq}) + \text{NaOH}(\text{aq}) \rightarrow \text{KNaC}_8\text{H}_4\text{O}_4(\text{aq}) + \text{H}_2\text{O}(\text{aq})$	Revise the formula for potassium acid phthalate to " $\text{KNaC}_8\text{H}_4\text{O}_4$ " throughout exercise 94.	Other factual inaccuracy in content
Ch 4: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis, Example 4.16	There's an extraneous equation before Figure 1: $2\text{HI}(\text{g}) \rightarrow \text{H}_2(\text{g}) + \text{I}_2(\text{g})$	Delete the extraneous equation " $2\text{HI}(\text{g}) \rightarrow \text{H}_2(\text{g}) + \text{I}_2(\text{g})$ " before Figure 1.	Typo
Ch 4: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis, Exercise 91	The first of two ICE tables in Example 14.11 (p. 778 of current PDF) should be deleted...it contains some errors, includes a numerical value prior to its subsequent provision in the narrative, and is of no pedagogical value (arguably has a negative impact, confusing)...please delete this table	In Example Determination of $K_a$ or $K_b$ from pH, delete the sentence "We can summarize the various concentrations and changes as shown here (the concentration of water does not appear in the expression for the equilibrium constant, so we do not need to consider its concentration):" and the ICE figure that follows.	General/pedagogical suggestion or question
Ch 4: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis,	On page 674 the answer for the 12.8 check your learning the answer is given negative and then nonspontaneous. Was that right because it is kind of confusing	In Example 16.8 Calculation of $\Delta G$ 298, revise Check Your Learning answer as follows: (a) 140.8 kJ/mol, nonspontaneous (b) 141.5 kJ/mol, nonspontaneous	Typo

Exercise 94			
Ch 4: Stoichiometry of Chemical Reactions, Sec 5: Quantitative Chemical Analysis, Figure 4.15	The figure caption has a typo. It states the figure (b) is for 0.100 M HCl, but it should be 0.100 M CH <sub>3</sub> CO <sub>2</sub> H (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 5: Thermoch emistry, Sec 1: Energy Basics, Example 5.1	Page 190: Example 4.7 has several typos. In step 4, the half reaction involving Cr has an extra "+" sign after 14H <sup>+</sup> , 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" to "brings". In the 2nd sentence of the 2nd paragraph, delete the space between "6" and the "+" sign.	Typo
Ch 5: Thermoch emistry, Sec 1: Energy Basics, Example 5.1	Page 334: Problem #72: Delete the words "or compounds" because all of these species are atoms.	Revise exercise 72 as follows:  "72. Based on their positions in the periodic table, rank the following atoms in order of increasing first ionization energy: Mg, O, S, Si"	Other factual inaccuracy in content
Ch 5: Thermoch emistry, Sec 1: Energy Basics, Example 5.1	Page 322: When describing the ionization energies in Table 6.3, the text says there is a color change in the successive ionization energy values for an element for the removal of core electrons, but Table 6.3 does not show this color change. Table 6.3 should be updated so that the ionization energy for the removal of core electrons is a different color than the ionization energy for the removal of valance electrons. This should be done for each element in the table.	In the paragraph before Table 6.3 Successive Ionization Energies for Selected Elements (kJ/mol), revise the 4th sentence as follows:  "As seen in Table 6.3, there is a large increase in the ionization energies for each element."	Other factual inaccuracy in content
Ch 5: Thermoch	Page 471: Third sentence under the heading "Density	Our reviewers accepted this change.	Typo

emistry, Sec 1: Energy Basics, Subsec: Thermal Energy, Temperatu re, and Heat	of a Gas" insert the word "be" between the words "can" and "used". The sentence should read:  "The density of an unknown gas can be used to determine..."		
Ch 5: Thermoch emistry, Sec 2: Calorimetr y	Page 441: Question 14. Cut the sentence saying "Draw a Lewis structure of this compound." replace it with "The Lewis structure of this compound is shown below."	Revise Exercise 14 as follows:  14. Methionine, CH <sub>3</sub> SCH <sub>2</sub> CH <sub>2</sub> CH(NH <sub>2</sub> )CO <sub>2</sub> H, is an amino acid found in proteins. The Lewis structure of this compound is shown below. What is the hybridization type...	Typo
Ch 5: Thermoch emistry, Sec 2: Calorimetr y	Page 343: Figure 7.8. 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).	In Figure 7.8, remove the top arrowhead from the black arrow.	Other factual inaccuracy in content
Ch 5: Thermoch emistry, Sec 2: Calorimetr y	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."	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..."	Other factual inaccuracy in content
Ch 5: Thermoch emistry, Sec 2: Calorimetr y	Page 337: In the first sentence of the second paragraph under the heading "Electronic Structures of Cations" I believe "groups 12-17" should be replaced with "groups 13-18"	In the 2nd paragraph, revise "groups 12-17" to "groups 13-17" in the 1st sentence.	Other factual inaccuracy in content
Ch 5: Thermoch emistry, Sec 2: Calorimetr y, Example	Page 314: In bullet point 1, I suggest replacing the phrase "intermediate semimetallic elements" with "metalloids" as that is the term used to describe	In number 1, revise "intermediate semimetallic elements" to "metalloids".	General/ped agogical suggestion or question

5.3	those elements going back to chapter 2.		
Ch 5: Thermoch emistry, Sec 2: Calorimetr y, Example 5.5	Page 310: The term "degenerate orbitals" should be defined on this page somewhere after the definition of Hund's rule.	In the 1st paragraph after Figure 6.23, 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 energy levels. Orbitals that have the same energy are degenerate orbitals."  Add degenerate orbitals as a Key Term with the following definition:  "degenerate orbitals: orbitals that have the same energy"	General/ped agogical suggestion or question
Ch 5: Thermoch emistry, Sec 3: Enthalpy, Example 5.15	Page 370: Figure 7.19 – I think that it should be avoided using "E" as the symbol for a central atom. Most textbooks and instructors use A-X-E notation for geometries. Where A is the central atom, X is a terminal atom, and E represents lone pairs.  Since "E" normally represents number of lone pairs, it should not be used as a symbol for a central atom as this generates confusion. "A" would be a much better choice for the central atom.	In Figure 7.19, revise the symbol for the central atom from "E" to "A".	General/ped agogical suggestion or question
Ch 5: Thermoch emistry, Sec 3: Enthalpy, Example 5.15	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/ped agogical suggestion or question
Ch 5: Thermoch emistry, Sec 3: Enthalpy, Example 5.8	Page 250: Example 5.8: I suggest cutting the last half of the second sentence in the question as I find that it makes the problem confusing. I would just say  "When 0.0500 mol of HCl(aq) reacts with 0.0500 mol of NaOH(aq) to form 0.0500 mol of NaCl(aq), 2.9 kJ of heat are produced. What is $\Delta H$ , the enthalpy change, per mole of acid that reacts?"	In Example 5.8 Measurement of an Enthalpy Change, revise the instructions as follows:  "When 0.0500 mol of HCl(aq) reacts with 0.0500 mol of NaOH(aq) to form 0.0500 mol of NaCl(aq), 2.9 kJ of heat are produced. What is the enthalpy, delta H, per mole of acid that reacts?"	General/ped agogical suggestion or question

<p>Ch 5: Thermoch emistry, Sec 3: Enthalpy, Exercise 43</p>	<p>Page 180: This example of a precipitation reaction is not a good example, because the solubility of fluoride compounds is not specified in Table 4.1.</p> <p>I suggest changing NaF to NaCl so that AgCl is the precipitate. This change should be made to both the molecular and net ionic equation.</p>	<p>In Table 4.1 Solubilities of Common Ionic Compounds in Water, add the soluble compounds and exceptions of fluoride as new bullets to the top row.</p>	<p>General/pedagogical suggestion or question</p>
<p>Ch 5: Thermoch emistry, End of Chapter Exercises, Exercises 7, 25, 55, and 67</p>	<p>The three values listed in the image above as Ka values are actually pKa values. (This makes a big difference.) Also, the value for the Cu complex should not be negative.</p>	<p>In the last paragraph, revise "Ka" to "pKa" for the examples of the first stage of hydrated metal ions ionization.</p>	<p>Typo</p>
<p>Ch 6: Electronic Structure and Periodic Properties of Elements, Sec 1: Electroma gnetic Energy</p>	<p>Page 173: In the equation for calculating oxygen atoms. It should say 2 H2O molecules.</p> <p>Molecules should be plural.</p>	<p>Our reviewers accepted this change.</p>	<p>Typo</p>
<p>Ch 6: Electronic Structure and Periodic Properties of Elements, Sec 3: Developm ent of Quantum Theory</p>	<p>Page 152 in Figure 3.17 caption: The 4 in the formula for potassium permanganate should be a subscript.</p>	<p>In the caption of figure 3.17, ensure that the "4" in KMnO4 is subscript in both instances.</p>	<p>Typo</p>
<p>Ch 6: Electronic Structure and Periodic Properties of Elements, Sec 3: Developm ent of Quantum</p>	<p>Page 234: The fourth sentence after Figure 5.11.</p> <p>"These easy-to-use "coffee cup" calorimeters allow more heat exchange with their surroundings, and therefore produce less accurate energy values."</p> <p>The calorimeter was defined to be the</p>	<p>In the 1st paragraph after Figure 5.11, revise "their surroundings" to "the outside environment" in the 4th sentence.</p>	<p>Other factual inaccuracy in content</p>

