

## **INTRODUCTION**

The study of Science is critical for living a meaningful and functional life in a technologically advanced and globalized world. This curriculum has been designed to give learners at the Junior High School level an early in the comprehension of the fundamental concepts, facts, principles and theories of Science and to nurture in them scientific skills, competencies and fortitude for more advanced study of the specialized disciplines of Science.

The General objectives for Grades 7 – 9 Science:

1. Acquire the fundamental facts, concepts, principles and theories of Science.
2. Develop basic scientific skills and competencies.
3. Utilize digital technology to conduct research for systematic investigation to establish facts and process information for problem solving.
4. Embrace positive scientific values and attitudes that make for peaceful coexistence in society.
5. Develop a love for Science.

*A learner-centered approach is emphasized in this curriculum. This is based on the firm belief that learning becomes more permanent, meaningful and exciting when learners themselves take ownership of the learning process. Instructors are therefore urged to contrive those classroom strategies that engage learners actively in the teaching and learning process.*

**SEMESTER: ONE**

**GRADE: 7**

**PERIOD: I**

**TOPIC: SCIENTIFIC KNOWLEDGE, MEASUREMENT AND NON- LIVING MATTER**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES/LABS	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Apply scientific methods in Science using relevant acquire skills to solve problems</p> <p>Interpret the characteristics of matters and describe the changes that take place in their environment</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Discover Science and Scientific knowledge</li> <li>2. Organize some simple methods of acquiring scientific knowledge</li> <li>3. Compare the two systems of measurement</li> <li>4. Demonstrate the use of the two systems of measurement in solving problems</li> <li>5. Outline the characteristics of nonliving matters</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>Science &amp; Scientific knowledge</b> <ul style="list-style-type: none"> <li>• Definition of Science</li> <li>• Knowing of facts is knowledge</li> <li>• Scientific methods;                             <ul style="list-style-type: none"> <li>- Attitudes</li> <li>- Observation</li> <li>- Experimentation</li> </ul> </li> </ul> </li> <li>2. <b>Measurement</b> <ul style="list-style-type: none"> <li>• English</li> <li>• Metric system</li> </ul>                     State the relationship between the two systems of measurements and how they are                 </li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <ol style="list-style-type: none"> <li>1. <b>Class Discussion:</b> Elicit facts and stories of fiction from the learners to give idea on the difference between fact and fiction in science. Show the learners some simple digests, which will enable them to ask appropriate questions.</li> </ol> <p><b>Assignment:</b> Let learners look at pictures in figures 1.3-1.7 in the textbook page 3. Decide what you think the people are doing and how</p>	<p><b><u>A. Primary Text</u></b></p> <p>Williams K- Fullick, Ann, Gardner, Sue-Jones, Catharine Science For Junior High for Liberia Grade 7 Pupil’s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 1</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b></p> <p><i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>Other Resources/ Supplementary Readings</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> <li>• Creativity &amp; Innovation skills</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (<u>Select relevant option</u>)</b></p> <ul style="list-style-type: none"> <li>• Attendance</li> <li>• Quiz</li> <li>• Laboratory report</li> </ul>

	<p>6. Discuss the state of matter and their properties</p> <p>7. Distinguish the forms of matter with examples (elements, compounds and mixtures)</p> <p>8. Compare the relationship between elements, compounds and mixtures</p> <p>9. Categorize the types of fuel and their composition.</p>	<p>used to solve problems.</p> <p><b>3. Matter</b></p> <ul style="list-style-type: none"> <li>• Non-living matter characteristics and examples.</li> <li>• States of Matter</li> <li>• Solid, liquid and gas.</li> <li>• Elements, compounds and mixtures.</li> </ul> <p><b>4. Physical and chemical changes:</b> The properties of changes, substances in chemical changes and the participation of energy should be mentioned and verified experimentally.</p>	<p>they are being scientists. Think of some more examples from your everyday life about how ordinary people do science.</p> <p><b>Continuum:</b> Display examples of elements, mixtures and compounds: Sea water, sand for mixing, air for mixture of gases, sand can be examined by means of hand; show the different components. Examples of burning a candle, respiration and decaying of materials can be cited for chemical changes – melting of candle wax and boiling of water into steam for physical change. Find wood, charcoal, gasoline, oil, cooking gas, etc, are examples that all fuels contain hydrogen and carries hydrocarbon.</p> <p><b>Class Work:</b> Demonstrate the systems of measurement using rulers and meter sticks, installing the concept of inch</p>	<p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Class Participation</li> <li>• Fairs (creativity, Display)</li> <li>• Observation</li> <li>• Test</li> </ul>
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		<p><b>5. Fuels:</b> solid fuels, liquid fuels and gaseous fuels; uses of each kind should be mentioned.</p>	<p>and centimeter by asking them to measure straight lines of different length, simple problems involving distances in yards and meters or other higher units should be measured.</p> <p><b>Assignment:</b> Ask learners to identify non-living matters. Let them make a list of as many as they can, include materials from the classroom, surrounding, and even at home.</p> <p><b>Group work:</b> Organize learners into small mixed group. Utilize the elements around you. Instruct the learners to identify elements found in the classroom, let them discuss what they found with friends.</p> <p><b>Laboratory:</b> Boiling of water to determine what happens when water boils? Dissolving sugar or salt in cold water to determine what happened.</p>		
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			<p><b>A.</b> Experiment with Sulfur, Iron, and magnet. Form a mixture, and also separate the mixture. Or form a mixture using oil and water record and discuss your results.</p> <p><b>B.</b> Experiment with water can be repeated with ice cubes showing the three states of matter/water.</p> <p><b>Science Fair:</b> Assign learners to:</p> <ol style="list-style-type: none"> <li>1. Make a poster to show what the scientific method is all about <ol style="list-style-type: none"> <li>a. Use the scientific method to solve problems( identify any problem)</li> <li>b. Carry out simple experiments using the scientific method</li> <li>c. Learners demonstrate a scientific attitude and also provide future recommendation for their work.</li> </ol> </li> </ol>		
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**SEMESTER: ONE**

