

Chemistry B Course Description

Course Description

In this course, you will learn what matter is made of. By matter, we do not mean just rocks or chemicals. We mean everything - even you. You will explore the unseen world of atoms and molecules, the building blocks of the universe. You will be able to understand what makes one form of matter different from the other.

After completing this course, you will be able to:

1. State the general purpose for the study of chemistry.
2. List several fields of study where knowledge of chemistry is important.
3. Use scientific units of measurement.
4. Describe the structure and components of basic atoms.
5. Use the periodic table to locate important chemical information.
6. Describe several types of chemical bonds.
7. Manipulate common chemical formulas and equations.
8. List and describe types of chemical reactions.
9. List some physical characteristics of common gases, liquids, and solids.
10. Describe the behavior of solutions and ions.
11. Describe reaction energy and reaction kinetics.
12. Discuss important aspects of nuclear chemistry.

Course Outline

Unit 1 - Chemical Reactions:

- What is a Chemical Reaction
- Physical Change
- Stoichiometry

Unit 2 - Solids, Liquids, and Gases:

- Solids, Liquids, and Gases
- Understanding Gas Laws
- Liquids and Solids
- Changes of State

Unit 3 - Water, Solutions, and the Acid-Bases:

- Properties of Solutions
- Properties of Acids and Bases

Unit 4 - Reaction Rates and Equilibrium:

- Reaction Rates and Collision Theory

- Kinetics

Unit 5 - Thermodynamics:

- Energy Transfer
- Conservation of Energy

Unit 6 - Nuclear Energy:

- Energy Inside of the Atom
- Nuclear Reactions
- Fission and Fusion

Getting Started

In each section there will be lessons which will include examples and rules. The section will usually end with a practice set to allow you to practice the skills taught and get immediate feedback on the solutions. The lesson pages will direct you on when it is time to complete a discussion, assignment, quiz, or exam.

Audio Instruction:

Some sections will have an audio/video lesson included, in which many of the topics are taught by a teacher explaining the steps and solutions.

Discussions:

Throughout the class, you will be asked to participate in discussions. These are not discussion in which you are speaking-you will be writing messages on a messageboard, and others will be able to respond to you and you to them. These will be given a grade based on a particular number of points.

Written Assignments:

In the units there are often forms or particular assignments which must be downloaded to your computer, finished, and returned to your teacher. These must be saved in Rich Text Format. See the section in this unit on Rich Text Format, which explains how to handle these.

Unit Lab Notebooks:

Each unit has several open responses wich must be completed and submitted to the instructor. The open responses allow you to do a little internet research at times and use the skills you have acquired in the unit. They are worth 10 points.

Quizzes:

Regular course quizzes are given in all sections and may only be taken one time. They range in value from 10 points to 20 points. This assesses what you have learned in the section from the reading, listening, and practices.

Exams:

Each unit ends with an exam. This will cover all topics in the unit and may be taken in one sitting only. Once you log out, the exam locks you out.

Notebook:

This course uses a lot of formulas and techniques which may be hard to store in your memory permanently. You are *encouraged to keep a notebook* where you can keep formulas and perhaps examples of different types of problems. You will find it useful when preparing for quizzes and exams.

Laboratory Instructions:

Labs are an important part of the scientific process, and understanding the scientific process is one of the most important parts of this class. You should have had detailed instruction in the scientific process and lab procedures before taking this class, but it will still be helpful to review these processes.

Steps in the scientific method:

1. Observation: defining the problem you wish to explain
2. Hypothesis: one or more falsifiable explanations for the observation
3. Experimentation: controlled attempts to test one or more hypothesis.
4. Conclusion: was the hypothesis supported or not? After this step the hypothesis is either modified or rejected, and the cycle continues.

After a hypothesis has been repeatedly tested, a hierarchy of scientific thought develops. The hypothesis has the lowest level of certainty. A theory is a hypothesis that has been repeatedly tested with little modification, e.g. The Laws of Thermodynamics, Newton's Law of Gravity. Science uses the word theory differently than it is used in the general population. Theory to most people, in general nonscientific use, is an untested idea. A scientist would call that a hypothesis.

Scientific experiments are also concerned with isolating the variables. A good science experiment does not simultaneously test several variables, but rather a single variable that can be measured against a control. Scientific controlled experiments are situations where all factors are the same between two test subjects, except for the single experimental variable.

Course Lab Procedure:

Be sure to follow the following steps carefully every time you have a lab requirement.

1. Follow the link to the lab site (for virtual labs) and preview the lab procedures. Some labs will be what we refer to as "kitchen labs", where you will complete at home with basic supplies that can easily be found.
2. Open the lab report form and fill in the Purpose and Hypothesis sections.
3. Perform the lab.
4. To complete the lab report form, locate the lab in the assessments and complete all areas.
5. In some cases, labs are also followed by quizzes, where the computer will automatically score, hence giving you immediate feedback.