Theory	<p>surroundings earlier, so I find this confusing.</p> <p>I suggest replacing “their surroundings” with “the outside environment”.</p> <p>This is also occurs at other times throughout this section.</p>		
Ch 6: Electronic Structure and Periodic Properties of Elements, Sec 3: Development of Quantum Theory	<p>Page 234, Section 5.2 on Calorimetry. The fourth sentence in this section is confusing.</p> <p>“The change in temperature of the measuring part of the calorimeter is converted into the amount of heat (since the previous calibration was used to establish its heat capacity).”</p> <p>I suggest deleting the information in the parentheses. I also suggest adding the word "transferred" after the word "heat".</p>	<p>In the 1st paragraph, revise the 4th sentence as follows:</p> <p>"The temperature change measured by the calorimeter is used to derive the amount of heat transferred by the process under study."</p>	General/pedagogical suggestion or question
Ch 6: Electronic Structure and Periodic Properties of Elements, Sec 4: Electronic Structure of Atoms (Electron Configurations), Example 6.11	<p>Page 239 and 240. Earlier in this section, the calorimeter itself was defined as being part of the surroundings. So in the sentence that bridges these two pages, it should read "...the calorimeter minimizes energy exchange with the outside environment"</p>	<p>In the 1st paragraph after Example 5.4, revise "surroundings" to "outside environment" in the 2nd sentence.</p>	Other factual inaccuracy in content
Ch 6: Electronic Structure and Periodic Properties of Elements, Sec 4: Electronic Structure of Atoms	<p>Table 2.7 on page 104: The formula for ammonium chloride should be <math>\text{NH}_4\text{Cl}</math>.</p>	<p>In Table 2.7 Names of Some Polyatomic Ionic Compounds, revise the formula given for ammonium chloride to "<math>\text{NH}_4\text{Cl}</math>".</p>	Other factual inaccuracy in content

(Electron Configurations), Subsec: Electron Configurations and the Periodic Table			
Ch 6: Electronic Structure and Periodic Properties of Elements, Sec 5: Periodic Variations in Element Properties	Page 180: In the first line it should say "Table 4.1" NOT "Table 4.2"	Our reviewers accepted this change.	Typo
Ch 6: Electronic Structure and Periodic Properties of Elements, Sec 5: Periodic Variations in Element Properties, Exercise 72	Page 179: Sixth line down. Delete the word "text"	Our reviewers accepted this change.	Typo
Ch 6: Electronic Structure and Periodic Properties of Elements, Sec 3: Development of Quantum Theory, Figure 6.24	Page 153: In the second sentence there should be a space between "solution," and "n1 = n2".	Our reviewers accepted this change.	Typo
Ch 7: Chemical Bonding and Molecular Geometry,	Page 104: Under the heading "Compounds Containing Polyatomic Ions" I suggest re-wording the text prior to Table 2.7 to the following:	Revise the 1st sentence in section Compounds Containing Polyatomic Ions as follows:  "Compounds containing polyatomic ions are named similarly to those containing only	General/pedagogical suggestion or question

<p>Sec 1: Ionic Bonding, Subsec: Electronic Structures of Cations</p>	<p>“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 2.7.”</p> <p>To me the original text suggests that the 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.</p>	<p>monatomic ions, i.e. by naming first the cation and then the anion.”</p>	
<p>Ch 7: Chemical Bonding and Molecular Geometry, Sec 2: Covalent Bonding</p>	<p>Page 95 – Last sentence in section 2.5 should have the word “and” replaced with “an”.</p> <p>The number in square brackets is the atomic mass number (an approximate atomic mass) of the most stable isotope of that element.</p>	<p>Our reviewers accepted this change.</p>	<p>Typo</p>
<p>Ch 7: Chemical Bonding and Molecular Geometry, Sec 2: Covalent Bonding, Subsec: Electronegativity and Bond Type, Figure 7.8</p>	<p>Page 138 – Answer to example 3.8 should be “<math>9.17 \times 10^{20}</math> C atoms”</p>	<p>In Example 3.8 Deriving the Number of Atoms and Molecules from the Mass of a Compound, revise the final answer of the solution as follows: “<math>9.17 \times 10^{20}</math> C atoms”</p>	<p>Incorrect calculation or solution</p>
<p>Ch 7: Chemical Bonding and Molecular</p>	<p>Page 122 – Problems 49 and 50. The questions should read the following. “For each of the following pairs of ions, write the</p>	<p>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:”</p>	<p>Typo</p>



Geometry, Sec 3: Lewis Symbols and Structures, Subsec: Electron- deficient Molecules	formula of the compound they will form:"		
Ch 7: Chemical Bonding and Molecular Geometry, Sec 6: Molecular Structure and Polarity, Figure 7.9	In Table 2.5 on page 98: Oxide (O <sup>2-</sup> ) 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 2.5 Common Polyatomic Ions.	Other factual inaccuracy in content
Ch 8: Advanced Theories of Covalent Bonding, Sec 2: Hybrid Atomic Orbitals, Exercise 14	Glossary entry: "ideal gas constant (R)" change to "0.08206" L atm mol <sup>-1</sup> K <sup>-1</sup> .	revise the definition for ideal gas constant (R) as follows:  ideal gas constant (R): constant derived from the ideal gas equation $R = 0.08206 \text{ L atm mol}^{-1} \text{ K}^{-1}$ or $8.314 \text{ L kPa mol}^{-1} \text{ K}^{-1}$	Typo
Ch 9: Gases, Key Terms	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 <sub>2</sub> 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 <sub>2</sub> . "	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 <sub>2</sub> ."	Incorrect calculation or solution
Ch 9: Gases, Sec 1: Gas	The third sentence below the heading "Standard Conditions of Temperature	Revise the third sentence of section Standard Conditions of Temperature and Pressure as follows:	Other factual inaccuracy in content

Pressure, Exercise 9	<p>and Pressure" should say:</p> <p>"At STP, one mole of an ideal gas has a volume of about 22.4 L - this is referred to as the standard molar volume (Figure 9.18)."</p>	<p>"At STP, one mole of an ideal gas has a volume of about 22.4 L-this is referred to as the standard molar volume (Figure 9.18)."</p>	
Ch 9: Gases, Sec 1: Gas Pressure, Figure 9.4	<p>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"</p>	<p>Revise the sentence referring to the symbol v in the de Broglie equation as follows:</p> <p>"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 identical, they mean very different things)."</p>	Other factual inaccuracy in content
Ch 9: Gases, Sec 1: Gas Pressure, Figure 9.4	<p>In chapter 9 section5, kinetic-molecular theory, the formula for root mean square velocity is dimensionally incorrect. It is given as <math>u_{rms} = \sqrt{3RT/m}</math>, but it should either be <math>\sqrt{3kT/m}</math> or <math>\sqrt{3RT/M}</math>, with M as molar mass.</p> <p>Likewise, there is some confusion whether <math>KE_{avg}</math> stands for kinetic energy or molar kinetic energy. The first formula suggests the former and the second the latter:</p> <p><math>KE_{avg} = 1/2 m u_{rms}^2</math> ... energy of a single particle, value <math>\sim 10e-23</math> kJ</p> <p><math>KE_{avg} = 3/2 RT</math> ... molar energy, value e.g 3.7 kJ/mol</p>	<p>Revise the formula for root mean square velocity throughout the section.</p>	General/pedagogical suggestion or question
Ch 9: Gases, Sec 1: Gas Pressure, Figure 9.5	<p>On page 355 of the 2016 printing. In section 7.3 on Electron deficient molecules. The second sentence should say.</p> <p>"...with central atoms from groups 2 and 13, outer atoms..."</p>	<p>In subsection Electron-deficient Molecules, revise the second sentence as follows:</p> <p>"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."</p>	Typo

	NOT "groups 2 and 12"		
Ch 9: Gases, Sec 1: Gas Pressure, Figure 9.5	<p>Id like to report an error in the text. Chemistry, Chapter 4, section 4.1:</p> <p>The substances generated by the reaction are called products, and their formulas are placed on the right sight of the equation.</p> <p>Sight should be side</p>	After Figure 4.2, revise "right sight" to "right side" in number 2.	Typo
Ch 9: Gases, Sec 2: Relating Pressure, Volume, Amount, and Temperatu re: The Ideal Gas Law, Subsec: Standard Conditions of Temperatu re and Pressure	<p>In example 14.12, there are two extraneous '+' signs in the worked example, turning x squared into the x(2+) cation.</p>	In the solution to Example 14.12, remove the plus symbols from the equations in step 2.	Typo
Ch 9: Gases, Sec 4: Effusion and Diffusion of Gases	<p>Please include all information necessary to solve problems in the problem.</p> <p>Specifically, in chapter 5, problem 43 ("Calculate the enthalpy of solution (<math>\Delta H</math> for the dissolution) per mole of <math>\text{CaCl}_2</math>") 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.</p>	<p>Revise exercise 43 as follows:</p> <p>43. Calculate the enthalpy of solution (<math>\Delta H</math> for the dissolution) per mole of <math>\text{CaCl}_2</math> (refer to exercise 25).</p>	General/pedagogical suggestion or question
Ch 9: Gases, Sec 5: The Kinetic- Molecular Theory	<p>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,</p>	In Example 5.1 Measuring Heat, revise the answer to Check Your Learning to " $5.07 \times 10^4 \text{ J}$ ".	Typo

