Exploring Creation with Chemistry 3rd Edition - Errata file instructions

Student Notebook – 2nd PRINTING

This file contains the corrected pages for the 2nd Printing: June 2016 of the Student Notebook.

You can find which printing you have by going to the publications page in the front of your book. The printing for the Textbook, Solutions and Tests Manual, and Student Notebook may not be the same. Corrections for the Textbook, and Solutions and Tests Manual are in separate files.

The items highlighted in bright pink are the corrections to the errors in the book. Make sure your Student Notebook reads the same as the corrections on these pages.

Newest corrections listed at the end of the file.

(Updated July 2024).

DAILY SCHEDULE

Week	Day 1	Day 2	Day 3	Day 4	Day 5
1	**MODULE 1** Read pp. xix Optional SN Graphing section	Read pp. 1–4 Experiments 1.1–1.2	Read pp. 4–12 OYO 1.1–1.3	Read pp. 12–14 OYO 1.4–1.8	Read pp. 14-18 OYO 1.9–1.11
2	Read pp. 19-27 OYO 1.12-1.14	Read pp. 27–30 Experiment 1.3	Read pp. 31-37 OYO 1.15-1.17	Study guide	Study for the test Optional EPP*
3	Take module 1 test	**MODULE 2** Read pp. 44–50 OYO 2.1	Experiment 2.1	Read pp. 50–57 OYO 2.2–2.6	Read pp. 57–66 OYO 2.7–2.9
4	Optional MCKE** 3 Experiment 2.2	Read pp. 66–76 OYO 2.10–2.12	Experiment 2.3 Optional MCKE 1	Study guide	Study for the test Optional EPP
5	Take module 2 test	**MODULE 3** Read pp. 84–89 Experiment 3.1	Read pp. 89–93 OYO 3.1–3.3	Read pp. 93–104 OYO 3.4–3.5	Read pp. 104–108 OYO 3.6–3.7
6	Read pp. 108–113 Experiment 3.2	Read pp. 114–125 OYO 3.8–3.12	Study guide	Study for the test Optional EPP	Take module 3 test
7	**MODULE 4** Read pp. 132–143 OYO 4.1–4.3	Read pp. 143–147 OYO 4.4–4.7	Read pp. 148–150 OYO 4.8–4.11	Read pp. 150–155 OYO 4.12	Read pp. 156–163 OYO 4.13–4.14
8	Study guide	Study for the test Optional EPP	Take module 4 test	Study for quarterly test 1	Take quarterly test 1
9	**MODULE 5** Read pp. 172–176 OYO 5.1–5.3	Read pp. 177–185 OYO 5.4–5.8	Read pp. 185–191 OYO 5.9	Experiment 5.1	Read pp. 192–195 OYO 5.10
10	Read pp. 195–197 OYO 5.11	Experiment 5.2	Study guide	Study for the test Optional EPP	Take module 5 test

* EPP STANDS FOR EXTRA PRACTICE PROBLEMS FOUND IN APPENDIX B IN THE BACK OF THE TEXT

** MCKE STANDS FOR MICROCHEM KIT EXPERIMENT

Week	Day 1	Day 2	Day 3	Day 4	Day 5
30	Take module 14 test	**MODULE 15** Read pp. 524–529 Experiment 15.1	Read pp. 529–533 OYO 15.1–15.4	Read pp. 533–535 OYO 15.5–15.6	Read pp. 535–541 OYO 15.7-15.8
31	Read pp. 541–543 OYO 15.9	Read pp. 543–546 Experiment 15.2 OYO 15.10	Read pp. 547–552 OYO 15.11–15.13	Optional MCKE 11	Study guide
32	Study for the test Optional EPP	Take module 15 test	**MODULE 16** Read pp. 559–562 OYO 16.1	Read pp. 562–565 OYO 16.2	Read pp. 565–568 OYO 16.3–16.5
33	Read pp. 568–570 Optional MCKE 6 Experiment 16.1	Read pp. 570–576 OYO 16.6–16.7	Optional MCKE 17 Experiment 16.2	Read pp. 578–580	Read pp. 581–582
34	Study guide	Study for the test Optional EPP	Take module 16 test	Study for quarterly test 4	Take quarterly test 4

