

Immaculate Conception High School

Science Department

COURSE OUTLINE

General Science

2024/25

Term:	1	Academic Year:	2024 - 2025	Grade:	8
Teachers:	Miss Kadesha Croney Miss Danielle Francis				
Teacher Contact Info.:	Email: kcroney@immaculatehigh.edu.jm dfrancis@immaculatehigh.edu.jm		Tel: 876-346-8807		
Duration of Course:	September to December 2024 Term 1	January to April 2024 Term 2	May to July 2024 Term 3		
Modality	<input checked="" type="checkbox"/> Face to Face <input type="checkbox"/> Blended <input type="checkbox"/> Online				

COURSE DESCRIPTION:

The Grade 8 General Science course is designed to build a strong foundation in the core scientific disciplines of chemistry, physics, and biology, essential for success in the CSEC sciences offered in upper school. This course introduces students to fundamental concepts, ensuring they are well-prepared for more advanced studies. Understanding these basic concepts is not only critical for excelling in the CSEC core sciences but also for developing scientific literacy, critical thinking, and problem-solving skills that are valuable in everyday life. By gaining a solid foundation in these areas, students will be better prepared to tackle more complex scientific challenges and succeed in their upper school studies.

COURSE PREREQUISITES:

Mastery in the General Science grade 7 course.

COURSE OBJECTIVES:

Upon the completion of this course, students will have the ability to:

- Develop a strong foundation in the basic principles of chemistry, physics, and biology, preparing them for topics in the CSEC core sciences.
- Explore scientific concepts through hands-on activities, experiments, and discussions, fostering a curiosity and appreciation for science.
- Apply scientific principles to solve real-world problems and make informed decisions based on evidence.
- Highlight the interconnectedness of chemistry, physics, and biology, showing how these disciplines work together to explain natural phenomena.
- Understand the importance of environmental stewardship and the role of science in addressing global challenges like climate change and sustainability.

STUDENT LEARNING OUTCOME:

By the end of this course, students will be able to:

1. **Explain the Particulate Theory of Matter:** Describe the basic structure of matter, including atoms, molecules, and their interactions, and understand how these concepts apply to everyday materials.
2. **Understand the Structure of the Atom:** Identify the components of an atom (protons, neutrons, electrons) and explain how they determine the properties of elements.
3. **Interpret the Periodic Table:** Use the Periodic Table to classify elements, understand periods and groups, and predict the behavior of different elements based on their position.
4. **Describe Forces and Motion:** Explain the relationship between forces and motion, including concepts like gravity, friction, and acceleration, and apply these principles to predict the movement of objects.

5. **Understand Biological Processes:** Describe key biological processes such as photosynthesis, digestion, and the carbon cycle, and explain their significance in sustaining life.
6. **Analyze Food Chains and Food Webs:** Identify the roles of producers, consumers, and decomposers in ecosystems and explain how energy flows through food chains and webs.
7. **Promote Healthy Living:** Understand the importance of water and balanced nutrition, identifying different food groups and their roles in maintaining a healthy body.
8. **Apply Scientific Concepts to Real-World Problems:** Demonstrate the ability to use scientific knowledge to analyze and propose solutions to environmental and health-related issues, fostering responsible and informed citizenship.

GENERAL OUTLINE OF THE COURSE:

- **Chemistry:** Students will explore the **Particulate Theory of Matter**, understand the structure of the **Atom**, and learn about the **Periodic Table** with a focus on **Periods and Groups**. These topics lay the groundwork for understanding chemical reactions, bonding, and material properties.
- **Physics:** The course covers essential topics in physics, including **Forces and Motion**. Students will learn how forces affect the movement of objects, providing a basis for understanding concepts such as gravity, friction, and acceleration.
- **Biology:** In biology, students will study **Water** and its role in life processes, the process of **Photosynthesis, Food Chains and Food Webs**, the **Digestive System, Food Groups**, and the **Carbon Cycle**. These topics are crucial for understanding how living organisms interact with their environment and sustain life.

EXPECTATIONS OF STUDENTS

To aid their successful completion of this course, students are expected to:

- Actively engage in all classroom activities, including discussions, experiments, and group projects. Participation is crucial for deepening understanding and developing critical thinking skills.

