Louis St. Laurent
Middle Years IB Science 10
Course Outline

RESOURCES
Text: Science 10 Addison Wesley
Supplementary Resources: Science 10 Data Booklet

OUTLINE
In addition to the topics below, students will develop laboratory skills, as well as a higher level of scientific communication and critical thinking.

Unit A: Energy and Matter in Chemical Change
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 will learn how to classify compounds and name them using proper nomenclature. In addition students will 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 for ionic and molecular compounds, and 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
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 quantified, and how to use energy calculations. 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 inter-conversions 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

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
- Mechanisms of transport, gas exchange, and environmental response in multicellular organisms

Unit D: Energy Flow in Global Systems

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
- Hydrologic cycle and phase change
- Relationship between biomes, solar energy and climate
- Human activity and climate change

ATTENDANCE

- Regular attendance is necessary in order to be successful in this course. Contact will be made with your parent/guardian by your teacher after 3 unexcused absences, after that, you will be dealt with by a member of the Administration.
- If for some reason you are absent, it is ***your responsibility*** to make up all the missed work and get the notes from another student ***before the next class.***
- If you are planning an extended leave from class, you are expected to complete the same requirements as those students attending class. Arrangements to complete missed work and tests must be made *prior* to the leave; if you are going on a trip or away at a

tournament, be sure to consult the LSL Handbook on extended absence protocol and the reduction of grades based on incompleteness of course requirements.

LABORATORY/HOMEWORK EXPECTATIONS:

- Lab materials are continually being set up and removed. If you are unable to participate in a lab activity, please make arrangements *prior to the lab*. Lab groups will consist of 2-4 students working at a common station to gather group results. You are responsible for all pre and post lab activities on an **individual basis.** This means that all written work of an assignment and/or homework must be ***your own.***
- Students are expected to do much of the reading from the text on their own time to be prepared for the next day's lecture. If you are not keeping up with the reading you *will* fall behind.

*NOTE: Even if you are absent from the lab or class, you must complete the lab write up or assigned homework. Use your class contacts to provide you with the assignment or results in the event you miss a class or the lab itself.

ASSESSMENT/ EVALUATION:

There will be two reporting periods, worth 80% of the course mark broken down in the percentages below

1. Quizzes/Assignments	**15%**
2. Unit Exams	**40%**
3. Projects	**20%**
4. Final Exam	**25%**

A wide range of assessment information is used in the development of a student's final grade. Individualized assessments provided specific information regarding student progress and overall performance in class. Student assessment may vary from student to student to adapt to differences in student needs, learning styles, preferences and paces. ***Not all students will be graded similarly and a teacher reserves the right to make changes to a student's grade structure/calculation.***

The MYP Philosophy:
As a Middle Years IB school, we look to provide instruction that places a premium on holistic, interdisciplinary learning refined through engagement with six **Global Contexts**. These areas serve as conceptual lenses through which students explore and examine ideas, probe connections across and through subject areas, and use what they are learning in school to solve real world problems.

1. **Identities and relationships** – This context focuses on exploring and reflecting on one's own values and well-being, rights and responsibilities, and human relationships.
2. **Orientation in space and time** – This context encourages students to inquire about their personal histories and the interconnectedness of individuals and civilizations from local and global perspectives.
3. **Personal and cultural expression** – This context explores the different ways in which individuals express ideas, feelings, nature, culture, beliefs, and values. Students are encouraged to appreciate the aesthetic and to extend and enjoy creativity.
4. **Scientific and technical innovation** – Using this global context inspires students to broaden their understanding of how the world works based on the interaction between the natural world and human societies. Through this context, students focus on the impact of scientific and technological advances on society and the environment.
5. **Globalization and sustainability** – Students concentrate on studying the interconnectedness, structure, and function of human-made societies and their impact on humankind and the environment.
6. **Fairness and development** – Through this context, students question the distribution of finite resources among people and other living things and promote access to equal opportunities, peace, and conflict resolution.

MYP Assessment:
MYP assessment will include assessing each of the four criteria at least twice throughout the semester. These rubrics will be used both independently and in conjunction with other science rubrics. Students will receive both a Science 10 grade and an MYP grade on the final semester report card.