**GRADE: 7**  
**PERIOD: II**  
**TOPIC: LIVING- MATTER**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES/LABS	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b>                      Demonstrate positive attitude towards the environment and use natural resources in a sustainable manner.</p> <p>Develop self-control, respect for themselves, and delaying sexual activity to enable them obtain their goals.</p>	<p><b>Upon completion of this topic, learners will:</b></p> <ol style="list-style-type: none"> <li>1. Highlight the characteristics of living matter</li> <li>2. Recognize the cell as a basic unit of living things</li> <li>3. Differentiate between plants and animals</li> <li>4. Assess the basic structure of plants and their functions</li> <li>5. Determine the characteristics of flowering and</li> </ol>	<p><b>1. Differences between plants and animals;</b>                      Classification of living things; flowering and non-flowering plants.</p> <p><b>Parts of a plant and their functions:</b></p> <ol style="list-style-type: none"> <li>a. Root system &amp; shoot systems:                             <ul style="list-style-type: none"> <li>• Root: absorption and fixation</li> </ul> </li> <li>• Stem – Transportation of raw materials and preparation of food.</li> <li>• Leaves – preparation of food mention chlorophyll,</li> <li>• Process of photosynthesis in the preparation of starch,</li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b>  <b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <p><b>Assignment</b></p> <p><b>A.</b> Diagrams of species in both groups should be drawn by the learners and be labeled.</p> <p><b>B.</b> Construct a poster of the human reproductive system, label its parts and explain their functions.</p> <p><b>Experimental Research:</b>                      The differences in growth of a plant in a shade and one that is in the sunlight can be</p>	<p><b><u>A. Primary Text</u></b>                      Williams K- Fullick, Ann, Gardner, Sue-Jones, Catharine                      Science For Junior High for Liberia                      Grade 7 Pupil’s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 1</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b>  <i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>C. Other Resources/ Supplementary Readings</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies</b>  <i>(Select relevant option).</i></p> <ul style="list-style-type: none"> <li>• Attendance</li> <li>• Observation</li> <li>• Quizzes</li> <li>• Oral Presentation</li> <li>• Group assignments/work</li> <li>• Individual projects Class Participation, Skits</li> <li>• LABS-reports</li> </ul>

	<p>non-flowering plants</p> <p>6. Model the parts of flowering and non-flowering plants</p> <p>7. Model the parts of flower and discuss the function of each part</p> <p>8. Deliberate the process of photosynthesis</p> <p>9. Classify the basic group of animals</p> <p>10. Describe the function of the systems in the human body</p> <p>11. List characteristics that describe the stages of puberty</p>	<p>flowers and fruits reproduction.</p> <ul style="list-style-type: none"> <li>• Flowers</li> <li>• Fruits</li> </ul> <p><b>2. Structure and functions of flowers:</b></p> <p><i>Structure:</i> Flower, stalk, pedicels, epicalyx</p> <ul style="list-style-type: none"> <li>a) Calyx – sepals</li> <li>b) Corolla – petals</li> <li>c) Androecium – stamens, filaments, anthers and pollen grains (male parts)</li> <li>d) Gynoecium: ovary, style, stigma (female part)</li> </ul> <p><b>Functions:</b></p> <ul style="list-style-type: none"> <li>a) Epicalyx and Calyx protection</li> <li>b) b). Corolla – helping pollination (attracting insects)</li> <li>c) Androecium – male part</li> <li>d) Gynoecium – female part.</li> </ul>	<p>chosen to illustrate photosynthesis and the need for chlorophyll Green matter can be illustrated with the leaves (show on the mountain leaf).</p> <p><b>Investigation/ Demonstration:</b> The vertebrate group – fish, frog, birds and mammals can be examined to study their external features. The invertebrate group – grasshopper, butterflies, moths, earthworms, crayfish, etc can be collected by the learners and examine to study their external features.</p> <p><b>Group Work: Group learners into small mixed group.</b></p> <p>Use a puzzle on developmental stages. Ask learners to complete the puzzle, the group that completes correctly and fast will be the winners</p>	<p>Shika Express - Biology Version 1.1 Hands-On Activities Companion Guide Tanzania Shikanamikono-Biology2016pdf</p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a> <a href="http://www.dictionary.com">www.dictionary.com</a> <a href="http://www.khanacademy.com">www.khanacademy.com</a> <a href="http://www.dison.com">www.dison.com</a> <a href="http://www.nature.com">www.nature.com</a> <a href="http://www.sporcle.com">www.sporcle.com</a> <a href="http://www.sciencekids.org">www.sciencekids.org</a> <a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Field Trip</li> <li>• Demonstration</li> <li>• Investigation</li> <li>• Debates</li> <li>• Test</li> </ul>
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	<p>in the growth of boys and girls</p> <p>12. Discuss the significance of sex hormones in the development of male and female</p> <p>13. State the relationship between ovulation and menstruation with normal development and pregnancy</p> <p>14. Identify the Socio-psychological, economic and biological consequences of teenage pregnancy</p> <p>15. Compile measures that</p>	<p><b>Growth, photosynthesis and reproduction of plants (elementary treatment)</b></p> <p><b>Animals:</b> General characteristics of animals – vertebrates and invertebrates, the main characteristics, to differentiate them and mention endoskeleton (vertebral column), invertebrate – without of skeleton. Examples found locally.</p> <p><b>Human Reproductive system and puberty</b></p> <ul style="list-style-type: none"> <li>• Female Reproductive System</li> <li>• Male Reproductive System</li> </ul> <p><b>3. Puberty.</b></p> <ul style="list-style-type: none"> <li>- External characteristic of puberty stages in boys and girls</li> </ul>	<p><b>Role Play:</b> Learners perform Skit on hygiene practices Learners explain lesson learned in skit. Hand washing procedure: <i>Reference hand on Guide.</i></p> <p><b>Question and Answer:</b> Ask learner to explain menstruation and what it means to the girls Explain wet dreams and what they mean to the boys</p> <p>Outline methods of preventing teenage pregnancy.</p> <p><b>Debate:</b> Conduct a panel discussion on the psycho-socio, economic and biological consequences of teenage pregnancy.</p> <p><b>Field Trip:</b> Show examples of flowering and nonflowering plants through outdoor studies. Learners should collect specimens and study/examine them in the classroom.</p>		
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	prevent teenage pregnancy	<ul style="list-style-type: none"> <li>- Secretion of sex hormones by the pituitary and adrenal glands.</li> <li>- Bodily integrity and privacy</li> </ul> <p><b>4. Developmental changes</b></p> <ul style="list-style-type: none"> <li>• Puberty</li> <li>• Physical change</li> <li>• Emotional change</li> <li>• Social change</li> </ul> <p><b>5. Menstrual cycle</b> Menstruation Wet dreams Menopause</p> <p><b>6. Pregnancy:</b></p> <ul style="list-style-type: none"> <li>• How does pregnancy occur?</li> <li>• Consequences of teenage pregnancy</li> <li>• Prevention</li> </ul>	<p>Hibiscus – Rosasinesis (okra), Ipomea Bakata (potato green), Oriza sativa (rice plant), Manihot utilissima (cassava), etc can be collected and examined in the classroom to show parts of a plant.</p> <p>Hibiscus or any complete flower can be shown. The learners should draw accurate diagrams from the actual specimens not from the pictures. Flowers should be dissected to show male and female parts.</p> <p>The growth of tap root of a germinating bean seed can be shown by marking it with ink.</p>		
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**SEMESTER: ONE**

