

SCIENCE (SNC2D) **COURSE OUTLINE**

Course Title: Science, Grade 10, Academic

Ministry Course Code: SNC2D

Name of School: Lighthouse Academy

Department: Science

Course Developer: Dr. A B M Shamsur Rahman OCT

Course Development Date: January 2020

Course Revision Date: January 2020

Credit Value: 1.0

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

Pre-requisite: Science, Grade 9, Academic or Applied

Course Description/Rationale

This course enables students to enhance their understanding of concepts in biology, chemistry, earth and space science, and physics, and of the interrelationships between science, technology, society, and the environment. Students are also given opportunities to further develop their scientific skills. Students will plan and conduct investigations and develop their understanding of scientific theories related to the connections between cells and systems in animals and plants; chemical reactions, with a particular focus on acid-base reactions; forces that affect climate change; and the interaction of light and matter.

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: Chemical Reactions

- C1.analyze a variety of safety and environmental issues associated with chemical reactions, including the ways in which chemical reactions can be applied to address environmental challenges;
- C2.investigate, through inquiry, the characteristics of chemical reactions;
- C3.demonstrate an understanding of the general principles of chemical reactions, and various ways to represent them.

E. Physics: Light and Geometric Optics

- E1.evaluate the effectiveness of technological devices and procedures designed to make use of light, and assess their social benefits;
- E2.investigate, through inquiry, the properties of light, and predict its behaviour, particularly with respect to reflection in plane and curved mirrors and refraction in converging lenses;
- E3.demonstrate an understanding of various characteristics and properties of light, particularly with respect to reflection in mirrors and reflection and refraction in lenses.

B. Biology: Tissues, Organs, and Systems of Living Things

- B1.evaluate the importance of medical and other technological developments related to systems biology, and analyze their societal and ethical implications;
- B2.investigate cell division, cell specialization, organs, and systems in animals and plants, using research and inquiry skills, including various laboratory techniques;
- B3.demonstrate an understanding of the hierarchical organization of cells, from tissues, to organs, to systems in animals and plants.

D. Earth and Space Science: Climate Change

- D1.analyze some of the effects of climate change around the world, and assess the effectiveness of initiatives that attempt to address the issue of climate change;
- D2.investigate various natural and human factors that influence Earth's climate and climate change;
- D3.demonstrate an understanding of natural and human factors, including the greenhouse effect, that influence Earth's climate and contribute to climate change.;

Unit Descriptions and Instructional Hours
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The course content has been divided into the following units of study, which has been developed to achieve the expectations outlined in Science Grade 10 curriculum guideline.

Unit	Title	Hours
1	Chemistry: Chemical Reactions	33
2	Physics: Light and Geometric Optics	30
3	Biology: Tissues, Organs, and Systems of Living Things	27
4	Earth and Space Science: Climate Change	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 and 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	25%

	texts. Chemical reactions, optics, organ systems and climate change related problem solving. Writing chemical equations, drawing diagrams of reflection and refraction of light, organ systems	
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 Tests (Student Product) <ol style="list-style-type: none"> 1. Chemical Reactions (14%) 2. Lights and Geometric Optics (14%) 3. Tissues, Organs, and Systems of Living Things (12%)
	30%	Assignments, Projects, and Labs (Observation, Conversation, Student Product) <ol style="list-style-type: none"> 1. Scientific Investigation Skills and Career Exploration (Assignment 4%) 2. Chemical Reactions (Assignment 5%) 3. Investigation of Synthesis, Decomposition and displacement reactions (Lab 5%) 4. Investigation of Plant organs and systems (Lab 3%) 5. Investigating Reflection and Refraction (Project 8%) 6. Tissues, Organs, and Systems of Living Things (Assignment 5%)
30%	10%	ISU (Observation, Conversation, Student Product) ISU: Research project related to any one or more of the following topics: Climate Change; Tissues, Organs, and Systems of Living Things
	20%	Final Exam (Student Product)

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, ruler, geometry set, lined/grid paper, blank paper, scientific calculator

Resources

A number of resources are required for this course:

1. Text book: ON Science 10, McGraw-Hill Ryerson ISBN: 978-0-07-0722224
 2. Handouts: Relevant handouts will be given to students.
 3. Multimedia and presentation packages: will be presented from time to time.
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Acknowledgment

I have read and understood the course expectations, teaching and assessment strategies in the course outline for Science 10.

Student's Name: _____

Student's Signature: _____ Date: _____

Parent's Signature: _____ Date: _____