# Course Description

An introduction to the principles of general chemistry for students of the health professions. Topics include the structure, properties, and reactions of inorganic compounds, nuclear chemistry, stoichiometry, gas laws, solution chemistry, thermochemistry, equilibrium, kinetics, and acid‐base chemistry. Emphasis is on physiological and clinical correlations.

# University Learning Outcomes (ULO)

* **ULO1:**Knowledge of Human Cultures and the Physical and Natural World
* **ULO2:**Intellectual and Practical Skills
* **ULO3:**Personal and Social Responsibility
* **ULO4:**Integrative and Applied Learning­
* **ULO5:**Immersed in the Critical Concerns of the Sisters of Mercy of the Americas

# Program Learning Outcomes (PLO)

* **PLO1**: Express an appreciation and understanding of a variety of aesthetic, literary, cultural and ideological traditions.(ULO 2, 3)
* **PLO2**: Engage meaningfully in a community of scholarship through inquiry, research and the communication of ideas. (ULO 2, 4)
* **PLO3**: Evaluate historical, political, economic and scientific data while recognizing the interrelatedness of events and processes. (ULO 1, 2, 3, 4)
* **PLO5**: Reflect upon the relationship of the Divine to the human experience. (ULO 2, 3, 4)
* **PLO6**: Examine and understand the dynamics of individual and group behavior. (ULO 2, 4)
* **PLO7**: Demonstrate an understanding of quantitative reasoning. (ULO 1, 2, 4)
* **PLO8**: Engage in constructive activities of service to the community in light of the Gospel tradition as experienced through the Mercy charism that shapes the College. (ULO 2, 3, 4)

# Course Learning Outcomes (CLO)

* **CLO1:** Demonstrate the quantitative and qualitative skills needed to succeed in chemistry, including the ability to read and interpret graphs, the ability to apply algorithms to problem solving, and the ability to employ critical-thinking skills. The student will demonstrate these abilities through performance on formative and summative assignments on MasteringChemistry and performance on examinations. (PLO3, PLO7)
* **CLO2:** Demonstrate the mastery of specific knowledge and skills in chemistry listed in the learning objectives for each chapter posted on the Blackboard site and the ability to make connections between concepts in chemistry. The student will demonstrate this mastery through performance on formative and summative assignments on MasteringChemistry and performance on examinations. (PLO3, PLO7)
* **CLO3:** Apply the fundamental principles of chemistry to the composition, structures, and processes of human physiology. The student will demonstrate this ability through performance on formative and summative assignments on MasteringChemistry and performance on examinations. (PLO2, PLO3, PLO7)

# Student Expectations

Students are expected to:

* Ask probing and insightful questions related to course content.
* Make meaningful and relevant connections and application to their own learning process.
* Be productive and contributing members of class discussions.

# Required Course Materials

Timberlake, K. C. (2016). *General, organic, and biological chemistry: Structures of life* (5th ed.). Boston, MA: Pearson.

ISBN-13: 978-0-13-389931-3

It is recommended you purchase the etext with MasteringChemistry license access directly from Pearson: [MasteringChemistry with Pearson eText - Instant Access - for General, Organic, and Biological Chemistry: Structures of Life, 5th Edition.](http://www.mypearsonstore.com/bookstore/masteringchemistry-with-pearson-etext-instant-access-0133899314)

# Suggested Point Values

|  |  |  |
| --- | --- | --- |
| **Assessment** | **Point Value** | **Due** |
| **Week 1** |  |  |
| Practice: Week 1 MasteringChemistry: Ch. 1 & 2 | 50 |  |
| Discussion Question: Using Metric Measurements | 60 |  |
| **Week 2** |  |  |
| Practice: Week 2 MasteringChemistry: Ch. 3 & 4 | 50 |  |
| Discussion: Exploring the Elements Through the Periodic Table | 60 |  |
| Discussion Question: Fossil Fuels | 60 |  |
| **Week 3** |  |  |
| Practice: Week 3 MasteringChemistry: Ch. 4 & 5 | 50 |  |
| Discussion Question: Lead and Other Dangerous Elements | 60 |  |
| **Week 4** |  |  |
| Practice: Week 4 MasteringChemistry: Ch. 5 & 6 | 50 |  |
| Discussion Question: Nuclear Energy: Pros and Cons | 60 |  |
| Discussion Question: Nuclear Chemistry in the News | 60 |  |
| Ionic Equations Worksheet | 60 |  |
| **Week 5** |  |  |
| Practice: Week 5 MasteringChemistry: Ch. 5 & 6 | 50 |  |
| Discussion Question: Noble Gas Compounds | 60 |  |
| **Week 6** |  |  |
| Practice: Week 6 MasteringChemistry: Ch. 7 & 8 | 50 |  |
| **Week 7** |  |  |
| Practice: Week 7 MasteringChemistry: Ch. 9 & 10 | 50 |  |
| Discussion Question: Mount Everest and the Limits of Human Physiology | 60 |  |
| **Week 8** |  |  |
| Practice: Week 8 MasteringChemistry: Ch. 10 & 11 | 50 |  |
| Discussion Question: Hyperventilation Versus Hypoventilation | 60 |  |
| **Total Points** | **1000** |  |

**Grading Scale**

|  |  |
| --- | --- |
| **Grade** | **Range** |
| A | 93-100 |
| A- | 90-92 |
| B+ | 87-89 |
| B | 83-86 |
| B- | 82-80 |
| C+ | 77-79 |
| C | 73-76 |
| C- | 70-72 |
| D+ | 67-69 |
| D | 63-66 |
| D- | 60-62 |
| F | 59 |

# Course Schedule

|  |  |  |
| --- | --- | --- |
| **Week** | **Start** | **End** |
| One | <insert start date> | <insert end date> |
| Two |  |  |
| Three |  |  |
| Four |  |  |
| Five |  |  |
| Six |  |  |
| Seven |  |  |
| Eight |  |  |