12 In the formation of ammonium phosphate, how many moles of N_2 are required to make 15 moles of product?

13 In the combustion of C_3H_8, how many moles of CO_2 will be made when 13.2 moles of C_3H_8 are burned?

10.9 Acetic acid has a K_b of 2.93 °C/m and a normal boiling point of 118.1 °C. What would be the boiling point of a solution made by dissolving 100.0 g of $CaCO_3$ in 400.0 g of acetic acid?

10.10 If you wanted to boil a solution made by dissolving 265.0 grams of phosphorus trihydride into 2.0 kg of water, to what temperature would you have to raise it? (K_b of water = 0.512 °C/m)

STUDY GUIDE QUESTIONS

1 When you dissolve sodium fluoride in water, which compound is the solute and which is the solvent?

2 Contrast the way ionic compounds dissolve in water with the way that polar covalent compounds dissolve in water.

PRACTICE PROBLEMS

1 A balloon is filled with hydrogen at a temperature of 22.0 °C and a pressure of 812 mm Hg. If the balloon's original volume was 1.25 liters, what will its new volume be at a higher altitude, where the pressure is only 625 mm Hg? Assume the temperature stays the same.

2 A bacterial culture isolated from sewage produced 23.0 mL of methane gas at 23.0 °C and 795 torr. What would the volume of the methane be at STP?

3 A steel container with a volume that cannot change is filled with 95.0 atms of compressed air at 20.0 °C. It sits out in the sun all day, and its temperature rises to 55.0 °C. What is the new pressure?

7 What is the pressure of 15.0 grams of nitrogen gas when the temperature is 21.0 °C and the gas occupies 1.00 L of space?

8 A chemist performs the following reaction:

$$CS_2\ (s) + 3O_2\ (g) \rightarrow CO_2\ (g) + 2SO_2\ (g)$$

If the chemist starts with 11.0 grams of CS_2 and an excess of O_2, what volume of sulfur dioxide will be produced at a temperature of 341 °C and a pressure of 2.1 atm?

9 It is difficult to make solid titanium, but since it is used in the manufacture of airplane engines and frames, it must be produced. When mined, titanium ore is mostly TiO_2. To make solid titanium, the titanium ore must first be converted to titanium tetrachloride via the following reaction:

$$3TiO_2\ (s) + 4C\ (s) + 6Cl_2\ (g) \rightarrow 3TiCl_4\ (g) + 2CO_2\ (g) + 2CO\ (g)$$

How many liters of Cl_2 gas at STP would be required to completely convert 1.0000 kilogram of TiO_2 into $TiCl_4$?

Reactions	Sign of ΔS
b. **$2H_2O$ (g) + O_2 (g) → $2H_2O_2$ (g)**	
c. **2AgOH (s) + $Mg(NO_3)_2$ (aq) → $2AgNO_3$ (aq) + $Mg(OH)_2$ (aq)**	

13.10 In On Your Own problem 13.5, you determined the ΔH° of the following reaction:

$CaO (s) + CO_2 (g) \rightarrow CaCO_3 (s)$

Use what you just learned to calculate ΔS° for this same reaction.

13.11 The ΔH of a certain chemical reaction is 20.0 kJ, and the ΔS is 123 J/k. At what temperatures is this reaction spontaneous?