	not $5.05 \times 10^4$ .		
Ch 9: Gases, Sec 5: The Kinetic- Molecular Theory, Exercise 95	In Figure 9.5, the equation reads $P_{\text{atm}} = P_{\text{gas}} + h\rho g$ . The $p$ should be the greek letter rho, or should somehow be marked to make it clear that this $p$ is equal to density, not to a pressure.	In Figure 9.5 showing manometers, revise the $p$ in $h\rho g$ to the greek letter rho for clarity.	Typo
Chapter 11, Section 4, Page 625	The answer of the molar solubility of $\text{Ca}(\text{OH})_2$ should be $6.9 \times 10^{-3} \text{ M}$ . The textbook said $1.3 \times 10^{-2} \text{ M}$ . If the question asked the concentration of hydroxide ions, that would make sense. However, the question asked for the molar solubility of $\text{Ca}(\text{OH})_2$ , which you don't need to multiply $x$ by 2.	Revise the solution to Example 15.4 Determination of Molar Solubility from $K_{\text{sp}}$ , Part II as follows:  "Therefore, the molar solubility of $\text{Ca}(\text{OH})_2$ is $6.9 \times 10^{-3} \text{ M}$ ."	Typo
Chapter 16 Thermody namics, Section 4 Free Energy, Exercise 31	The answer for Example 16.7 should be $9.6 \text{ kJ/mol}$ .  There's a typo in the calculation for $\Delta H$ at the bottom of page 917. $-285.83 \text{ kJ/mol}$ was used for $\Delta H$ 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 $8.6 \text{ kJ/mol}$ .	Revise Example 16.7 Evaluation of $\Delta G$ degrees Change from $\Delta H$ degrees and $\Delta S$ degrees to use the value " $-2.86.83$ " for $\Delta H$ degrees throughout. Revise the final answer to " $9.6 \text{ kJ/mol}$ " accordingly.	Typo
Chapter 6, Section 5	On page 207 of the pdf copy (section 4.5)  In the chemical equation: $2\text{CH}_3\text{CO}_2\text{H} + \text{K}_2\text{CO}_3 \rightarrow \text{KCH}_3\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$  $\text{KCH}_3\text{CO}_3$ is not a compound, and the reaction is not balanced. The correct compound is $\text{KC}_2\text{H}_3\text{O}_2$ , and the reaction should read: $2\text{HC}_2\text{H}_3\text{O}_2(\text{aq}) + \text{K}_2\text{CO}_3(\text{s}) \rightarrow 2\text{KC}_2\text{H}_3\text{O}_2(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$	Revise the reaction of acetic acid and potassium carbonate as follows:  " $2\text{CH}_3\text{CO}_2\text{H}(\text{aq}) + \text{K}_2\text{CO}_3(\text{s}) \rightarrow 2\text{CH}_3\text{CO}_2\text{K}(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$ "	Typo
Chapter 9, Section 3	The phase diagram of carbon dioxide contains two errors.  The first error. The actual critical pressure of carbon dioxide occurs at $7390 \text{ kPa}$ , but the figure	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

	<p>indicates that it occurs all the way at or below the x-axis, which starts at 10 kPa.</p> <p>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.</p>		
Chapter 9.1, Figure 9.5	<p>Chapter 16 Thermodynamics problem 63. The solution in the back of the text has a different temperature and a different F6P concentration. The concentration in the solution in the back should be 120 and the temperature should be 310 K.</p>	<p>Revise the solution given for exercise 63 as follows:</p> <p>63. One of the important reactions in the biochemical pathway glycolysis is...</p> <p>Solution ...<math>\Delta G = 1.7 \times 10^3 + (8.314 \times 310 \times \ln[28/120]) = -2.1 \text{ kJ}</math>.</p>	Typo
Ch 10: Liquids and Solids, Sec 1: Intermolecular Forces, Exercise 19	<p>The Body-centered unit cell structure is still not correct in the Web View.</p>	<p>Revise Figure 10.56 to correct the body-centered unit cell structure.</p>	Other factual inaccuracy in content
Ch 10: Liquids and Solids, Sec 1: Intermolecular Forces, Exercise 21	<p>Figure 2.27 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.</p>	<p>In Figure 2.27, remove Group 12 from the main group elements.</p>	Other factual inaccuracy in content
Ch 10: Liquids and Solids, Sec 3: Phase Transitions	<p>The nuclide symbol for fluorine needs to have the atomic number (9) moved and subscripted below the atomic mass number (19).</p>	<p>Revise "9 19 F" to "19 9 F".</p>	Typo
Ch 10: Liquids and Solids, Sec 3: Phase Transitions, Example 10.10	<p>The caption for Figure 6.35 has an extra "of" and should say: "This version of the periodic table shows the first ionization energy (IE1), in kJ/mol, of selected elements."</p>	<p>Our reviewers accepted this change.</p>	Typo

Ch 10: Liquids and Solids, Sec 3: Phase Transitions , Example 10.7	Example 6.11 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 10: Liquids and Solids, Sec 3: Phase Transitions , Figure 10.22	"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 <sup>-</sup> , 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 ( $K_a > 0$ , so it ionizes to make the solution acidic).  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).	Other factual inaccuracy in content
Ch 10: Liquids and Solids, Sec 3: Phase Transitions , Subsec: Heating and Cooling Curves	I think the second nuclear equation after Example 21.4 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 " $\alpha$ " to "He".	General/pedagogical suggestion or question
Ch 10: Liquids and Solids, Sec 4: Phase Diagrams, Exercise 57	I think the first sentence in the second paragraph after Figure 21.4 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 are (much) more energetic than better-known X-rays."	Revise the 2nd paragraph after Figure 2.14 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 10: Liquids and Solids, Sec 4: Phase Diagrams, Figure	The third sentence in the section on Balancing Nuclear Equations states: "A balanced nuclear reaction equation indicates that there is a rearrangement during a	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

10.34	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.		
Ch 10: Liquids and Solids, Sec 6: Lattice Structures in Crystalline Solids, Figure 10.53	There is incorrect information in the section on "Role of precipitation in waste water treatment": 1)The phosphate ion has a charge of 3- NOT 2- (See the third sentence in this section). 2) Calcium carbonate is NOT a "strong base". See the list of strong bases in chapter 4 and/or 14. 3) The formula for hydroxylapatite in the text is different from what is in the reaction.	Revise "(PO <sub>4</sub> <sup>2-</sup> )" to "(PO <sub>4</sub> <sup>3-</sup> )". Delete the sentence "The lime is converted into calcium carbonate, a strong base, in the water." Revise "hydroxylapatite, Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH)" to "hydroxylapatite, Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> OH". Revise "Ca <sub>10</sub> (PO <sub>4</sub> ) <sub>6</sub> · (OH) <sub>2</sub> (s)" to "Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> · (OH)(s)".	Other factual inaccuracy in content
Ch 10: Liquids and Solids, Sec 6: Lattice Structures in Crystalline Solids, Figure 10.56	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 11: Solutions and Colloids, Sec 1: The Dissolution Process, Exercise 5	The series of reactions between the phosphate ion and the hydronium ion contains numerous errors. It should be: PO <sub>4</sub> <sup>3-</sup> + H <sub>3</sub> O <sup>+</sup> → HPO <sub>4</sub> <sup>2-</sup> + H <sub>2</sub> O; HPO <sub>4</sub> <sup>2-</sup> + H <sub>3</sub> O <sup>+</sup> → H <sub>2</sub> PO <sub>4</sub> <sup>-</sup> + H <sub>2</sub> O; H <sub>2</sub> PO <sub>4</sub> <sup>-</sup> + H <sub>3</sub> O <sup>+</sup> → H <sub>3</sub> PO <sub>4</sub> + H <sub>2</sub> O. 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 <sub>4</sub> <sup>2-</sup> " to "H <sub>2</sub> PO <sub>4</sub> <sup>2-</sup> " in the 2nd reaction.	Other factual inaccuracy in content
Ch 11: Solutions	The title of Table 15.2 "Common Complex Ions	Reverse the order of the rows in Table 15.2, so AlF <sub>6</sub> <sup>3-</sup> comes first, and CdCN <sub>4</sub> <sup>2-</sup>	Typo

and Colloids, Sec 1: The Dissolution Process, Exercise 8	by Decreasing Formation Constants" is inaccurate because the values are not listed in order of decreasing value. This table title should be corrected.	comes last. Remove brackets from substances.	
Ch 11: Solutions and Colloids, Sec 2: Electrolytes, Exercise 11	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 11: Solutions and Colloids, Sec 2: Electrolytes, Exercise 13	"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 17.6, revise "If the temperature is not 273.15 K" to "If the temperature is not 298.15 K".	Other factual inaccuracy in content
Ch 11: Solutions and Colloids, Sec 2: Electrolytes, Subsec: Covalent Electrolytes	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 11: Solutions and Colloids, Sec 3: Solubility	In Example 15.15 Check your learning the equilibrium " $\text{Ag}(\text{s}) \rightleftharpoons \text{Ag}^+(\text{aq}) + \text{Cl}^-(\text{aq})$ " should be replaced with " $\text{AgCl}(\text{s}) \rightleftharpoons \text{Ag}^+(\text{aq}) + \text{Cl}^-(\text{aq})$ ".	In the Check Your Learning, revise " $\text{Ag}(\text{s})$ " to " $\text{AgCl}(\text{s})$ ".	Typo
Ch 11: Solutions and Colloids, Sec 3: Solubility, Exercise 21	Incorrect/inconsistent numbers are used in Example 15.11. At the start of the problem the $K_{\text{sp}}$ value for $\text{AgI}$ is given as $1.5 \times 10^{-16}$ , yet in the solution it is changed to $1.8 \times 10^{-10}$ . Later a $[\text{Ag}^+]$	Revise the solution to Example 15.11 as appropriate.	None



