

Errata for the First Printing of *Discovering Design with Chemistry*

Student Text

- p. x:** The third line from the bottom should begin, “information will not be shared with others.” The word “will” was left out.
- p. 7:** In the first problem of Example 1.3, the last paragraph contains the phrase, “I am dividing 102 by 15.423.” That should be “I am dividing 15.423 by 102.”
- p. 17:** In the second line of step #2, “center of circle” should be “center of the circle.”
- p. 20:** The man pictured on the moon is actually Buzz Aldrin, not Neil Armstrong. The photo was taken by Neil Armstrong.
- p. 29:** In the third equation on the page, the answer’s unit should be “cg,” not “g.”
- p. 67:** In the fourth line from the bottom, “177” should be “117.”
- p. 88:** In the sixth line of the third paragraph, “ 6.0×10^5 ” should be “ 6.0×10^4 .”
- p. 91:** In the second-to-last line of #2, the “ 1.66×10^{-23} ” should be “ 1.66×10^{-24} .”
- p. 122:** In the last line of #8c, “chance” should be “change.”
- p. 125:** In #14, the electron configuration should be “ $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^2$.” The “ $3d^{10}$ ” is out of order. This does not affect the answer.
- p. 125:** In #21, remove “names and”. The student should just give the chemical formulas.
- p. 130:** In Example 5.1, the line right above the second Lewis structure should start out, “three of the chlorines’ electrons.” The word “the” was left out.
- p. 136:** The first line under the section heading should end, “If two atoms have” (replace “electrons” with “atoms.”)
- p. 147:** The line right above the second drawing should start, “out of the page and another pointing...”
- p. 148:** The fourth line on the page should end, “consider carbon...” Remove “the.”
- p. 152:** The last line of the second paragraph should end, “they generally do not mix well together.”
- p. 156:** In #8, the line right under the first drawing should end, “each fluorine needs a...”

p. 165: After “Denatured alcohol” at the bottom of the page, the following should be added, “(You can get this in any hardware store that sells paint. This is the alcohol you were supposed to get for your alcohol lamp, and you probably have some extra.)”

p. 176: In the third line, “carbon” should be “oxygen.”

p. 180: In the 7th line on the page, “if you have a chemical like” should be “if you have a chemical equation like.”

p. 187: In the second equation, “C (g)” should be “C (s)”

p. 203: In step #15 the last words should be “step 8.”

p. 203: In step #20 the parenthetical statement should be “(measured in step 9).”

p. 217: Step 4 should read, “Put the beaker, vinegar, and watch glass on the scale. Read and record the mass.”

p. 218: In problem 2, there are only three significant figures in 0.500, so there should only be three significant figures in the mass of sulfur. Thus, it should be 16.0 g sulfur.

p. 218: In problem 4, the mass of ammonia should be 17.04. Thus, “17.03” should be changed to “17.04” the three times it is found in the solution.

p. 227: The NaHCO_3 in the chemical equation should have “(s)” for its phase, not “(aq).”

p. 232: In the fifth equation, the answer should be 4.16 g, since 2.02 has only three significant figures. That means the “4.155 g” in the next equation should also be 4.16 g.

p. 238: In the sixth equation on the page, the moles of H_2O should be 4.99 moles, since there are only three significant figures in 89.9. That means “4.989” should change to “4.99” the two times it appears in the solution, and “9.978” should be changed to “9.98” the three times it appears. This also changes the answer to the final equation to “3.00.”

p. 240: In the last paragraph, the addition of the two masses should be “23.4 g + 4.91 g = 28.3 g.” That means “28.31” should be changed to “28.3” the three times it is found on the page.

p. 241: In the example, the underlined answer should be “ $\text{C}_2\text{H}_5\text{O}_3$.” Two lines down, the alternate answer in parentheses should be “($\text{O}_3\text{C}_2\text{H}_5$).”

p. 241: Comprehension check 9 should start 100.00.

p. 250: In the two lines at the bottom, 100.0 should be 100.00.

p. 251: In the third equation, “1.500” should be “1.50.”

p. 260: The 100-mL beaker listed in the materials for Experiment 9.1 is not needed.