# Weekly Learning Modules

|  |  |  |  |
| --- | --- | --- | --- |
| **Week One: Introduction to Chemistry and Measurements** | | | |
| ***Learning Objectives*** | | ***Alignment*** | |
| * 1. Write the names and abbreviations for International System of Units (SI) or metric units used to measure length, mass, volume, temperature, and time. | | CLO1, CLO2 | |
| * 1. Calculate metric equalities using numerical prefixes. | | CLO1, CLO2 | |
| * 1. Write conversion factors to change metric and/or English units to another. | | CLO1, CLO2 | |
| * 1. Calculate the dosage level given a medication weight or volume. | | CLO1, CLO2 | |
| * 1. Classify a number as exact or measured. | | CLO1, CLO2 | |
| * 1. Determine the number of significant figures in a measurement and in the result of a calculation. | | CLO1, CLO2 | |
| * 1. Express numbers using scientific notation. | | CLO1, CLO2 | |
| * 1. Record measurements to the correct number of significant figures. | | CLO1, CLO2 | |
| * 1. Convert numbers and fractions to percent. | | CLO1, CLO2 | |
| * 1. Calculate density and specific gravity using mass and volume measurements. | | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | | ***Alignment*** | ***AIE*** |
| **Tutorials**  During this course you will be asked to use and participate in various technologies to complete activities and assignments.  **Review** the tutorials available on Blackboard as needed.  **Click** the **Student Resources** button from the menu on the left. | | N/A | N/A |
| **Weekly Participation and Discussion**  The purpose of the weekly discussions is to provide you with a way to synthesize the concepts presented in this course. Each week, you will respond to the discussion questions with a substantive post of 200-to 250-words that addresses all the prompts for the question by 11:59 p.m. EST of the listed due date. By the conclusion of each week, Sunday at 11:59 p.m. EST, you will make at least one substantive comment of 100-to 150-words to three of your classmates’ posts for each assigned discussion question. Your comments must further the discussion by following the RISE Model for meaningful feedback. It is recommended that you check in periodically throughout the week to ensure that you are meeting the participation requirement.  **Review** the RISE Model for Peer Feedback, located on Blackboard. | |  |  |
| **MasteringChemistry Registration**  MasteringChemistry is an online, interactive resource that includes readings, multimedia examples, practice problems, and quizzes. You will use it throughout the course to complete a number of practice activities and for-points assignments. Complete the following as early as possible in Week 1 to register with MasteringChemistry:   * Ensure you have the following information before attempting registration:   + **COURSE ID**: Your instructor will post the Course ID in the Announcements forum. It will use a format like *MCprofessor12345*.   + **ACCESS CODE**: This is the access code provided with your purchase of the eText from Pearson. * Navigate to the following address and following the instructions to complete your registration with [MasteringChemistry](http://www.pearsonmylabandmastering.com/northamerica/masteringchemistry/students/get-registered/index.html).   After you gain access to MasteringChemistry, you are ready to begin completing your assignments.  **Complete** the Introduction to MasteringChemistry within the MasteringChemistry module and post any questions and comments about the reading in the MasteringChemistry Registration discussion forum. | | CLO1, CLO2, CLO3 | Review technology tools and tutorials =  **1 hour** |
| **Weekly Reading**  **Read** Ch. 1 & 2 of *General, Organic, and Biological Chemistry.*  **Post** any questions and comments about the reading in the General Questions and Discussion Forum. | | 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10 | Lecture Activity = **1 hour** |
| **Lecture: Scientific Notation and Density**  **Watch** each of the following lectures dealing with scientific notation, all available on YouTube:   * [“Scientific Notation: Introduction”](https://www.youtube.com/watch?v=Dme-G4rc6NI&list=UUj3EXpr5v35g3peVWnVLoew) (13:55) * [“Fixing Incorrect Scientific Notation”](http://youtu.be/6yPtVmsDud0) (4:47) * [“Scientific Notation Practice Problems”](http://youtu.be/7iGAa0BVS9I) (13:30)   **Watch** each of the following lectures dealing with density, all available on YouTube:   * [“Density: A Story of Archimedes and the Gold Crown”](https://www.youtube.com/watch?v=KMNwXUCXLdk&feature=youtu.be) (9:09) * [“Density Practice Problems”](https://www.youtube.com/watch?v=7tVebi3TSsg&list=PL3hPm0ZdYhyz_A3Q-jhLuGtBrWsJqTHpu) (8:55)   **Post** any questions and comments about the reading in the General Questions and Discussion Forum. | | 1.6, 1.7, 1.8, 1.10 | Review interactive and compose summaries =  **1 hour** |
| ***Supplemental Resources and Activities***  *Explore these optional resources to deepen your understanding.* | | ***Alignment*** | ***AIE*** |
| **Adobe Connect Live Discussion**  **Review** [Adobe Connect Resources](https://sites.gmercyu.edu/student-resources/adobe-connect-resources/).  **Participate** in the scheduled live session with the course instructor. This session will provide an overview of the class and discuss the major assignments in the course.  **Prepare** to ask questions concerning the content of the week and the course as a whole.  Note: A recorded lecture will be made available to those who are unable to attend the live session. | |  | Live Discussion: lecture and discussion = **1 hour** |
| **Optional: Dimensional Analysis Lecture and Activity**  **Watch** ["Intro to dimensional analysis: Treating units algebraically"](https://www.khanacademy.org/math/algebra/introduction-to-algebra/units-algebra/v/dimensional-analysis-units-algebraically) available on Khan Academy (6:28).  **Post** any questions and comments about the reading in the General Questions and Discussion Forum. | | 1.1, 1.2, 1.3, 1.7 | Review video and post response =  **.5 hours** |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | | ***Alignment*** | ***AIE*** |
| **Practice: Week 1 MasteringChemistry: Ch. 1 & 2**  **Complete** the MasteringChemistry Ch. 1 & 2 Homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** any questions and comments about the activity in the discussion forum. | | 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10 | Review interactive problem set and post response =  **1 hour** |
| **Discussion Question: Using Metric Measurements**  NASA lost a $125 million Mars orbiter in 1999 because of an error in converting English units to metric.  **Read** the article [“Mars Climate Orbiter Team Finds Likely Cause Of Loss”](http://mars.jpl.nasa.gov/msp98/news/mco990930.html) available at NASA.gov.  **Read** the article [“Mystery of Orbiter Crash Solved”](http://www.washingtonpost.com/wp-srv/national/longterm/space/stories/orbiter100199.htm) available on the *Washington Post* website.  **Write** a response to the following questions in the discussion forum:   * What countries do not use the metric system? * Should the United States switch to the metric system? * What would be the advantages and disadvantages of this switch? * What is the most significant way this switch would affect you personally? * What are the applications of the metric system in medicine and health care?   *Note:* Initial answers to the discussion question must be substantive and in the range of 250 to 450 words. Any references used should be properly cited following APA formatting guidelines. Initial discussion question responses are due by 11:59 p.m. (Eastern Time) on Thursday.  **Write** a substantive response to a minimum of three different students. All responses must be posted by 11:59 p.m. (Eastern Time) on Sunday. | | 1.1, 1.3 | Compose initial response and respond to 3 students = **1 hour** |
| **Total** |  |  |  |

# Faculty Notes

**Course Setup**

**Text Options:** Instructors may wish to allow the option of the [hard cover version of the text](http://www.mypearsonstore.com/bookstore/general-organic-and-biological-chemistry-structures-0321966929) for students who prefer a hard copy. Please review and direct students to the appropriate option.

