

SCIENCE (SNC1D) COURSE OUTLINE

Course Title: Science, Grade 9, Academic

Ministry Course Code: SNC1D

Name of School: Lighthouse Academy

Department: Science

Course Developer: Dr. A B M Shamsur Rahman OCT

Course Development Date: September, 2018

Credit Value: 1.0

Course Length: One semester (110 hrs)

Pre-requisite: none

Secondary Policy Document: The Ontario Curriculum Grades 9 and 10 Science, 2008 (Revised)

Course Description/Rationale

This course enables students to develop their understanding of basic concepts in biology, chemistry, earth and space science, and physics, and to relate science to technology, society, and the environment. Throughout the course, students will develop their skills in the processes of scientific investigation. Students will acquire an understanding of scientific theories and conduct investigations related to sustainable ecosystems; atomic and molecular structures and the properties of elements and compounds; the study of the universe and its properties and components; and the principles of electricity.

Curriculum Strands and Expectations

The expectations identified for the course describe the knowledge and skills that students are expected to develop and demonstrate in their class work, on tests, and in various other activities on which their achievement is assessed and evaluated.

By the end of this course, students will:

A. Scientific Investigation Skills and Career Exploration

- A1. demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);
- A2. identify and describe a variety of careers related to the fields of science under study, and identify scientists, including Canadians, who have made contributions to those fields.

C. Chemistry: Atoms, Elements, and Compounds

- C1. assess social, environmental, and economic impacts of the use of common elements and compounds, with reference to their physical and chemical properties;
- C2. investigate, through inquiry, the physical and chemical properties of common elements and compounds;
- C3. demonstrate an understanding of the properties of common elements and compounds, and of the organization of elements in the periodic table.

E. Physics: The Characteristics of Electricity

- E1. assess some of the costs and benefits associated with the production of electrical energy from renewable and non renewable sources, and analyse how electrical efficiencies and savings can be achieved, through both the design of technological devices and practices in the home;
- E2. investigate, through inquiry, various aspects of electricity, including the properties of static and current electricity, and the quantitative relationships between potential difference, current, and resistance in electrical circuits;
- E3. demonstrate an understanding of the principles of static and current electricity.

B. Biology: Sustainable Ecosystems

- B1. assess the impact of human activities on the sustainability of terrestrial and/or aquatic ecosystems, and evaluate the effectiveness of courses of action intended to remedy or mitigate negative impacts;
- B2. investigate factors related to human activity that affect terrestrial and aquatic ecosystems, and explain how they affect the sustainability of these ecosystems;
- B3. demonstrate an understanding of the dynamic nature of ecosystems, particularly in terms of ecological balance and the impact of human activity on the sustainability of terrestrial and aquatic ecosystems.

D. Earth and Space Science: The Study of The Universe

- D1. assess some of the costs, hazards, and benefits of space exploration and the contributions of Canadians to space research and technology;
- D2. investigate the characteristics and properties of a variety of celestial objects visible from Earth in the night sky;
- D3. demonstrate an understanding of the major scientific theories about the structure, formation, and evolution of the universe and its components and of the evidence that supports these theories.

Unit Descriptions and Instructional Hours

The course content has been divided into the following units of study, which has been developed to achieve the expectations outlined in Science Grade 9 curriculum guideline.

Unit 2: Chemistry: Atoms, Elements and Compounds

Students will learn that:

- Elements and compounds have specific physical and chemical properties that determine their practical uses.
- The use of elements and compounds has both positive and negative effects on society and the environment.

Unit 3: Physics: Characteristics of Electricity

Students will learn that:

- Electricity is a form of energy produced from a variety of non-renewable and renewable sources.
- The production and consumption of electrical energy has social, economic, and environmental implications.

- Static and current electricity have distinct properties that determine how they are used.

Unit 4: Biology: Sustainable Ecosystems

Student will learn:

- Ecosystems are dynamic and have the ability to respond to change, within limits, while maintaining their ecological balance.
- People have the responsibility to regulate their impact on the sustainability of ecosystems in order to preserve them for future generations.

Unit 5: Earth and Space Science

Student will learn:

- Different types of celestial objects in the solar system and universe have distinct properties that can be investigated and quantified.
- People use observational evidence of the properties of the solar system and the universe to develop theories to explain their formation and evolution.
- Space exploration has generated valuable knowledge but at enormous cost.