- Demonstrate a consistent effort in completing assignments, studying course materials, and preparing for assessments. Regular review and practice are essential for mastering the course content.
- Ask questions, seek clarification, and explore topics beyond the classroom. A curious mindset will help them gain a deeper appreciation of scientific concepts.
- Work in groups to conduct experiments and solve problems. They are expected to collaborate effectively, share ideas, and contribute to group tasks while respecting the perspectives of others.
- Take responsibility for their learning by staying organized, managing their time effectively, and meeting deadlines. They are also expected to adhere to school policies and classroom rules.

**TERM ONE 2024
SEPTEMBER TO DECEMBER 2024**

TOPICS	SUGGESTION FOR TEACHING/ACTIVITIES & ASSESSMENT STRATEGIES
WEEK 1 September 9-13 INTRODUCTION OF THE COURSE	The teacher will have a welcome session where the students will share their expectations and goals. The term plan will be discussed, rules and expectations as well for classes.
WEEK 2 September 16-20 FORCES AND MOTION	<ul style="list-style-type: none"> • Distinguishing between vector and scalar quantities • Recognizing balanced and unbalanced forces (Effects of balanced and unbalanced forces; Investigating forces involved in floating and sinking) <p>Notes will be posted to the google classroom in a PowerPoint presentation.</p> <p>Video Presentations should be shown relevant to the topic</p>

	<p>For balanced and unbalanced forces, differentiated instruction should be used to show the different forces.</p>
<p>WEEK 3 September 23-27 FORCES AND MOTION Cont.'</p>	<ul style="list-style-type: none"> • Use diagrams to show all forces acting on moving objects. • Investigating effects of streamlined shapes on motion • Describing motion of an object using position, direction and speed <p>Coursework #1 Assign a worksheet which asks students to calculate resultant forces as well as balanced and unbalanced forces.</p>
<p>WEEK 4 September 30-Oct 4 FORCES AND MOTION Cont.'</p>	<ul style="list-style-type: none"> • Distinguish between displacement, distance, velocity, speed, and acceleration • Solve problems with displacement, distance, velocity, speed and acceleration <p>Coursework #2 Assign a worksheet with formulas that asks them to calculate displacement, distance, velocity, speed and acceleration.</p>
<p>WEEK 5 WATER October 7-11</p>	<ul style="list-style-type: none"> • Discuss the concept of the density of water. • Calculate the density of water including unit used (g/cm³). • Include the calculations of the density of an object and when compared to the density of water will it float or sink. <p>Coursework#3</p>

	<p>Assign a worksheet with formulas that asks them to calculate the density of objects given the mass and volume. There should be questions asking them to calculate the mass and volume of irregular objects.</p>
<p>WEEK 6 WATER October 14-18</p>	<p>Mid-term Oct. 16 Heroes Day</p>
<p>WEEK 7 WATER October 21-25</p>	<ul style="list-style-type: none"> • Relate the difference in density to the forces that allow objects to floats and give hypothetical values for these forces
<p>WEEK 8 October 28-Nov 1</p>	<p>Six Weekly Test</p>
<p>WEEK 9 WATER Nov 4-8</p>	<ul style="list-style-type: none"> • Review of the water cycle. While reviewing the water cycle, the students identify the points at which the water may become polluted. • Importance of water to plants and animals.
<p>WEEK 10 WATER Nov 11-15</p>	<ul style="list-style-type: none"> • Tests for water, conservation, purification of water
<p>WEEK 11 PARTICULATE NATURE OF MATTER Nov 18-22</p>	<ul style="list-style-type: none"> • Discuss the first 20 elements and their uses. • Atoms <p>Research Project: Assign students to one element found in the Periodic Table and they should link where it is found in real</p>