**Course Schedule Table:** Instructors may wish to modify the course schedule table to include columns for Lab lessons, Discussion Questions, Videos, etc.

**Instructors should contact their Pearson and HOLScience’s area representatives before the classes begin to conform their class information and access to the instructor version of the online software. Provide the Course ID to students in the Announcement forum.**

**Adobe Connect:** Students should post any questions or comments they have to the Announcement forum. The instructor can then utilize those questions that come up in the first part of the week to tailor any live Adobe Connect class session that would be scheduled toward the later part of the week. That 1-hour synchronous session will allow students the opportunity to go over any questions they had with the homework and clarify any misconceptions they have about the course content. All Adobe Connect sessions should be recorded and a link to the recording be posted to the course page so any student who misses the session can review it later in the week.

*Note:* It is the instructor’s choice as to whether use this tools and what day they will schedule the Adobe Connect Live Session, but it is recommended that they schedule this session for Wednesday of the week so students have plenty of time to review their homework prior to the deadline on Sunday.

**Tests:** All tests are taken within the MasteringChemistry website. Grades provided in MasteringChemistry need to be manually transferred to Blackboard.

**General Questions and Discussion Forum:** This course includes a discussion forum for general questions, comments, and concerns. This forum is intended for any course-related commentary not found within a specific weekly discussion. This forum is not graded. Make sure to monitor this forum for student posts. You are encouraged to make an announcement advertising this forum and monitor and post regularly to build engagement.

**Adobe Connect:** Consider posting an announcement asking students to submit any questions or topics they'd like addressed ahead of time. The instructor can then utilize those questions that come up in the first part of the week to tailor the live Adobe Connect class session that would be scheduled toward the later part of the week. That 1-hour synchronous session will allow students the opportunity to go over any questions they had with the homework and clarify any misconceptions they have about the course content. All Adobe Connect sessions should be recorded and a link to the recording be posted to the course page so any student who misses the session can review it later in the week.

*Note:* It is the instructor’s choice as to what day they will schedule the Adobe Connect Live Session, but it is recommended that they schedule this session for Wednesday of the week so students have plenty of time to review their homework prior to the deadline on Sunday.