**GRADE: 7**  
**PERIOD: III**  
**TOPIC: ENERGY**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES/ LABS	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Interpret the concept of energy and recognize its forms and safe use.</p> <p>Apply knowledge acquired to the use of simple machines.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Explain the meaning of energy</li> <li>2. Discuss the kinds of energy with examples</li> <li>3. Discuss the forms of energy with examples</li> <li>4. Demonstrate how matter is used to produce energy</li> <li>5. Explain the relationship between work and energy</li> <li>6. Explain ways how we can</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>Definition of energy.</b></li> <li>2. <b>Kinds of energy</b> <ol style="list-style-type: none"> <li>a) Potential energy</li> <li>b) Kinetic energy</li> </ol> </li> <li>3. <b>Conversion of energy</b> <ol style="list-style-type: none"> <li>a) From Potential to Kinetic Energy</li> </ol> </li> <li>4. <b>Simple machines</b> <ol style="list-style-type: none"> <li>a) Lever</li> <li>b) Inclined plane</li> <li>c) Screw</li> <li>d) Wheel/axle</li> <li>e) Pulley</li> </ol> </li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <ol style="list-style-type: none"> <li>1. <b>Group work:</b> Learners work with a partner and list all the activities you do that require energy, eg: cooking food</li> <li>2. <b>Assignment:</b> List as many ways as possible that you can save energy in your everyday life. Compare your list with another pair</li> <li>3. <b>Demonstration:</b> Have learners demonstrate the Three forms of</li> </ol>	<p><b><u>A. Primary Text</u></b>  Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine  Science For Junior High for Liberia  Grade 7 Pupil’s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 1</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b>  <i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>C. Other Resources/Supplementary Readings</u></b></p> <p>Facilitators are also encouraged to utilize internet links to source</p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (Select relevant option)</b></p> <ul style="list-style-type: none"> <li>• Attendance</li> <li>• Observation</li> <li>• Participation</li> <li>• Quizzes</li> <li>• Test</li> </ul>

	<p>conserve energy and our natural resources</p> <p>7. Discuss the principles associated with simple machine</p> <p>8. Discuss how the principles associated with simple machine can be applied or used in daily life</p> <p>9. Discuss the six kinds of machine and their uses</p> <p>10. Describe the types of machine</p> <p>11. Explain the relationship between force, work, energy and power</p> <p>12. Solve simple problems involving work, force and energy</p>	<p>f) Wedge</p> <p>5. <b>Force, work and power</b></p> <p>a) Definition</p> <p>b) Simple problems involving work</p>	<p>levers by means of meter sticks and hanging weight or improvised material.</p> <p>4. Examples; scissors beam balance, tongs.</p> <p>5. <b>Observation:</b> Learners will observe and do actions in each of the above.</p> <p>6. <b>Assignment:</b> Have learners make diagrams of simple and compound pulleys and demonstrate how they work.</p> <p>7. <b>Demonstration:</b> Lead learners to demonstrate the use of inclined plane with local materials.</p> <p>8. <b>Assignment:</b> Ask learners to describe the three main simple machines and examples of each.</p>	<p>additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Group assignments</li> <li>• Individual projects</li> <li>• Demonstrations.</li> <li>• Experimental Research (Laboratory)</li> <li>• Fair</li> <li>• Creativity</li> <li>• Display</li> <li>• Interpersonal</li> <li>• Exposition</li> <li>• Presentations</li> <li>• Group</li> <li>• Individual</li> </ul>
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**SEMESTER: TWO**