	concentration of $1.6 \times 10^{-9}$ is calculated yet the answer says "[Ag+] is $1.5 \times 10^{-13}$ M". In the next part, at the start the Ksp value of AgCl is given as $1.6 \times 10^{-10}$ , , yet in the solution it is changed to $1.8 \times 10^{-10}$ .		
Ch 11: Solutions and Colloids, Sec 3: Solubility, Subsec: Solutions of Solids and Liquids	There are numerous mistakes in Example 16.8. In the solution to part (a): " $\Delta G^\circ_f$ " is the symbol that should be used for the free energy of formation, NOT " $\Delta G^\circ_{298}$ ". Also, in the first equation " $G^\circ_{298}$ " should be replaced with " $\Delta G^\circ_f$ ". In the solution to part (b): The symbol for the standard enthalpy of formation is " $\Delta H^\circ_f$ ", NOT " $\Delta H^\circ_{298}$ ".	In the solution of Example 16.8, revise " $\Delta G^\circ_{298}$ " to " $\Delta G^\circ_f$ " and " $\Delta H^\circ_{298}$ " to " $\Delta H^\circ_f$ " where appropriate.	None
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties	For the mercury barometer on the left, the correct column height is 760 mm, not 790 mm.	In Figure 9.4, revise "790 mm" to "760 mm".	Typo
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Example 11.10	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 11: Solutions and Colloids, Sec 4: Colligative Properties, Example 11.2	Section 13.4 summary, X is used, but should be x to be consistent with the main text.	In the Summary, revise "the coefficient of X" to "the coefficient of x".	General/pedagogical suggestion or question
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Exercise 33	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.  Calculation of Changes in Concentration: Step 2a, I	Revise the subsection title "Calculation of Changes in Concentration" to "Calculation of Equilibrium Concentrations from Initial Concentrations".	General/pedagogical suggestion or question

	suggest, "...express the other changes in terms of x."		
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Exercise 39	Example 13.7 should more clearly state that the given concentrations of nitrogen and oxygen are at equilibrium. A "=" is missing between [O <sub>2</sub> ] and 0.0089 mol/L. It should say [O <sub>2</sub> ] = 0.0089 mol/L.	Revise the last sentence of the instructions as follows: Calculate the equilibrium concentration of NO(g) in air at 1 atm pressure and 2000 °C. The equilibrium concentrations of N <sub>2</sub> and O <sub>2</sub> at this pressure and temperature are 0.036 M and 0.0089 M, respectively.	General/pedagogical suggestion or question
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Exercise 66	"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 shifts toward equilibrium—do not forget to consider the reaction stoichiometry as described earlier in this module."	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 proceeds toward equilibrium (don't forget to account for the reaction stoichiometry).	General/pedagogical suggestion or question
Ch 11: Solutions and Colloids, Sec 4: Colligative Properties, Table 11.2	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 11: Solutions and Colloids, Sec 5: Colloids, Chemistry in Everyday Life: Deepwater Horizon Oil Spill	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 <sub>c</sub> and the concentrations of reactants and products, any problem that requires us to solve for K <sub>c</sub> 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 <sub>c</sub> , as it will be the only unknown.	General/pedagogical suggestion or question
Ch 12: Kinetics, End of Chapter	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

Exercises, Exercise 24 and 74			
Ch 12: Kinetics, Sec 1: Chemical Reaction Rates, Exercise 5	"...react to reach compositions adhering to the same equilibrium (the value of $Q_c$ changes until it equals the value of $K_c$ )." should say "...react to reach compositions adhering to the same equilibrium constant (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 12: Kinetics, Sec 1: Chemical Reaction Rates, Figure 12.2	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: Kinetics, Sec 1: Chemical Reaction Rates, Subsec: Relative Rates of Reaction	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: Kinetics, Sec 1: Chemical Reaction Rates, Subsec: Relative Rates of Reaction	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: Kinetics, Sec 2: Factors Affecting Reaction Rates	Exercise 58, the problem seems insolvable unless one assumes something like the rate doubles for every $10^\circ\text{C}$ . Unless I am mistaken, then the problem should state this as a hint.  Exercise 59, the answer should be $3.8 \times 10^{15} \text{ s}^{-1}$  Exercise 61, perhaps the	Exercise 58: Add a hint as follows: (Hint: Assume the rate doubles for each $10^\circ\text{C}$ rise in temperature.)  Exercise 61: Revise "the serum" to "human serum".	None

	<p>text should state “in blood serum” instead of “in the serum.”</p> <p>Exercise 63, I get 180.0 kJ mol<sup>-1</sup> for the activation energy.</p> <p>Exercise 65, I think there are sig fig issues in both the problem and answers. Additional digits in both the temperatures (four total) and rate constants (three total) are needed. I get <math>1.5 \times 10^8 \text{ s}^{-1}</math> for the frequency factor and <math>3.3 \times 10^{-10} \text{ s}^{-1}</math> for the rate constant in part a. In part b, the answer should have both hours and days to three significant figures.</p>		
<p>Ch 12: Kinetics, Sec 2: Factors Affecting Reaction Rates, Subsec: The State of Subdivisio n of the Reactants, Figure 12.6</p>	<p>Exercise 33, the solution’s graphic is incorrect: the line is sloped in the wrong direction, and the rate constant should be positive.</p> <p>Exercise 34, it is difficult to visually distinguish between zero-, first-, and second-order plots for the given data.</p> <p>Exercise 35, the solution graphic has incorrect units and scale along the y-axis.</p> <p>Exercise 45, the answer for half-life is incorrect and missing a unit; the answer should be 0.324 h. The fraction remaining is correct. Note that there are two slightly different temperatures listed in the problem—these should be the same.</p> <p>Exercise 46, the positron emission reaction has several typos.</p> <p>Exercise 49, in the solution’s table, a few of the rate constants are slightly different than the ones I calculated.</p>	<p>Our reviewers accepted this change.</p>	<p>Incorrect answer, calculation, or solution</p>

Ch 12: Kinetics, Sec 3: Rate Laws	<p>Exercise 23, the solution's rate law has a typo in chemical formula, however, the numerical answer is correct.</p> <p>Exercise 25, the solution's rate constant should only have two significant figures.</p> <p>Exercise 31, the rate for trial 2 should be <math>6.10 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}</math> and the solution rate law has a typo in chemical formula, however, the numerical answer is correct.</p>	<p>Exercise 23: This issue was addressed in another report: 4221.</p> <p>Exercise 25: Revise "9.12" to "9.1".</p> <p>Exercise 31: Revise "[OCI<sup>-1</sup>]" to "[OCI<sup>-</sup>]".</p>	General/pedagogical suggestion or question																
Ch 12: Kinetics, Sec 3: Rate Laws, Exercise 19	<p>Exercise 5, the initial concentration of reactant should be <math>2.00 \text{ mol L}^{-1}</math>. This affects answers for other parts of the question as well.</p>	<p>Revise the table as follows:</p> <table border="1"> <tr> <td>Time (s)</td> <td>0.0</td> <td>5.0</td> <td>10.0</td> <td>15.0</td> <td>20.0</td> <td>25.0</td> <td>35.0</td> </tr> <tr> <td>[A] (M)</td> <td>1.00</td> <td>0.775</td> <td>0.625</td> <td>0.465</td> <td>0.360</td> <td>0.285</td> <td>0.230</td> </tr> </table> <p>Revise the solution as appropriate.</p>	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	General/pedagogical suggestion or question
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												
Ch 12: Kinetics, Sec 3: Rate Laws, Exercise 23	<p>In Figure 12.26 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<sub>2</sub> and ethane.</p>	<p>Revise Figure 12.26 to show a single bond between the C atoms, and revise gray carbon atoms to black.</p>	General/pedagogical suggestion or question																
Ch 12: Kinetics, Sec 3: Rate Laws, Exercise 25	<p>Figure 12.25 caption uses "NAPDH" but this should be "NADPH".</p>	<p>In Figure 12.25, revise "NAPDH" to "NADPH".</p>	General/pedagogical suggestion or question																
Ch 12: Kinetics, Sec 3: Rate Laws, Exercises 23, 25, and 31	<p>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.</p>	<p>Revise the introductory paragraph as follows:</p> <p>... 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 12.21.</p>	General/pedagogical suggestion or question																
Ch 12: Kinetics, Sec 4: Integrated	<p>In the opening paragraph the phrase "thermodynamically favorable" should not be</p>	<p>Revise "that are thermodynamically favorable" to "that are energetically favorable".</p>	General/pedagogical suggestion or question																

Rate Laws	used since Thermodynamics is not until Ch. 16.		
Ch 12: Kinetics, Sec 4: Integrated Rate Laws	<p>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."</p> <p>At the end of the same paragraph, I suggest a wording change to "collisions that possess adequate energy..."</p>	<p>After Figure 12.16, revise as follows:</p> <p>"The postulates of collision theory are accommodated in the Arrhenius equation. The frequency factor A..."</p>	General/pedagogical suggestion or question
Ch 12: Kinetics, Sec 4: Integrated Rate Laws, Example 12.8	<p>"Activation energy" should not be used in the text before it is defined. The second sentence after Figure 12.14 could simply say: "Every collision between reactants requires a certain amount of energy in order to result in product formation."</p>	<p>After Figure 12.14, revise as follows:</p> <p>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.</p> <p>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 depicts the structure of possible transitions states in the reaction between CO and O<sub>2</sub> to form CO<sub>2</sub>.</p>	General/pedagogical suggestion or question
Ch 12: Kinetics, Sec 4: Integrated Rate Laws, Example 12.9	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 12: Kinetics, Sec 5: Collision Theory	The question in Example 12.9 should specifically reference the reaction in Example 12.8.	Revise the 1st sentence of Example 12.9 to "The data below are for the same reaction described in Example 12.8. Test these data to confirm that this dimerization reaction is second-order."	General/pedagogical suggestion or question
Ch 12: Kinetics, Sec 5: Collision Theory	Example 12.8 is correct. Check Learning has a small rounding error—answer should be 0.0195 mol L <sup>-1</sup> .	Revise the Check Your Learning solution to "0.0195 mol/L".	None