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| --- | --- | --- | --- |
| Week Two: Energy, Matter, Atoms, and Elements | |  |  |
| ***Learning Objectives*** | | ***Alignment*** | |
| * 1. Convert Celsius, Kelvin, and Fahrenheit temperatures into corresponding values on another temperature scale. | | CLO1, CLO2 | |
| * 1. Distinguish between types and instances of kinetic and potential energy. | | CLO1, CLO2 | |
| * 1. Convert between energy units. | | CLO1, CLO2 | |
| * 1. Classify examples of matter as either pure substances or as mixtures. | | CLO1, CLO2 | |
| * 1. Distinguish between homogeneous and heterogeneous mixtures. | | CLO1, CLO2 | |
| * 1. Classify matter according to its state. | | CLO1, CLO2 | |
| * 1. Differentiate between physical and chemical properties. | | CLO1, CLO2 | |
| * 1. Interpret heating and cooling curves for a substance. | | CLO1, CLO2 | |
| * 1. Calculate the quantity of heat lost or gained during a temperature change using specific heat. | | CLO1, CLO2 | |
| * 1. Calculate the energy value of a given weight of food in kilojoules (kJ) or kilocalories (kcal). | | CLO1, CLO2, CLO3 | |
| * 1. Identify the names of an element from its symbol and vice versa. | | CLO1, CLO2 | |
| * 1. Identify an element in the periodic table from its group and period. | | CLO1, CLO2 | |
| * 1. Identify an element as a metal, metalloid, or nonmetal using the periodic table. | | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** Ch. 3 and sections 4.1–4.4 in Ch. 4 of *General, Organic, and Biological Chemistry.*  **Post** any questions and comments about the reading in the General Questions and Discussion Forum. | | 2.1-2.13 | Lecture activity = **.5 hours** |
| **Learning Activity: Physical and Chemical Change**  **Watch** the following videos available on YouTube:   * [“Chemical and Physical Changes”](https://www.youtube.com/watch?v=M8tyjwB42X4) (3:18) * [“Chemical and Physical Processes”](http://youtu.be/ziQtpXVDpn0?list=PLllVwaZQkS2op2kDuFifhStNsS49LAxkZ) (4:05)   **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 2.6, 2.7 | Review the video and post response=  **1 hour** |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | | ***Alignment*** | ***AIE*** |
| **Practice: Week 2 MasteringChemistry: Ch. 3 & 4**  **Complete** the MasteringChemistry Ch. 3 & 4 Homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | | 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 2.13 | Review interactive problem set and post response =  **1 hour** |
| **Discussion: Exploring the Elements Through the Periodic Table**  **Review** the interactive periodic table available at [Ptable](http://www.ptable.com).  **Review** the [Element table](http://elements.wlonk.com/ElementsTable.htm).  **Review** the [Element Lessons](http://ed.ted.com/periodic-videos) available on Ted.  **Identify** or choose an element that interests you.  **Write** a 150- to 300-word paragraph in the discussion forum describing how your chosen element and its properties are important in your life.  *Note:* Initial answers to the discussion question must be substantive and in the range of 250 to 450 words in the discussion forum. Any references used should be properly cited following APA formatting guidelines. Initial discussion question responses are due by 11:59 p.m. (Eastern Time) on Thursday.  **Write** a substantive response to a minimum of three different students. All responses must be posted by 11:59 p.m. (Eastern Time) on Sunday. | | 2.11, 2.12, 2.13 | Compose initial response and respond to 3 students = **1 hour** |
| **Discussion Question: Fossil Fuels**  **Read** the following introduction to fossil fuel considerations:  We use fossil fuels (oil, gas, and coal) for many things: power for transportation, electricity production, and home and industrial heating. Often overlooked is the fact that these fuels also provide the basic raw materials for medicines and all the polymer products (clothing, plastics, and so on) we use every day.    **Read** about [“Peak Oil”](https://en.wikipedia.org/wiki/Hubbert_peak_theory).  **Write** a response to the following question in the discussion:   * Should we be burning the petroleum that provides the starting materials that are used for the synthesis of many medicines and polymers? * If we continue to burn petroleum for the next 50 years, what do you think the consequences would be?   *Note:* Initial answers to the discussion question must be substantive and in the range of 250 to 450 words. Any references used should be properly cited following APA formatting guidelines. Initial discussion question responses are due by 11:59 p.m. (Eastern Time) on Thursday.  **Write** a substantive response to a minimum of three different students. All responses must be posted by 11:59 p.m. (Eastern Time) on Sunday. | | 2.2, 2.7 | Compose initial response and respond to 3 students = **1 hour** |
| **Total** |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Week Three: Atoms, Elements, and Nuclear Chemistry | |  |  |
| ***Learning Objectives*** | | ***Alignment*** | |
| * 1. Identify the subatomic particles proton, neutron, and electron and their electrical charges. | | CLO1, CLO2 | |
| * 1. State the number of protons, neutrons, and electrons of an atom or isotope given the atomic number and the mass number. | | CLO1, CLO2 | |
| * 1. Describe the energy levels, sublevels, and orbitals for electrons in an atom. | | CLO1, CLO2 | |
| * 1. Write the electronic configuration and draw orbital diagrams for an element. | | CLO1, CLO2 | |
| * 1. Explain trends in the periodic properties of elements from their electronic configuration, including atomic size, ionization energy, and metallic character. | | CLO1, CLO2 | |
| * 1. Draw an electron-dot symbol for any representative element. | | CLO1, CLO2 | |
| * 1. State the differences between alpha, beta, gamma, and positron radiation. | | CLO1, CLO2 | |
| * 1. Balance a nuclear equation for alpha, beta, gamma, and positron emission. | | CLO1, CLO2 | |
| * 1. Identify types of radioactive decay from the parent and daughter isotopes. | | CLO1, CLO2 | |
| * 1. Identify the relative penetrating power and the potential to do tissue damage of the different kinds of radioactive decay. | | CLO1, CLO2, CLO3 | |
| * 1. Describe how radiation is detected and measured. | | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** sections 4.5–4.8 in Ch. 4 of *General, Organic, and Biological Chemistry.*  **Read** sections 5.1 & 5.3 in Ch. 5 of *General, Organic, and Biological Chemistry.*  **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11 | Lecture activity = **.5 hours** |
| **Video: Atomic Structure**  **Watch** the following videos on atomic structure available on YouTube:   * [“Models of the Atom Timeline”](https://www.youtube.com/watch?v=NSAgLvKOPLQ) (10:51) * [“Basic Atomic Structure: A Look Inside the Atom”](https://www.youtube.com/watch?v=h6LPAwAmnCQ) (7:44) * [“Atomic Number, Mass Number, and Net Charge”](https://www.youtube.com/watch?v=dRfrvpVdKGM) (6:26) * [“Practice Problems: Net Charge, Mass Number, Atomic Number”](https://www.youtube.com/watch?v=ZzkL3DNjz_s) (4:56) * [“Valence Electrons and the Periodic Table”](https://www.youtube.com/watch?v=h6LPAwAmnCQ) (16:52) * [“What are isotopes?”](https://www.youtube.com/watch?v=EboWeWmh5Pg) (7:55) * [“Isotopes and Elements Practice Problems”](https://www.youtube.com/watch?v=n4WZ0-fItt8) (6:38)   **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 3.1, 3.2, 3.3, 3.4 | Review the video and post response=  **1.5 hours** |
| **Video: Alpha Decay**  **Watch** the following videos on radioactive decay available on YouTube:   * [“Alpha Decay”](https://www.youtube.com/watch?v=CwExbnOzc4o) (13:07) * [“Beta Decay”](https://www.youtube.com/watch?v=uqAA_D9Mi_I) (9:58) * [“Positron Decay”](https://www.youtube.com/watch?v=bjuZSvZukAw) (11:33)   **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 3.7, 3.8 | Review the video and post response=  **.5 hours** |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | | ***Alignment*** | ***AIE*** |
| **Practice: Week 3 MasteringChemistry: Ch. 4 & 5**  **Complete** the MasteringChemistry Ch. 4 & 5 Homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | | 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11 | Review interactive problem set and post response =  **1 hour** |
| **Discussion Question: Lead and Other Dangerous Elements**  **Read** [“Children Are Still Poisoned by Lead – Thousands of Them”](http://www.philly.com/philly/blogs/public_health/Children-are-still-poisoned-by-lead--thousands-of-them.html) available on the Philly.com website.  **Read** [“Lead Poisoning”](http://www.patient.co.uk/doctor/Lead-Poisoning.htm) available on the Patient website.  **Research** an element from the periodic table that has a harmful effect on the human body.  **Write** a response to the following questions in the discussion forum:   * What element did you choose? * What is the etiology of exposure to the element? How is it harmful? * Compare the effects of lead poisoning and lead exposure to the etiology of the element you chose. * Which is more dangerous to the population at large: lead or the element you chose? Justify your response.   *Note:* Initial answers to the discussion question must be substantive and in the range of 250 to 450 words. Any references used should be properly cited following APA formatting guidelines. Initial discussion question responses are due by 11:59 p.m. (Eastern Time) on Thursday.  **Write** a substantive response to a minimum of three different students. All responses must be posted by 11:59 p.m. (Eastern Time) on Sunday. | | 3.5, 3.10, CLO3 | Compose initial response and respond to 3 students =  **1 hour** |
| **Total** |  |  |  |