**GRADE: 7**

**PERIOD: IV**

**TOPIC: HEALTH AND DISEASE**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Adopt good hygiene behavior and recognize diseases associated with lack of vitamins.</p> <p>Resist peer pressure, harmful substances, and identify risky behavior that affect the body while creating awareness about HIV&amp;AIDS.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Define health, disease and personal hygiene</li> <li>2. Identify common diseases in our community, myth and methods of prevention and control</li> <li>3. Explain the importance of community health in relation to family planning&amp; reproductive health, malaria and HIV&amp;AIDS</li> </ol>	<ol style="list-style-type: none"> <li>1. Definition of <ul style="list-style-type: none"> <li>• Health</li> <li>• Personal hygiene</li> <li>• Disease</li> </ul> </li> <li>2. Types of Diseases</li> <li>3. Methods of preventing and controlling diseases such as diarrhea, cholera, malaria</li> <li>4. Common myths about disease</li> <li>5. Community health <ul style="list-style-type: none"> <li>• Family Planning and Reproductive Health</li> </ul> </li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <ol style="list-style-type: none"> <li>1. <b>Class Discussion</b> on health, disease, personal hygiene and community health.</li> <li>2. <b>Exposition:</b> Teacher leads discussion on how common diseases in our community can be prevented and controlled.</li> <li>3. <b>Fair:</b> Learners design poster of information about hygiene and how to prevent diarrhea, malaria and typhoid to be display in schools.</li> <li>4. <b>Assignment:</b> Learner discuss myths and beliefs about some common diseases in our community (e.g.</li> </ol>	<p><b><u>A. Primary Text</u></b></p> <p>Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine  Science For Junior High for Liberia  Grade 7 Pupils Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 1</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b></p> <p><i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p>Life skills population  Family Life  Education/Resource Book</p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies</b>  <i>(Select relevant option)</i></p> <ul style="list-style-type: none"> <li>• Attendance</li> <li>• Observation</li> <li>• Quizzes</li> <li>• Group assignments</li> </ul>

	<p>4. List some harmful practices in our community</p> <p>5. Demonstrate good hygiene practices</p> <p>6. Relate the principles of hygiene and balance diet to good health</p> <p>7. Discuss Nutrition and name the basic food groups</p> <p>8. List some locally produced food within each food group</p> <p>9. Discuss myths and taboos associated with nutrition</p> <p>10. List some diseases associated with</p>	<ul style="list-style-type: none"> <li>• Malaria</li> <li>• HIV&amp;AIDS</li> </ul> <p>6. Personal hygiene</p> <p>7. Food needs of the body;</p> <p>8. Food types</p> <p>9. Locally produced food</p> <p>10. Diseases associated with vitamins deficiency.</p> <p>11. Substance/drug abuse and influence factors.</p> <ul style="list-style-type: none"> <li>• Drug use</li> <li>• Alcohol use</li> <li>• Peer pressure</li> <li>• Parental pressure etc.</li> </ul>	<p>malaria is caused by eating plum and drinking beer)</p> <p>5. <b>Group work:</b> Work with group. Discuss how information about family planning could be shared in your school and community so peers are able to make informed discussion when to have baby.</p> <p>6. Class exercise to demonstrate personal hygiene (group hand washing)</p> <p>7. <b>Assignment:</b></p> <p>A. Let learners list locally produced food within their community.</p> <p>B. Let teacher assist learners to categorize the food as energy, protective and body building foods.</p> <p>C. The teacher should lead the discussion on mal-nutrition and diseases associated with them.</p> <p>D. Discuss with learners the impact of drug abuse and the</p>	<p><b>C. Other Resources/ Supplementary Readings</b></p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Individual projects</li> <li>• Demonstrations</li> <li>• Class participation</li> <li>• Health talk</li> <li>• Role play</li> <li>• Fair</li> <li>• Creativity</li> <li>• Display</li> <li>• Interpersonal Presentation/ Exposition</li> <li>• Group</li> <li>• Individual</li> <li>• Test</li> </ul>
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	<p>vitamin deficiency</p> <p>11. Discuss the effect of substance and drug abuse on the body</p> <p>12. State the importance of physical exercise on the body</p> <p>13. Discuss behaviors that put one at risk of becoming infected with HIV</p>	<p>12. The importance of physical exercises.</p> <p>13. Risky behavior for HIV infection:</p> <p>a. High risk behavior</p> <p>b. Low risk behavior</p> <p>c. No-risk behavior</p>	<p>importance of exercise to the body.</p> <p>8. <b>Debate:</b> Prepare three colors of card (red, yellow and green) representing the three risky behaviors (high risk, low risk and no risk).</p> <p>9. <b>Demonstration:</b> Prepare flash card with a list of risky behaviors of individuals and ask the learners to come out one at a time and take one flash card to place it under the appropriate colored card.</p> <p>Ask the learners to state why they placed the card under a particular color, and ask the other learners whether they agree.</p> <p>Correct any misinformation and be sure that the card is moved to the correct color.</p> <p><b>Continuum:</b> Use risk statement that show different scenarios about HIV and AIDS. Invite learners to determine high risk, low risk and no-risk behavior. Invite learners to share why they choose what they choose</p>		
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**SEMESTER: TWO**

