

SYLLABUS: PHY 101 – Physical Science – Coker University

I. INSTRUCTOR AND CONTACT INFORMATION

Instructor: Dr. James L. Harrison **E-mail:** jaharrison@coker.edu **Emergency:** 843.861.1697

Information Technology Trouble Ticket: <http://suppdort.coker.edu> **IT Support:** 843.383.8323

1. If Blackboard Learn is not loading as expected, then call 843.383.8323 for IT Support.
2. If no response from 843.383.8323 for IT Support, then call James Harrison at 843.861.1697.
3. Record the results of reporting methods 1 AND 2 by using ONE external (non-Coker) email describing the nature of the system's response:
 1. Access: <http://support.coker.edu>
 2. Copy to: loydwonel@gmail.com

Format for the class: Online PHY 101

II. DESCRIPTIVE INFORMATION

Course Description: A survey of physical science including concepts in physics and chemistry. Particular attention will be given to the concepts of scientific inquiry, properties and changes of matter, forces, motion, sound, light, electricity, and magnetism. **Prerequisite:** MAT 101

III. STATEMENT OF COURSE GOALS AND OBJECTIVES

Mission Objectives: The Coker College mission statement is as follows, “The College’s goal is to graduate students with the ability to think analytically and creatively, and to write and speak effectively.” In this class you will practice analytical thinking, be introduced to scientific writing and public speaking.

Course Philosophy: This class will be an introduction / overview of the many different functional areas for physical science and will help develop critical thinking of the world from a scientific viewpoint.

Contribution Pillar: This class also promotes students to use their basic scientific knowledge to start to make more informed decisions on worldwide topics such as energy use affecting climate change.

Course Objectives: By the end of this class you should have a general understanding of many of the branches in physical sciences, including concepts in physics, chemistry and earth science.

Learning Outcomes: The learning outcomes for PHY 101 are a way of identifying the effect of the course on the student’s knowledge, skills and attitudes. The learning outcomes for Coker University students are as follows:

1. Gain a basic understanding in scientific investigation and the scientific method. (Scientific method, Chapter 1)
2. Gain an understanding of the basic concepts of physics like motion, energy, heat / temperature, wave motions / sound, electricity and light. (Physics, Chapter 2-7)
3. Gain an understanding of the basic concepts of chemistry like atoms / periodic properties, chemical bonds, chemical reactions, water and solutions. (Chemistry, Chapter 8-11)

Enabling Objectives: See enabling objectives listed for each course chapter in **V. COURSE REQUIREMENTS.**

IV. REQUIRED TEXT AND READINGS

NOTE

The printed “Connect Plus Access Card for Physical Science including the electronic SmartBook” is purchased at the Coker Bookstore. The interactive electronic textbook that you are purchasing is a media

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access purchase. Blackboard is paired to McGraw Hill Connect for Physical Science, Tillery, 11th Edition. This pairing allows you to access Connect within Blackboard.

Contact Emily Phillips ephillips@coker.edu regarding your purchase of Connect Plus Access Card for Physical Science which includes your e-book. You are encouraged to use this [PHY 101 comparison shopping tool](#) provided by Emily Phillips.

Follow the instruction on your Connect Plus Access Card to access “PHY 101 20-W3 (117684900)” at the registration link:

Media	Registration Link	ISBN-13:	Edition	Year	Title	Authors
Printed “Connect Plus Access Card for Physical Science” includes SmartBook	From Blackboard Learn SELECT Course Tools and McGraw-Hill Higher Education, then CLICK on Go to My Connect Section for paired Connect Section: PHY 101 20-W3 (117684900).	978-1-2595-9778-7	11 th	2017	Physical Science	Tillery, Slater, Slater

NOTE

Blackboard is paired to McGraw Hill Connect for Physical Science, Tillery, 11th Edition. This pairing allows you to access Connect within Blackboard.

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V. ACADEMIC COURSE REQUIREMENTS

Evaluation: The student's grade will be determined by an evaluation of the student's performance on the following course assessments.

Evaluation of Performance				
Assessment Types	Number	Points Each	Weight (%)	Worth (%)
Introduction	1	N/A	N/A	N/A
McGraw-Hill Connect (LEARNSMART) Assignments	11	100	2	22
McGraw-Hill Connect, Module Quizzes	6	100	5	30
Blackboard Chapter by Chapter Reflective Connections Journal	1	100	30	30
McGraw-Hill Connect, Final Exam	1	100	18	18
			Total	100

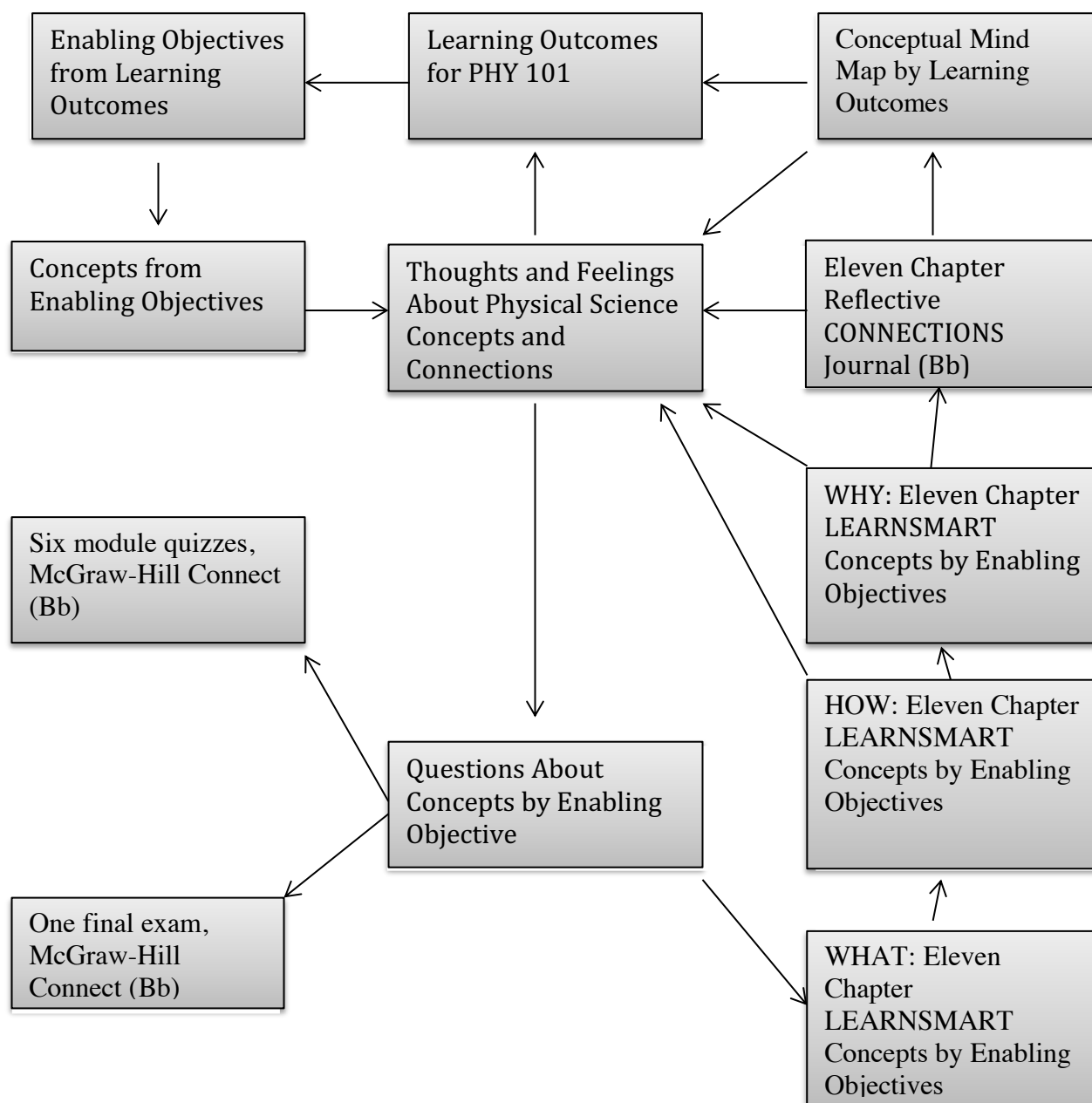
Course Grade: The student's accumulated point total for the course determines the student's percentage achieved and the student's course grade.

Grading Scale	
Percentage	Letter
90-100	A
80-89	B
70-79	C
60-69	D
<60	F

Course Assessments: Each student is expected to complete / submit the graded assignments for module by the due date and time listed in Blackboard. Graded assignments can range in terms of scope and design to satisfy the course outcomes, goals and objectives. All graded assignments, however, include instructions to submit the assignment for grading.

NOTE: A module week begins on a Monday morning and ends on a Sunday evening or the last evening of the term at 11:59PM.

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- **Demonstrating Your Understanding of Physical Science by Connecting the Concepts from LEARNSMART Exercises and Your Reflective Journal Through Quizzes** – The quizzes cover specific modules (multiple chapters within a module) as listed in the course schedule. Students are expected to complete the assigned quiz no later than Sunday at 11:59 PM of the current week.
 - The student will demonstrate an understanding of the following:
 - The basic concepts of scientific investigation and the scientific method. (Scientific method, Chapter 1)
 - The basic concepts of physics like motion, energy, heat / temperature, wave motions / sound, electricity and light. (Physics, Chapters 2-7)
 - The basic concepts of chemistry like atoms / periodic properties, chemical bonds, chemical reactions, water and solutions. (Chemistry, Chapters 8-11)
- a) **QUIZ OVERVIEW:**
 - i) A module quiz has ~10 questions for each chapter covered in module, e.g., two chapters means a quiz with 20 questions.
 - ii) Generally, one question is included for each enabling objective that is assigned for the specific module and its chapters.
 - iii) A student is encouraged to save a partial quiz each time before exiting.
 - iv) A student may enter a quiz multiple times before submitting a quiz.
 - v) A student is not allowed to start the quiz after the due date.
 - vi) NOTE: A quiz due date for must be extended to allow progress after a due date is missed.
- b) **CONNECT QUIZ BASIC:**
 - i) No time limits
 - ii) No printing allowed
 - iii) Questions and detractors are scrambled for each attempt.
- c) **CONNECT QUIZ ATTEMPTS:**
 - i) Unlimited attempts are allowed (quiz submissions).
 - ii) On each new attempt, students can revise their previous selections.
 - iii) Students can revise their previous attempts even if manual grading questions are not yet graded.
 - iv) There is no score deduction for taking unlimited attempts.
 - v) Study attempts are allowed after a quiz is submitted.
- d) **CONNECT QUIZ RESOURCES / ASSISTANCE:**
 - i) Access to the eBook and resources is allowed.
 - ii) Zero percent is deducted from all question scores when resources are used.
 - iii) Access to hints is not allowed.
 - iv) Access to -check my work- is not allowed.
 - v) Show solutions and answers is not allowed.
 - vi) Guided solutions are not allowed.
 - vii) Access to -ask the instructor- is not allowed.
 - viii) Practice questions are allowed.
- e) **CONNECT QUIZ FEEDBACK:**
 - i) Blackboard quiz results are available after quiz is submitted.

Reflecting on Your Thoughts or Feelings That Are Observed During Your Journey Through the Concepts of Physical Science – The journal is a CHAPTER-BY-CHAPTER collection of your reflections about science and your understanding of the concepts of physical sciences as you journey through the course. A student can edit or delete a journal entry. A student can't delete the instructor's comment on a journal entry. A student can see the journal rubric attributes at any time during the term before submitting the journal for grading and after grading the rubric with its scores. (See Reflective Writing, CITATION; <https://student.unsw.edu.au/reflective-writing>)

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- The grammar and reflective style of writing is first person perspective... I, me, my thinking, feeling, being, sensing, etc. about your journey to understanding about the WHAT, HOW AND WHY that physical science is meaningful to YOU.
 - These verbs are synonyms for “reflect” upon as follows: (think about deeply, Thesaurus.com)
 - Consider
 - Deliberate
 - Meditate
 - Mull
 - Ponder
 - Ruminant
 - Weigh
 - Mull over
 - Muse on.
 - The verbs are antonyms for “reflect” upon as follows:
 - Dismiss
 - Forget
 - Ignore
 - Neglect.
 - GRAMMAR & REFLECTIVE STYLE Rubric Row: Contributes 20 out of 100 points to reflective journal score.
 - “An occasional grammatical or reflective style error” = 20 points.
- This journal must contain a personal account of this CHAPTER-BY-CHAPTER journey of discovery developing an understanding of
 - “WHAT is a reflection about MY LEARNSMART assignment from EACH of 11 chapters, e.g.,
 - Chapter 1 What is science, Key terms, p. 21
 - Chapter 2 Motion, Key terms., p. 57
 - Chapter 3 Energy, Key terms, p. 82
 - Chapter 4 Heat and Temperature, Key terms, p. 111
 - Chapter 5 Wave Motions and Sound, Key terms, p. 135
 - Chapter 6 Electricity, Key terms, p. 172
 - Chapter 7 Light, Key terms, p. 200
 - Chapter 8 Atoms and Periodic Properties, Key terms, p. 226
 - Chapter 9 Chemical Bonds, Key terms, pp. 249-250
 - Chapter 10 Chemical Reactions, Key terms, p. 272
 - Chapter 11 Water and Solutions, Key terms, p. 296
 - WHAT CONNECTED Rubric Row: Contributes 20 out of 100 points to reflective journal score.
 - “Rich in content, insightful analysis, synthesis and evaluation; clear **connections of four newly introduced concepts** are made to real-life situations or to previous concepts” = 20 points.
- This journal must include your philosophical, theological and / or sociological reflections that became apparent as you developed an understanding of
 - “HOW I am connected to the concepts of physical science in MY LEARNSMART assignment from EACH of 11 chapters, e.g.,
 - My academic major, vocation, dreams ...
 - My person, my family, my friends, my associates.
 - My realization that I am a biological and sentient being?

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- HOW CONNECTED Rubric Row: Contributes 20 out of 100 points to reflective assignment score.
- “Entries are high quality consisting of personal reflections that **connect four newly introduced concepts** to real-life academic course of study, family / friends and associates” = 20 points.
- This journal must contain a personal account of this CHAPTER-BY-CHAPTER journal of discovery developing an understanding of
 - “**WHY I am connected to the concepts of physical science in MY LEARNSMART assignment from EACH chapter (behaviors , e.g., ...)**
 - The costs of physical science
 - The benefits of physical science
 - The importance of physical science.
 - WHY CONNECTED Rubric Row: Contributes 20 out of 100 points to reflective journal score.
 - “Entries are high quality consisting of personal reflections that **connect four newly introduced concepts** to the costs and benefits (importance) of physical science “ = 20 points.
- Your posted journal entry, reflecting on the concepts from each of the 11 chapters (6 Modules) is due no later than the last Sunday of the term at 11:59 PM.
 - The chapter specific journal entries are due on or before module due date, the respective Sunday, 11:59 PM for each module.
 - WHEN CONNECTED Rubric Row: Contributes 20 out of 100 points to the reflective journal score.
 - “11 of 11-chapter specific reflections are entered into the journal on or before the respective module due date (Sunday, 11:59 PM).” = 20 points.
- ***Demonstrating Your Understanding of Physical Science by Connecting the Concepts from LEARNSMART Exercises, Quizzes and Your Reflective Journal Through the Final Exam*** – The final exam covers specific modules (multiple chapters within a module) as listed in the course schedule. Students are expected to complete the assigned final exam no later than last night of the course at 11:59 PM.
 - The student will demonstrate an understanding the following:
 - The basic concepts of scientific investigation and the scientific method. (Scientific method, Chapter 1)
 - The basic concepts of physics like motion, energy, heat / temperature, wave motions / sound, electricity and light. (Physics, Chapters 2-7)
 - The basic concepts of chemistry like atoms / periodic properties, chemical bonds, chemical reactions, water and solutions. (Chemistry, Chapters 8-11)
- f) FINAL EXAM OVERVIEW:
 - i) The final exam has ~6 questions for each chapter covered in module, e.g., 11 chapters means an exam with 60 questions.
 - ii) Generally, one question is included for each enabling objective that is assigned for the specific module and its chapters.
 - iii) A student is encouraged to save the partial exam each time before exiting the exam.
 - iv) A student may enter the exam multiple times before submitting the exam.
 - v) A student is not allowed to start the exam after the due date.
- g) CONNECT EXAM BASIC:
 - i) No time limits
 - ii) No printing allowed

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- iii) Questions and detractors are scrambled for each attempt.
- h) CONNECT EXAM ATTEMPTS:
 - i) Unlimited attempts are allowed (exam submissions).
 - ii) On each new attempt, students can revise their previous selections.
 - iii) Students can revise their previous attempts even if manual grading questions are not yet graded.
 - iv) There is no score deduction for taking unlimited attempts.
 - v) Study attempts are NOT allowed after the exam is submitted.
- i) CONNECT EXAM RESOURCES / ASSISTANCE:
 - i) Access to the eBook and resources is allowed.
 - ii) Zero percent is deducted from all question scores when resources are used.
 - iii) Access to hints is not allowed.
 - iv) Access to -check my work- is not allowed.
 - v) Show solutions and answers is not allowed.
 - vi) Guided solutions are not allowed.
 - vii) Access to -ask the instructor- is not allowed.
 - viii) Practice questions are allowed.
- j) CONNECT EXAM FEEDBACK:
 - i) Blackboard exam results are available after exam is submitted.

VI. ACADEMIC POLICIES

Academic Dishonesty: Academic dishonesty includes plagiarism, cheating, or failing to appropriately cite sources. Any form of academic dishonesty is wholly incompatible with the Code of Student Responsibility, the Mission of the University, and generally understood standards of ethical academic behavior. Academic dishonesty is among the most serious of the violations that might be committed at the University. Because of the seriousness of academic dishonesty offenses, the penalties for these offenses include suspension or expulsion from the University.

- **Cheating** – A student is guilty of cheating when he/she wrongfully gives, takes or receives unauthorized assistance of information in the preparation of academic work to be submitted for course credit, or in fulfillment of a University requirement.
- **Plagiarism** – A student is guilty of plagiarism when he / she submits work purporting to be his / her own, but which in fact, borrows ideas, organization, wording, or anything else from other sources — a published article, a chapter of a book, a friend's paper, etc. — without appropriate source acknowledgment. Plagiarism, as a form of cheating, also includes employing or allowing another person to alter or revise the academic work the student submits as his / her own. Students may generally discuss assignments among themselves or with an instructor or tutor, but the student alone must do the actual work. When an assignment involves research in out- side sources of information, the student must carefully acknowledge exactly what they are, and where and how he / she has employed them. (Coker University Academic Catalog: 2005-2006)

Attendance: The student must be aware of course announcements, messages and events in the course management environment (Blackboard). The course is not self-paced. The student must login into the course, participate and submit each week's / module's assignments (introduction / BIO, journal entries, LEARNSMART exercises, concept quizzes and exams) to remain current in the course. Various assignments become available and come due at specific days and times during. For example, the student must access, complete and submit each graded assignment before its due date and time (Sunday @ 11:59 pm.)

Participation: The discussion topics and conceptual mapping exercises are interactive, cooperative and collaborative. The student and the student's peers gain more value by contributing to a common objective. The forum topics and conceptual mapping exercises have phases or steps that have specific due days in the respective week.

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Late or Missed Assignments: A score of zero will be given for each missed assignment unless arrangements are completed with the instructor at least 24 hours prior to the assignment due date. THIS DOES NOT SIMPLY MEAN NOTIFICATION. The student must complete a satisfactory written (e-mail / message) confirmation with the instructor. This is the responsibility of the student. IF the instructor has not agreed to other arrangements at least 24 hours prior to the due date for the scheduled assignment, THEN the student will receive a zero for the assignment.

Zero scores can be resolved to the benefit of the student as follows:

- The process of drop / add affects students who are added onto the class roster. Therefore, overdue assignments for the first three weeks will not be marked with zero until after Saturday of the 3rd week (typically, 1st & 2nd weeks through the verification of enrollment week, 3rd week).
- Requesting an extension after the due date for one week will result in a 10 percent deduction from the submitted assignment score, e.g., requesting a two-week extension will result in 20 percent penalty deduction.
- The Coker University policy for INCOMPLETE grade will be applied for a student whose situation meets the Coker University policy.

Disability Assistance: Reasonable accommodations will be provided for qualified students with documented physical, sensory, Enabling or psychiatric disabilities that require assistance to fully participate in this class. If a student has a disability that will likely need some accommodation by the instructor, the student should contract Robin Richardson in the Enabling Support Services (LSS) office (ext. 8021, rrichardson@coker.edu) to provide the necessary documentation. No accommodations can be made without documentation from LSS. The student is solely responsible for contacting Robin Richardson.

Emergencies: Missed assignments will only be accepted if unforeseen and verifiable circumstances are involved. For example, Coker University system outages are not under control of the student:

1. Internet access portal
2. Blackboard
3. E-mail.

It is the student's responsibility to communicate these circumstances to the instructor and provide appropriate verification as soon as possible (See Late and Missed Assignments).

VII. SCHEDULE OF ASSIGNMENTS

Module 1 – Chapter 1 contains the following assignments:

Action	Assignment	Due No Later Than
Update	Your User Profile in Blackboard Learn with a selected image!	01/12/20 Sunday, 11:59 PM
Post	Your introduction and interact with classmates in discussion forum	01/12/20 Sunday, 11:59 PM
Read	Selected Sections from Chapter 1	01/12/20 Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 1	01/12/20 Sunday, 11:59 PM
Submit	Module Quiz for Chapters 1	01/12/20 Sunday, 11:59 PM
Post	Your Reflective Journal Entries for Chapter 1	01/12/20 Sunday, 11:59 PM

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Enabling Objectives and Concepts (supporting the outcomes) After completing module 1, the student will be able to:

❖ Perform the *Enabling Objectives* listed by Chapter and Section and

❖ Understand the *Concepts* (Key Terms) listed by page.

❖ **Chapter One, *What is Science?***

○ Enabling Objectives by Chapter and Section

- Objects & Properties (1.1)
 - Know what physical scientists study
 - Recall the meanings of concepts and properties
- Quantifying Properties (1.2)
 - Recall how measurements and units are used
- Measurement Systems (1.3)
 - Understand the definition of standard units and the difference between the two major systems
- Standard Units for the metric system (1.4)
 - Recall the fundamental properties (length, mass, time) and how they are defined
- Metric Prefixes (1.5)
 - Exemplify how metric prefixes work
- Understandings from Measurements (1.6)
 - Exemplify the use of well-known measurements
 - Define the following terms: data, ratio, variables
 - Exemplify common symbols, sources of them and how these relate to quantities
- The Nature of Science (1.7)
 - Understand how natural philosophers acquire information in contrast to how information is acquired through scientific investigation
 - Recall the methods and steps of the scientific method.
 - Recall the definition and characteristics of a hypothesis, experiment and controlled experiment
 - Understand how and when results are accepted
 - Understand what a model, theory and conjecture are

○ Concepts (Key Terms, p. 21)

- area (p. 7)
- controlled experiment (p. 15)
- data (p. 7)
- density (p. 8)
- direct proportion (p. 10)
- English system (p. 4)
- equation (p. 10)
- experiment (p. 15)
- fundamental properties (p. 5)
- hypothesis (p. 14)
- inverse proportion (p. 10)
- kilogram (p. 5)
- liter (p. 6)
- measurement (p. 4)
- meter (p. 5)
- metric system (p. 5)
- model (p. 17)
- numerical constant (p. 11)

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- properties (p. 3)
- proportionality constant (p. 11)
- pseudoscience (p. 16)
- quantities (p. 10)
- ratio (p. 7)
- referent (p. 3)
- scientific law (p. 17)
- scientific principle (p. 17)
- second (p. 6)
- standard unit (p. 4)
- theory (p. 19)
- unit (p. 4)
- variable (p. 10)
- volume (p.7)

Module 2 – Chapters 2 and 3 contain the following assignments:

Action	Assignment	Due No Later Than
Read	Selected Sections from Chapters 2 and 3	01/19/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 2	01/19/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 3	01/19/20, Sunday, 11:59 PM
Submit	Module Quiz for Chapters 2 and 3	01/19/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 2	01/19/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 3	01/19/20, Sunday, 11:59 PM

Enabling Objectives and Concepts (supporting the outcomes): After completing module 2, the student will be able to:

❖ Perform the *Enabling Objectives* listed by Chapter and Section and

❖ Understand the *Concepts* (Key Terms) listed by page.

❖ Chapter 2 – Motion

○ Enabling Objectives by Chapter and Section

- Describing Motion (2.1)
 - Understand the important aspects of motion and how the motion of the object must be measured relative to something else
- Measuring Motion (2.2)
 - Define and exemplify the following: speed, velocity, acceleration and forces
- Horizontal Motion on land (2.3)
 - Describe and define friction and inertia
- Falling Objects (2.4)
 - Explain how to determine the velocity of a falling object
 - Explain what gravity is and how it relates to distance, time and acceleration of a falling object

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- Compound Motion (2.5)
 - Explain the motion of a vertical projectile and compound motion with horizontal and vertical components
- Three Laws of Motion (2.6)
 - Understand Newton's First, Second and Third Laws of Motion
 - Define mass, weight, and momentum
- Momentum (2.7)
 - Define momentum, impulse and conservation of momentum
- Forces and Circular Motion (2.8)
 - Understand that circular motion implies acceleration
- Newton's Law of Gravitation (2.9)
 - Recall Newton's Law of Gravitation
- Concepts (Key terms., p. 57)
 - acceleration (p. 29)
 - centrifugal force (p. 49)
 - centripetal force (p. 49)
 - first law of motion (p. 41)
 - force (p. 32)
 - free fall (p. 36)
 - fundamental forces (p. 32)
 - g (p. 38)
 - geosynchronous satellite (p. 54)
 - impulse (p. 48)
 - inertia (p. 34)
 - law of conservation of momentum (p. 47)
 - mass (p. 44)
 - momentum (p. 47)
 - net force (p. 32)
 - newton (p. 43)
 - second law of motion (p. 43)
 - speed (p. 27)
 - third law of motion (p. 45)
 - universal law of gravitation (p. 50)
 - velocity (p. 29)
- ❖ **Chapter 3 Energy**
 - Enabling Objectives by Chapter and Section
 - Work (3.1)
 - Define force, work, and power
 - Recall matter does not need to be moving to supply energy
 - Recall and define the units for work and power
 - Motion, Position and Energy (3.2)
 - Define energy, potential energy, and kinetic energy
 - Energy Flow (3.3)
 - Recall the relationship between energy and work
 - Recall different forms of energy can be converted to another and back, but the total energy is conserved
 - Energy Sources Today (3.4)
 - Define fossil fuels
 - Recall that supplies of petroleum and natural gas are limited
 - Recall the most common energy sources used currently

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- Know how most of our energy loss occurs
- Energy Sources Tomorrow (3.5)
 - Clarify the use of alternative in describing sources of energy
 - Define solar, geothermal energy and hydrogen fuel
- Concepts (Key terms, p. 82)
 - chemical energy (p. 72)
 - electrical energy (p. 73)
 - energy (p. 68)
 - fossil fuels (p. 77)
 - geothermal energy (p. 81)
 - horsepower (p. 65)
 - joule (p. 64)
 - kinetic energy (p. 69)
 - law of conservation of energy (p. 75)
 - mechanical energy (p. 71)
 - nuclear energy (p. 73)
 - potential energy (p. 68)
 - power (p. 65)
 - radiant energy (p. 73)
 - watt (p. 66)
- work (p. 63)
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Module 3 – Chapters 4 and 5 contain the following assignments:

Action	Assignment	Due No Later Than
Read	Selected Sections from Chapters 4 and 5	01/26/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 4	01/26/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 5	01/26/20, Sunday, 11:59 PM
Submit	Module Quiz for Chapters 4 and 5	01/26/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 4	01/26/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 5	01/26/20, Sunday, 11:59 PM

Enabling Objectives and Concepts (supporting the outcomes): After completing module 3, the student will be able to:

- ❖ Perform the *Enabling Objectives* listed by Chapter and Section and
- ❖ Understand the *Concepts* (Key Terms) listed by page.
- ❖ **Chapter 4 Heat and Temperature,**
 - Enabling Objectives by Chapter and Section
 - The Kinetic Molecule (4.1)
 - Recount the kinetic molecular theory.
 - Identify atom, element, compound, molecule.
 - Describe solids, liquids, and gases.
 - Define temperature.

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- Temperature (4.2)
 - Remember the temp scales and how to convert from one to another.
- Heat (4.3)
 - Recall heat, specific heat
 - Understand how heat energy, specific heat, mass and temperature change are related
 - Summarize conduction, convection and radiation
- Energy, Heat, and Molecular Theory (4.4)
 - Recall phase change and latent heat
 - Define latent heat of vaporization and fusion
 - Recall heat engine
- Thermodynamics (4.5)
 - Know thermodynamics and entropy
 - Describe the first and second law of thermodynamics
- Concepts (Key terms, p. 111)
 - British thermal unit (p. 96)
 - calorie (p. 96)
 - Celsius scale (p. 92)
 - conduction (p. 98)
 - convection (p. 99)
 - entropy (p. 110)
 - external energy (p. 95)
 - Fahrenheit scale (p. 92)
 - first law of thermodynamics (p. 107)
 - heat (p. 95)
 - internal energy (p. 95)
 - Kelvin scale (p. 93)
 - kilocalorie (p. 96)
 - kinetic molecular theory (p. 88)
 - latent heat of fusion (p. 102)
 - latent heat of vaporization (p. 102)
 - molecule (p. 89)
 - phase change (p. 101)
 - radiation (p. 100)
 - second law of thermodynamics (p. 108)
 - specific heat (p. 97)
 - temperature (p. 90)
- ❖ **Chapter 5 Wave Motions and Sound,**
 - Enabling Objectives by Chapter and Section
 - Forces and Elastic Materials (5.1)
 - Define elastic material and vibration
 - Distinguish between amplitude, period, and frequency
 - Waves (5.2)
 - Define mechanical waves
 - Describing Waves (5.3)
 - Describe wave terminology and know the symbol and units for wavelength
 - Sound Waves (5.4)

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- Know some species are able to hear frequencies that humans cannot
- Know that electromagnetic waves travel faster than sound waves in air
- Recall conditions that create boundaries
- Define echo
- Energy of Waves (5.5)
 - Describe intensity and decibel scale
- Sources of Sounds (5.6)
 - Recall the source of sound
 - Distinguish between noise and pure tone
 - Describe the Doppler effect
- Concepts (Key terms, p. 135)
 - amplitude (p. 118)
 - beat (p. 127)
 - cycle (p. 118)
 - decibel scale (p. 129)
 - Doppler effect (p. 132)
 - echo (p. 126)
 - frequency (p. 118)
 - fundamental frequency (p. 131)
 - hertz (p. 118)
 - infrasonic (p. 123)
 - longitudinal wave (p. 120)
 - period (p. 118)
 - pitch (p. 123)
 - reflection (p. 126)
 - refraction (p. 125)
 - resonance (p. 129)
 - reverberation (p. 126)
 - shock wave (p. 132)
 - sonic boom (p. 134)
 - standing waves (p. 130)
 - transverse wave (p. 120)
 - ultrasonic (p. 123)
 - vibration (p. 117)
 - wavelength (p. 122)
 - waves (p. 120)

Module 4 – Chapters 6 and 7 contain the following assignments:

Action	Assignment	Due No Later Than
Read	Selected Sections from Chapters 6 and 7	02/02/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 6	02/02/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 7	02/02/20, Sunday, 11:59 PM

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Submit	Module Quiz for Chapters 6 and 7	02/02/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 6	02/02/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 7	02/02/20, Sunday, 11:59 PM

Enabling Objectives and Concepts (supporting the outcomes): After completing module 4, the student will be able to:

❖ Perform the *Enabling Objectives* listed by Chapter and Section and

❖ Understand the *Concepts* (Key Terms) listed by page.

❖ **Chapter 6 Electricity**

○ Enabling Objectives by Chapter and Section

- Concepts of Electricity (6.1)
 - Recall the origin of the words electricity and electron and the basic structure of the atom
 - Know the nature of the charge associated with protons and electrons
 - Define coulomb and volt
 - Summarize Coulomb's law
- Electric Current (6.2)
 - Compare direct currents and alternating currents
 - Define electrical force, ampere, ohm, and electrical resistance
- Magnetism (6.3)
 - Remember the meaning of magnetic properties and the rule about magnetic pole attraction and repulsion
 - Define magnetic poles
- Electric Currents and Magnetism (6.4)
 - Describe the magnetic field lines around a wire that is producing them
- Electromagnetic Induction (6.5)
 - Summarize electromagnetic induction
- Circuit Connections (6.6)
 - Contrast parallel and series circuits

○ Concepts (Key terms, p. 172)

- alternating current (p. 151)
- amp (p. 149)
- ampere (p. 149)
- coulomb (p. 144)
- Coulomb's law (p. 145)
- direct current (p. 151)
- electric circuit (p. 148)
- electric current (p. 148)
- electric field (p. 146)
- electric generator (p. 163)
- electrical conductors (p. 144)
- electrical resistance (p. 151)
- electromagnet (p. 159)
- electromagnetic induction (p. 162)
- electrostatic charge (p. 142)

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- force field (p. 146)
- fundamental charge (p. 144)
- magnetic domain (p. 158)
- magnetic field (p. 156)
- magnetic poles (p. 156)
- ohm (p. 151)
- Ohm's law (p. 152)
- parallel circuit (p. 165)
- series circuit (p. 165)
- short circuit (p. 170)
- transformer (p. 163)
- volt (p. 147)
- watt (p. 153)

❖ Chapter 7 Light,

- Enabling Objectives by Chapter and Section
 - Sources of Light (7.1)
 - Identify incandescent light sources
 - Recognize the electromagnetic spectrum
 - Compare types of electromagnetic radiation on the spectrum
 - Properties of Light (7.2)
 - Describe the light ray model
 - Identify terms relating to reflection
 - Match terms relating to reflection to geometric representations
 - Define refraction and the index of refraction
 - Map the colors of the visible light by wavelength and frequency
 - Explain white light
 - Evidence for Waves (7.3)
 - Define terms related to interference
 - Identify transverse and longitudinal waves
 - Evidence for Particles (7.4)
 - Explain why the sky is blue
 - Define terms relating to the energy of light
 - The Present Theory (7.5)
 - Summarize the modern understanding of light
 - Relativity (7.6)
 - Recognize the special and general theories
 - Identify the principles on which Einstein's special theory of relativity is based
- Concepts (Key terms, p. 200)
 - blackbody radiation (p. 179)
 - consistent law principle (p. 197)
 - constancy of speed (p. 197)
 - general theory of relativity (p. 198)
 - incandescent (p. 179)
 - index of refraction (p. 186)
 - interference (p. 191)
 - light ray model (p. 181)
 - luminous (p. 179)

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- photoelectric effect (p. 195)
- photon (p. 196)
- polarized (p. 192)
- quanta (p. 195)
- real image (p. 184)
- refraction (p. 185)
- total internal reflection (p. 186)
- unpolarized light (p. 192)
- virtual image (p. 184)
- salinity (p. 284)
- salt (p. 292)
- solubility (p. 285)
-

Module 5 – Chapters 8 and 9 contains the following assignments:

Action	Assignment	Due No Later Than
Read	Selected Sections from Chapters 8 and 9	02/09/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 8	02/09/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 9	02/09/20, Sunday, 11:59 PM
Submit	Module Quiz for Chapters 8 and 9	02/09/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 8	02/09/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 9	02/09/20, Sunday, 11:59 PM

Enabling Objectives and Concepts (supporting the outcomes): After completing module 5, the student will be able to:

- ❖ Perform the *Enabling Objectives* listed by Chapter and Section and
- ❖ Understand the *Concepts* (Key Terms) listed by page.
- ❖ **Chapter 8 Atoms and Periodic Properties**
 - Enabling Objectives by Chapter and Section
 - Atomic Structure Discovered (8.1)
 - Summarize Dalton's atomic theory
 - Summarize the general characteristics of the current model or structure of the atom and describe the subatomic particles that make up the atom
 - Define atomic number, isotope and mass number
 - Interpret the atomic symbol of an element for a given isotope
 - The Bohr Model (8.1)
 - Articulate the basic principle of quantization of energy
 - Quantum Mechanics (8.3)
 - Identify the four quantum numbers that describe the distribution of electrons in an atom
 - Electron Configuration (8.4)
 - Define electron configuration and summarize the procedure of writing out the electron configuration of an atom

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- The Periodic Table (8.5)
 - Describe the general arrangement of the periodic table and classify elements according to their position on the periodic table
 - Recall the names of the important groups in the periodic table
 - Describe the chemical and physical properties of the different families and explain the relationship between electron configuration, group number and chemical behavior
 - Use the periodic table to determine the ion formed by an element
- Metals, Nonmetals, and Semiconductors (8.6)
 - Recall the general characteristics of metals, nonmetals and semiconductors and their relative position on the periodic table
 - Define an ion, explain how to predict the ion formed using the periodic table and recall the trends in the formation of representative group ions
 - Solve for the number of outer electrons in an atom
- Concepts (Key terms, p. 226)
 - atomic mass unit (p. 210)
 - atomic number (p. 209)
 - atomic weight (p. 210)
 - Balmer series (p. 212)
 - electron (p. 207)
 - electron dot notation (p. 221)
 - electron pair (p. 218)
 - electron volt (p. 214)
 - excited states (p. 213)
 - ground state (p. 213)
 - Heisenberg uncertainty principle (p. 217)
 - ion (p. 222)
 - isotope (p. 209)
 - line spectrum (p. 211)
 - mass number (p. 210)
 - matter waves (p. 215)
 - neutron (p. 209)
 - nucleus (p. 208)
 - orbital (p. 217)
 - Pauli exclusion principle (p. 218)
 - photons (p. 211)
 - proton (p. 209)
 - quanta (p. 211)
 - quantum mechanics (p. 216)
 - representative elements (p. 219)
 - semiconductors (p. 224)
 - transition elements (p. 219)
 - wave mechanics (p. 216)

❖ Chapter 9 Chemical Bonds

- Enabling Objectives by Chapter and Section
 - Compounds and Chemical Change (9.1)
 - Exemplify elements and compounds
 - Compare and contrast atoms, compounds, and molecules
 - Define and describe a chemical change/reaction and a chemical equation

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- Valence Electrons and Ions (9.2)
 - Compare inner and valence electrons
 - Recall the Octet rule
 - Describe ion formation
- Chemical Bonds (9.3)
 - Identify the ways in which elements combine
 - Solve for the ion formed from an element
 - Describe the general characteristics of an ionic bond, the formation of an ionic bond and the electron transfer in the formation of ionic bonds
 - Recall the format used for the chemical formula of a compound and interpret the chemical formula of an ionic compound
 - Explain how to predict the ion formed by an element using the periodic table and use the charges to determine the correct formula for a given ionic compound
 - Define a covalent bond, summarize the general characteristics of covalent bonding and describe the formation of a covalent bond
 - Define a covalent compound
 - Describe bonding and lone pairs in covalent species
 - Recall the definitions of single, double, and triple bonds and how the periodic table can be used to determine the number of bonds made by nonmetals
 - Recall the methods by which electrons can be depicted in electron dot structure
- Bond Polarity (9.4)
 - Define electronegativity, describe the significance in the difference in the electronegativity of two atoms, and use electronegativity values to predict the type of bonds (ionic, covalent or polar covalent)
 - Summarize the characteristics of a polar covalent bond
 - Describe a dipole
- Composition of Compounds (9.5)
 - Recall that chemical compounds have common names
 - Recall the general rules for naming ionic and covalent compounds and use these rules to name a given ionic or covalent bond
 - Recall the Greek numerical prefixes used for naming covalent compounds
 - Recall the rules for writing a chemical formula and solve for the chemical formula of a given ionic or covalent compound from its name
 - Recall and use the rules for naming ionic compounds containing polyatomic ions and for writing the chemical formula of an ionic compound containing a polyatomic ion from its chemical name
 - Define valence
- Concepts (Key terms, pp. 249-250)
 - atom (p. 233)
 - chemical bond (p. 236)
 - chemical energy (p. 234)
 - chemical equation (p. 234)
 - chemical reaction (p. 234)
 - covalent bond (p. 239)
 - covalent compound (p. 240)
 - double bond (p. 241)
 - electronegativity (p. 242)

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- formula (p. 238)
- heat of formation (p. 237)
- ionic bond (p. 237)
- ionic compounds (p. 238)
- molecule (p. 233)
- octet rule (p. 235)
- polar covalent bond (p. 243)
- single bond (p. 241)
- triple bond (p. 241)
- valence (p. 249)
- valence electrons (p. 235)
-

Module 6 – Chapters 10 and 11 contains the following assignments:

Action	Assignment	Due No Later Than
Read	Selected Sections from Chapters 10 and 11	02/16/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 10	02/16/20, Sunday, 11:59 PM
Perform	LEARNSMART Sections from Chapter 11	02/16/20, Sunday, 11:59 PM
Submit	Module Quiz for Chapters 10 and 11	02/16/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 10	02/16/20, Sunday, 11:59 PM
Post	Your Reflective Journal Entry for Chapter 11	02/16/20, Sunday, 11:59 PM

Enabling Objectives and Concepts (supporting the outcomes): After completing module 6, the student will be able to:

- Perform the *Enabling Objectives* listed by Chapter and Section and
- Understand the *Concepts* (Key Terms) listed by page.
- **Chapter 10 Chemical Reactions**
 - Enabling Objectives by Chapter and Section
 - Chemical Formulas (10.1)
 - Describe a molecular formula and the information it contains
 - Recall the definition of formula weight, how to calculate the molecular/formula weight from its chemical formula and be able to calculate it
 - Chemical Equations (10.2)
 - Recount the usefulness of a chemical equation
 - Define products and reactants in a chemical equation
 - Recall the meaning of subscripts and coefficients used with a chemical formula
 - Recall and summarize how to balance a chemical equation without changing its meaning and solve for a balanced equation
 - Describe the combustion of a hydrocarbon
 - Types of Chemical Reactions (10.3)
 - Recall the three different types of chemical reactions: describe the characteristics of

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redox reactions, a reaction of an acid with a base, and what occurs when a soluble ionic compound is dissolved in solution

- Define oxidizing and reducing agents
- When an ionic compound dissolves, solve for the species in solution
- Information from Chemical Equations (10.4)
 - Describe the multiple meanings of a coefficient in a chemical reaction
 - Recall Avogadro's number, the definitions of the mole, gram-atomic, -formula, and – molecular weight
 - Calculate the mass of one mole of atoms or molecules
 - Solve for the gram-molecular or formula weight for a given species
 - Interpret a given chemical equation correctly
- Concepts (Key terms, p. 272)
 - Avogadro's number (p. 268)
 - chemical equation (p. 258)
 - combination reaction (p. 264)
 - decomposition reaction (p. 264)
 - empirical formula (p. 255)
 - formula weight (p. 256)
 - gram-atomic weight (p. 269)
 - gram-formula weight (p. 269)
 - gram-molecular weight (p. 269)
 - ion exchange reaction (p. 265)
 - law of conservation of mass (p. 259)
 - mole (p. 268)
 - molecular formula (p. 255)
 - molecular weight (p. 256)
 - oxidation-reduction reaction (p. 263)
 - oxidizing agents (p. 263)
 - redox reaction (p. 263)
 - reducing agent (p. 263)
 - replacement reaction (p. 265)
- **Chapter 11 Water and Solutions**
 - Enabling Objectives by Chapter and Section
 - Household Water (11.1)
 - Know some sources and uses for household water and recall some of the common types of U.S. drinking water pollution
 - Properties of Water (11.2)
 - Exemplify the terms solvent and/or solute
 - Remember why water is considered a universal solvent
 - Remember some characteristics of the structure of water molecules and know what hydrogen bonding is
 - Know some benefits of having water in a liquid phase possess greater density than water in a solid phase
 - Recall what a solution is and how it is made, what an aqueous solution is and the general rule for forming solutions, that like dissolves like

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- Remember what a solution concentration is, what percent by volume and percent by weight are
 - Recall what a mole and Avogadro's number are, what solubility is, and the definitions of salinity and molarity
- Properties of Water Solutions (11.3)
 - Know what electrolytes and nonelectrolytes are, some boiling point characteristics, what drives the freezing process, and the normal freezing point and boiling point of water
- Acids, Bases and Salts (11.4)
 - Identify the properties of acids, bases, and salts
 - Define acid, base, and salt
 - Exemplify various common salts and their uses
 - Recall what a pH scale measures, represent pH scale values and exemplify pH values of common substances
- Concepts (Key terms, p. 296)
 - acid (p. 291)
 - acid-base indicator (p. 290)
 - base (p. 291)
 - concentration (p. 282)
 - electrolyte (p. 286)
 - hydrogen bonding (p. 280)
 - hydronium ion (p. 287)
 - miscible fluids (p. 281)
 - molarity (p. 285)
 - neutralized (p. 291)
 - pH scale (p. 292)
 - polar molecule (p. 280)

Module 7 – Journal & Final Exam, Chapters 1 – 11 contains the following assignments:

Action	Assignment	Due No Later Than
Post	Reflective Journal with Entries for Chapters 1 - 11	02/28/20, Tuesday, 11:59 PM
Submit	Final Exam for Chapters 1 - 11	02/28/20, Tuesday, 11:59 PM

VIII. LIBRARY AND INFORMATION TECHNOLOGY WORKSHEET

This class requires use of the following library resources and services:

- _____ In-class library orientation / bibliographic instruction
- _____ Listening or viewing multimedia materials in the library
- _____ Library reserve materials
- _____ Specialized software (SPSS, C++, Java, etc.): None
- _____ Other specific library resources (e.g. reading list, reference items, special database)

Details: NONE

IX. STATEMENT ABOUT TECHNOLOGY SKILLS

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This class requires the following proficiencies:

X Word processing

X Spreadsheets

 PowerPoint

X E-mail / Internet use

X Basic research skills (self-taught at <http://tilt.lib.utsystem.edu>)

X. CORE SKILLS WITH LEVEL DETAILED

Core Skills Assessment: After this physical science course, students will be assessed on their ability to think analytically. The results of the core skills assessment are not used to determine grades, but rather are used to help the University improve programs and advise students more effectively.

Core Skills Goals: The goal of Coker University is “to improve significantly each student’s ability to think analytically and creatively, and to write and speak effectively” (from the Mission of Coker University).

Analytical Thinking: Effective analytical thinking is characterized by the ability to critically analyze physical science theories and information. This will be evidenced by oral reviews of current events in physical science. Core skills assessment will be determined from classroom observations and rated using the following criteria:

- 1) **Graduate Level:** Students who have acquired this skill at the graduate level will be able to critically analyze most physical science theories and research practices effectively. Students at this level will be able to analyze most theories or items of research that they encounter. Students will also be able to identify and understand the relevance of most physical science theories in their own lives. They will be prepared to identify various theories across the discipline of physical science and critique each one and use the language of physical science to describe most conditions or situations encountered in class, on the Internet or in the textbook.
- 2) **Junior-Senior Level:** Students who have acquired this skill at the junior-senior level will be able to critically analyze many physical science theories and research practices that are encountered. Students will be able to discuss both historical as well as contemporary physical science theories but may not see the relevance in their own lives and to use the language of physical science to describe many conditions or situations encountered in class, on the Internet or in the textbook.
- 3) **Freshman - Sophomore Level:** Students who have acquired this skill at the freshmen-sophomore level will be able to critically analyze some of the physical science theories and research practices that are encountered. They will be able to identify some relevance of the physical science theories in their lives and to use some of the language of physical science to describe conditions or situations encountered in class, on the Internet or in the textbook.
- 4) **Remedial Level:** Student demonstrates limited ability to critically analyze any of the physical science theories and research practices that are encountered. They will be able to identify few physical science theories that are relevant to their lives and form confusing and conflicting conclusions when using the language of physical science to describe conditions or situations encountered in class, on the Internet or in the textbook.