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| --- | --- | --- | --- |
| Week Four: Nuclear Chemistry and Compounds and Their Bonds | |  |  |
| ***Learning Objectives*** | | ***Alignment*** | |
| * 1. Calculate the amount of remaining radioisotope after a specified time period, given the half-life of a radioisotope. | | CLO1, CLO2 | |
| * 1. Calculate the time required for a radioisotope to decay to a particular mass, given the half-life of the radioisotope. | | CLO1, CLO2 | |
| * 1. Calculate radiation doses using radiation activity units. | | CLO1, CLO2 | |
| * 1. Describe the use of radioisotopes for medical diagnosis and treatment. | | CLO1, CLO2, CLO3 | |
| * 1. Differentiate between the processes of nuclear fission and nuclear fusion. | | CLO1, CLO2 | |
| * 1. Write symbols for common ions of the representative elements using the octet rule. | | CLO1, CLO2 | |
| * 1. Write the correct formula for a named ionic compound using charge balance. | | CLO1, CLO2 | |
| * 1. Classify a compound as ionic or covalent. | | CLO1, CLO2 | |
| * 1. Write the name of an ionic compound from its formula and vice versa. | | CLO1, CLO2 | |
| * 1. Write the name and formula for a compound containing a polyatomic ion. | | CLO1, CLO2 | |
| * 1. Draw electron-dot symbols for the representative elements. | | CLO1, CLO2 | |
| * 1. Draw electron-dot structures for covalent compounds, including multiple bonds and resonance structures. | | CLO1, CLO2 | |
| * 1. Write the name of a covalent compound from its formula and vice versa. | | CLO1, CLO2 | |
| * 1. Determine the polarity of a covalent bond given the electronegativity values of the atoms bonded. | | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** sections 5.4–5.6 in Ch. 5 of *General, Organic, and Biological Chemistry.*  **Read** sections 6.1–6.6 in Ch. 6 of *General, Organic, and Biological Chemistry.*  **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14 | Lecture activity = **.5 hours** |
| **Video: Nuclear Chemistry Resources**  **Watch** the following videos on nuclear half-life available on YouTube:   * [“Nuclear Half Life: Intro and Explanation”](https://www.youtube.com/watch?v=opjJ-3Tkfyg&list=UUj3EXpr5v35g3peVWnVLoew) (5:52) * [“Nuclear Half Life: Calculations”](http://youtu.be/WAsmY4ocWSA) (8:03)   **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 4.1, 4.2 | Review videos and post response =  **1 hour** |
| **Nuclear Medicine Resources**  **Review** the following resources on nuclear medicine available:   * [Nuclear Medicines and Radioisotopes](http://www.ansto.gov.au/NuclearFacts/AboutNuclearScience/Radioisotopes/UsingRadioisotopes/index.htm) * [Nuclear Medicine: Answering your Questions](http://www.ansto.gov.au/cs/groups/corporate/documents/webcontent/mdaw/mdax/~edisp/acstest_038604.pdf) * [Radioisotopes in Medicine](http://www.world-nuclear.org/info/Non-Power-Nuclear-Applications/Radioisotopes/Radioisotopes-in-Medicine/) * [Isotopes Used in Medicine](http://www.radiochemistry.org/nuclearmedicine/radioisotopes/ex_iso_medicine.htm) * [Radiation Dose Chart](http://www.ans.org/pi/resources/dosechart/)   **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 4.4 | Review interactive and post response =  **1 hour** |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | | ***Alignment*** | ***AIE*** |
| **Practice: Week 4 MasteringChemistry: Ch. 5 & 6**  **Complete** the MasteringChemistry Ch. 5 & 6 Homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | | 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14 | Review interactive problem set and post response =  **1 hour** |
| **Discussion Question: Nuclear Energy: Pros and Cons**  **Research** to find the answers to the following questions:   * How many states in the United States have nuclear waste storage sites? * Where is current research on nuclear fusion being conducted?   **Write** a response to the following questions in the discussion forum:   * Given that fossil fuel reserves will eventually be depleted, do you think nuclear power should be expanded? * What are pros and cons of nuclear power expansion? * How should the nuclear waste issue be dealt with? * Should fusion research be more heavily funded? Why or why not?   *Note:* Initial answers to the discussion question must be substantive and in the range of 250 to 450 words. Any references used should be properly cited following APA formatting guidelines. Initial discussion question responses are due by 11:59 p.m. (Eastern Time) on Thursday.  **Write** a substantive response to a minimum of three different students. All responses must be posted by 11:59 p.m. (Eastern Time) on Sunday. | | 4.1, 4.2, 4.3, 4.4, 4.5 | Compose initial response and respond to 3 students =  **1 hour** |
| **Discussion Question: Nuclear Chemistry in the News**  **Read** any current article(s) provided by the instructor. Based on the reading, respond to your instructor’s prompts.  **Post** your responses to the instructor's prompts.  *Note:* Initial answers to the discussion question must be substantive and in the range of 250 to 450 words. Any references used should be properly cited following APA formatting guidelines. Initial discussion question responses are due by 11:59 p.m. (Eastern Time) on Thursday.  **Write** a substantive response to a minimum of three different students. All responses must be posted by 11:59 p.m. (Eastern Time) on Sunday. | | COURSE | Compose initial response and respond to 3 students = **1 hour** |
| **Ionic Equations Worksheet**  **Complete** the Net Ionic Equations Worksheet.  **Submit** your assignment to the instructor via Blackboard. | | 4.6, 4.7 | Worksheet – Interpret case and solve problems = **.5 hours** |
| **Total** |  |  |  |

# Faculty Notes

**Discussion Question: Nuclear Chemistry in the News:** For this discussion, locate a current article related to nuclear chemistry to share with the class OR have students find one for themselves and summarize it for the class. Provide a copy of the article and include questions for students to respond. Prepare prompts to assist in the discussion. Students will respond to your prompts and participate in the discussion.