**GRADE: 7**

**PERIOD: V**

**TOPIC: EARTH AND SPACE SCIENCE**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Identify and describe features of earth and space science and recognize how they impact natural formations and the environment.</p> <p>Understand basic concepts and processes of science as they are used in everyday life</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>Distinguish between Earth and Space Science</li> <li>Explain what causes weather to change and why we have different climates in various parts of the world</li> <li>Name and describe the spheres of the earth</li> </ol>	<p><b>1. Definition of:</b></p> <ol style="list-style-type: none"> <li>Earth Science</li> <li>Space Science</li> </ol> <p><b>2. Earth climatic zones:</b></p> <ol style="list-style-type: none"> <li>Torrid zone</li> <li>Frigid zone</li> <li>Equator</li> <li>Tropics cancer</li> <li>Tropics Capricorn</li> </ol> <p><b>Atmosphere and its contents:</b></p> <ol style="list-style-type: none"> <li>Biosphere</li> <li>Stratosphere</li> <li>Troposphere</li> <li>Mesosphere (exosphere/ ionosphere)</li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <ol style="list-style-type: none"> <li><b>Class Discussions:</b> Ask learners to define Earth Science and Space Science and lead discussion on their ideas to clarify the meaning.</li> <li><b>Assignment:</b> Ask learners to sketch a globe depicting the earth's climatic zones (torrid, frigid, equator, tropics of cancer and tropics of Capricorn) and lead discussion on the rationale for doing the work.</li> <li><b>Peer work:</b> Work with a partner. Use a light source to</li> </ol>	<p><b><u>A. Primary Text</u></b> Williams K- Fullick, Ann, Gardner, Sue-Jones, Catharine Science For Junior High for Liberia Grade 7 Pupil;s Book (Pearson, 2014) M.B. Wiredu, et al. A  <i>New Integrated Science for JHS - BK 1</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b> <i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>C. Other Resources/ Supplementary Readings</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>Effective Communication</li> <li>Analytical Skills,</li> <li>Digital Skills,</li> <li>Research and Problem Solving skills</li> <li>Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (<u>Select relevant option</u>)</b></p> <ul style="list-style-type: none"> <li>Test</li> <li>Quizzes</li> <li>Individual-projects(report)</li> </ul>

	<p>4. List and describe the levels of the atmosphere</p> <p>5. Name the factors that influence the weather of a place</p> <p>6. Describe factors that lead to rain formation</p> <p>7. Name the three kinds of rocks and factors that lead to their formation</p> <p>8. Name some minerals of the earth found in Liberia</p>	<p>e) Magnetosphere</p> <p><b>3. Weather and Climate</b> - Define;</p> <p>a). Weather b). Climate</p> <p><b>A. Factors influencing weather:</b></p> <p>i. Air pressure ii. Temperature iii. Precipitation iv. Humidity</p> <p><b>B. Factors influencing Climates:</b></p> <p>i. Position to the place nearness to the sea or equator</p> <p>ii. Latitude iii. Prevailing wind belt iv. Temperature v. Rainfall vi. Sunshine</p>	<p>represent the Sun. One person holds the light source so that it does not move. The other person must move the globe so that the light source shines on the equator, up to the Tropic of Cancer and down to the Tropic of Capricorn. Let learners explain what they learn about the climate zones in the activity.</p> <p>4. <b>Laboratory:</b> Lead learners to experiment formation of cloud through evaporation process (boiling of water), and then lead discussion on the rest of the activities.</p> <p>5. <b>Assignment:</b> Ask learners to define: a). Weather b). Climate and clarify learner's definition and differentiate climate from weather.</p> <p>6. <b>Group work:</b> Divide the class into two groups and ask each group to list factors influencing weather or climate. Lead</p>	<p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a> <a href="http://www.dictionary.com">www.dictionary.com</a> <a href="http://www.khanacademy.com">www.khanacademy.com</a> <a href="http://www.dison.com">www.dison.com</a> <a href="http://www.nature.com">www.nature.com</a> <a href="http://www.sporcle.com">www.sporcle.com</a> <a href="http://www.sciencekids.org">www.sciencekids.org</a> <a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Peer work- (assessment)</li> <li>• Observation</li> <li>• Attendance</li> <li>• Participation</li> <li>• Oral presentation</li> <li>• Field Trips- (Presentation)</li> <li>• Group work</li> <li>• Role and Responsibilities</li> <li>• Peer Assessment</li> </ul>
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		<p><b>5. Spheres of the Earth;</b>  a). Hydrosphere  b). Lithosphere  c). Mantle and Core</p> <p><b>6. Crust of the Earth;</b>  a). Rock formation  b). Kinds of rock <ul style="list-style-type: none"> <li>• Igneous rock</li> <li>• Sedimentary rock</li> <li>• Metamorphic rock</li> </ul> c). Rock cycle Some product from rock cycle found in Liberia.</p>	<p>discussion on the learners' ideas.</p> <p>7. <b>Class Discussion:</b> Learners discuss the spheres of the earth (hydrosphere, lithosphere, mantle and core). Lead discussion on the ideas of learners.</p> <p><b>Assignment:</b> Explain the formation of rocks and the various types (igneous, sedimentary, metamorphic), including rock cycle.</p>		
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**SEMESTER: TWO**