- p. 266:** After “Denatured alcohol” near the bottom of the page, the following should be added, “(You can get this in any hardware store that sells paint. This is the alcohol you were supposed to get for your alcohol lamp, and you probably have some extra.)”
- p. 271:** In Example 9.4, the second line under the problem should start, “MgCl₂ is in excess, so we need to know the moles of AgNO₃.” The chemical “AgCl” was inadvertently used.
- p. 277:** In the very first equation, “0.275 kg” should be “0.2750 kg.”
- p. 277:** In second line under the very first equation, “dissolve” should be “dissolved.”
- p. 282:** In the solution to problem 7, the line right above the final equation should read, “Multiplying both sides of the equation by “liters of solution” and dividing both sides by 1.5 moles/liter.” 3.00 was used instead of 1.5.
- p. 289:** The 8th line from the bottom should read, “standard units of pressure is N/m², which is called the”. The word “force” was used instead of “pressure.”
- p. 319:** In the last equation for #7, “0.968 atm” should be “0.9679 atm.”
- p. 324:** In the chemical equation for #23, there should not be a “2” in front of Mg.
- p. 326:** In the second line of the last paragraph on the page, “later in in this chapter” should be “later on in this chapter.”
- p. 346:** In step 14 of the experiment, change “add vinegar until you are 15 mL away” to “add vinegar to the solution until you are 15 mL away.” That makes it more clear that the instruction is not referring to step 8.
- p. 351:** Two lines above the last equation on the page, “NaOH” should be changed to “H₃PO₄.”
- p. 353:** The chemical reaction has a typo in it. Each instance of “HC₂H₃O” should be replaced with “HC₂H₃O₂”, “C₂H₃O” should be replaced with “C₂H₃O₂”, and “NaC₂H₃O” should be replaced with “NaC₂H₃O₂”
- p. 373:** The last line of the first paragraph should begin, “when copper and silver” instead of “when copper and aluminum.”
- p. 374:** In problem 6b, there should be a “2” in front of each Cr to make the charges balance.
- p. 376:** In the 14th line from the bottom, “Mn must be 3+ on the reactants side” should read “Mn must be 3+ on the products side.”
- p. 378:** In the first line under the chemical equation, “automobile acid” should be “automobile battery.”
- p. 380:** In the second line under the chemical equation, “an oxidation state of 1-.” should be changed to “an oxidation state of 2-.”

- p. 385:** In problem 8a, there should be a “2” in front of the “Ag(s).”
- p. 392:** In the second line from the bottom of the page, “more than twice as hard” should be replaced with “about twice as hard.”
- p. 418:** In Experiment 14.1, change “water” to “vinegar” in step 14.
- p. 437:** In the first equation, “NaCl” should be “KCl.”
- p. 451:** In #4, there is a mismatch between the units in the question and its answer. Both units should just be kJ.
- p. 451:** In #9, it should ask for the ΔH_f° of H₂S (g), not H₂S (l).
- p. 473:** Each S₂O₈⁻ in Example 15.4 should be S₂O₈²⁻
- p. 479:** The 8th equation on the page should be 2.00 = 2.00^y, since the right side of the equation also has three significant figures.
- p. 483:** In the fourth paragraph, third line from the bottom, the word “reactants” should be replaced with “products” twice.
- p. 490:** In the second-to-last equation, replace the “→” with “⇌.”
- p. 491:** For the chemical equation in Example 16.3, replace the “→” with “⇌.” In the second line under that equation, change CO₂ (s) to CO₂ (g).
- p. 493:** The third line of the page should start, “is greater than the equilibrium constant,”
- p. 497:** One of the supplies for Experiment 16.2 was left out. Add “test tube” to the supply list.
- p. 498:** Step 3 should begin, “Swirl the water”
- p. 501:** Step 11 should begin, “Pour the solution in the 250-mL”

