



Loyola

HIGH SCHOOL

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Sec. 2 Science & Technology Cycle 1 (Year 2)

Description:

Cycle 1 (year 2) Science and Technology provides students the opportunity to construct a hypothesis, test it by experimentation, identify the different variables, and familiarize themselves with the scientific method. The course develops the student's ability to seek answers to problems, communicate in the language used in science & technology and apply their knowledge. The curriculum integrates concepts by incorporating the perspectives of biology, chemistry, physics, and earth/space science. Proper lab techniques, the use of technology, the collection of data, math applications and graphing techniques are reinforced.

Goals:

- Students will participate in hands-on activities and group-work.
- Students will be able to apply class material to everyday life and better understand scientific phenomena they encounter in the media and in future classes.
- Students will be more inclined to pursue or consider a science or technology-related career.
- Students will begin to develop a topic for their upcoming Science Fair project

Requirements:

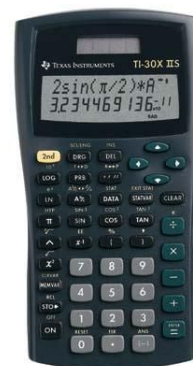
Students must be well organized and maintain their science binders in good condition. All students will be expected to produce a formal lab report at least once per term. Homework usually consists of simple worksheets, textbook readings and preparing for quizzes and tests. An expected maximum of about 2 hours of homework per cycle (9 days) is to be expected for the average student and cycle. There is a 20% late penalty for missing work or work not done. Small quizzes are assigned every two or three periods on average, while there are approximately 2-3 large tests per term. Extra help in the form of tutorials and meetings is offered as required by appointment (eliem@loyola.ca) and are usually held at lunch or after school.

Resources:

- Text: Eureka! Student Textbook B.
- Moodle website (online course website - moodle.loyola.ca).
 - “**Sec 2 Science Mr. Elie**” & guest password is “**science**”
- LHS Scientific Laboratory Report Guidelines (available on Moodle)
- Various science iPad apps (i.e. Gizmos) to be used throughout the year

Materials:

- 3 ring binder (1 or 1 1/2 inch) with 5 **dividers**
 - **Single topic binder (not to be shared with other courses)**
- Approx. 30-50 sheets of Hole-punched Graph Paper (ideally **metric**)
- One small 30-40 page Hilroy notebook (graph or lined paper)
- Several pencils!!! (no pens needed in this class)
- Scientific calculator (same one as math class)
- Short plastic ruler (approximately 15 cm)
- Scissors & a glue stick are optional
- Safety glasses will be provided, but students may purchase their own pair if they wish

**Evaluation, Components & Competencies:**

| Component | Science Competencies | Examples | Weighting |
|------------------|--|--|------------|
| Practical | -Seeks answers or solutions to scientific or technological problems -Communicates in the languages used in science and technology | Labs, lab reports activities, lab exam, etc. | 40% |
| Theory | -Makes the most of his knowledge of science and technology -Communicates in the languages used in science and technology | Tests, quizzes, homework June exam, etc. | 60% |

Term breakdown

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|--------|---|----------------------------|
| Term 1 | 20% | Ends Nov. 2 nd |
| Term 2 | 20% | Ends Feb. 13 th |
| Term 3 | 60% (June exam is worth 40% of this term) | Ends May 30 th |

For the Term 1 and Term 3 reports, each student will have comments regarding at least two (2) of the following four (4) cross-curricular competencies:

- Exercises critical judgment
- Organizes his work
- Communicates effectively
- Works in a team

Topics to be covered:

| Term 1 | Term 2 | Term 3 |
|--|--|--|
| <p>Scientific Method</p> <ul style="list-style-type: none"> ● Review of the scientific method ● Laboratory report writing (review Scientific Laboratory Report Guidelines document) ● Laboratory safety <p>Engineering</p> <ul style="list-style-type: none"> ● Specifications ● Design plan ● Technical drawing ● Manufacturing process sheet ● Raw material, Material & Equipment ● Safety in use of tools <p>Technological Systems</p> <ul style="list-style-type: none"> ● System (overall function, inputs, processes, outputs, control) ● Components of a system ● Basic mechanical functions (links, guiding control) ● Energy transformation ● Mousetrap car project <p>Forces and Motion</p> <ul style="list-style-type: none"> ● Types of motion ● Effects of a force ● Simple machines (inclined planes, levers, pulleys) ● Work, force, and energy (potential and kinetic) ● Mechanisms that transmit motion ● Mechanisms that change motion | <p>Forces and Motion (continued)</p> <p>Science Techniques</p> <ul style="list-style-type: none"> ● Cross-multiplication ● Manipulation of variables/parameters (mass, volume, density, for example) ● Graphing data <p>Properties of matter</p> <ul style="list-style-type: none"> ● Characteristic properties ● Mass & Volume ● Density ● Temperature ● States of matter ● Acidity/alkalinity <p>Organization of matter</p> <ul style="list-style-type: none"> ● Atoms, Elements ● Atomic theory ● Periodic Table ● Molecules ● Element hockey card project <p>Transformation of matter</p> <ul style="list-style-type: none"> ● Physical change ● Chemical change ● Conservation of matter ● Mixtures & Solutions ● Separation of mixture | <p>Cells</p> <ul style="list-style-type: none"> ● Plants versus animal cells, organelles (similarities and differences) ● Reproductive mechanisms in plants ● Plant growth project <p>Cell Division</p> <ul style="list-style-type: none"> ● DNA & Mitosis ● Microscope use ● Functions of cell division (reproduction, growth, regeneration) ● Meiosis and sexual development (meiosis, fertilization) ● Genetic diversity <p>Reproduction & Reproductive Systems</p> <ul style="list-style-type: none"> ● Puberty ● Hormone regulation in men ● Spermatogenesis ● Erection & Ejaculation ● Hormone regulation in women ● Oogenesis, Ovarian and menstrual cycles <p>Survival of Species</p> <ul style="list-style-type: none"> ● Asexual and sexual reproduction ● Plants versus animal reproduction ● Reproductive mechanisms in animals ● Reproductive organs ● Gametes ● Fertilization and pregnancy ● Stages of human development ● Contraception and abortion ● Sexually transmitted diseases <p>Science Fair</p> <ul style="list-style-type: none"> ● Introduction and selection of topic |

Please note that some material may overlap into the adjacent term.

Basic binder organization information (eventual layout of the binder)

- First page = assignment/quiz/HW form
- Second page (or inside your binder's plastic sleeve) = course outline
- Third page (given out in November) = Special Formulas Sheet(s)
- Fourth page (given out in January) = Cycle 1 Review (organization of matter, etc.)

Tabs/divider labels:

- "Notes" for notes, handouts, worksheets done in class**
 - Safety contract
 - Graphing checklist (instructions)
 - Technological Instruments & Tools
 - Potential & Kinetic Sample Questions (has colour on the back)
 - Sample lever problem (has colour)
 - Technological World Notes (printed powerpoint)
 - Force, motion and energy in class notes and problems
 - Newton's first law of physics (printed powerpoint)
 - Simple machines (about 5 pieces of paper stapled)
 - December Exam Review sheets
 - Nova hunting the elements questions
- ANY HANDWRITTEN NOTES (not in a notebook) CAN PUT HERE AS WELL
- "Labs" for labs & activities**
 - Experimental Method Sheet
 - Technical diagram (blocks) with name on it (80% complete)
 - Graph of burn baby burn
 - Lab report cover page template
 - Lab report guidelines (to be printed by you)
 - Mousetrap car handouts (with mousetrap drawing stapled to back)
 - Weight lifting workout lab
 - Inclined plane lab activity (we did as a demo)
 - Lever lab activity (we all did it as a lab)
 - Characteristic and Non-char. properties lab
 - Mass vs. Volume of metal cubes lab & GRAPH
 - Acids and Bases Lab Activity (with coloured in back portion)
 - Activity: Sink or Float
 - Activity: Cola can crushing with Science
- "Gizmos & Q/T" Quizzes & tests**
 - All Gizmos support materials
 - Hilroy notebook of study guides/notes (or any hand written notes)
 - Must have name & class on cover
 - first page(s) should already be filled out by the time of the first test.
 - Grade sheets (student reports)
 - Bill Nye quizzes (all that you have)
- "HW" Homework**
 - Reading a liquid volume
 - Worksheets: Memory check (design process, specifications, etc.)
 - Worksheets: Memory check (raw material, systems, etc.)
 - Tech diagram (personal drawing of object)
 - Practice calculation sheets (about 10 pages or so)
 - Non-characteristic properties of matter: states of matter (2 sheets of paper double sided)
 - Density & Percent Error sheets
- "Misc." Science Fair & Paper/Graph paper**
 - Science Fair ideas for the future
 - graph paper (ideally metric)