Outline of the Course Content and hours

Unit	Title	Hours
1	Chemistry: Atoms, Elements, and Compounds	33
2	Physics: The Characteristics of Electricity	30
3	Biology: Sustainable Ecosystems	27
4	Earth and Space Science: The Study of The Universe	20
TOTAL		110

* “Scientific Investigation Skills and Career Exploration” will be incorporated throughout the above units

Teaching Strategies

A wide variety of instructional strategies will be used to provide learning opportunities that accommodate a range of learning styles and interests. These include:

Direct instruction	Individual work/ team work	Computer aided demonstrations
Laboratory activities	Problem solving	Model construction
Multimedia presentations	Issue analysis and presentation	Discussion/ Question and answer sessions.

Learning Strategies

To ensure student's skills such as the ability to work independently or in a team, efficient work habits, study skills and initiative, a variety of learning strategies will be used in order to obtain optimal understanding and application.

Brainstorming Webs	Discussion
Cooperative Learning	Independent Study
Role-playing	Work sheets
Researching	Reports

Learning Skills

The following criteria will be used to assess Learning Skills:

- (i) Work habits (ii) Initiative (iii) Team Work (iv) Organization (v) Works independently

Assessment

For student success various assessment tools will be used such as a checklist, rubric, to assess their knowledge and skills. These criteria will be to ensure assessment as learning and assessment for learning (Growing Success- ministry of education) that needs to take place and will include strategies such as sharing learning goals and success criteria, providing feedback in relation to goals, and developing students' ability to self-assess – as a way of increasing student's engagement in and commitment to learning.

Evaluation of Student Performance:

Evaluation will be based on assessment of learning for grading and reporting. Evidence of student achievement for evaluation will be collected over time from three different sources – teacher observation, conversation, and student products using multiple sources of evidence to ensure the reliability and validity of the evaluation of student learning. Evaluation will be focused on student's achievement of the overall expectations based on the four Ministry of Education achievement categories: Knowledge and Understanding, thinking, communication and application. A single evaluation may include one, more than one, or all of the categories in the weighting listed below:

Category	Description	Weighting
Knowledge and Understanding	Subject-specific knowledge acquired in course content	30%
Thinking/Inquiry	Critical thinking processes as follows: Planning Skills (research, organization) Processing Skills (analyzing, evaluating) Critical thinking processes (problem solving, decision making, research)	20%
Application	The use of knowledge and skills to make connections with texts. Elements and compounds, static and current electricity, and space science related problem solving. Writing structures of atoms and compound, drawing diagrams electric circuit and sustainable ecosystems.	25%
Communication	Conveying of meaning: presentations, participation Oral: in class oral discussion Visual: multimedia presentation	25%

Final Grade

Term work will be 70% of the final evaluation and conducted throughout the course in all the four categories. Students will use a variety of checklists, rubrics, rating scales, marking schemes, provided by the teacher from time to time.

Final evaluation of 30% will comprise an ISU of 10%, and an exam of 20%, which will incorporate the work of the whole term, meeting all the overall expectations of the course in each achievement category.

Percentage of Final Grade		Evaluation Components
70%	40 %	Unit Test (Student Product) 1. Chemistry: Atoms, Elements, and Compounds (14%) 2. Physics: The Characteristics of Electricity (14%) 3. Biology: Sustainable Ecosystems (12%)
	30%	Assignments, Projects, and Labs (Observation, Conversation, Student Product) 1. Investigation of physical and chemical properties of elements and compounds (Lab, 8%) 2. Elements (Project, 5%) 3. Electric circuit (Lab, 10%) 4. Sustainable Ecosystem (Assignment, 7%)
30%	10%	ISU (Observation, Conversation, Student Product) ISU: Research project related to any one or more of the following topics of Earth And Space Science: The Study of The Universe; The Night Sky, Exploring Our Stellar Neighborhood, The Mysterious Universe: Report and Presentation
	20%	Student Product Final Exam

Student's Expectation

- Come to class daily with proper materials (binder, pencil, eraser etc.)
- To use and care for books and study materials safely.
- Submit work that is original and represents your own effort.
- To seek clarification from your teacher if assignment criteria, theory or marking rubric is not fully understood.
- To take part in field trips.
- To hand in all projects and assignments on or before the assigned due date.