MYP IB - Year 5 - Science Rubric

	7-8	5-6	3-4	1-2	0
Criterion A Knowing & Understanding	i. **Explain** scientific knowledge ii. Apply scientific knowledge and understanding to **solve problems** set in **familiar and unfamiliar situations** iii. **Analyze** and **Evaluate** information to make **scientifically supported judgments**	i. **Describe** scientific knowledge ii. Apply scientific knowledge and understanding to **solve problems** and **suggest solutions** set in **unfamiliar situations** iii. **Analyze** information to make **scientifically supported judgments**	i. **Outline** scientific knowledge ii. Apply scientific knowledge and understanding to **solve problems** set in **familiar situations** iii. **Interpret** information to make **scientifically supported judgments**	i. **State** scientific knowledge ii. Apply scientific knowledge and understanding to **suggest solutions** to problems set in **familiar situations** iii. **Interpret** information to make **judgments**	The student does not reach a standard identified by any of the descriptors.
Criterion B Inquiring and Designing	i. **Explain** a problem of question to be tested by a scientific investigation ii. **Formulate and explain** a testable hypothesis **using correct scientific reasoning** iii. **Explain** how to manipulate the variables, and **explain** how **sufficient, relevant data** will be collected iv. **Design** a **logical, complete and safe method** in which he or she **selects appropriate materials and equipment**	i. **Describe** a problem of question to be tested by a scientific investigation ii. **Formulate and explain** a testable hypothesis **using scientific reasoning** iii. **Describe** how to manipulate the variables, and **describe** how **sufficient, relevant data** will be collected iv. Design a **complete and safe method** in which he or she **selects appropriate materials and equipment**	i. **Outline** a problem of question to be tested by a scientific investigation ii. **Formulate** a testable hypothesis **using scientific reasoning** iii. **Outline** how to manipulate the variables, and **outline** how **relevant data** will be collected iv. **Design** a **logical, complete and safe method** in which he or she **selects appropriate materials and equipment**	i. **State** a problem of question to be tested by a scientific investigation ii. **Outline** a testable hypothesis iii. **Outline** the variables iv. **Design** a **method** with **limited success**	The student does not reach a standard identified by any of the descriptors.
Criterion C Processing and Evaluating	i. **Correctly collect, organize, transform and present** data in numerical and/or visual forms ii. **Accurately interpret** data and **explain results using correct scientific reasoning** iii. **Evaluate** the validity of a hypothesis based on the outcome of a scientific investigation iv. **Evaluate** the validity of a method based on the outcome of a scientific investigation v. **Explain** improvements or extensions to the method that would benefit the scientific investigation	i. **Correctly collect, organize, and present** data in numerical and/or visual forms ii. **Accurately interpret** data and **explain results using scientific reasoning** iii. **Discuss** the validity of a hypothesis based on the outcome of a scientific investigation iv. **Discuss** the validity of a method based on the outcome of a scientific investigation v. **Describe** improvements or extensions to the method that would benefit the scientific investigation	i. **Correctly collect and present** data in numerical and/or visual forms ii. **Accurately interpret** data and **explain results** iii. **Outline** the validity of a hypothesis based on the outcome of a scientific investigation iv. **Outline** the validity of a method based on the outcome of a scientific investigation v. **Outline** improvements or extensions to the method that would benefit the scientific investigation	i. **Collect and present** data in numerical and/or visual forms ii. **Interpret** data iii. **State** the validity of a hypothesis based on the outcome of a scientific investigation iv. **State** the validity of a method based on the outcome of a scientific investigation v. **State** improvements or extensions to the method	The student does not reach a standard identified by any of the descriptors.
Criterion D Reflecting on the impacts of science	i. **Explain** the ways in which science is applied and used to address a specific problem or issue ii. **Discuss and evaluate** the implications of using science and its application to solve a specific problem or issue, interacting with a factor iii. **Consistently apply** scientific language to communicate understanding **clearly and precisely** iv. Document sources **completely**	i. **Describe** the ways in which science is applied and used to address a specific problem or issue ii. **Discuss** the implications of using science and its application to solve a specific problem or issue, interacting with a factor iii. **Usually apply** scientific language to communicate understanding clearly and precisely iv. **Usually** document sources correctly	i. **Summarize** the ways in which science is applied and used to address a specific problem or issue ii. **Describe** the implications of using science and its application to solve a specific problem or issue, interacting with a factor iii. **Sometimes apply** scientific language to communicate understanding iv. **Sometimes** document sources correctly	i. **Outline** the ways in which science is applied and used to address a specific problem or issue ii. **Outline** the implications of using science and its application to solve a specific problem or issue, interacting with a factor iii. **Apply** scientific language to communicate understanding but does so with **limited success** iv. Document sources, with **limited success**	The student does not reach a standard identified by any of the descriptors.