



Loyola

HIGH SCHOOL

Secondary 4 Applied Science & Technology Cycle 2 (Year 2)

Course Outline

Teacher: Mr. Plimer

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Requirements:

- Observatory – The Environment (student textbook)
- 2x 80 page Hilroys (one for each course, not shared with any other subject)
- Lined loose-leaf paper (at least 25 sheets), and graph paper (about 10 sheets).
- Ruler, pens, highlighters, scientific calculator (non-programmable) and pencils
- iPad (always charged)

The above equipment is required for **every** lesson. Failure to bring an item will result in disciplinary action.

Course Information:

Students are required to take two science courses in Secondary 4 - Science and the Environment (SE) and Applied Science and Technology (AST.) Both courses build upon scientific concepts studied in earlier science and technology courses, and students are expected to be familiar with these. Additionally, students are required to apply some of the principles studied in earlier mathematics programs. The SE course will include an introduction to chemistry. The AST course will examine environmental topics, the study of electricity and magnetism, electronics, graphical language, physical principles and mechanical engineering.

There are extensive hands-on activities to enhance the course content.

The **SE** course will take place from **September to December** while the **AST** course will take place from **January to June**.



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Students write a final **Loyola exam** in December for the **SE** course which counts for 50% of Term 2 Theory. Students are required to write a **Loyola AST** exam and a **Ministry exam** in June for the

AST course. Students who want to take the physics and chemistry options in secondary five must obtain a minimum grade of **75%** in **both** the AST and SE courses.

Competencies / Evaluation: SE and AST Courses

Section	Competency	Weighting
Practical	Seeks answers and solutions to scientific or technological problems. Communicates in the languages used in science and technology	40%
Theory	Makes the most of his knowledge of science and technology. Communicates in the languages used in science and technology	60%

	Term 1	Term 2	Term 3
S.E.	40%	60% (Loyola exam = 50% of theory)	
A.S.T.		25%	75% (Loyola exam = value of a class test. Ministry exam = 50% of theory)

Extra help sessions are always available via student request.

Any missed tests must be completed on a student's first day back at school. For missed labs due to illness or a predictable absence, Mr Dagher must be contacted within 24 hours of the lab date being announced/day of illness to arrange an alternate date. A 20% late penalty per day is policy if the



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above does not occur.

Topics: Science & the Environment (T1 & T2), Applied S&T (T2 & T3):

TERM 1	TERM 2	TERM 3
<p>Scientific Method</p> <ul style="list-style-type: none"> Laboratory report writing Laboratory safety <p>Science Techniques</p> <ul style="list-style-type: none"> Review of dimensional analysis Review of graphing data <p>Organization of Matter</p> <ul style="list-style-type: none"> Lewis notation Simplified atomic model Relative atomic mass and isotopes Types of bonds (covalent, ionic) Polyatomic ions Nomenclature and notation rules Concept of the mole <p>Physical Properties of Solutions</p> <ul style="list-style-type: none"> Concentration (g/L, %, mol/L) Electrolytes pH scale Ions Electrical conductivity <p>Chemical Changes</p> <ul style="list-style-type: none"> Precipitation Synthesis and decomposition Photosynthesis and respiration Acid-base neutralization reactions Salts Law of Conservation of Mass Balancing chemical equations Stoichiometry Endothermic and exothermic reactions <p>(N.B. The SE course finishes in December which is about 1 month into Term 2).</p>	<p>Graphical Language</p> <ul style="list-style-type: none"> Interpretation of exploded views Orthogonal drawings (multiview, isometric) Dimensions and tolerance <p>Materials</p> <ul style="list-style-type: none"> Constraints (tension, compression, deflection, shearing) Characteristics of mechanical properties Properties (plastics, ceramics, composites, ferrous & non-ferrous alloys, wood) Modification of properties (degradation and protection) <p>Electricity</p> <ul style="list-style-type: none"> Electrical charge Static electricity Ohm's Law Series and parallel circuits Kirchhoff's Laws <p>Electromagnetism</p> <ul style="list-style-type: none"> Forces of attraction and repulsion Magnetic field of a live wire Magnetic field of a solenoid Electromagnetic induction <p>Transformation of Energy</p> <ul style="list-style-type: none"> Law of Conservation of Energy Energy efficiency Distinction between heat and temperature Relationship between power and electrical energy 	<p>Electrical Engineering</p> <ul style="list-style-type: none"> Power supply Conduction, insulation and protection Resistance and tolerance of resistors Switches (pole and throw) Transformation of energy (electricity and light, heat, vibration, magnetism) Function (capacitor, diode, transistor, relay) <p>Mechanical Engineering</p> <ul style="list-style-type: none"> Adhesion and friction of parts Linkages and degrees of freedom Guiding controls Motion transmission systems (gear trains, belt & pulley, friction gears, chain & sprocket, worm gears) Gear ratios, resisting and engine torque Motion transformation systems (CAM & follower, screw gears type 1 & 2, crank & slider, rack & pinion) <p>Forces & Motion</p> <ul style="list-style-type: none"> Types of forces Equilibrium of two forces Relationship between speed, distance, time Mass and weight <p>Environmental Sciences</p> <ul style="list-style-type: none"> Ecosystems, food chains, disturbances Air masses and circulation Energy resources from atmosphere, lithosphere and hydrosphere Earth/moon gravitation (tides) Minerals and ores Biomes and catchment areas



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General:

Homework will be assigned in the form of completing lab activities or studying for tests/quizzes. There will also be homework completed and graded in class throughout the year. Independent review and practice of daily work is essential in order to understand and retain the information taught.

Secondary 4 is an important year as it can influence future subject choices, as well as choice of CEGEP. Students are expected to further develop their work habits, study routines and time management skills.

Note that if a student misses a class for whatever reason, it is THEIR responsibility to make-up the missed work and/or missed lab. They need to go through their class president in order to obtain the correct information.

Students are required to check their Loyola email **every day** for updates and/or information. Lab coats and safety glasses are required at all times when in the chemistry laboratory; replacement fees apply for missing equipment.

iPads must stay in the students' bags unless required. No other devices are allowed unless prior consent has been given.