3 A chemist does a reaction rate analysis of the following reaction:

$$C_4Cl_9OH + F^- \rightarrow C_4Cl_9F + OH^-$$

He collects the following data:

Trial	Initial Concentration of C_4Cl_9OH (M)	Initial Concentration of F^-(M)	Instantaneous Reaction Rate (M/s)
1	0.25	0.50	0.0202
2	0.25	1.00	0.0202
3	0.50	1.00	0.0404

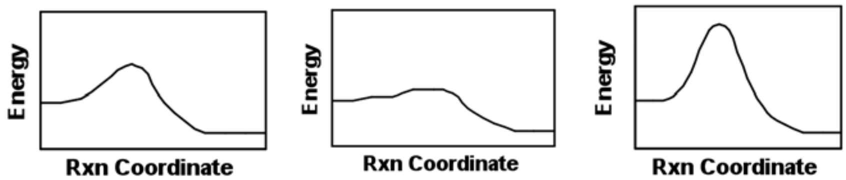
What is the rate equation for this reaction?

4 The following reaction:

$$Br_2\ (g) + I_2\ (g) \rightarrow 2IBr\ (g)$$

is determined to be second order with respect to I_2 and first order with respect to Br_2. Its rate constant is 1.1×10^{-3} $1/M^2 \cdot s$. What is the overall order of the reaction? If the reaction was run with both reactants at a concentration of 1.00 M, then what would the instantaneous rate be?

9 Energy diagrams are presented below for the same reaction. One diagram is for the reaction without a catalyst, one is for the same reaction with a catalyst that increases the reaction rate by a factor of 3, and one is for the same reaction with a catalyst that increases the reaction rate by a factor of 10. Identify the diagram for each case. Note: reaction is abbreviated as rxn in the diagrams below.



I II III

10 In the reaction mechanism below, indicate which substance is acting like a catalyst.

Step 1. 2Cl (g) + 2O_3 (g) → 2O_2 (g) + 2OCl (g)

Step 2. 2OCl (g) → O_2 (g) + 2Cl (g)

Is this a heterogeneous or a homogeneous catalyst?

EXTRA PRACTICE PROBLEMS

1 A chemistry book lists the rate constant for a reaction as 34.5 1/M·s. What is the overall order of the reaction?

3 A chemist is studying 2 chemical equilibria. Reaction A has an equilibrium constant equal to 1,213 M, while Reaction B has an equilibrium constant equal to 0.344 M^2. Which reaction will make more products?

4 After taking a cursory glance through a chemistry book, a student says that sometimes a chemical reaction is written with a single arrow and sometimes it is written with a double arrow. The student says that this means some chemical reactions are equilibrium reactions and some are not. What is wrong with the student's statement?

5 Why do we ignore solids in the equilibrium constant and when using Le Châtelier's principle?

6 Why are acid ionization reactions important in chemistry?

7 What is the range of the pH scale?

8 Three solutions have the following pH levels. Which is (are) the acidic solution(s)?

Chemicals	pH	Acidic solution? (Yes/No)
A	1	
B	10	
C	7	

9 Three acid solutions of equal concentration have the following pH levels:

Solution A: pH = 1 Solution B: pH = 4 Solution C: pH = 6

Which solution is made with the acid that has the *lowest* ionization constant?

10 Where does acid rain come from?

16.6 A Galvanic cell runs on the following chemical equation:

$$2H^{+} (aq) + Mn (s) \rightarrow H_2 (g) + Mn^{2+} (aq)$$

Draw a diagram for this Galvanic cell, labeling the electron flow, the anode and cathode, and the positive and negative sides of the Galvanic cell.

16.7 A Galvanic cell runs on the following chemical equation:

$$3Cl_2 (aq) + 2Al (s) \rightarrow 2Al^{3+} (aq) + 6Cl^{-} (aq)$$

Draw a diagram for this Galvanic cell, labeling the electron flow, the anode and cathode, and the positive and negative sides of the Galvanic cell.

STUDY GUIDE QUESTIONS

1 Define oxidation number.

9. Clean up and return everything to the proper place.

Hypothesis:

DATA and OBSERVATIONS:

TABLE	
Steps	**Observations**
7	
8	

Exploring Creation with Chemistry, 3rd Edition – Errata File

Additional corrections for the 2nd Printing of the **Student Notebook**.