	<p>life-giving details about the element in a summary video and posted in Google Classroom.</p> <p>Course work #4 Research Project: Learning by doing in class. Create models to depict the difference between elements and compounds using modeling clay.</p>
<p>WEEK 12 PARTICULATE NATURE OF MATTER Nov 25-29</p>	<ul style="list-style-type: none"> • Definitions of elements and compounds • Differences between elements, diatomic molecules and compounds • Use water as an example and ask the students to identify the properties and uses of Hydrogen, Oxygen as well as that of water. • Use water as an example and ask the students to identify the properties and uses of Hydrogen, Oxygen as well as that of water.
<p>WEEK 13 SUBATOMIC PARTICLES</p>	<ul style="list-style-type: none"> • Discuss Subatomic particles • Define the number and atomic number and show each for the elements. • Calculate the electronic configuration
<p>WEEK 14 PERIODS AND GROUPS Dec 2-6</p>	<ul style="list-style-type: none"> • Properties of metals and non-metals • Link electronic configuration with Group and Period Numbers
<p>Dec 9-13</p>	<p>TEST 2:</p> <ul style="list-style-type: none"> • Periodic Table

	<ul style="list-style-type: none"> • Atomic Structure
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**TERM TWO 2025
JANUARY 6 TO APRIL 30, 2025**

TOPICS	SUGGESTION FOR TEACHING/ACTIVITIES & ASSESSMENT STRATEGIES
WEEK 1 January 6-10 PARENT CONSULTATION WEEK	Parent Consultations. <ul style="list-style-type: none"> • A comprehensive review of the previous six weeks test and the returning of the papers.
WEEK 2 January 13-17 PHOTOSYNTHESIS	Describe the process in the leaves and the equation for the process. <ul style="list-style-type: none"> • Raw materials and products and the conditions necessary for the process to occur. • Outline of the two stages of photosynthesis. • Role of water to release oxygen. • Identification of the processes by which the raw materials needed are taken up by plants. <p>Show a diagram on the board or use prepared visuals of the flowering plant. Discuss the structure of leaves (e.g., stomata, veins, chloroplasts) and their role in photosynthesis.</p> <p>Ask students to annotate the diagram with descriptions of the processes that occur in different parts of the leaf.</p>
WEEK 3 January 20-24 PHOTOSYNTHESIS Cont.'	<ul style="list-style-type: none"> • Factors affecting the process of photosynthesis. • An elaboration of temperature, carbon dioxide, light intensity and oxygen. <p>Set up an experiment using</p>

	<p>potted plants placed at varying distances from a light source (e.g., a lamp). Measure the distance between each plant and the light source. Monitor and record the rate of photosynthesis by observing the number of bubbles released by the plants in a set time. Discuss how light intensity affects the rate of photosynthesis and why certain plants thrive in specific light conditions.</p>
<p>WEEK 4 January 27-31 PHOTOSYNTHESIS Cont.'</p>	<ul style="list-style-type: none"> • A discussion on how the flowering plant uses the food produced during photosynthesis. • Photosynthesis review. <p>Coursework #1 Assign students to design, execute, and report on an experiment investigating a specific factor affecting photosynthesis. They can choose one of the factors (light intensity, CO₂ concentration, temperature, or water availability) and conduct an experiment following the scientific method they learnt from grade 7.</p>
<p>WEEK 5 FOOD CHAINS & WEBS February 3-7</p>	<p>Introduction to ecosystem feeding relationships.</p> <ul style="list-style-type: none"> • Recall that plants are producers and are the source of energy for animals. • Examples of terrestrial and aquatic food chains.
<p>WEEK 6 SIX WEEKS TEST February 10-14</p>	<p>SIX WEEKLY TEST PHOTOSYNTHESIS & FOOD CHAINS</p>

<p>WEEK 7 FOOD WEBS & CHAINS February 17-21</p>	<p>The discussion of the importance of food webs, energy levels and the impact of humans on food web and food chains. Assign students with various case studies or scenarios depicting human activities that impact food webs or food chains (e.g., deforestation, overfishing, pollution). Have students analyze and discuss the potential consequences of these human activities on the affected ecosystems.</p>
<p>WEEK 8 ECOLOGICAL PYRAMIDS</p>	<ul style="list-style-type: none"> • Provide students with data or information on the energy distribution at each trophic level in a specific ecosystem. • Ask students to create energy pyramids representing the flow of energy from producers to consumers in the ecosystem. • Guide students in interpreting the energy pyramid, emphasizing the decrease in available energy at higher trophic levels and its implications for ecosystem stability. <p>Gamification activity</p>
<p>WEEK 9 PREDATOR PREY RELATIONSHIPS March 3-7</p>	<ul style="list-style-type: none"> • Discuss common Predator/Prey Relationships and provide examples of each.
<p>WEEK 10 ECOLOGY REVIEW March 10-14</p>	<ul style="list-style-type: none"> • Review of ecological feeding relationships.
<p>WEEK 11 HUMAN NUTRITION March 17-21</p>	<p>Discuss the major food groups and nutrients: Proteins, Carbohydrates, Fats and oils. Vitamins and minerals, Calcium, iron, iodine, fiber, vitamin A, B, C, D, K.</p>
<p>WEEK 12 HUMAN NUTRITION Cont. March 24-28</p>	<ul style="list-style-type: none"> • Discuss the strategies in planning snacks and meals.

