

## Science Course Descriptors G6 - 12

Directions: Please write a description of the subject areas reflected below. Describe in paragraph form the program components and highlights. You can refer to the [Subject Guides](#) as well as AERO, etc. for additional information. Please keep the descriptions clear, brief, and clearly flowing from 6-12.

Grade Level	Course description
Grade 6	<p><b>Middle School Physical Science</b> Students will develop understanding of four core ideas in the physical sciences. The middle school performance expectations in the Physical Sciences allow learners to explain phenomena central to the physical sciences but also to the life sciences and earth and space science. The performance expectations in physical science blend the core ideas with scientific and engineering practices and crosscutting concepts to support students in developing useable knowledge to explain real world phenomena in the physical, biological, and earth and space sciences. In the physical sciences, performance expectations at the middle school level focus on students developing understanding of several scientific practices.</p>
Grade 7	<p><b>Middle School Life Sciences</b> Students will develop understanding of key concepts to help them make sense of the life sciences. These ideas build upon students' science understanding from earlier grades and from the disciplinary core ideas, science and engineering practices, and crosscutting concepts of other experiences with physical and earth sciences. There are five life science topics in middle school: 1) Structure, Function, and Information Processing, 2) Growth, Development, and Reproduction of Organisms, 3) Matter and Energy in Organisms and Ecosystems, 4) Interdependent Relationships in Ecosystems, and 5) Natural Selection and Adaptations.</p>
Grade 8	<p><b>Middle School Earth and Space Science</b> Students will develop their understanding of the three disciplinary core ideas in the Earth and Space Sciences. The middle school performance expectations in Earth and Space Science build on the elementary school ideas and skills and allow middle school students to explain more in-depth phenomena central not only to the earth and space sciences, but to life and physical sciences as well. These performance expectations blend the core ideas with scientific and engineering practices and crosscutting concepts to support students in developing useable knowledge to explain ideas across the science disciplines.</p>
Grade 9	Biology 9

	<p>The grade nine Biology course is an exploration of major scientific themes through a combined biological and chemical science approach. Students will discover important scientific content and develop basic scientific skills while exploring the history and philosophy of science, molecular building blocks, genetics and evolution. Course activities will not be limited to content coverage and basic lab skills but will also involve significant work in research, writing and technological skills. Assessments will be varied and allow students to demonstrate their understanding and extend their knowledge.</p>
Grade 10	<p>Chemistry and Physics 10</p> <p>The grade 10 Science course continues with the major scientific themes taught in grade 9 with the objective that by the end of the course students will have a broad understanding of science through a combined biological, chemical and physical approach built over a two year period. Students, in this second year of science, will continue to discover important scientific content, develop basic scientific skills while exploring the universe, kinematics, basic Newtonian physics, energy, chemical processes and global environmental issues. Course activities will not be limited to content coverage and basic lab skills but will also involve significant work in research, writing and technological skills. Assessments will be varied and allow students to demonstrate their understanding and extend their knowledge.</p>
Grade 11/12	<p>Biology 11/12 Standard level</p> <p>In Biology Standard Level students gather knowledge and develop a general understanding of the principles of the subject. There are four main biological concepts that run throughout the course: 1) Structure and function, 2) Universality versus diversity, 3) Equilibrium within systems, 4) Evolution. These concepts serve as the main themes of the different topics making up the course. Over the two year course students will study cell and molecular biology, genetics, ecology, human physiology, evolution and biodiversity. There will be one additional topic. These topics will be examined externally at the end of the two year course. Students will also complete an Internal Assessment component of the course, a long-term investigation designed and carried out by the student, which contributes 20% towards the final grade. There is also an interdisciplinary activity called the Group 4 Project. Students must be highly motivated and well organised to get the most from the internal assessment.</p> <p>Biology 11/12 Higher Level</p> <p>IB Biology – Higher Level. In Biology Higher Level students gather knowledge and develop a general understanding of the principles of the subject. There are four main biological concepts that run throughout the course: 1) Structure and function, 2) Universality versus diversity, 3) Equilibrium within systems, 4) Evolution. These concepts serve as the</p>

main themes of the different topics making up the course. Over the two year course students will study cell and molecular biology, genetics, ecology, human physiology, evolution and biodiversity, these topics are the same as the core content. However, Higher Level students will also study the following: nucleic acids, metabolism, cell respiration, photosynthesis, plant and animal physiology, genetics and evolution, as well as one option. Students will also complete an Internal Assessment component of the course, a long-term investigation designed and carried out by the student, which contributes 20% towards the final grade. There is also an interdisciplinary activity called the Group 4 Project. Students must be highly motivated and well organised to get the most from the internal assessment.

#### Chemistry 11/12 Standard Level

In Chemistry Standard Level, students gather knowledge and develop a general understanding of the principles of the subject. This is done by examining a series of topics over the two year period. These include stoichiometry, bonding and organic chemistry (which collectively cover about 40% of the course), together with smaller units on atomic structure and periodicity, kinetics, energetics, acids and bases, equilibrium and oxidation and reduction. There will be one additional Option topic. These topics will be examined externally at the end of the two year course. Students will also complete an Internal Assessment component of the course, a long-term investigation designed and carried out by the student, which contributes 20% towards the final grade. There is also an interdisciplinary activity called the Group 4 Project. Students must be highly motivated and well organised to benefit the most from the internal assessment activity.

#### Chemistry 11/12 Higher Level

In Chemistry Higher Level, students gather knowledge and develop a general understanding of the principles of the subject. This is done by examining a series of topics over the two year period. These include stoichiometry, bonding and organic chemistry, together with units on atomic structure and periodicity, kinetics, energetics, acids and bases, equilibrium and oxidation and reduction. Higher Level candidates cover the same topics as Standard Level, but in greater depth. There will be one additional Option topic. These topics will be examined externally at the end of the two year course. Students will also complete an Internal Assessment component of the course, a long-term investigation designed and carried out by the student, which contributes 20% towards the final grade. There is also an interdisciplinary activity called the Group 4 Project. Students must be highly motivated and well organised to benefit the most from the internal assessment activity.

#### Physics 11/12 Standard Level

In Physics Standard Level, students gather knowledge and develop a general understanding of the principles of the subject. This is done by examining a series of topics over the two year period. These include measurement, mechanics, circular motion, energy production, waves, electricity and magnetism, and atomic and particle physics. There will be one additional Option topic. These topics will be examined externally at the end of the two year course. Students will also complete an Internal Assessment component of the course, a long-term investigation designed and carried out by the student, which contributes 20% towards the final grade. There is also an interdisciplinary activity called the Group 4 Project. Students must be highly motivated and well organised to benefit the most from the internal assessment activity.

#### Physics 11/12 Higher Level

In Physics Higher Level, students gather knowledge and develop a general understanding of the principles of the subject. This is done by examining a series of topics over the two year period. These include measurement, mechanics, circular motion, energy production, waves, electricity and magnetism, and atomic and particle physics. Higher Level candidates cover the same topics as Standard Level, but in greater depth with respect to the final three listed above. There will be one additional Option topic. These topics will be examined externally at the end of the two year course. Students will also complete an Internal Assessment component of the course, a long-term investigation designed and carried out by the student, which contributes 20% towards the final grade. There is also an interdisciplinary activity called the Group 4 Project. Students must be highly motivated and well organised to benefit the most from the internal assessment activity.