(Posted July 2024)

Clarifications:

Page 517 – Experiment 10.3, Steps 2-5 of the Procedure section were revised for clarity and safety. See revised page below.

Pages 592-593 – Experiment 16.2, Materials List and Procedure Steps 5-10 were revised for clarity. See revised pages below.

Correction:

Page 92 – #10 b. configuration should be: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8 4p^6 5s^1$

(insert $3s^2$ after $2p^6$)

EXPERIMENT 10.3

DATE

Purpose:
To investigate a solute that releases heat when dissolved.

Materials:
- Beaker (A short, fat glass will do.)
- Lye (This is commonly sold with the drain cleaners in hardware stores and supermarkets. Make sure that your bottle is labeled 100% lye or something similar. If you cannot find lye, you can order it online. It may be listed under its chemical name, sodium hydroxide. *Always use this chemical in a well-ventilated area.*)
- Rubber gloves
- Water
- Sink
- Tablespoon
- Safety goggles

Question:
Can a solute release heat when dissolved?

Procedure:
1. Put on the gloves and safety goggles.

2. Put the beaker in the sink directly under the faucet.

3. Slowly turn on the water and add enough water to your beaker so that the water level in it is about 1.5 centimeters high.

4. Measure 3 tablespoons of lye and slowly add it to the beaker.

5. Stir the solution with the tablespoon until all or most of the lye dissolves.

6. Take one glove off and *carefully* touch the outside of the beaker, near the bottom. **Record your observations in the data table.** Most likely, the beaker will feel warm. It might be quite hot, so be careful.

7. Continue to stir the solution with the other hand, and periodically touch the outside of the beaker near the bottom to see how hot it is getting. Once again, *be careful* when you touch the beaker with your bare hand because it can get very hot! **Record your observations.**

8. Eventually, the solution might get so warm that you can no longer comfortably touch the beaker. At that point, put the glove back on.

EXPERIMENT 16.2

DATE

Purpose:
To create a Galvanic cell from lemons.

Materials:
- 4 juicy lemons
- 4 copper pennies (Pennies from before 1982 have higher copper content. You can also use copper wire instead of a penny.)
- 4 two-inch zinc coated (galvanized) nails
- 5 small wires, ideally with alligator clips
- Voltmeter (optional)
- Pre-wired LED (Light Emitting Diode) bulb
- Safety goggles

Question:
Can you create a Galvanic cell battery from common household items that can light an LED bulb?

Procedure:
1. Squeeze the lemon gently with your hands or roll it on a table with some pressure to release the lemon juice. Don't rupture the lemon's skin.
2. Make a small penny-sized cut in the lemon and insert the copper penny into it with half of the penny sticking out.
3. Insert the galvanized nail into the other side of the lemon, ensuring that the nail does not touch the penny.
4. This is a single cell of a battery. The nail and the penny are the electrodes, and the lemon juice is the electrolyte.
5. If you have a voltmeter, connect one wire of the voltmeter to the nail and the other to the penny. Note what it reads. If you don't have a voltmeter, skip to Step 6.
6. Now try to connect one wire from the nail to the LED wire and another wire from the penny to the other LED wire. What do you see? This current is not enough to light an LED light. To have enough current, you will need to add more lemons
7. Create 3 more of the same lemon batteries.

8. Connect 5 wires in this order:

   Wire 1: LED wire to galvanized nail in lemon 1

   Wire 2: galvanized nail in lemon 1 to penny in lemon 2

   Wire 3: galvanized nail in lemon 2 to penny in lemon 3
   Wire 4: galvanized nail in lemon 3 to penny in lemon 4
   Wire 5: galvanized nail in lemon 4 to LED wire

9. What do you see? **Record your observations in the data table.** Can you determine which is the cathode, and which is the anode in this experiment based on figure 16.3?

10. Clean up and return everything to the proper place.

Hypothesis:

DATA and OBSERVATIONS: