

SCI1100_202338_Staging_EMBR_TEM

SCI-1100

2023 05/01/2023 to 04/30/2024 Modified 03/22/2023

Course Description

This full-year course provides an overview of the atom and the molecular-level properties and interactions in the created world. Students learn the properties of matter, atomic structure, and basic atomic bonding and then apply this understanding to the mathematical and conceptual groundwork of more complex molecular interactions. Emphasis is placed on student analysis and critical thinking related to scientific investigations, demonstrations, and lab exercises. Students are exposed to the perfection and order of God's creation as they investigate the laws and patterns that govern chemistry in the natural world.

Rationale

Chemistry gives the student an opportunity to explore substances, their properties, and how the interactions of these substances can generate a different set of properties. The study of chemistry generates critical cognition and analysis that enlightens the student's perception of the function of substances within creation. Chemistry is a necessary component of the student's understanding of physical processes in the world around them.

Prerequisite

Completion or current enrollment in Algebra II

Course Learning Outcomes

- A. The student will investigate and understand that experiments in which variables are measured, analyzed, and evaluated produce observations and verifiable data.
- B. The student will investigate and understand that the placement of elements on the periodic table is a function of their atomic structure.
- C. The student will investigate and understand how conservation of energy and matter is expressed in chemical formulas and balanced equations.
- D. The student will investigate and understand that chemical quantities are based on molar relationships.
- E. The student will investigate and understand that the phases of matter are explained by kinetic theory and forces of attraction between particles.
- F. The student will investigate and understand how basic chemical properties relate to organic chemistry and biochemistry.

Course Resources

See Ember's [Systems Requirements](#) for computer specifications necessary to operate this curriculum.

- Note: Embedded YouTube videos may be utilized to supplement Ember's YouTube videos are the property of the respective content creator, licensed to YouTube for distribution and user access. As a non-profit educational institution, Ember is able to use YouTube video content under the YouTube Terms of Service. For additional information on copyright, please contact the [Jerry Falwell Library](#)

* Course Policies

Types of Assessments

To simplify and clearly identify which policies apply to which assessment, each assessment has been categorized into one of four categories: Lesson, Assignment, Quiz, or Test. Each applicable item on the course Modules page has been designated with an identifier chosen from among these categories. Thus, a Quiz on the American Revolution may be designated by the title, "1.2.W Quiz: The American Revolution."

- **Lesson:** *Any item on the Modules page designated as a "Lesson"*

These include instructional content and sometimes an assessment of that content. Typically, a Lesson will be the day-to-day work that a student completes.

- **Assignment:** *Any item on the Modules page designated as an "Assignment"*

Typical examples of Assignments include, but are not limited to, papers, book reports, projects, labs, and speeches. Assignments are usually something that the student should do his or her best work on the first time.

- **Quiz:** *Any item on the Modules page designated as a "Quiz"*

This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Quizzes cover a smaller amount of material than Tests.

- **Test:** *Any item on the Modules page designated as a "Test"*

This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Tests cover a larger amount of material than Quizzes.

Materials Selection Policy

Ember curates educational materials that are consistent with the school's philosophy; however, the fallen human condition depicted in literature (as in Scripture itself) is not always pleasant. Valuable works sometimes have objectionable or profane elements. Good books provide four (4) recognized values.

- They build godly attitudes and character traits.
- They deepen our social and cultural awareness.
- They strengthen our use of written language.
- They provide a lifelong source of enjoyment and relaxation.

In order to instill these values in students and fulfill the stated objectives of the school, all Ember students are expected to read and study good books on a regular basis. Recognizing that materials designed for one level may not be appropriate for another, three (3) levels of criteria are applied:

- Elementary materials must contain no objectionable material,
- Objectionable elements in sixth through eighth-grade materials must be limited and must serve a specific educational purpose, and
- Objectionable content may be included in high school materials but must be outweighed by positive literary, curricular, and/or Christian values.

The curriculum department has approved required educational materials for students.

Resubmission Policy

Students are expected to submit their best work on the first submission for every Lesson, Assignment, Quiz, and Test. However, resubmissions may be permitted in the following circumstances:

- **Lesson:** Students are automatically permitted two attempts on a lesson. Students may freely resubmit for their first two attempts without the need for teacher approval.

If a student feels that he or she deserves a resubmission on a Lesson, Assignment, Quiz, or Test due to a technical issue such as a computer malfunction, the student should message his or her teacher to make the request. With Ember, the teacher may be a physical school teacher or the student's parent/guardian. The teacher can give another attempt from his or her Canvas account. For more information on how to do this, please review the Ember orientation course.

Schedule

Module 1: Scientific Measurements and Calculations

- Week 1: Converting Units
- Week 2: Scientific Notation and Accuracy
- Week 3: Dimensional Analysis, Matter, and Density
- Week 4: Module 1 Review and Quiz

Module 2: Atomic Structure

- Week 5: Atomic Theory & the Periodic Table
- Week 6: Electron Configuration
- Week 7: Light and Energy
- Week 8: Periodic Properties
- Week 9: Quarter 1 Review and Exam

Module 3: Chemical Bonds & Molecular Structures

- Week 10: Ionic & Covalent Bonding
- Week 11: Covalent Bonds & Molecular Structures

Module 4: Chemical Reactions

- Week 12: Chemical Equations
- Week 13: Types of Chemical Reactions

Module 5: Stoichiometry

- Week 14: The Mole
- Week 15: Empirical & Molecular Formulas
- Week 16: Using Stoichiometry
- Week 17: Stoichiometry & Volume
- Week 18: Quarter 2 Review and Exam

Module 6: The Chemistry of Solutions

- Week 19: Solutions
- Week 20: Concentration & Dilutions
- Week 21: Acids and Bases
- Week 22: Neutralization & Titration

Module 7: Gases

- Week 23: Four Gas Laws
- Week 24: Working with Gases

Module 8: Heat Measurements and Calculations

- Week 25: Measuring Energy and Temperature
- Week 26: Using Energy and Heat
- Week 27: Quarter 3 Review and Exam

Module 9: Thermodynamics & Kinetics

- Week 28: Enthalpy
- Week 29: Thermodynamics
- Week 30: Kinetics

Module 10: Chemical Equilibrium & Reduction-Oxidation Reactions

- Week 31: Chemical Equilibrium
- Week 32: Le Chatelier's Principle
- Week 33: Oxidation-Reduction Reactions

Module 11: Nuclear and Organic Chemistry

- Week 34: Nuclear Chemistry
- Week 35: Organic Chemistry
- Week 36: Quarter 4 Review & Exam