**GRADE: 7**

**PERIOD: VI**

**TOPIC: AGRICULTURE**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Develop skills in farming while appreciating the value of nature.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. State the two main types of Agriculture products</li> <li>2. Explain how soil is prepared for growing plants</li> <li>3. State the importance of fertilizer in the growing of plants, and</li> <li>4. Apply the fundamentals of Agriculture in the production of food in making the green revolution a reality.</li> </ol>	<p><b>Agriculture:</b></p> <ol style="list-style-type: none"> <li>a) Definition</li> <li>b) Two main types of agricultural products;               <ol style="list-style-type: none"> <li>(i). Food crops</li> <li>(ii). Cash crops</li> </ol> </li> <li>c) The three kinds of plants:               <ol style="list-style-type: none"> <li>i Annual plant – e.g.</li> <li>ii Biannual plant – e.g.</li> <li>iii Perennial plant – e.g.</li> </ol> </li> <li>d) Soil preparation for growing plants: Alluvial, Loamy and Sandy soils.</li> <li>e) Purpose for soil preparation.</li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <ol style="list-style-type: none"> <li>1. <b>Assignment:</b> Let learners define agriculture and state the two main types of agricultural products – possible answers; food crops and cash crops.</li> <li>2. <b>Non-Experimental Research:</b> Let learners bring sample of food and cash crops collections for categorization.</li> <li>3. <b>Assignment:</b> Ask learners to brainstorm and state those plants that bear fruits once a year, twice a year</li> </ol>	<p><b><u>A. Primary Text</u></b> Williams K- Fullick, Ann, Gardner, and Sue-Jones, Catharine (2014): Science for Junior High for Liberia Grade 7 Pupils’ Book. Pearson, England.</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 1</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b> <i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>C. Other Resources/ Supplementary Readings</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (<u>Select relevant option</u>)</b></p> <ul style="list-style-type: none"> <li>• Test</li> <li>• Quizzes</li> <li>• Group assignments</li> </ul>

		<p>f) Seed Germination and growth - Dicot seed (beans and pea)</p> <ul style="list-style-type: none"> <li>- Monocot seed (paddy/ corn)</li> <li>- Fertilizers</li> </ul> <p>g) Process of Germination:</p> <ul style="list-style-type: none"> <li>- Testa</li> <li>- Tegmen</li> <li>- Cotyledon</li> <li>- Endosperm</li> <li>- Hilum</li> <li>- Micropyle</li> <li>- Embryo</li> <li>- Radicle</li> <li>- Plumule</li> <li>- Tap root</li> <li>- Adventitious (fibrous)</li> </ul> <p>h) Condition for Germination;</p> <ul style="list-style-type: none"> <li>- water</li> <li>- air(oxygen)</li> </ul>	<p>and throughout the year and ask them to bring specimen of each of the following class time.</p> <p>4. <b>Demonstration:</b> Teacher display three types of soil used for growing plants and explain their usage.</p> <p>5. <b>Demonstration:</b> Lead learners to experiment the preparation of the soil to grow seeds.</p> <p>6. <b>Presentation:</b> Explain the purpose of irrigation and retention of water in the soil.</p> <p>7. <b>Experimental Research:</b> Let learners experiment the planting of seeds into the nursery and observe the growing process of seeds.</p> <p>8. <b>Class Discussion:</b>  <b>A.</b> Let the learners describe the type of seeds by observing the germinated</p>	<p>T.E. Lartey, et al. <i>BECE Agriculture for JSS – Pupil's Book 1</i> (Sedco, 2005)</p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Projects</li> <li>• Individual reports</li> <li>• Group reports</li> <li>• Demonstrations</li> <li>• Observations</li> <li>• Oral presentation</li> <li>• Field work</li> <li>• Participation</li> <li>• Test</li> <li>• Assignment</li> <li>• Non-Experimental research</li> <li>• Group work</li> </ul>
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		<ul style="list-style-type: none"> <li>- sunlight (temperature)</li> <li>- spacing</li> </ul> <p>i) Weeding types;</p> <ul style="list-style-type: none"> <li>- Mechanical method</li> <li>- Chemical method</li> <li>- Physical method</li> </ul> <p>j) Difference between manure and fertilizers</p>	<p>ones to state whether it is dicot or monocot.</p> <p>9. Lead learners to discuss the chemicals and other things that are used to improve plant growth.</p> <p>10. <b>Assignment:</b> Ask learners to describe the conditions that are necessary for plant growth and survival.</p> <p>11. <b>Group work:</b>  <b>A.</b> Divide the class into groups Lead learners to give the various weeding methods and state the advantages and disadvantages of weeding.</p> <p>12. Group learners into two small groups and let each group state the difference between fertilizer and manure and then make clarification of their responses.</p>		
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**SEMESTER: ONE**

**GRADE: 8**

**PERIOD: I**

**TOPIC: SCIENTIFIC KNOWLEDGE AND NON-LIVING MATTER**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS/ RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Apply scientific knowledge to innovate/create and effectively share findings/information with others</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>Discuss the scientific method and demonstrate its application in problem solving</li> <li>Describe and discuss the basic and derived units of measurement</li> <li>Describe the composition of matter</li> <li>Discuss the states of matter and their properties</li> <li>Differentiate the kinds of matter (elements,</li> </ol>	<p><b>1. Scientific knowledge:</b></p> <ol style="list-style-type: none"> <li>Common sense as a source of knowledge.</li> <li>How scientists solve problems.</li> <li>The nature of scientist.</li> <li>Measurements; basic and derived units (area, volume, density, weight and force).</li> </ol> <p><b>2. Matter: Non-living</b></p> <ol style="list-style-type: none"> <li>The structure of matter; states of matter</li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <ol style="list-style-type: none"> <li><b>Class Discussion:</b> Ask learners to list the components of scientific knowledge and tell them to find the difference between scientific knowledge and superstition.</li> <li><b>Fair:</b> Lead learners to demonstrate the components of scientific knowledge to solve scientific problems.                     <ol style="list-style-type: none"> <li>Create a chart to show what the scientific method is all about</li> <li>Use the scientific method to solve problems (identify any problem)</li> </ol> </li> </ol>	<p><b><u>A. Primary Text</u></b>                      W. K- Fullick, A.G. Sue-Jones, Catharine                      Science For Junior High for Liberia                      Grade 8 Pupil;s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 2</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b>  <i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>Other Resources/ Supplementary Readings</u></b>                      Measurement chart</p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>Effective Communication</li> <li>Analytical Skills,</li> <li>Digital Skills,</li> <li>Research and Problem Solving skills</li> <li>Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (Select relevant option)</b></p> <ul style="list-style-type: none"> <li>Attendance</li> <li>Observation</li> <li>Participation</li> <li>Assignment</li> <li>Class work</li> <li>Quizzes</li> </ul>