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| Week Five: Compounds and Their Bonds and Chemical Reactions and Quantities | |  |  |
| ***Learning Objectives*** | | ***Alignment*** | |
| * 1. Predict the three-dimensional molecular shape of a covalent compound, and classify it as polar or nonpolar using the VSEPR (valence shell electron pair repulsion) model. | | CLO1, CLO2 | |
| * 1. Describe the attractive forces between ions, polar molecules, and nonpolar molecules. | | CLO1, CLO2 | |
| * 1. Balance a chemical equation from the reactant and product formulas. | | CLO1, CLO2 | |
| * 1. Draw reaction coordinate energy diagrams for endothermic and exothermic reactions. | | CLO1, CLO2 | |
| * 1. Classify a reaction as combination, decomposition, single or double replacement, or combustion. | | CLO1, CLO2 | |
| * 1. Identify the reactant oxidized, the reactant reduced, reducing agent, and oxidizing agent in a chemical reaction. | | CLO1, CLO2 | |
| * 1. Calculate the number of particles in a given amount of moles and the number of moles in a given number of particles using Avogadro’s number. | | CLO1, CLO2 | |
| * 1. Determine the molar mass of a substance using the periodic chart. | | CLO1, CLO2 | |
| * 1. Convert between mass and moles using molar mass. | | CLO1, CLO2 | |
| * 1. Calculate the moles and/or grams of a compound in a reaction given a quantity in moles and/or grams of a reactant or product using a mole–mole factor in the balanced equation for the reaction. | | CLO1, CLO2 | |
| * 1. Calculate the theoretical yield and the percent yield for a chemical reaction. | | CLO1, CLO2 | |
| * 1. Identify the limiting reactant in a chemical reaction. | | CLO1, CLO2 | |
| * 1. Calculate the reaction theoretical yield from the limiting reactant. | | CLO1, CLO2 | |
| * 1. State the products and balance a chemical equation for a hydrocarbon combustion reaction. | | CLO1, CLO2 | |
| * 1. Calculate heat absorbed or released in a chemical reaction. | | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** sections 6.7–6.9 in Ch. 6 of *General, Organic, and Biological Chemistry.*  **Read** Ch. 7 of *General, Organic, and Biological Chemistry.*  **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 5.1-5.15 | Lecture activity = **.5 hours** |
| **Lecture: Mole and Avogadro’s Number**  **Watch** the following lectures on moles and Avogadro’s number:   * [“The mole and Avogadro’s number”](https://www.khanacademy.org/science/health-and-medicine/lab-values/v/the-mole-and-avogadro-s-number) available on Khan Academy (9:44) * [“Very Common Mole Questions”](https://www.youtube.com/watch?v=BO9M1hbs88s) available on YouTube (10:11)   **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 5.7, 5.8, 5.9, 5.10 | Review videos and post response =  **.5 hours** |
| **Lecture: VSEPR Theory**  **Watch** the following lecture on VSEPR theory:   * [“VSEPR Theory: Introduction”](https://www.youtube.com/watch?v=nxebQZUVvTg&list=UUj3EXpr5v35g3peVWnVLoew&index=65) (20:29)   **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 5.1, 5.2 | Review video and post response =  **.5 hours** |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | | ***Alignment*** | ***AIE*** |
| **Practice: Week 5 MasteringChemistry: Ch. 5 & 6**  **Complete** the MasteringChemistry Ch. 5 & 6 Homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments to the discussion forum. | | 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15 | Review interactive problem set and post response =  **1 hour** |
| **Discussion Question: Noble Gas Compounds**  The elements in Group VIII of the periodic table became known as the noble gases because, prior to 1962, there were no observed compounds of these elements. They were thought to be relatively unreactive or aloof from the other elements.  **Write** a response to each of the following questions in the discussion forum:   * What other elements have been shown to react with the noble gases? * How would you characterize the electronegativity of these other elements? * Why do you think that level of electronegativity is necessary to form a compound with a noble gas? * Which noble gases have not formed compounds yet? Why do you think this is so?   **Provide** references for your answers.  *Note:* Initial answers to the discussion question must be substantive and in the range of 250 to 450 words. Any references used should be properly cited following APA formatting guidelines. Initial discussion question responses are due by 11:59 p.m. (Eastern Time) on Thursday.  **Write** a substantive response to a minimum of three different students. All responses must be posted by 11:59 p.m. (Eastern Time) on Sunday. | | 4.6, 4.8, 4.14, 5.6 | Discussion question=  **1 hour** |
| **Total** |  |  |  |

