**Welcome to Science 8**

**Mr. Bond**

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**Tutorial Times: after school everyday**

2019-2020 Course Outline

This course explores science from an inquiry and exploration perspective. It is divided into five areas of Science: **Processes of Science**, Life Science (**Biology**), Physical Science(**Physics** and **Chemistry**), and Earth and Space Science (**Geology**).

These skills will be the focus in Sciences (*Approaches to Learning* - ATL):

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| **Category** | **Skill indicator** |
| Thinking skills | Interpret data gained from scientific investigations  |
| Social skills | Practice giving feedback on the design of experimental methods  |
| Communication skills | Use appropriate visual representations of data based on purpose and audience  |
| Self-management skills | Structure information appropriately in laboratory investigation reports  |
| Research skills | Make connections between scientific research and related moral, ethical, social, economic, political, cultural or environmental factors  |

**Units that will be covered!**

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| Picture**UNIT One** **Cells and Systems**- ​*Big Idea*: Life processes are performed at a cellular level | Picture **UNIT Two****Optics**- *Big Idea:* Energy can be transferred as both a particle and a wave | Picture**UNIT Three****Atomic Theory**- *Big Idea:* The behaviour of matter can be explained by the kinetic molecular theory and atomic theory | Image result for plate tectonics**UNIT Four****Plate Tectonics**-*Big Idea*: The Theory of Plate Tectonics is the unifying theory that explains Earth’s geological processes. |

**Course Description**

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| **Unit 1: Life Science – Cells and Systems** **Big Idea: Life processes are performed at a cellular level**  |
| *It is expected that students will understand:** **Living things** respire, grow, take in nutrients, produce waste, respond to stimuli, and reproduce; there is a debate as to whether or not to classify **viruses** as living things
* **Cell Theory**: living things are made of one or more cells, all cells come from pre-existing cells, the cell is a basic unit of life
* Types of cells: **prokaryotic** and **eukaryotic** cells, **plant** and **animal** cells, cells contain structures that carry out essential functions
* **Photosynthesis** and **cellular respiration**
* The relationship of micro-organism with living things: basic functions of the **immune system**, vaccination and antibiotics, impacts of epidemics and pandemics on human populations
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| **Unit 2: Physical Science – Optics** **Big Idea: Energy can be transferred as both a particle and a wave**  |
| MCj04347340000[1]*It is expected that students will understand:** Types and effects of **electromagnetic radiation**
* **Light**: properties, behaviours and ways of sensing
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| **Unit 3: Physical Science – Atomic Theory** **Big Idea: The behavior of matter can be explained by the kinetic molecular theory and atomic theory** |
| *It is expected that students will understand:** **Kinetic Molecular Theory**: explains how particles move in different states
* **Atomic theory** and models: Provides evidence for the existence of atoms and molecules
* **Protons, Neutrons** and **Quarks** are held together by a strong nuclear force
* **Electrons and Leptons** are held at a distance from the nucleus through electromagnetism

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| **Unit 4: Earth and Space Science – Plate Tectonics on Earth** **Big Idea: The theory of plate tectonics is the unifying theory that explains Earth’s geological processes**  |
| *It is expected that students will understand:** **Plate Tectonic** movement: types, plate boundaries and earthquakes and volcanoes
* Major **geological events** of local significance
* **First People knowledge** of: local geological formations, and significant local geological events
* **Layers of the Earth**
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**Assessment**

Students will be assessed based on the criteria detailed below and MYP assessment will be both formally (report cards) and informally (feedback on assignments) reported. MYP levels will be used to calculate a student’s overall standing in a course.

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| Examples of Science 8 Tasks and Assignments |
| **Criterion A**- Knowledge and Understanding  | **Quizzes, Tests, Projects, Presentations** |
| **Criterion B**- Inquiring and Designing  | **Design Labs – Students design an investigation using Scientific Process** |
| **Criterion C** - Processing and Evaluating  | **Laboratory investigations and activities** |
| **Criterion D** - Reflecting on the impacts of science  | **Research Assignments, Reflections, Debates, Written Reports** |

**Criterion A**: Knowing and understanding

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| **level** | **Level descriptor** |
| 0 | The student does not reach a standard described by any of the descriptors below. |
| 1-2 | The student is able to: * **recall** scientific knowledge
* apply scientific knowledge and understanding to **suggest solutions** to problems set in **familiar situations**
* **apply** information to make **judgments**.
 |
| 3-4 | The student is able to: * **state** scientific knowledge
* apply scientific knowledge and understanding to **solve problems** set in **familiar situations**
* **apply** information to make **scientifically supported judgments**.
 |
| 5-6 | The student is able to: * **outline** scientific knowledge
* apply scientific knowledge and understanding to **solve problems** set in **familiar situations** and **suggest solutions** to problems set in **unfamiliar situations**
* **interpret** information to make **scientifically supported judgments**.
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| 7-8 | The student is able to: * **describe** scientific knowledge
* apply scientific knowledge and understanding to **solve problems** set in **familiar and unfamiliar situations**
* **analyse** information to make **scientifically supported judgments**.
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**Criterion B**: Inquiring and designing