Late Assignments/ Missed Tests

- Student will be allowed a window to hand in work without penalty up to one day for minor assignments, and up to two days for major projects.
- You must present an acceptable reason for the late assignment on the missed due date to avoid consequences and a contract for an alternative assignment due date may be drawn up. Where possible, present reasons to the teacher prior to the due date.
- After this period, unless there are extenuating circumstances (accepted at the teacher's discretion), late assignments may receive a reduced mark based on the contract and situation and the expectations tied to the assignment.
- If a test is missed while you are absent for an acceptable reason, you must be prepared to write the missed test on the day you return to school. Consult with your teacher before the test is missed (if possible) or as soon as possible in other circumstances.

Rules and Regulations

1. **Plagiarism / Dishonest Activity:** It is the responsibility of every student to ensure that all assignments and projects which are to be evaluated are original, personal works and are accurately documented as outlined by the teacher. Examples of plagiarism are:
 - the submission of someone else's work (in whole or in part) as your own; giving work to someone else to be copied and submitted; directly copying an existing work and claiming it is your own original creation.
 - buying or selling of assignments and projects
 - submitting work from one course as work in another course

Consequences of Plagiarism

- the teacher will inform parents/guardians that the student has submitted work which is not original.
 - student caught plagiarizing in any other forms as well, will get a straight zero for that assignment, project or test as a penalty for cheating. It will be teacher's discretion to allow/decline the student to resubmit the assignment and project after having discussion with parents and approval/disapproval from the principal.
2. **Conduct:** Students must follow the school's Code of Conduct, participate fully in discussions, and complete all assignments in time to the best of their ability.
 3. **Responsibility:** It is also the student's responsibility to make up for any missed work during their absences.

Program and Planning

For an effective science program, a variety of activities will be conducted that will integrate expectations from different strands and provide for the explicit teaching of knowledge and skills. It will provide frequent opportunities for students to rehearse, practice, and apply skills and strategies, and to make their own choices. These considerations may include, but not be limited to:

- Provide effective instructional approaches and learning activities draw on students' prior knowledge, capture their interest, and encourage meaningful practice both inside and outside the classroom.
- Provide students with opportunities to learn in a variety of ways – individually, cooperatively, independently, with teacher direction, through hands-on experiences, and through examples followed by practice.
- Provide activities and challenges that actively engage students in inquiries that honor the ideas and skills students bring to them, while further deepening their conceptual understandings and essential skills.
- Provide students with opportunities to use of a variety of equipments and materials that helps deepen and extend their understanding of scientific concepts and further extends their development of scientific investigation skills.
- Make sure to follow safe practices at all times and communicate safety expectations to students in accordance with school board and Ministry of Education policies and Ministry of Labour regulations.
- Motivate students to examine the opinions and values of others, detect bias, look for implied meaning in their readings, and use the information gathered to form a personal opinion or stance.
- Provides opportunities for students to engage in various oral activities in connection with expectations in all the strands, such as brainstorming to identify what they know about the new topic they are studying, discussing strategies for solving a problem, presenting and defending ideas or debating issues, and offering critiques of models and results produced by their peers.
- Encourage students to use ICT to support and communicate their learning.
- Motivate students to develop a variety of important capabilities, including the ability to identify issues, conduct research, carry out experiments, solve problems, present results, and work on projects both independently and as a team.
- Provide students with opportunities to explore various careers related to the areas of science under study and to research the education and training required for these careers.

Materials

Subject binder, stationary set; pen, pencils, eraser, sharpener, rule, geometry set, lined/grid graph paper, blank paper, scientific calculator

Resources

A number of resources are required for this course:

1. Text book: ON Science 9, McGraw-Hill Ryerson: ISBN: 978-0-07-0726895
2. Handouts: Relevant handouts will be given to students.
3. Multimedia and presentation packages: will be presented from time to time.

Acknowledgment

I have read and understood the course expectations, learning skills, assessment and evaluation strategies, and school rules for this Science 9 course outline.

Student's Name: _____

Student's Signature: _____ Date: _____

Parent's Signature: _____ Date: _____