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| Week Six: Gases and Solutions | |  |  |
| ***Learning Objectives*** | | ***Alignment*** | |
| * 1. Describe the kinetic molecular theory of gases and the physical properties of gases. | | CLO1, CLO2 | |
| * 1. Describe the units of measurement used for pressure, and use conversion factors to convert between units. | | CLO1, CLO2 | |
| * 1. Calculate the new pressure or volume when the temperature and amount of gas are held constant and either pressure or volume is changed using Boyle’s law. | | CLO1, CLO2 | |
| * 1. Calculate the new temperature or volume when the pressure and amount of gas are held constant and either temperature or volume is changed using Charles’s law. | | CLO1, CLO2 | |
| * 1. Calculate the new temperature or pressure when the volume and amount of gas are held constant and either temperature or pressure is changed using Gay-Lussac’s law. | | CLO1, CLO2 | |
| * 1. Calculate the new pressure, volume, or temperature of a gas when changes in two of these properties are given and the amount of gas is constant using the combined gas laws. | | CLO1, CLO2 | |
| * 1. Calculate the amount or volume of a gas when the pressure and temperature are constant using Avogadro’s law. | | CLO1, CLO2 | |
| * 1. Calculate pressure (*P*), volume (*V*), temperature (*T*), or amount in moles (*n*) of a gas when given three of these four values using the ideal gas law equation. | | CLO1, CLO2 | |
| * 1. Calculate the total pressure of a mixture of gases using Dalton’s law of partial pressures. | | CLO1, CLO2 | |
| * 1. Calculate molecular mass using the ideal gas law. | | CLO1, CLO2 | |
| * 1. Identify the solute and solvent in a solution. | | CLO1, CLO2 | |
| * 1. Describe the solvent–solute attractions that result in solutions for ionic and/or polar solutes and for nonpolar solutes and solvents. | | CLO1, CLO2 | |
| * 1. Differentiate between saturated and unsaturated solutions. | | CLO1, CLO2 | |
| * 1. Identify a salt as either water soluble or insoluble. | | CLO1, CLO2 | |
| * 1. Calculate the concentration of a solution in milliequivalents per liter, molarity, and percent concentration: %(*m*/*m*), %(*m*/*v*), %(*v*/*v*). | | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** Ch. 8 of *General, Organic, and Biological Chemistry.*  **Read** sections 9.1–9.3 in Ch. 9 of *General, Organic, and Biological Chemistry.*  **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 6.1-6.15 | Lecture activity = **.5 hours** |
| **Lecture: Kinetic Molecular Theory of Gas and Gas Pressure**  **Watch** the following lectures on gases and gas laws:   * [“The Kinetic Molecular Theory of Gas (part 1)”](https://www.youtube.com/watch?v=fIMdIMACyN4) (9:58) * [“The Kinetic Molecular Theory of Gas (part 2)”](https://www.youtube.com/watch?v=apOSDqZd6Fg) (5:31) * [“Gas Pressure: The Basics”](https://www.youtube.com/watch?v=zvh9uv2Hxx4) (12:25) * [“Measuring Gas Pressure and Atmospheric Pressure”](https://www.youtube.com/watch?v=YU4ZLSH5m1Q) (16:09)   **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 6.1, 6.2 | Review videos and post response =  **.5 hours** |
| **Lecture: Gas Laws**  **Watch** the following lectures on gases and gas laws:   * [“Boyle’s Law”](https://www.youtube.com/watch?v=ZoGtVVu3ymQ) (5:41) * [“Charles’s Law”](http://youtu.be/oIfFoiwRCVE?list=UUj3EXpr5v35g3peVWnVLoew) (6:41) * [“Gay-Lussac’s Law Practice Problems”](http://youtu.be/wHD-32rUHkE) (12:04) * [“Combined Gas Law”](https://www.youtube.com/watch?v=bftkRnTcFj8) (6:47) * [“Avogadro’s Law”](https://www.youtube.com/watch?v=i-vA9uLSf7Y) (14:47) * [“Ideal Gas Law Introduction”](https://www.youtube.com/watch?v=WhP6zJbSxec) (6:17) * [“Ideal Gas Law Practice Problems”](https://www.youtube.com/watch?v=TqLlfHBFY08) (10:52) * [“Which Gas Equation Do I Use?”](https://www.youtube.com/watch?v=kOp-3CMb6nY) (12:59)   **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.10 | Review videos and post response =  **1.5 hours** |
| ***Supplemental Resources and Activities***  *Explore these optional resources to deepen your understanding.* | | ***Alignment*** | ***AIE*** |
| **Optional Lectures: Gas Exchange**  **Watch** each of the following lectures dealing with gas exchange available on Khan Academy:   * [“Alveolar gas equation – Part 1”](https://www.khanacademy.org/science/health-and-medicine/respiratory-system/gas_exchange/v/alveolar-gas-equation-part-1) (7:59) * [“Alveolar gas equation – Part 2”](https://www.khanacademy.org/science/health-and-medicine/respiratory-system/gas_exchange/v/alveolar-gas-equation-part-2) (7:06) * [“O2 and CO2 solubility”](https://www.khanacademy.org/science/health-and-medicine/respiratory-system/gas_exchange/v/o2-and-co2-solubility) (7:45) * [“Graham’s law of diffusion”](https://www.khanacademy.org/science/health-and-medicine/respiratory-system/gas_exchange/v/graham-s-law-of-diffusion) (8:57) * [“Introduction to lab values and normal ranges”](https://www.khanacademy.org/science/health-and-medicine/lab-values/v/introduction-to-lab-values-and-normal-ranges) (10:24) * [“Units for common medical lab values”](https://www.khanacademy.org/science/health-and-medicine/lab-values/v/units-for-common-medical-lab-values) (11:24) * [“Fick’s law of diffusion”](https://www.khanacademy.org/science/health-and-medicine/respiratory-system/gas_exchange/v/fick-s-law-of-diffusion) (12:21) * [“Oxygen movement from alveoli to capillaries”](https://www.khanacademy.org/science/health-and-medicine/respiratory-system/gas_exchange/v/oxygen-movement-from-alveoli-to-capillaries) (11:46)   **Post** any questions and comments to the General Questions and Discussion Forum. | | 6.1, 6.4, 6.6, 6.9, 7.11 | Review videos and post response =  **2.5 hours** |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | | ***Alignment*** | ***AIE*** |
| **Practice: Week 6 MasteringChemistry: Ch. 7 & 8**  **Complete** the MasteringChemistry Ch. 7 & 8 Homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | | 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15 | Review interactive problem set and post response =  **1 hour** |
| **Total** |  |  |  |

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| Week Seven: Solutions, Reaction Rates, and Chemical Equilibrium | |  |  |
| ***Learning Objectives*** | | ***Alignment*** | |
| * 1. Calculate the amount of a solute or solvent using concentration. | | CLO1, CLO2 | |
| * 1. Describe the solvent–solute attractions that result in solutions for ionic and/or polar solutes and for nonpolar solutes and solvents. | | CLO1, CLO2 | |
| * 1. Differentiate between saturated and unsaturated solutions. | | CLO1, CLO2 | |
| * 1. Identify a salt as either water soluble or insoluble. | | CLO1, CLO2 | |
| * 1. Calculate the concentration of a solution in milliequivalents per liter, molarity, and percent concentration: %(*m*/*m*), %(*m*/*v*), %(*v*/*v*). | | CLO1, CLO2 | |
| * 1. Calculate the amount of a solute or solvent using concentration. | | CLO1, CLO2 | |
| * 1. Calculate the new concentration or volume of a diluted solution. | | CLO1, CLO2 | |
| * 1. Calculate the amount of another reactant or product in a reaction given the volume and concentration of a solution. | | CLO1, CLO2 | |
| * 1. Identify a mixture as a solution, a colloid, or a suspension. | | CLO1, CLO2 | |
| * 1. Describe how the freezing point, boiling point, or osmotic pressure of a solution is affected by the number of particles in the solution. | | CLO1, CLO2 | |
| * 1. Describe how Henry’s law relates to blood gas pressure. | | CLO1, CLO2, CLO3 | |
| * 1. Describe dialysis and the osmotic action of the normal kidney. | | CLO1, CLO2, CLO3 | |
| * 1. Describe the process of hemodialysis. | | CLO1, CLO2, CLO3 | |
| * 1. Describe how temperature, concentration, and catalysts affect the rate of a reaction. | | CLO1, CLO2 | |
| * 1. Write an equilibrium constant expression from a balanced equation. | | CLO1, CLO2 | |
| * 1. Distinguish between homogeneous and heterogeneous equilibria. | | CLO1, CLO2 | |
| * 1. Calculate the equilibrium constant for a reversible reaction given the concentrations of reactants and products at equilibrium. | | CLO1, CLO2 | |
| * 1. Predict the extent of a reaction using an equilibrium constant. | | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** sections 9.4–9.6 in Ch. 9 of *General, Organic, and Biological Chemistry.*  **Read** sections 10.1–10.3 in Ch. 10 of *General, Organic, and Biological Chemistry.*  **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 7.1-7.18 | Lecture activity = **.5 hours** |
| **Study Area: Solubility Self-Study Activity**  **Complete** the “Solubility Self-Study Activity” in the Ch. 8 Study Area in MasteringChemistry.  **Post** questions and comments to the General Questions and Discussion Forum. | | 7.4 | Review interactive and post response =  **.5 hours** |
| **Lecture: Henry’s Law**  **Watch** the following Henry’s law lecture available on Khan Academy:   * [“Henry’s law”](https://www.khanacademy.org/science/health-and-medicine/respiratory-system/gas_exchange/v/henry-s-law) (8:39)   **Write** a paragraph summary of the lecture.  **Submit** your paragraph to your instructor via Blackboard.  **Post** questions and comments to the General Questions and Discussion Forum. | | 7.11 | Review video and post response =  **.5 hours** |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | | ***Alignment*** | ***AIE*** |
| **Practice: Week 7 MasteringChemistry: Ch. 9 & 10**  **Complete** the MasteringChemistry Ch. 9 & 10 Homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | | 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.7, 7.8, 7.9, 7.10, 7.11, 7.12, 7.13, 7.14, 7.15, 7.16, 7.17, 7.18 | Review interactive problem set and post response =  **1 hour** |
| **Discussion Question: Mount Everest and the Limits of Human Physiology**  It was not until May 8, 1978 that Mount Everest was first climbed without the use of supplemental oxygen. Reinhold Messner and Peter Habeler did not know until they reached the summit that day whether it was physiologically possible.  **Review** research materials on the physiological factors involved in high-altitude function, including but not limited to the following resources:   * [“Physiological Factors Limiting Endurance Exercise Capacity”](http://www.ideafit.com/fitness-library/capacity) available on IDEAFit * [Oxygen uptake (VO2) kinetics](https://en.wikipedia.org/wiki/VO2_max) in different species is something for you to consider   **Write** a response to the following questions in the discussion forum based on your research:   * If Mount Everest were 9,000 meters in elevation, do you think it would be possible for a human to reach the top without supplemental oxygen? Why or why not? * What factors did you consider in your answer? * Would it be a good idea to take your dog with you if you were to attempt a 9,000-meter Everest climb? Why or why not?   *Note:* Initial answers to the discussion question must be substantive and in the range of 250 to 450 words. Any references used should be properly cited following APA formatting guidelines. Initial discussion question responses are due by 11:59 p.m. (Eastern Time) on Thursday.  **Write** a substantive response to a minimum of three different students. All responses must be posted by 11:59 p.m. (Eastern Time) on Sunday. | | 7.11, 7.12 | Compose initial response and respond to 3 students = **1 hour** |
| **Total** |  |  |  |