	<ul style="list-style-type: none"> • Helpful hints for healthy living. <p>Assign students to plan a day's worth of meals that cover all essential food groups and nutrients.</p> <p>Provide guidelines emphasizing the importance of incorporating proteins, carbohydrates, fats/oils, vitamins, and minerals into each meal.</p>
WEEK 13 HUMAN NUTRITION Cont. March 31-April 4	<ul style="list-style-type: none"> • Perform food tests for starch, fats, reducing sugars and protein.
WEEK 14 HUMAN NUTRITION Cont. April 7-11	<ul style="list-style-type: none"> • Lab write up
April 14-18	Revision
April 21-25	

TERM THREE 2025
MAY 1 TO JULY 4, 2025

TOPICS	SUGGESTION FOR TEACHING/ACTIVITIES & ASSESSMENT STRATEGIES
WEEK 1 DIGESTIVE SYSTEM May 5-9	<ul style="list-style-type: none"> • Mechanical Digestion • Structure of teeth and function of each tooth • Dental formula • Locations and mechanism of mechanical digestion in the body
WEEK 2 DIGESTIVE SYSTEM	<ul style="list-style-type: none"> • Chemical Digestion • Enzymes

<p>May 12-16</p>	<ul style="list-style-type: none"> • Digestion within the stomach and duodenum
<p>WEEK 3 May 19-23 MID TERM BREAK</p>	<p><u>LABOUR DAY 2025</u></p>
<p>WEEK 4 May 26-30</p>	<p>SIX WEEKS TEST</p>
<p>WEEK 5 TRANSPORT PROCESSES June 2-6</p>	<p>DIFFUSION</p> <ul style="list-style-type: none"> • Review definition of diffusion, osmosis. Introduce active transport. <p>DIFFUSION</p> <ul style="list-style-type: none"> • Review osmosis in plant cells and animal cells, in hypertonic, hypotonic, and isotonic solutions. • Properties that affect the rate of diffusion.
<p>WEEK 6 AIR June 9-13</p>	<p>AIR</p> <ul style="list-style-type: none"> -Composition of air -Chemical tests for oxygen and carbon dioxide. -The different gases in the air and their uses. <p>CARBON CYCLE</p> <ul style="list-style-type: none"> -Describe the carbon cycle in simple terms to include the processes of combustion, respiration, and photosynthesis.
<p>WEEK 7</p>	<p>REVISION WEEK</p>

AIR June 16-20	
WEEK 8 June 23-27	REVISION WEEK
WEEK 9 WATER June 30-July 4	START OF END OF YEAR EXAMINATIONS
WEEK 10 WATER Nov 11-15	START OF END OF YEAR EXAMINATIONS

REFERENCE MATERIAL

Investigating Science for Jamaica: Grade 8 by June Mitchelmore

INTERNET SOURCES

- Khan Academy: <https://www.khanacademy.org/science>
- National Geographic Kids: <https://kids.nationalgeographic.com/>
- NASA's Climate Kids: <https://climatekids.nasa.gov/>
- Science Buddies: <https://www.sciencebuddies.org/>
- PBS LearningMedia: <https://www.pbslearningmedia.org/subjects/science/>
- HowStuffWorks: <https://www.howstuffworks.com/>
- Exploratorium: <https://www.exploratorium.edu/explore>
- CK-12 Foundation: <https://www.ck12.org/student/>
- BBC Bitesize: <https://www.bbc.co.uk/bitesize/subjects/zng4d2p>
- The Kids Should See This: <https://thekidshouldseethis.com/>

Electronic Resources/ E-Books

Compiled by Kadesha Croney 2024

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