CARSON GRAHAM SECONDARY

Middle Years Programme

COURSE OUTLINE – MYP YEAR 4 SCIENCES

Course Overview & Expectations:

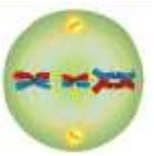
In the words of Rosalind Franklin, "Science and everyday life cannot and should not be separated." This course deepens students' understanding of the natural and technological world. Students continue to develop a "scientific way of thinking" as well as growing a broad knowledge of the underpinnings of modern science.

This year students will get the opportunity to further develop scientific knowledge, skills, and attitudes that will be relevant in their everyday life. We will investigate scientific questions while building on students' curiosity about the world. Students will also work to develop as communicating, caring, inquiring, risk taking, knowledgeable, reflective, open-minded, principled, balanced, and thinking individuals.

Learning:

Through engaging with this course, students should UNDERSTAND…

Life Science
Cells are derived from cells.



Chemistry
The electron arrangement of atoms impacts their chemical nature.

Physics
Electric current is the flow of electric charge.

Earth Science
The biosphere, geosphere, hydrosphere, and atmosphere are interconnected, as matter cycles and energy flows through them.

Through engaging with this course, students will KNOW…

Statement of Inquiry	Concepts	Unit Title/Topic
The collection of valid, empirical evidence leads to predictions and conclusions based upon logic.	Logic, Evidence, Consequences	Experimental Design, Analysis and Evaluation
We are all related to every living thing through the form and function of DNA and the patterns of mitosis	**Relationships**, Form, functions, Patterns	Asexual Reproduction
Reproductive relationships have consequences resulting in patterns, transformation and diversity.	**Relationships**, Consequences Transformation	Cell Division – Meiosis and Sexual Reproduction
Through centuries of collecting evidence Scientists have developed a system to categorize the patterns found in atomic structure models.	**Systems**, Models, Patterns Evidence	Electronic Structure of the Atom and the Periodic Table
An Understanding of the underlying structure and models of interacting atoms enables one to predict the changes that may result from that interaction.	**Change**, Interaction, Models	Electronic Structure of the Atom and Chemical Interactions
Ohm's Law descries the mathematical relationship between energy and the movement of electrons modelled by electrical circuits.	**Relationships**, Interaction, Models, Movement	Electricity – Relationship Between Voltage, Resistance and Current
Human behaviors/habits/practices/laws have consequences that impact balanced systems. First Nations perspectives on sustainability and interconnectedness guide our inquiry throughout the year.	**Systems**, Consequences Interaction, Balance	Interconnectedness of the Spheres
Changes to biotic and abiotic factors in a balanced ecosystem have environmental consequences.	**Change**, Consequences, Environment Balance	Ecology - Biosphere

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Through engaging with this course, students will DO…

CURRICULAR COMPETENCIES	EXAMPLES
Questioning and Predicting	Predicting the results of the Flame Test lab on metallic ion solutions.
Planning and Conducting	Designing and enacting a lab exploring Ohm's law in Play Doh.
Processing and Analyzing Data and Information	Graphing the data and writing a report on the result of the Resistance Wire Rheostat lab.
Evaluating	Reflecting on the success of the method used to gather data on the emission spectra of metallic elements during the Flame Test lab.
Applying and Innovating	Designing a method to investigate the effect of an abiotic factor in the production of compost.
Communicating	Research and report on the implications of modern fire suppression technology and the use of Traditional Ecological Knowledge.