Answer Key & Tests

- p. v:** In the second line, “83.3” should be changed to “82.3”
- p. v:** In the fifth line, change “take of ¼ of a point” to “take off ¼ of a point.”
- p. 7:** In #3, “mili” should be “milli”
- p. 9:** For #17d, the first sentence should end, “move it two spaces to the right.” This does not affect the answer.

p. 14: For #9, in both the underlined answer and the answer in the equation, the unit should be “kg,” not “slugs.”

p. 17: The end of the second line of #1j should read “so that the ratio of the masses of” The first “the” was left out.

p. 17: For #2e, the word “thing” should be replaced with “things.”

pp. 19-20: For #12, the word “oxygen” should be replaced with “chlorine” all three times it is used in the explanation.

p. 23: For #3, the “98.1” in the first equation should be followed with “g.”

p. 24: For #5, the “48.00” in the last equation should be followed with “g.”

p. 25: In the last line of #12, “neurons” should be changed to “neutrons.”

p. 28: For #18, the underlined answer should be 9.17×10^{-8} , in agreement with the worked-out solution.

p. 29: For #19, the third line should end “So it must absorb a photon of wavelength.” The word “energy” was used instead of “wavelength.”

p. 29: For #23, the second line should start “lot, and they are right where unknown’s lines are” The word “hydrogen’s” was used instead of “unknown’s.”

p. 31: Question #16 should end with “of the atom in question #15?” The question currently refers to itself.

p. 36: The underlined portion of the answer to #8 should read, “(b) is a 2p orbital and (d) is a 3p orbital.” The “(c)” should be changed to “(d).”

p. 37: In #11b, the electron configuration should be underlined, since it is the answer.

p. 37: For #14, the order of the numbers summed should match the proper electron configuration, so it should be “ $2 + 2 + 6 + 2 + 6 + 2 + 10 + 2 = 32.$ ”

p. 40: At the end of #17, “(Cobalt’s symbol is Co.)” should be added, since cobalt isn’t one of the elements for which the student is supposed to know the symbol.

p. 45: In the last line of both “c” and “d,” the word “pairs” should be replaced with “pair.”

p. 66: The underlined portion of the answer to #16c should read “single displacement reaction.” The word “replacement” was inadvertently used instead of “displacement.”

p. 71: In the first line of the explanation for question #9b, “hydrogen” should be inserted after “lack of a prefix on.”

pp. 73-74: For 9e, the Au atoms are not taken into account properly. The answer given is correct, but the solution doesn’t account for the Au atoms properly. The first attempt at balancing should also have a “2” in front of Au on the products side. That changes all the tables so that there are 2 Au atoms on both sides of the equation.

p. 77: In the last equation, “6.95” should be changed to “6.94.”

p. 78: The solution to #8 should begin, “The answers are 0.31g and 0.017 moles.”

p. 92: In the solution to #5, the answer should have only three significant figures, so it should be 4.70×10^2 grams.

p. 94: Since the question asked for both the empirical and molecular formulas, the answer to #13 should also have the molecular formula, which is C₉H₂₄O₃.

p. 98: For #13 and #15, “(Barium is abbreviated with Ba.)” should be added to the end of each question.

p. 99: For the third equation in the solution to #4, “CaCO₃” should be changed to “C₄H₈S₂.”

p. 100: In the last equation on the page, “4.00” should be “4.000.”

p. 101: In the solution to #10, the mass of oxygen should be 92.3 g, so “92.31” should be replaced both times with “92.3.” This makes the moles of oxygen 5.77, so “5.769” should be replaced twice with “5.77.” This makes the ratio 3.00 instead of 3.000.

p. 103: For #15, the percentage of Ba should have five significant figures (52.546%). That means “52.55%” should be changed to “52.546%” both times it appears in the solution.