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| Week Eight: Reaction Rates and Chemical Equilibrium and Acids and Bases | |  |  |
| ***Learning Objectives*** | | ***Alignment*** | |
| * 1. Calculate equilibrium concentrations from equilibrium constants. | | CLO1, CLO2 | |
| * 1. Describe the changes made in equilibrium concentrations using Le Châtelier's principle when reaction conditions of volume, temperature, or concentration change. | | CLO1, CLO2 | |
| * 1. Identify Arrhenius and Brønsted–Lowry acid and base pairs. | | CLO1, CLO2 | |
| * 1. Write equations for the dissociation of strong and weak acids. | | CLO1, CLO2 | |
| * 1. Write an equilibrium constant expression for a weak acid. | | CLO1, CLO2 | |
| * 1. Calculate the [H3O+] and [OH-] in an aqueous solution using the ion product constant for water. | | CLO1, CLO2 | |
| * 1. Calculate the pH from [H3O+]. | | CLO1, CLO2 | |
| * 1. Calculate the [H3O+] and [OH-] of an aqueous solution given the pH. | | CLO1, CLO2 | |
| * 1. Write balanced equations for the reactions of acids with metals, carbonates, and bases. | | CLO1, CLO2 | |
| * 1. Calculate the molarity or volume of an acid from titration data. | | CLO1, CLO2 | |
| * 1. Describe the role of buffers in maintenance of aqueous solution pH. | | CLO1, CLO2 | |
| * 1. Describe the blood buffer system and how it responds to changes in pH. | | CLO1, CLO2, CLO3 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** sections 10.4–10.5 in Ch. 10 of *General, Organic, and Biological Chemistry.*  **Read** Ch. 11 of *General, Organic, and Biological Chemistry.*  **Post** any comments or questions about the reading in the General Questions and Discussion Forum. | | 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12 | Lecture activity = **.5 hours** |
| **Lecture: Acids and Bases**  **Watch** the following acids and bases lecture available on YouTube:   * [“Acids, bases, and pH”](https://www.youtube.com/watch?v=A_URRb5mk5Q) (5:47)   **Post** questions and comments to the General Questions and Discussion Forum. | | 8.4, 8.5 | Review video and post response =  **.5 hours** |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | | ***Alignment*** | ***AIE*** |
| **Practice: Week 8 MasteringChemistry: Ch. 10 & 11**  **Complete** the MasteringChemistry Ch. 10 & 11 Homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | | 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12 | Review interactive problem set and post response =  **1 hour** |
| **Discussion Question: Hyperventilation Versus Hypoventilation**  **Write** a response to the questions in the discussion forum:   * Why can you not hold your own breath forever? Yes, it is because you run out of oxygen, but what cellular chemistry changes occur as you hold your breath (blood pH, carbonate/CO2 levels, and so on)? * What happens to blood pH and carbonate/CO2 levels when you hyperventilate? How would breathing into a paper bag when you were hyperventilating alter these?   *Note:* Initial answers to the discussion question must be substantive and in the range of 250 to 450 words. Any references used should be properly cited following APA formatting guidelines. Initial discussion question responses are due by 11:59 p.m. (Eastern Time) on Thursday.  **Write** a substantive response to a minimum of three different students. All responses must be posted by 11:59 p.m. (Eastern Time) on Sunday. | | 8.11, 8.12 | Compose initial response and respond to 3 students = **1 hour** |
| **Total** |  |  |  |

# Breakdown of Academic Instructional Equivalencies

|  |  |
| --- | --- |
|  | **AIE Hours** |
| **Week 1** |  |
| Required | 6 |
| Supplemental | 1.5 |
| **Week 2** |  |
| Required | 5.5 |
| Supplemental |  |
| **Week 3** |  |
| Required | 5.5 |
| Supplemental |  |
| **Week 4** |  |
| Required | 7 |
| Supplemental |  |
| **Week5** |  |
| Required | 4.5 |
| Supplemental |  |
| **Week 6** |  |
| Required | 7 |
| Supplemental |  |
| **Week 7** |  |
| Required | 4.5 |
| Supplemental |  |
| **Week 8** |  |
| Required | 4 |
| Supplemental |  |
|  |  |
| **Total Required Hours** | 44 |
| **Total Supplemental Hours** | 1.5 |
| **Total Hours** | 45.5 |