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| **level** | **Level descriptor** |
| 0 | The student does not reach a standard described by any of the descriptors below. |
| 1-2 | The student is able to: * **state** a problem or question to be tested by a scientific investigation, with **limited success**
* **state** a testable hypothesis
* **state** the variables
* design **a method, with limited success**.
 |
| 3-4 | The student is able to: * **state** a problem or question to be tested by a scientific investigation
* **outline** a testable hypothesis **using scientific reasoning**
* **outline** how to manipulate the variables, and **state** how **relevant data** will be collected
* design a **safe method** in which he or she **selects materials and equipment**.
 |
| 5-6 | The student is able to: * **outline** a problem or question to be tested by a scientific investigation
* **outline and explain** a testable hypothesis **using scientific reasoning**
* **outline** how to manipulate the variables, and **outline** how s**ufficient, relevant data** will be collected
* design **a complete and safe method** in which he or she **selects appropriate materials and equipment**.
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| 7-8 | The student is able to: * **describe** a problem or question to be tested by a scientific investigation
* **outline and explain** a testable hypothesis **using correct scientific reasoning**
* **describe** how to manipulate the variables, and **describe** how **sufficient, relevant** data will be collected
* design a **logical, complete and safe method** in which he or she **selects appropriate materials and equipment**.
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**Criterion C**: Processing and evaluating

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| **Level** | **Level descriptor** |
| 0 | The student does not reach a standard described by any of the descriptors below. |
| 1-2 | The student is able to: * **collect and present** data in numerical and/or visual forms
* **accurately interpret** data
* **state** the validity of a hypothesis **with limited reference** to a scientific investigation
* **state** the validity of the method **with limited reference** to a scientific investigation
* **state limited** improvements or extensions to the method.
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| 3-4 | The student is able to: * **correctly collect and present** data in numerical and/or visual forms
* **accurately interpret** data and **describe** results
* **state** the validity of a hypothesis based on the outcome of a scientific investigation
* **state** the validity of the method based on the outcome of a scientific investigation
* **state** improvements or extensions to the method that would benefit the scientific investigation.
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| 5-6 | The student is able to: * **correctly collect, organize and present** data in numerical and/or visual forms
* **accurately interpret** data and **describe** results **using scientific reasoning**
* **outline** the validity of a hypothesis based on the outcome of a scientific investigation
* **outline** the validity of the method based on the outcome of a scientific investigation
* **outline** improvements or extensions to the method that would benefit the scientific investigation.
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| 7-8 | The student is able to: * **correctly collect, organize, transform and present** data in numerical and/ or visual forms
* **accurately interpret data** and **describe** results **using correct scientific reasoning**
* **discuss** the validity of a hypothesis based on the outcome of a scientific investigation
* **discuss** the validity of the method based on the outcome of a scientific investigation
* **describe** improvements or extensions to the method that would benefit the scientific investigation.
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**Criterion D**: Reflecting on the impacts of science

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| **level** | **Level descriptor** |
| 0 | The student does not reach a standard described by any of the descriptors below. |
| 1-2 | The student is able to: * **state** the ways in which science is used to address a specific problem or issue
* **state** the implications of the use of science to solve a specific problem or issue, interacting with a factor
* **apply** scientific language to communicate understanding but does so **with limited success**
* document sources, **with limited success**.
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| 3-4 | The student is able to: * **outline** the ways in which science is used to address a specific problem or issue
* **outline** the implications of using science to solve a specific problem or issue, interacting with a factor
* **sometimes apply** scientific language to communicate understanding
* **sometimes** document sources **correctly**.
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| 5-6 | The student is able to: * **summarize** the ways in which science is applied and used to address a specific problem or issue
* **describe** the implications of using science and its application to solve a specific problem or issue, interacting with a factor
* **usually apply** scientific language to communicate understanding **clearly and precisely**
* **usually** document sources **correctly**.
 |
| 7-8 | The student is able to: * **describe** the ways in which science is applied and used to address a specific problem or issue
* **discuss and analyse** the implications of using science and its application to solve a specific problem or issue, interacting with a factor
* **consistently apply** scientific language to communicate understanding **clearly and precisely**
* document sources **completely**.
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