p. 104: For #5, replace “A sample of” with “An object.”

p. 107: In #47, change the reference from “#7” to “#46.”

p. 108: For #2, add “a” after “it is liters with.”

p. 109: In the first equation for #8, “74.9 g” should be changed to “74.9 kg.” In the very next line, “25.6 g” should be changed to “25.6 kg.”

p. 110: In the second equation for #9, the answer should have only two significant figures, so it should be “1.3.”

p. 111: In #17, “most abundant element is ⁴⁰Ca” should be “most abundant isotope is ⁴⁰Ca.”

p. 111: In #19, the second sentence should end “meters per second.”

- p. 112:** In #25, the third line of the explanation should start “Mg₃P₂.” “Na” was inadvertently used instead of “Mg.”
- p. 117:** In the last equation for the solution to #48, “6” should be “6.000.”
- p. 121:** In the second equation on the page, “40.0 g NaOH” should be “40.00 g NaOH.”
- p. 122:** For the last equation in the solution to #17, “0.450 kg” should be “0.4500 kg.”
- p. 124:** In the first equation, the m’s should be marked as cancelling each other.
- p. 134:** In the second equation of the solution to #18, replace “3 mole²” with “3 moles.”
- p. 140:** In the solution to #6, the sentence above the last equation should start, “Multiplying by 360.4 K.”
- p. 142:** In the last two equations for the solution to problem #12, “oxygen” should be replaced with “krypton” and “nitrogen” should be replaced with “argon.”
- p. 146:** The second sentence in the answer to #17 should be underlined, since the question asked about the initial color of the solution.
- p. 154:** In the solution to #2, the sentence after the underlined sentence should begin, “The definition of oxidation number says...” The word “electronegativity” was used instead of “oxidation number.”
- p. 157:** In the solution to #8a, the second sentence after the drawing should begin, “Don’t worry about the electrode...” The word “electron” was used instead of “electrode.”
- p. 171:** The last line of #10 should start, “calorimeter has a heat capacity.”
- p. 176:** There is a mismatch in units between the question and the answer for #4. The unit should be just kJ in both.
- p. 179:** For #15, delete “mole” in the unit of the underlined answer.
- p. 186:** In the first equation for #8, the first unit of “mole” should not be cancelled. That’s why it appears in all subsequent equations and in the answer. It has nothing to cancel with.
- p. 190:** For #14, the answer should be, “The rate equation is $\text{Rate} = (230 \text{ l}/\text{M}^2\cdot\text{s})[\text{ClO}_2]^2[\text{OH}]$. The solution is correct, but in the answer, the “3” and “0” were reversed.
- p. 190:** In the fifth equation on the page, “0.030” should be “0.020.” In the next equation, “3.00” should be “3.0” since there are only two significant figures.
- p. 192:** In the 4th and 5th equations, “0.020” should be changed to “0.0020,” and “0.010” should be changed to “0.0010.”

p. 197: In the 4th, 5th, and 6th equations of the solution to #6, change “4.00” to “4.0,” since it should have only two significant figures.

p. 209: For #6, “aluminum sulfide” should be “iodine.”

p. 215: For #8, the second sentence should begin, “That means the freezing point.”

p. 215: For #8, the first equation should have a negative sign in front of the “(i).”

p. 216: For #13, the first equation should begin “ $P_{\text{total}} = P_{\text{hydrogen}} + P_{\text{helium}}$.”

p. 218: Right under the first equation, “ H_3PO_4 ” should be “ H_2SO_4 .”

p. 218: Right under the second equation, the problem number should be “20,” not “15.”

p. 219: In #24, underline the answer and delete the “=” in the first line of text.

p. 220: In #31, the line under the first equation should begin, “Since the 0 °C is exact.” 100 was used instead of 0.

p. 221: In #35, the equation should end “ $91,800 \text{ J} - 5.90 \times 10^4 \text{ J} = 32,800 \text{ J}$.”