

## COURSE OUTLINE – MYP YEAR 5 SCIENCES



### Course Overview & Expectations:

Science 10 introduces main topics from Biology, Chemistry, Physics and Earth Science. This will form the basis for further studies in future grades and provide students with knowledge to find areas of interest. This course has four main units of study: DNA, Genetics and Natural Selection; Chemical Reactions and Radioactivity; Law of Conservation of Energy; The Universe.

Students will get the opportunity to 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 individual.

### Learning:

Through engaging with this course, students should UNDERSTAND...

#### Space Exploration

The formation of the universe can be explained by the big bang theory.



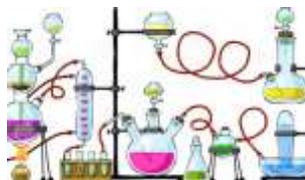
#### Physical Science: Physics

Energy is conserved and its transformation can affect living things and the environment



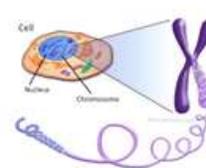
#### Physical Science: Chemistry

Chemical processes require energy change as atoms are rearranged



#### Life Science

Genes are the foundation for the diversity of living things



Through engaging with this course, students will KNOW...

Statement of Inquiry	Concepts	Unit Title/Topic
At various turning points in human history, evidence has been used to create models of change.	<b>Change</b>	The Big Bang
Changes in energy provide opportunities that have risks, benefits, and consequences.	<b>Change</b>	Radioactivity and Nuclear Energy
Human interactions, through the use of energy, affect environmental sustainability.	<b>Global Interaction</b>	Sustainability - Interdisciplinary
There are global climate consequences to energy transformation.	<b>Change</b>	Energy
Scientific Innovation leads to the creation of models to help us understand that balance exist when chemical species undergo transformations.	<b>Change</b>	Chemical Models
Our relationships with chemical species and natural resources have consequences.	<b>Relationships</b>	Effects of pH on the Environment
Natural conservation laws balance chemical changes.	<b>Change</b>	Chemical Reactions
When environments change species adaptations drive evolution.	<b>Change</b>	Evolution and Selections
Patterns of inheritance are observed to design genetic models that explain individual traits.	<b>Systems</b>	Mendelian Genetics
Our relationships with genetically modified organisms have consequences requiring ethical judgements.	<b>Relationships</b>	Ethics and Applications in Genetics

## Through engaging with this course, students will DO...

CURRICULAR COMPETENCIES CATEGORIES	EXAMPLES
Questioning and Predicting	Question and predict how characteristics are genetically inherited.
Planning and Conducting	Design a controlled experiment to study how the rate of a chemical reaction can be affected.
Processing and Analyzing Data and Information	Use the data from a pedigree to explain the inheritance pattern of a genetic trait.
Evaluating	Discuss and evaluate how to reduce sources of error in a lab when measuring mass change in a reaction.
Applying and Innovating	Discuss how new technologies are being developed and used to create cleaner sources of energy.
Communicating	Create a presentation to best communicate knowledge of a scientific model.

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

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

Category Skill indicator	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 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...

The MYP Science course will focus on developing skills related to 4 criteria based objectives.	Formative assessment is assessment <i>as</i> learning, or assessment <i>for</i> learning. <b>Formative assessments could include;</b>	Summative assessment is assessment <i>of</i> learning. <b>Summative assessments could include;</b>
<b>A: Knowing and understanding</b>	Quizzes, worksheets	Tests, Projects
<b>B: Inquiring and designing</b>	Lab activities, worksheets	Lab Reports
<b>C: Processing and evaluating</b>	Lab activities, worksheets	Lab Reports
<b>D: Reflecting on the impacts of science</b>	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>

## 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.

## Assessment Rubrics:

### 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: <ul style="list-style-type: none"> <li>• <b>state</b> scientific knowledge</li> <li>• apply scientific knowledge and understanding to <b>suggest solutions</b> to problems set in <b>familiar situations</b></li> <li>• <b>interpret</b> information to make <b>judgments</b>.</li> </ul>
3-4	The student is able to: <ul style="list-style-type: none"> <li>• <b>outline</b> scientific knowledge</li> <li>• apply scientific knowledge and understanding to <b>solve problems</b> set in <b>familiar situations</b></li> <li>• <b>interpret</b> information to make <b>scientifically supported judgments</b>.</li> </ul>
5-6	The student is able to: <ul style="list-style-type: none"> <li>• <b>describe</b> scientific knowledge</li> <li>• apply scientific knowledge and understanding to <b>solve problems</b> set in <b>familiar situations</b> and <b>suggest solutions</b> to problems set in <b>unfamiliar situations</b></li> <li>• <b>analyse</b> information to make <b>scientifically supported judgments</b>.</li> </ul>
7-8	The student is able to: <ul style="list-style-type: none"> <li>• <b>explain</b> scientific knowledge</li> <li>• apply scientific knowledge and understanding to <b>solve problems</b> set in <b>familiar and unfamiliar situations</b></li> <li>• <b>analyse</b> and <b>evaluate</b> information to make <b>scientifically supported judgments</b>.</li> </ul>

### 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: <ul style="list-style-type: none"> <li>• <b>state</b> a problem or question to be tested by a scientific investigation</li> <li>• <b>outline</b> a testable hypothesis</li> <li>• <b>outline</b> the variables</li> <li>• <b>design</b> a method, <b>with limited success</b>.</li> </ul>
3-4	The student is able to: <ul style="list-style-type: none"> <li>• <b>outline</b> a problem or question to be tested by a scientific investigation</li> <li>• <b>formulate</b> a testable hypothesis <b>using scientific reasoning</b></li> <li>• <b>outline</b> how to manipulate the variables, and <b>outline</b> how <b>relevant data</b> will be collected</li> <li>• design a <b>safe method</b> in which he or she <b>selects materials and equipment</b>.</li> </ul>
5-6	The student is able to: <ul style="list-style-type: none"> <li>• <b>describe</b> a problem or question to be tested by a scientific investigation</li> <li>• <b>formulate and explain</b> a testable hypothesis <b>using scientific reasoning</b></li> <li>• <b>describe</b> how to manipulate the variables, and <b>describe</b> how <b>sufficient, relevant data</b> will be collected</li> <li>• design a <b>complete and safe method</b> in which he or she selects <b>appropriate materials and equipment</b>.</li> </ul>
7-8	The student is able to: <ul style="list-style-type: none"> <li>• <b>explain</b> a problem or question to be tested by a scientific investigation</li> <li>• <b>formulate and explain</b> a testable hypothesis <b>using correct scientific reasoning</b></li> <li>• <b>explain</b> how to manipulate the variables, and <b>explain</b> how <b>sufficient, relevant data</b> will be collected</li> <li>• <b>design</b> a <b>logical, complete and safe method</b> in which he or she <b>selects appropriate materials and equipment</b>.</li> </ul>



### 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: <ul style="list-style-type: none"> <li>• <b>collect and present</b> data in numerical and/or visual forms</li> <li>• <b>interpret</b> data</li> <li>• <b>state</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>• <b>state</b> the validity of the method based on the outcome of a scientific investigation</li> <li>• <b>state</b> improvements or extensions to the method.</li> </ul>
3-4	The student is able to: <ul style="list-style-type: none"> <li>• <b>correctly collect and present</b> data in numerical and/or visual forms</li> <li>• <b>accurately interpret</b> data and <b>explain</b> results</li> <li>• <b>outline</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>• <b>outline</b> the validity of the method based on the outcome of a scientific investigation</li> <li>• <b>outline</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ul>
5-6	The student is able to: <ul style="list-style-type: none"> <li>• <b>correctly collect, organize and present</b> data in numerical and/or visual forms</li> <li>• <b>accurately interpret</b> data and <b>explain</b> results <b>using scientific reasoning</b></li> <li>• <b>discuss</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>• <b>discuss</b> the validity of the method based on the outcome of a scientific investigation</li> <li>• <b>describe</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ul>
7-8	The student is able to: <ul style="list-style-type: none"> <li>• <b>correctly collect, organize, transform and present</b> data in numerical and/ or visual forms</li> <li>• <b>accurately interpret</b> data and <b>explain</b> results <b>using correct scientific reasoning</b></li> <li>• <b>evaluate</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>• <b>evaluate</b> the validity of the method based on the outcome of a scientific investigation</li> <li>• <b>explain</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ul>

### 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: <ul style="list-style-type: none"> <li>• <b>outline</b> the ways in which science is used to address a specific problem or issue</li> <li>• <b>outline</b> the implications of using science to solve a specific problem or issue, interacting with a factor</li> <li>• <b>apply</b> scientific language to communicate understanding but does so <b>with limited success</b></li> <li>• document sources, with <b>limited success</b>.</li> </ul>
3-4	The student is able to: <ul style="list-style-type: none"> <li>• <b>summarize</b> the ways in which science is applied and used to address a specific problem or issue</li> <li>• <b>describe</b> the implications of using science and its application to solve a specific problem or issue, interacting with a factor</li> <li>• <b>sometimes apply</b> scientific language to communicate understanding</li> <li>• <b>sometimes</b> document sources correctly.</li> </ul>
5-6	The student is able to: <ul style="list-style-type: none"> <li>• <b>describe</b> the ways in which science is applied and used to address a specific problem or issue</li> <li>• <b>discuss</b> the implications of using science and its application to solve a specific problem or issue, interacting with a factor</li> <li>• <b>usually apply</b> scientific language to communicate understanding clearly and precisely</li> <li>• <b>usually</b> document sources correctly.</li> </ul>
7-8	The student is able to: <ul style="list-style-type: none"> <li>• <b>explain</b> the ways in which science is applied and used to address a specific problem or issue</li> <li>• <b>discuss and evaluate</b> the implications of using science and its application to solve a specific problem or issue, interacting with a factor</li> <li>• <b>consistently apply</b> scientific language to communicate understanding <b>clearly and precisely</b></li> <li>• document sources <b>completely</b>.</li> </ul>