	<p>compound and mixtures)</p> <p>6. Identify some common compounds with their formula, scientific and common names</p> <p>7. Distinguish between compounds and mixtures with examples and Describe and demonstrate some common methods of separating mixtures.</p>	<p>and their properties.</p> <p>b) Elements: Definition of symbols.</p> <p>c) Compounds: Definition of compounds, formulas, scientific and commercial name.</p> <p>d) Mixture: examples; petroleum, air, sea water, sugar water.</p>	<p>c) Carry out simple experiments using the scientific methods</p> <p>d) Learners demonstrate a scientific attitude and also provide future recommendations for their work.</p> <p>3. <b>Assignment:</b></p> <p>A. Ask learners to state the characteristics and behavior of scientists and how these characteristics can be applied in their daily lives.</p> <p>B. Ask learners to state the difference between basic and derived units. Let them use these units to solve simple measurement problems of area, volume, density, weight and force.</p> <p>4. <b>Demonstration/ animation:</b> to discuss the states and properties of non-living matter.</p>	<p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Test</li> <li>• Individual projects Demonstrations</li> <li>• Fair:</li> <li>• Creativity</li> <li>• Display</li> <li>• Interpersonal</li> </ul>
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			<p>5. <b>Assignment:</b></p> <p>A. Lead learners to define and identify elements with their symbols.</p> <p>B. B. Learners to define and identify compounds with their formulae, scientific and commercial names.</p>		
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**SEMESTER ONE**

**GRADE: 8**  
**PERIOD: II**  
**TOPIC:**

**CLASSIFICATION AND LIVING MATTER**

<b>LEARNING OUTCOMES</b>	<b>OBJECTIVES</b>	<b>CONTENTS</b>	<b>ACTIVITIES</b>	<b>MATERIALS / RESOURCES</b>	<b>COMPETENCIES/ ASSESSMENT</b>
<p><b>Learners are able to:</b></p> <p>Develop the link between cells, tissues and organs in a living organism.</p> <p>Demonstrate relationships among the different types of systems in the human body</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Describe the characteristics of protists, plants and animals with examples</li> <li>2. Describe and explain cell structure</li> <li>3. Distinguish between respiration and photosynthesis in plants</li> <li>4. Discuss the types of roots and leaves</li> <li>5. Classify animals according to the major phyla</li> </ol>	<p><b>Classification of living things:</b></p> <ol style="list-style-type: none"> <li>i Protist characteristics with examples.</li> <li>ii Plant characteristics with examples.</li> <li>iii Animal characteristics with examples.</li> </ol> <p><b>Plants</b></p> <ol style="list-style-type: none"> <li>a) Needs of plants</li> <li>b) Cell structure</li> <li>c) Respiration and photosynthesis</li> <li>d) Types according to environment, hydrophyte, epiphytes, Rhodophytes</li> <li>e) Types of roots: Tap-root, adventitious and modified roots.</li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</p> <p>1. <b>Class Discussion:</b> Lead learners to classify living things (protist characteristics) with examples.                      - Plants characteristics with examples.</p> <p>2. <b>Class Discussion / Assignment:</b> Lead learners to list and discuss</p> <ol style="list-style-type: none"> <li>a. Animal characteristics</li> <li>b. Plant needs                             <ul style="list-style-type: none"> <li>- Cell structures</li> <li>- Respiration/ photosynthesis</li> </ul> </li> </ol> <p>Hydrophytes, epiphytes, Rhodophytes, etc.</p>	<p><b><u>A. Primary Text</u></b>                      Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine                      Science For Junior High for Liberia                      Grade 8 Pupils Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 2</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b>  <i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>C. Other Resources/ Supplementary Readings</u></b>                      Posters                      Shika Express - Biology Version 1.1</p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (Select relevant option)</b></p> <ul style="list-style-type: none"> <li>• Test</li> <li>• Quizzes</li> <li>• Group assignments</li> <li>• Non-Experimental research-report</li> <li>• Attendance</li> </ul>



	<p>6. Describe and discuss the insects with emphasis on grasshopper as an example</p> <p>7. Describe the structural organization of the human body; (elementary treatment only)</p> <p>8. Discuss the skeletal, digestive and circulatory systems with their principal organs and functions</p> <p>9. Identify the structure and the functions of the male and female reproductive systems and List some disorder and disease associated with them.</p>	<p>f) Types of leaves: Simple and compound.</p> <p>g) Shapes of leaves and arrangements on stem: typical flowers and their functions.</p> <p><b>Animals</b></p> <ul style="list-style-type: none"> <li>• Classifying animals</li> <li>• Cells, Tissues and organs</li> </ul> <p><b>Human Body System</b></p> <ul style="list-style-type: none"> <li>• Skeletal System</li> <li>• Digestive system</li> <li>• Circulatory system</li> <li>• Male and Female reproductive systems</li> </ul>	<p>(according to their environment).</p> <p>3. <b>Group work:</b> Divide the class in two groups and let each group discuss the types of roots. - Lead them to list each type with examples.</p> <ul style="list-style-type: none"> <li>- Let learners describe the various types of leaves (simple and compound).</li> <li>- Describe shapes of leaves and arrangements on stem.</li> </ul> <p>4. <b>4.Assignment:</b> Lead the learners to identify and state functions of:</p> <p>a) Typical flower</p> <p>5. <b>Peer Work:</b> Learner work with peer .Decide how you think cells, tissues and organs are linked in the body of an animal. Have peer agreed on the answer and write in your notebook. Answers will be check for clarity.</p> <p>6. <b>Hands-on activities:</b> Display some non-living things such</p>	<p>Hands-On Activities Companion Guide Tanzania <i>Shikanamikono-Biology2016pdf</i></p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionay.com">www.dictionay.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Group work</li> <li>• Oral Presentation</li> <li>• Class participation</li> <li>• Fairs</li> <li>• Creativity</li> <li>• Display</li> <li>• Interpersonal</li> <li>• Demonstrations.</li> </ul>
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			<p>as a stone, piece of wood, glass of water etc., and list any obvious differences between these things and a living organism (i.e. man). Produce a table from the whole class response.</p> <p>7. <b>Assignment:</b> Draw your own skeleton system and label it.</p> <p>8. <b>Group Work:</b> Let learners discuss and analyses in groups on what will happen to the food that they eat inside their body, and report to the class.</p> <p>9. <b>Fair:</b> Display posters of male and female reproductive system and discuss</p>		
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**SEMESTER: ONE**