Ch 12: Kinetics, Sec 5: Collision Theory	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 12: Kinetics, Sec 5: Collision Theory, Exercises 58, 59, 61, 63, and 65	At the bottom of the page, before Figure 12.5, 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 12.5, revise the denominator to " $9.70 \times 10^{-7} \text{ M/s}$ ".	Other factual inaccuracy in content
Ch 12: Kinetics, Sec 5: Collision Theory, Figure 12.16	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 12: Kinetics, Sec 5: Collision Theory, Figure 12.16	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 12: Kinetics, Sec 6: Reaction Mechanisms	Exercise 39, no sig fig concerns but same histamine error as in Exercise 33.	In part d, revise "histamine" to "tetrahydropyridine".	None
Ch 12: Kinetics, Sec 7: Catalysis	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 12: Kinetics, Sec 7: Catalysis	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 12: Kinetics, Sec 7: Catalysis, Figure 12.21	Exercise 8 Move (solution density = $10.8 \text{ g cm}^{-3}$ ) to the problem narrative.	At the end of the question stem, add the phrase "(solution density = $10.8 \text{ g cm}^{-3}$ )". Remove the phrase from parts a through c.	None
Ch 12: Kinetics, Sec 7:	Exercise 5(d), $\text{HCl}(\text{aq})$ should not use an aq phase label when benzene	In part d, revise " $\text{HCl}(\text{aq})$ " to " $\text{HCl}(\text{g})$ ".	None

Catalysis, Figure 12.25	is the solvent.		
Ch 12: Kinetics, Sec 7: Catalysis, Figure 12.26	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
Ch 12: Section 7	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 <sup>4</sup> g/mol".	None
Ch 13: Fundamental Equilibrium Concepts, End of Chapter Exercises, Exercises 57 and 69	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, Introduction	In the drawings in Figure 9.4, 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 9.4 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 1: Chemical Equilibria	In the formulas below each of the three manometer drawings, the symbol for density is typed as the letter "p" instead of the Greek small letter rho. Rho is used correctly on the line of text just before Example 9.2.	This error has been fixed and will register in the PDF upon our next edition.	Typo
Ch 13: Fundamental Equilibrium Concepts, Sec 1: Chemical Equilibria, Figure 13.5	The concentrations used to calculate the K <sub>sp</sub> value for CaF <sub>2</sub> (2.1 x 10 <sup>-4</sup> M and 4.2 x 10 <sup>-4</sup> M) are not the same concentrations provided in the question (2.15 x 10 <sup>-4</sup> M and 4.30 x 10 <sup>-4</sup> 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	In Example 15.1, Check your learning part (c): The	In the Check Your Learning solution part c, revise "Al <sup>2+</sup> " to "Al <sup>3+</sup> ".	None



tal Equilibrium Concepts, Sec 1: Introductio n	product for the dissolution of $\text{Al}(\text{OH})_3$ reaction should be " $\text{Al}^{3+}$ " NOT " $\text{Al}^{2+}$ ".		
Ch 13: Fundamen tal Equilibrium Concepts, Sec 2: Equilibrium Constants	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: Fundamen tal Equilibrium Concepts, Sec 2: Equilibrium Constants, Example 13.3	Exercise 16.31 on page 909. The second word "reactions" should be "reaction."	Our reviewers accepted this change.	Typo
Ch 13: Fundamen tal Equilibrium Concepts, Sec 2: Equilibrium Constants, Exercise 10	Exercise 16.17(b) --- reaction shown in part (b) [iron oxidation] is not balanced properly.	Revise the solution to part b to " $2\text{Fe} + 3/2 \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$ ".	Typo
Ch 13: Fundamen tal Equilibrium Concepts, Sec 2: Equilibrium Constants, Exercise 27	The Handbook of Chemistry and Physics link ( <a href="http://openstaxcollege.org//16Handbook">http://openstaxcollege.org//16Handbook</a> ) routes users to a restricted page. Users are able see the content depending on if they are at a subscribing location.	Update URL for ( <a href="http://openstaxcollege.org//16Handbook">http://openstaxcollege.org//16Handbook</a> ) to <a href="http://hbcponline.com/faces/contents/ContentsSearch.xhtml">http://hbcponline.com/faces/contents/ContentsSearch.xhtml</a> .	Broken link
Ch 13: Fundamen tal Equilibrium Concepts, Sec 2: Equilibrium Constants, Figure 13.7	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: Fundamen tal Equilibrium Concepts,	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

Sec 4: Equilibrium Calculations			
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations	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 $2.0 \times 10^{-6}$ 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, Exercises 62, 69, 73, 85, 91, and 97	Not really an error in content but more an error in formatting. This data table from Chapter 4 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, Subsec:	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 $H_2CO_3$ .	Revise the formula to " $H_2CO_3$ ".	Typo

Calculation of an Equilibrium Constant			
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec: Calculation of an Equilibrium Constant	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 $2.04 \times 10^{-4} \text{ M}$ .	Revise the solutions as follows: 57. $K_p = 1.9 \times 10^3$ 69. $[\text{CO}] = 2.04 \times 10^{-4} \text{ M}$	None
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec: Calculation of an Equilibrium Constant	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 at equilibrium."	Broken link
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec: Calculation of an Equilibrium Constant	The sentence below Figure 12.27 is missing the word "of" should say "Most modern, three-way catalytic converters possess a surface impregnated with a platinum-rhodium catalyst, which catalyzes the conversion of nitric oxide into dinitrogen and oxygen...".	add "of" between "conversion" and "nitric" in the "AUTOMOBILE CATALYTIC CONVERTERS" note	Typo
Ch 13: Fundamental Equilibrium Concepts, Sec 4: Equilibrium Calculations, Subsec: Calculation of Changes in Concentration	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; Ch 17: Electrochemistry	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 14: Acid Base Equilibria, Sec 6: Buffers, Subsec: Selection of Suitable Buffer Mixtures	I noticed that in section 3.2, 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 14: Acid-Base Equilibria, Sec 1: Brønsted- Lowry Acids and Bases	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 14: Acid-Base Equilibria, Sec 1: Brønsted- Lowry Acids and Bases, Example 14.2	The balanced reaction is incorrect. The carbonate should be expressed as $\text{CO}_3^{2-}(\text{aq})$ .	In the solution, revise the last part of the reaction to " $\text{CO}_3^{2-}(\text{aq})$ ".	Typo
Ch 14: Acid-Base Equilibria, Sec 1: Brønsted- Lowry Acids and Bases, Exercise 3	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 14: Acid-Base Equilibria, Sec 3: Relative Strengths of Acids and Bases	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 14: Acid-Base Equilibria, Sec 3:	There is a typo in the answer to Ch. 12, #23. The rate law should be "rate = $k[\text{NOCl}]^2$ "	In the solution, revise "NOC" to "NOCl".	None

Relative Strengths of Acids and Bases, Example 14.11			
Ch 14: Acid-Base Equilibria, Sec 3: Relative Strengths of Acids and Bases, Example 14.12	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 3: Relative Strengths of Acids and Bases, Example 14.14	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 3: Relative Strengths of Acids and Bases, Figure 14.8	Text running out of the box slightly.	Our reviewers accepted this change.	Typo
Ch 14: Acid-Base Equilibria, Sec 4: Hydrolysis of Salt Solutions	In Figure 9.5, the equation reads $P_{\text{atm}} = P_{\text{gas}} + \rho h g$ . The $\rho$ should be the greek letter rho, or should somehow be marked to make it clear that this $\rho$ is equal to density, not to a pressure.	In Figure 9.5 showing manometers, revise the $\rho$ in $\rho h g$ to the greek letter rho for clarity.	Typo
Ch 14: Acid-Base Equilibria, Sec 4: Hydrolysis of Salt Solutions, Subsec: Acid-Base Neutralization	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 $5.05 \times 10^4$ .	In Example 5.1 Measuring Heat, revise the answer to Check Your Learning to " $5.07 \times 10^4$ J".	Typo
Ch 14: Acid-Base Equilibria,	In Example 11.9 there are inconsistencies in steps 2-4. The molality calculated	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"	None

Sec 4: Hydrolysis of Salt Solutions, Subsec: Equilibrium in a Solution of a Salt of a Weak Acid and a Weak Base	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.	to "0.035 mol" in the denominator. Revise the final solution to " $1.1 \times 10^2$ g/mol".	
Ch 14: Acid-Base Equilibria, Sec 4: Hydrolysis of Salt Solutions, Subsec: The Ionization of Hydrated Metal Ions	I believe the answer to Ch. 9, #9 should be Earth: 14.7 psi; Venus: $1.31 \times 10^3$ psi. The answer for Venus has the decimal place in the wrong location.	Revise the solution to "Earth: 14.7 psi; Venus: $1.31 \times 10^3$ psi	None
Ch 14: Acid-Base Equilibria, Sec 4: Hydrolysis of Salt Solutions, Subsec: The Ionization of Hydrated Metal Ions	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 5: Polyprotic Acids	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
Ch 14: Acid-Base Equilibria, Sec 5: Polyprotic Acids, Example 14.19	I think that problem #89 is incomplete. What the student is suppose to solve for is not clear.	Remove extra space after equation so last part of question is clear.	Other factual inaccuracy in content
Ch 14: Acid-Base Equilibria, Sec 6:	I found two errors in Example 11.2. 1) The answer to the mole fraction of ethylene glycol should	In Example 11.2, revise "2000 g" to " $2.00 \times 10^3$ g" throughout. Revise "2220 g" to " $2.22 \times 10^3$ g" throughout. Revise "0.245" to "0.244". Revise "2 kg" to "2.00 kg".	Typo

