

SCIENCE 10

Mr. Schuler

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Science 10 consists of 4 equally weighted units that cover the main pillars of academic science. Students are expected to work diligently and be self-motivated learners. Regular attendance is essential and students are responsible for catching up on all missed work. Do not assume you are excused.

Unit A: Energy and Matter in Chemical Change (17.5%) (The chemistry unit)

Overview: Chemical changes involve energy and transformations of matter. A knowledge of the underlying structure of matter and the basic chemical species is important in understanding chemical changes. As students explore the properties of molecular and ionic compounds, including acids and bases, they begin to appreciate the need for a classification scheme and a system of nomenclature. Students classify, name compounds and write balanced chemical equations to represent chemical changes. As well, students are introduced to the law of conservation of mass and the mole concept.

Key Concepts

- how chemical substances meet human needs
- Workplace Hazardous Materials Information System (WHMIS) and safe practices
- International Union of Pure and Applied Chemistry (IUPAC) nomenclature, ionic and molecular compounds, acids and bases
- evidence of chemical change
- role and need for classification of chemical change
- writing and balancing equations
- law of conservation of mass and the mole concept

Unit B: Energy Flow in Technological Systems (17.5%) (The physics unit)

Overview: The first and second laws (conservation and conversion) of thermodynamics have been useful in the development of modern and efficient energy conversion devices. Students investigating mechanical energy conversions and transfers in systems will recognize that while energy is conserved, useful energy diminishes with each conversion. Students learn that energy can be observed only when it is being transferred, and that mechanical energy can be quantified. Energy conservation and conversion concepts are applied by students to explain energy conversions in natural and technological systems, and to investigate the design and function of energy conversion technologies.

Key Concepts

- forms and interconversions of energy
- technological innovations of engines that led to the development of the concept of energy
- one-dimensional motion
- mechanical energy conversions and work
- design and function of technological systems and devices involving potential and kinetic energy and thermal energy conversions
- efficient use of energy, and the environmental impact of inefficient use of energy

Unit C: Cycling of Matter in Living Systems (17.5%) (The biology unit)

Overview: The fundamental unit of life, the cell, is an example of an efficient open system comprised of a cell membrane and organelles that carry out the basic functions of all living organisms. Students will learn that technological advancements in microscopy have enhanced the study of cells and cellular processes. The understanding of life processes at the cellular level can also be applied to multicellular organisms.

Key Concepts

- microscopy and the emergence of cell theory
- cellular structures and functions, and technological applications
- active and passive transport of matter
- relationship between cell size and shape, and surface area to volume ratio
- use of explanatory and visual models in science
- cell specialization in multicellular organisms; i.e., plants
- mechanisms of transport, gas exchange, and environmental response in multicellular organisms; i.e., plants

Unit D: Energy Flow in Global Systems (17.5%) (The earth science unit)

Overview: Solar energy sustains life and drives the global climate systems on Earth. Without solar energy there would be no heat or precipitation and, therefore, no life on Earth. Students will gain an understanding that the absorption and transfer of thermal energy at and near Earth's surface results in a variety of climate zones with characteristic weather patterns and biomes. Climatic factors largely determine the flora and fauna found in each of the world's major biomes. The *United Nations Intergovernmental Panel on Climate Change* has stated that the balance of evidence suggests a human influence on global climate. Scientists from various fields are studying this relationship to determine the potential impact on biomes.

Key Concepts

- social and environmental contexts for investigating climate change
- solar radiation budget
- climate zones, transfer of thermal energy by the hydrosphere and the atmosphere
- hydrologic cycle and phase change
- relationship between biomes, solar energy and climate
- human activity and climate change

Materials (bring daily)

- Assigned textbook
- 3 ring binder with blank paper
- Pen (blue or black)
- Scientific calculator
- Pencil for diagrams and calculations

Stay organized!

Evaluation

Units are worth 17.5% each for a total of 70%.

The comprehensive final exam is worth 30%.

Each unit will include 3 section tests and one unit exam. Supplemental formative quizzes will be added as needed.

Unit exams are worth 50% of each unit. You should arrive prepared!

Other assignments will compliment the remaining unit grade.

Success in science 10 depends on working consistently and progressing at the pace of the class. Do not let yourself fall behind. Be prepared for tests. If you need help please ask.