Through this course, students will develop the following Approaches to Learning skills…

Below are some examples of how we develop ATL skills in this course:

Category Skill indicator	Examples
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 skills
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

Assessment:

Throughout this course, students will demonstrate their learning…

This course will focus on developing skills related to the following areas.	Formative assessment is assessment ***as*** learning, or assessment ***for*** learning. **Formative assessments could include;**	Summative assessment is assessment ***of*** learning. **Summative assessments could include;**
A: Knowing and understanding	Quizzes, worksheets	Tests, Projects
B: Inquiring and designing	Lab activities,	Lab Reports
C: Processing and evaluating	Lab activities,	Lab Reports,
D: Reflecting on the impacts of science	Journal reflections, group activities,	Research papers, Presentations, Projects

Academic Honesty and Personal Integrity

The faculty at Carson Graham expects our students to complete academic and nonacademic work that is authentic and respectful of intellectual property. All students are expected to adhere to the school's Policy for Academic Integrity. Ignorance of the standards related to academic honesty and student integrity is not an excuse for dishonesty, plagiarism and malpractice. You are expected to familiarize yourself with the policy.

https://www.sd44.ca/school/carson/About/schoolpolicies/Documents/Carson%20Graham%20Academic%20Honesty%20Policy%20reviewed%20December%202018.pdf

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Grade Descriptors:

Grade 7

Produces high-quality work with frequent insightful scientific discussion that is fully justified. Communicates comprehensive, nuanced understanding of concepts and contexts demonstrating proficient use of scientific and technical communication modes. Consistently demonstrates sophisticated analytical thinking and critical evaluation to make scientifically supported judgments. Frequently transfers scientific knowledge and applies scientific skills, with independence and expertise, in complex classroom and real-world situations.

Grade 6

Produces high-quality work with occasionally insightful scientific discussion and justification. Communicates extensive understanding of concepts and contexts demonstrating proficient use of scientific and technical communication modes. Demonstrates analytical thinking and critical evaluations to make scientifically supported judgments, frequently with sophistication. Transfers scientific knowledge and applies scientific skills, often with independence, in classroom and real-world situations.

Grade 5

Produces generally high-quality work with scientific discussion and justification. Communicates good understanding of concepts and contexts demonstrating proficient use of scientific and technical communication modes. Demonstrates analytical thinking and critical evaluations to make scientifically supported judgments, sometimes with sophistication. Usually transfers scientific knowledge and applies scientific skills, with some independence, in classroom and real-world situations.

Grade 4

Produces good-quality work with some evidence of scientific discussion and justification. Communicates basic understanding of most concepts and contexts with evidence of appropriate scientific and technical communication modes, with few misunderstandings and minor gaps. Often demonstrates analytical thinking to make scientifically supported judgments. Transfers some scientific knowledge and applies some scientific skills in classroom and real-world situations, but requires support in unfamiliar situations.

Grade 3

Produces work of an acceptable quality with occasional evidence of scientific description. Communicates basic understanding of many concepts and contexts, with occasional significant misunderstandings or gaps. Begins to demonstrate some analytical thinking and begins to make scientifically supported judgments. Begins to transfer scientific knowledge and apply skills, requiring support even in familiar classroom situations.

Grade 2

Produces work of limited quality. Communicates limited understanding of some concepts and contexts with significant gaps in understanding. Demonstrates limited evidence of scientific thinking. Limited evidence of transfer of scientific knowledge and application of skills.

Grade 1

Produces work of a very limited quality. Conveys many significant misunderstandings or lacks understanding of most concepts and contexts. Very rarely demonstrates evidence of scientific thinking. Very inflexible, rarely shows evidence of knowledge or skills.

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Assessment Rubrics

Grade 9

Criterion A: Knowing and understanding

Achievement 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** 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: • **outline** 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: • **describe** 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**
7-8	The student is able to: • **explain** scientific knowledge • apply scientific knowledge and understanding to **solve problems** set in **familiar and unfamiliar situations** • **analyse** information to make **scientifically supported judgments**

Criterion B: Inquiring and designing

Achievement 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 **sufficient, relevant data** will be collected • design **a complete and safe method** in which he or she **selects appropriate materials and equipment**
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

Achievement 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
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
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
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

Criterion D: Reflecting on the impacts of science

Achievement 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**
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**
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**