Buffers	<p>be 0.244. 2) In the question, the mass of water is expressed as <math>2.00 \times 10^3</math> 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.</p>		
Ch 14: Acid-Base Equilibria, Sec 6: Buffers, Subsec: How Buffers Work	<p>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,..." "</p>	<p>Revise "quantified as substance's solubility" to "quantified as a substance's solubility".</p>	Typo
Ch 14: Acid-Base Equilibria, Sec 7: Acid-Base Titration, Subsec: Titration Curve	<p>Revise the 2nd sentence of the caption for Figure 12.16 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.</p>	<p>In the caption, revise "ppresent" to "present".</p>	Typo
Ch 14: Acid-Base Equilibria, Sec 7: Acid-Base Titrations, Example 14.22	<p>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.</p>	<p>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 neutral.)</p>	General/pedagogical suggestion or question

	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."		
Ch 14: Acid-Base Equilibria, Sec 7: Acid-Base Titrations, Figure 14.21	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 7: Acid-Base Titrations, Subsec: Acid-Base Indicators	In the last sentence on this page an H <sup>+</sup> ion is called a proton. I do not think the explanation as to why an H <sup>+</sup> 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 <sup>+</sup> 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 <sup>+</sup> ion)".	General/pedagogical suggestion or question
Ch 15: Equilibria of Other Reaction Classes	In the answer for Ch. 11, #11(a) there should not be parentheses around the nitrate ion, NO <sub>3</sub> <sup>-</sup> . The answer should say: "(a) Fe(NO <sub>3</sub> ) <sub>3</sub> is a strong electrolyte, thus it should completely dissociate into Fe <sup>3+</sup> and NO <sub>3</sub> <sup>-</sup> ions. Therefore, (z) best represents the solution. "	In the solution, remove the parentheses from around NO <sub>3</sub> <sup>-</sup> .	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution	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 <sup>-1</sup> .	For Kb and Kf columns, revise "C" to "°C".	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution	I could not find the video at the link <a href="http://openstaxcollege.org/l/16isomers">http://openstaxcollege.org/l/16isomers</a> directs to. It should probably be changed to point to <a href="https://science360.gov/object/video/3e4cad94-222e-4a04-8102-5bb5242040ea">https://science360.gov/object/video/3e4cad94-222e-4a04-8102-5bb5242040ea</a>	Update URL for ( <a href="http://openstaxcollege.org/l/16isomers">http://openstaxcollege.org/l/16isomers</a> ) to: <a href="https://science360.gov/object/video/3e4cad94-222e-4a04-8102-5bb5242040ea">https://science360.gov/object/video/3e4cad94-222e-4a04-8102-5bb5242040ea</a>	Broken link



<p>Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution</p>	<p>In the second sentence of the last paragraph before Table 2.2, there is a missing closing parenthesis as follows:</p> <p>"The electron has a charge of <math>1-</math> 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."</p> <p>Note that there is no closing parenthesis before the closing quote mark.</p>	<p>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)."</p>	<p>Typo</p>
<p>Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution , Chemistry in Everyday Life: The Role of Precipitation in Wastewater Treatment</p>	<p>In two sentences, "ln A" should be replaced with just "A". The second to last sentence on page 539 should say: "...where <math>\Delta H_{\text{vap}}</math> 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.</p>	<p>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:</p> <p>Revise "ln A" to "A" twice.</p>	<p>Typo</p>
<p>Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution , Example 15.1</p>	<p>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: <math>(A_xB_y)_n = A_nxB_nx</math>. Correction: <math>(A_xB_y)_n = A_nxB_ny</math>.</p>	<p>Revise the molecular formula to "<math>(A_xB_y)_n = A_nxB_ny</math>".</p>	<p>Typo</p>
<p>Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation</p>	<p>The left-hand side of Figure 10.22 should say "Molecules escape from the liquid's surface to form vapor"</p>	<p>In figure 10.22, revise the left-hand label to "Molecules escape liquid's surface to form vapor".</p>	<p>Typo</p>

n and Dissolution , Example 15.11			
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution , Example 15.2	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 15.4	"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
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution , Examples 15.3, 15.4, 15.6, and 15.12	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, $E^{\circ}_{cell}$ , 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."	In the 3rd paragraph after Figure 17.6, revise as follows: The standard cell potential, $E^{\circ}_{cell}$ , 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. In the 3rd paragraph after Figure 17.8, revise as follows: The standard cell potential, $E^{\circ}_{cell}$ , 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.	Other factual inaccuracy in content
Ch 15: Equilibria of Other Reaction Classes,	I think the last sentence on this page should read: "This voltage is defined as zero for all temperatures."	In the 2nd paragraph, revise the last sentence as follows: "This voltage is defined as zero for all temperatures."	Typo

Sec 1: Precipitation and Dissolution , Exercise 23			
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution , Exercises 10 and 11	A little below figure 17.3 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.	After Figure 17.3, 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. ...	General/pedagogical suggestion or question
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution , Subsec: Ksp and Solubility	The sentence right before Figure 17.3 is missing the word "of" and should say: "The equation for the reduction half-reaction had to be doubled so that the number of electrons "gained" in the reduction half-reaction equaled the number of electrons "lost" in the oxidation half-reaction."	Typo corrected.	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and Dissolution , Subsec: The Solubility Product Constant	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 <sub>2</sub> 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 <sub>2</sub> O from each side of the reaction arrow.	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 1: Precipitation and	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	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

Dissolution , Subsec: The Solubility Product Constant	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.		
Ch 15: Equilibria of Other Reaction Classes, Sec 2: Lewis Acids and Bases	The third sentence in the 3rd paragraph should say: "These electrons go on to cause reduction. "	Corrected typo.	Typo
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	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	In the key concepts for section 17.3, 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 cathode."	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 the reaction at the anode from the standard reduction potential for the reaction at the cathode."	Typo

Ch 15: Equilibria of Other Reaction Classes, Sec 2: Lewis Acids and Bases, Example 15.13	There are typos in the answer for Ch. 21, 13(b). The symbol for the alpha particle and Pu are incorrect. See the question for the correct symbol for Pu and see the answer to 13(c) for the correct symbol for an alpha particle.	Revise the solution as appropriate.	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 2: Lewis Acids and Bases, Table 15.2	The third sentence in section 21.4 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	In the section on "Chemistry in Everyday Life" I believe it should say the "2013 Nobel Prize". I don't think the 2103 Nobel Prizes have been awarded yet :)	Our reviewers accepted this change.	Typo
Ch 15: Equilibria of Other Reaction Classes, Sec 3: Multiple Equilibria	The first paragraph after Example 16.7 contains typos. It should read: "The standard free energy change for a reaction may also be calculated from standard free energy of formation ( $\Delta G^\circ_f$ ) 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, $\Delta G^\circ_f$ is by definition zero for elemental substances	Revise the 1st paragraph after Example 16.7 as follows: The standard free energy change for a reaction may also be calculated from standard free energy of formation ( $\Delta G^\circ_f$ ) 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, $\Delta G^\circ_f$ is by definition zero for elemental substances under standard state conditions. The approach used to calculate $\Delta G^\circ$ for a reaction from $\Delta G^\circ_f$ values is the same as that demonstrated previously for enthalpy and entropy changes. For the reaction...	Typo

	under standard state conditions. The approach used to calculate $\Delta G^\circ$ for a reaction from $\Delta G^\circ_f$ values is the same as that demonstrated previously for standard enthalpy and entropy changes. For the reaction"		
Ch 15: Equilibria of Other Reaction Classes, Sec 3: Multiple Equilibria, Example 15.14	I think using the word "present" twice in the sentence right before Figure 16.4 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 the direction necessary to establish equilibrium."	Revise the sentence before Figure 16.4 as follows: "If a system consists of reactants and products in nonequilibrium amounts ( $Q \neq K$ ), the reaction... "	General/pedagogical suggestion or question
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 ( $\Delta H^\circ$ ) and standard change in entropy ( $\Delta S^\circ$ ) for a process. The standard free energy change ( $\Delta G^\circ$ ) 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 15: Equilibria of Other Reaction	The caption for Figure 16.4 has a typo. This caption should say: "These plots show the free energy	Our reviewers accepted this change.	Typo

Classes, Sec 3: Multiple Equilibria, Exercise 111	versus reaction progress for systems whose standard free energy changes are..."		
Ch 16, Section 4, Page 904	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 $\Delta G$ of zero describes a system at equilibrium."	Revise the sentence above Figure 16.3 as follows: "As noted earlier, the condition of $\Delta G = 0$ describes a system at equilibrium."	General/pedagogical suggestion or question
Ch 16: Thermochemistry, Sec 2: Entropy	The heading at the top of Example 16.7 should say: "Evaluation of $\Delta G^\circ$ from $\Delta H^\circ$ and $\Delta S^\circ$ " The word change is redundant.	Revise the title to "Evaluation of $\Delta G^\circ$ from $\Delta H^\circ$ and $\Delta S^\circ$ ".	Typo
Ch 16: Thermochemistry, Sec 2: Entropy	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: Thermochemistry, Sec 2: Entropy	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 central atom or ion.	Typo
Ch 16: Thermochemistry, Sec 2: Entropy, Exercise 17	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 $S_{solid} < S_{liquid}$	Revise the summary as follows: For a given substance, its entropy depends on its phase with $S_{solid} < S_{liquid} < S_{gas}$ . 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	Typo

	< S <sub>gas</sub> . 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."	changes for some chemical reactions and physical changes may be reliably predicted.	
Ch 16: Thermoch emistry, Sec 4: Free Energy	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: Thermoch emistry, Sec 4: Free Energy	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: Thermoch emistry, Sec 4: Free Energy	All of the reactions on page 857 after the words "The equations for the dissolution of AgCl in a solution of NH <sub>3</sub> are:" and all of the reactions on page 858 should contain an equilibrium arrow, ⇌, 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 <sub>3</sub> are:", revise the forward reaction arrows "→" to equilibrium arrows "⇌".	Typo
Ch 16: Thermoch emistry, Sec 4: Free Energy, Example 16.7	The last chemical equation on page 861, the one involving the dissolution of hydroxylapatite, should contain an equilibrium arrow, ⇌, rather than a forward reaction arrow. In the text this process is described as an equilibrium.	Revise the arrow in the chemical equation starting "Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> OH(s) → ..." to an equilibrium arrow "Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> OH(s) ⇌ ..."	Typo
Ch 16: Thermoch emistry, Sec 4:	I believe the word "laundry" should be replaced with "laundromat" in the first sentence of the	Revise "This could be important to a laundry because" to "This could be important to a laundromat because".	Typo



Free Energy, Example 16.8	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."		
Ch 16: Thermoch emistry, Sec 4: Free Energy, Exercise 57	The third sentence in the text after Figure 16.8 should read: "The least 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. "	Revise "corresponding to distributions (a) and (d)" to "corresponding to distributions (a) and (e)".	Typo
Ch 16: Thermoch emistry, Sec 4: Free Energy, Exercise 63	Question #57 should say "Determine $\Delta G^\circ$ for the following reactions."	Revise " $\Delta G$ " to " $\Delta G^\circ$ ".	Typo
Ch 16: Thermoch emistry, Sec 4: Free Energy, Subsec: Calculating Free Energy Change	The answer to 35(a) should be re-worded 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
Ch 16: Thermody namics, Sec 2: Entropy	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 16: Thermody namics, Sec 3: The Second and Third Laws of	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	Revise the text describing Figure 6.24 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	Other factual inaccuracy in content

<p>Thermodynamics, Exercises 22-23 and 28-29</p>	<p>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.</p>	<p>angular momentum, or as a loop with an electric current, even though this rotation or current cannot be observed in terms of spatial coordinates.</p>	
<p>Ch 16: Thermodynamics, Sec 4: Free Energy, End of Chapter Exercises</p>	<p>The first sentence in the third paragraph on this page has a typo. It should read: "Some common solubility products are listed in Table 15.1 according to their <math>K_{sp}</math> values, whereas a more extensive compilation of solubility products appear in Appendix J. "</p>	<p>In the paragraph above Table 15.1 Common Solubility Products by Decreasing Equilibrium Constants, revise the 1st sentence as follows:</p> <p>"Some common solubility products are listed in Table 15.1 according to their <math>K_{sp}</math> values, whereas a more extensive compilation of solubility products appears in Appendix J."</p>	<p>Typo</p>
<p>Ch 16: Thermodynamics, Sec 4: Free Energy, Example 16.7</p>	<p>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.</p>	<p>In the example after the explanation of beta decay, revise "X" to "Xe".</p>	<p>Typo</p>
<p>Ch 16: Thermodynamics, Sec 4: Free Energy, Example 16.8</p>	<p>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.</p>	<p>Revise the solution for exercise 91 to "0.0122 M".</p>	<p>Incorrect calculation or solution</p>

Ch 16: Thermodynamics, Sec 4: Free Energy, Exercise 35	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 17: Electrochemistry, Introduction	For the statement on this page: "The equivalence points of both the titration of the strong acid and of the weak acid are located in the color-change interval of phenolphthalein. We can use it for titrations of either strong acid with strong base or weak acid with strong base." The first sentence is not correct and the second sentence contains typos. The equivalence point for the strong acid titration is located before the color-change interval of phenolphthalein. I believe this statement would be better if it said: "The vertical portion of the titration curve for both the titration of the strong acid and of the weak acid are located in the color-change interval of phenolphthalein. Therefore, phenolphthalein will work well at indicating that the equivalence point has been reached for titrations of both a strong acid with a strong base and a weak acid with a strong base."	Revise the paragraph before Figure 14.23 as follows:  Color change pH intervals for three different acid-base indicators are shown in Figure 14.23. Since the phenolphthalein color change interval occurs within the near-vertical portions of both titrations curves, this indicator may be used to signal the end point in both strong and weak acid titrations.	Other factual inaccuracy in content
Ch 17: Electrochemistry, Sec 1: Balancing Oxidation-Reduction Reactions	The second sentence right after the section on Ksp and Solubility should say: "We can determine the solubility product of a slightly soluble solid from its measured solubility at a given temperature and pressure, provided that the only significant reaction that occurs when the solid dissolves is its dissociation into solvated ions, that is, the only equilibrium involved is:"	Revise the 1st two paragraphs of section Ksp and Solubility as follows:  The Ksp of a slightly soluble ionic compound may be simply related to its measured solubility provided the dissolution process involves only dissociation and solvation, for example:  $M_pX_q(s) \dots$  For cases such as these, one may derive Ksp values from provided solubilities, or vice-versa. Calculations of this sort are most conveniently performed using a compound's molar solubility, measured as moles of dissolved solute per liter of saturated	Typo

		solution.	
Ch 17: Electrochemistry, Sec 1: Balancing Oxidation-Reduction Reactions	The paragraph after the AgCl equilibrium should say: "When looking at dissolution reactions such as this, the solid is listed as a reactant, whereas the ions are listed as products. The solubility product constant, as with every equilibrium constant expression, never contains pure solids or pure liquids. Recall, that only the concentration of gas phase and aqueous phase species are included in the equilibrium expression, each raised to the power of its coefficient. Here, the solubility product constant is equal to the product of the Ag <sup>+</sup> and Cl <sup>-</sup> concentrations when a solution of silver chloride is in equilibrium with undissolved AgCl. 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 K <sub>sp</sub> ."	Replace the 4th paragraph of section The Solubility Product Constant with the following paragraph:  Note that the K <sub>sp</sub> expression does not contain a term in the denominator for the concentration of the reactant, AgCl. According to the guidelines for deriving mass-action expressions described in an earlier chapter on equilibrium, only gases and solutes are represented. Solids and liquids are assigned term values of one and are thus do not appear in equilibrium constant expressions.	Typo
Ch 17: Electrochemistry, Sec 2: Galvanic Cells	The sentence right before the section on The Solubility Product Constant should say: "We will also learn how to use the equilibrium constant of the reaction to determine the concentration of ions present in a saturated solution."	Revise the last sentence before section The Solubility Product Constant as follows:  "We will also learn how to use the equilibrium constant of the reaction to determine the concentration of ions present in a saturated solution."	Typo
Ch 17: Electrochemistry, Sec 2: Galvanic Cells	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	In Examples 15.3, 15.4, 15.6, and 15.12, add phases to all ICE tables.	General/pedagogical suggestion or question

	the Ksp expression.		
Ch 17: Electrochemistry, Sec 3: Standard Reduction Potentials	The last sentence right before Example 15.5 should say "Example 15.5 shows how to perform those unit conversions before determining the solubility product constant."	Throughout Chapter 15: Equilibria of Other Reaction Classes, revise any instances "solubility product constant" or "solubility product equilibrium constant" to "solubility product" throughout.	Typo
Ch 17: Electrochemistry, Sec 3: Standard Reduction Potentials	I think it would be better if the fourth sentence under the heading "How Buffers Work" was re-worded to say the following: "If we add a base such as sodium hydroxide, the hydroxide ions react with the acetic acid molecules". The next sentence (Then more of the acetic acid reacts with water, restoring the hydronium ion concentration almost to its original value:) should then be deleted and the chemical reaction between acetic acid and water should be replaced with a reaction between hydroxide ion and acetic acid. I think it is more clear to describe the OH- reacting directly with the weak acid in the buffer. This is how it is shown in the reaction in Figure 14.18 and also how the process is described for the example of adding strong base to the NH3/NH4+ buffer on page 806 and the example of adding strong base to the HCO3-/H2CO3 buffer on page 811.	Starting with the 1st paragraph of section How Buffers Work, revise as follows:  A mixture of acetic acid and sodium acetate... If we add a base such as sodium hydroxide, the hydroxide ions react with the few hydronium ions present. The decrease in hydronium ion concentration causes the acetic acid hydrolysis equilibrium to shift to the right, restoring the hydronium ion concentration almost to its original value, and yielding a relatively modest increase in pH:  $\text{CH}_3\text{CO}_2\text{H}(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{H}_3\text{O}^+(\text{aq}) + \text{CH}_3\text{CO}_2^-(\text{aq})$  If we add an acid such as hydrochloric acid, the resultant increase in hydronium ion concentration shifts the equilibrium to the left. This effectively converts the added strong acid to a much weaker acid (acetic acid), and the buffer solution thus experiences only a slight decrease in pH (Figure 14.18).	General/pedagogical suggestion or question
Ch 17: Electrochemistry, Sec 3: Standard Reduction Potentials	I find the following sentence on this page to be misleading and likely confusing to a student learning this material for the first time: "It indicates when equivalent quantities of acid and base are present." At the equivalence point neither the acid nor base is actually present. They have both been completely consumed by the reaction.	Revise the 1st paragraph after Table 14.4 as follows:  The simplest acid-base reactions are those of a strong acid with a strong base... The point of inflection (located at the midpoint of the vertical part of the curve) is observed when the amount of base added is equivalent to the amount of acid in the sample according to the stoichiometry of the titration reaction. The volume of titrant containing this stoichiometric amount of base is called the equivalence point for the titration (see the earlier chapter on stoichiometry).	Other factual inaccuracy in content

	I think it would be more clear if this sentence said the following: "It indicates when equivalent quantities of acid and base have been added."		
Ch 17: Electrochemistry, Sec 4: The Nernst Equation	The second sentence after bullet point 2 should be modified to reflect the reaction shown immediately after it. This sentence should have "hydrogen" replaced with "hydronium". The sentence should say "When an excess of hydronium ion enters the blood stream, it is removed primarily by the reaction:"	<p>Starting with the 1st paragraph after the rules of thumb for selecting buffer mixtures in section Selection of Suitable Buffer Mixtures, revise as follows:</p> <p>Blood is an important example of a buffered solution, with the principal acid and ion responsible for the buffering action being carbonic acid, <math>\text{H}_2\text{CO}_3</math>, and the bicarbonate ion, <math>\text{HCO}_3^-</math>. When a hydronium ion is introduced to the blood stream, it is removed primarily by the reaction:</p> <p><math>\text{H}_3\text{O}^+(\text{aq})\dots</math></p> <p>An added hydroxide ion is removed by the reaction:</p> <p><math>\text{OH}^-(\text{aq})\dots</math></p> <p>The added strong acid or base is thus effectively converted to the much weaker acid or base of the buffer pair (<math>\text{H}_3\text{O}^+</math> is converted to <math>\text{H}_2\text{CO}_3</math> and <math>\text{OH}^-</math> is converted to <math>\text{HCO}_3^-</math>). The pH of human blood thus remains very near the value determined by the buffer pairs <math>\text{pK}_a</math>, in this case, 7.35. Normal variations in blood pH are usually less than 0.1, and pH changes of 0.4 or greater are likely to be fatal.</p>	Typo
Ch 17: Electrochemistry, Sec 7: Electrolysis, Example 17.9	The first sentence in the summary for section 14.6 should say "A solution containing a mixture of a weak acid and its conjugate base, or of a weak base and its conjugate acid, is called a buffer solution." A solution of a strong acid and its conjugate base or a strong base and its conjugate acid is not a buffer solution so it is important to specify that the conjugate acid/base pairs must be weak.	<p>Revise the section summary for Buffers as follows:</p> <p>A solution containing a mixture of a weak acid and its conjugate base, or of a weak base and its conjugate acid, is called a buffer solution. The presence of a weak conjugate acid-base pair provides reactants that may neutralize small additions of strong acid or base, yielding weaker conjugate partners. The hydronium ion concentration of a buffer solution therefore does not change significantly when a small amount of acid or base is added.</p>	Other factual inaccuracy in content
Ch 17: Section 1, Page 918	On this page, $\text{Al}(\text{H}_2\text{O})_6^{3+}$ is described as a polyprotic acid, which would be fine, but polyprotic acids are not introduced, defined, and described until section	<p>Starting with the 2nd paragraph of section The Ionization of Hydrated Metal Ions, revise as follows:</p> <p>We frequently see the formula of this ion written simply as "<math>\text{Al}^{3+}(\text{aq})</math>", without explicitly noting that six water molecules are covalently</p>	General/pedagogical suggestion or question

	<p>14.5. I think rather than re-writing this section a better fix would be to move the section on polyprotic acids before the section on the hydrolysis of salts.</p>	<p>bonded to the aluminum ion. This is similar to the simplification of the formula of the hydronium ion, <math>\text{H}_3\text{O}^+</math> to <math>\text{H}^+</math>. In this case, a bonded water molecule acts as a weak acid (Figure 14.6) and donates a proton to a solvent water molecule.</p> <p><math>\text{Al}(\text{H}_2\text{O})_6^{3+}(\text{aq}) \dots</math></p> <p>The conjugate base produced by this process contains five other bonded water molecules capable of acting as acids, and so the sequential or step-wise transfer of protons is possible as depicted in the equations below:</p> <p><math>\text{Al}(\text{H}_2\text{O})_6^{3+}(\text{aq}) \dots</math></p> <p>This is an example of a polyprotic acid, the topic of discussion in a later section of this chapter.</p> <p>Figure 14.16</p> <p>Additional examples of the first stage in the ionization of hydrated metal ions are:</p> <p><math>\text{Fe}(\text{H}_2\text{O})_6^{3+}(\text{aq})</math></p>	
<p>Ch 17: Section 2, Page 923</p>	<p>The statement: "In a solution of a salt formed by the reaction of a weak acid and a weak base, to predict the pH, we must know both the <math>K_a</math> of the weak acid and the <math>K_b</math> of the weak base. If <math>K_a &gt; K_b</math>, the solution is acidic, and if <math>K_b &gt; K_a</math>, the solution is basic." implies that you are analyzing the <math>K_a</math> of the acid that reacts in the reaction and the <math>K_b</math> of the base that reacts in the reaction, when you should actually analyze the <math>K_a</math> of the weak acid in the salt and the <math>K_b</math> of the weak base in the salt. I think a more clear statement would be "A reaction between a weak acid and a weak base typically produces a salt that has a cation and an anion that both have acidic and/or basic properties. To determine whether the solution is acidic or basic the <math>K_a</math> value of the acid in the salt and the <math>K_b</math> value</p>	<p>Revise the 1st paragraph of section Equilibrium in a Solution of a Salt of a Weak Acid and a Weak Base as follows:</p> <p>In a solution of a salt formed by the reaction of a weak acid and a weak base, the salt's cation will be a weak acid (the conjugate acid of the weak base reactant) and its anion will be a weak base (the conjugate base of the weak acid reactant). To predict the pH of the salt solution, we must know both the <math>K_a</math> of the acidic cation and the <math>K_b</math> of the basic anion. If <math>K_a &gt; K_b</math>, the solution is acidic, and if <math>K_b &gt; K_a</math>, the solution is basic.</p>	<p>Other factual inaccuracy in content</p>

	of the base in the salt must be known. If $K_a > K_b$ , the solution is acidic, and if $K_b > K_a$ , the solution is basic."		
Ch 21: Nuclear Chemistry, Sec 2: Nuclear Equations	There are typos in the first sentence under Figure 12.17. The sentence should say: "A convenient approach for determining $E_a$ of a reaction involves the measurement of $k$ at different temperatures and using an alternate version of the Arrhenius equation that takes the form of a linear equation:"	Revise the sentence after Figure 12.17 as follows:  "A convenient approach for determining $E_a$ for a reaction involves the measurement of $k$ at different temperatures and using an alternate version of the Arrhenius equation that takes the form of a linear equation:"	Typo
Ch 21: Nuclear Chemistry, Sec 2: Nuclear Equations	The second sentence in the caption for Figure 12.16 has a typo. This sentence should say: "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."	Revise the 2nd sentence of the caption for Figure 12.16 for clarity as follows:  "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."	Typo
Ch 21: Nuclear Chemistry, Sec 2: Nuclear Equations, Subsec: Balancing Nuclear Reactions	For problem #79 there are typos in the answer. The answer should be $[PCl_3] = [Cl_2] = 0.195\text{ M}$ , $[PCl_5] = 1.81\text{ M}$	Revise the solution to exercise 79 as follows:  $[PCl_5] = 1.80\text{ M}$ ; $[Cl_2] = 0.195\text{ M}$ ; $[PCl_3] = 1.97\text{ M}$	Typo
Ch 21: Nuclear Chemistry, Sec 3: Radioactive Decay, Subsec: Types of Radioactive Decay	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 21: Nuclear Chemistry, Sec 4: Transmutation and Nuclear	In the description for figure 12.6 some of the numbers in the reaction are suppose to be subscripts. The three in " $2FeCl_3(aq)$ " and the two in " $3H_2(g)$ " should be subscripts.	In the caption for Figure 12.6, ensure that the "3" in " $2FeCl_3(aq)$ " and the "2" in " $3H_2(g)$ " are subscript.	Typo



Energy			
Ch 21: Nuclear Chemistry, Sec 4: Transmuta tion and Nuclear Energy	In the last sentence in the section on the "Phase Diagram for an Aqueous Solution of a Nonelectrolyte" the word "of" is missing. The sentence should read: "The solid and gaseous phases, therefore, are composed of solvent only, and so transitions between these phases are not subject to colligative effects."	Revise sentence to read: "The solid and gaseous phases, therefore, are composed of solvent only, and so transitions between these phases are not subject to colligative effects."	Typo
Ch 21: Nuclear Chemistry, Sec 4: Transmuta tion and Nuclear Energy, Exercise 13	The first sentence under "Solutions of Solids and Liquids" does not exactly agree with Figure 11.17 since sucrose is an organic solid, not an inorganic solid. I think it would be best if the word "inorganic" was deleted from this sentence.	Revise the 1st sentence of section Solutions of Solids and Liquids as follows:  "The dependence of solubility on temperature for a number of solids in water is shown by the solubility curves in Figure 11.17."	Other factual inaccuracy in content
Ch 21.4 Transmuta tion and Nuclear Energy	In the first sentence under "Heating and Cooling Curves" the word "related" should be replaced with "released". The sentence should read: "In the chapter on thermochemistry, the relation between the amount of heat absorbed or released by a substance..."	Revise the 1st sentence of section Heating and Cooling Curves as follows:  "In the chapter on thermochemistry, the relation between the amount of heat absorbed or released by a substance..."	Typo