**GRADE: 8**

**PERIOD: III**

**TOPIC: ENERGY AND SIMPLE MACHINES**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Appreciate energy sources and uses and how they impact the environment.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Distinguish between potential and kinetic energy with examples.</li> <li>2. Discuss the forms of energy with examples.</li> <li>3. Discuss and describe some of the forces in the environment (gravity, inertia, friction and adhesion).</li> <li>4. Name some sources and uses of fuel, and</li> </ol>	<p><b>1. Energy:</b></p> <ol style="list-style-type: none"> <li>a). definition of energy</li> <li>b). Energy - potential and kinetic.</li> <li>c). Forms of energy; mechanical, heat, light, chemical, atomic and solar.</li> <li>d). Sources and uses of energy.</li> <li>e). Forces in the environment; gravity, inertia, friction, cohesion and adhesion.</li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <p><b>Class Discussion:</b> Lead learners to define energy and states the types (Potential &amp; Kinetic).</p> <p><b>Assignment:</b> Ask learners to discuss the types of energy and state examples of each.</p> <p>Lead learners to identify the forms of energy and describe them with examples (Reports and Presentations).</p> <p><b>Group work:</b> Organize the class into two groups; let them brainstorm the impact of energy on everyday activities and the environment.</p> <p><b>Group Assignment and Demonstration:</b> Illustrate with flow charts to show the following energy transformations: solar energy to chemical in photosynthesis, Chemical energy to electrical energy in solar cells, chemical energy in fossil fuel into</p>	<p><b><u>A. Primary Text</u></b> Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine Science For Junior High for Liberia Grade 8 Pupil’s Book (Pearson, 2014)</p> <p><b><u>C. Secondary Text</u></b> <i>General Science</i> <i>Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>Other Resources/ Supplementary Readings</u></b></p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (<u>Select relevant option</u>)</b></p> <ul style="list-style-type: none"> <li>• Test</li> <li>• Quizzes</li> <li>• Group work</li> </ul>

	<p>Discuss the simple machine and demonstrate their applications.</p>	<p>f). fuels – examples and uses.</p> <p>g). Machines and their work; simple machine: simple mathematical problems on simple machines.</p>	<p>thermal energy/ electrical energy, potential energy to kinetic energy in falling object, electrical energy to light energy in bulbs, chemical energy is released from glucose during cellular respiration</p> <p><b>Demonstration/ Observation:</b> Lead learners to demonstrate gravity, inertia, friction, cohesion and adhesion by the following activities:</p> <ol style="list-style-type: none"> <li>Sending the ball vertically to the next end or upward.</li> <li>Two learners on 100 meters race.</li> <li>Rubbing palms together.</li> <li>Applying glue/honey on two surfaces of paper. Closing envelope using gum.</li> <li>Drop oil in water.</li> </ol> <p>Learners observe/Record: Observe the demonstrations and write a report.</p> <p><b>Class work /Demonstration:</b> Ask learners to collect charcoal, kerosene, candle and matches to demonstrate their uses as fuels by burning them.</p> <p><b>Demonstration:</b> Lead learners to demonstrate the use of simple and compound machines in doing work. Examples; shovels, wheelbarrows, ladder, scissors, knife, pulley, etc. Let them determine the amount and speed of work done.</p>	<p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Role and Responsibility</li> <li>• Peer Assessment</li> <li>• Individual projects- reports</li> <li>• Demonstrations.</li> <li>• Laboratory reports</li> <li>• Attendance</li> <li>• Participation</li> <li>• Observation</li> </ul>
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			<b>Problem Solving:</b> Lead learners to solve simple mathematical problems on work done.		
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**SEMESTER: TWO**

**GRADE: 8**  
**PERIOD: IV**  
**TOPIC: HEALTH AND HYGIENE**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Appreciate the importance of good health and demonstrate how diseases are transferable.</p> <p>Identify risky behavior /circumstances that can lead to rape, drug abuse and create awareness on STIs and HIV</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>Discuss the importance of good health and how it can be promoted</li> <li>Demonstrate various methods used in maintaining and promoting personal hygiene</li> <li>Discuss the relationship between personal hygiene and community health</li> <li>Explain the effects of</li> </ol>	<p><b>-The importance and promotion of good health.</b></p> <p><b>-Hygiene (Malaria)</b></p> <ul style="list-style-type: none"> <li>Good hygiene practices.</li> <li>Personal hygiene</li> </ul> <p>a) Care of skin, ear, nose, mouth and eyes.</p> <p>b) Care of reproductive organs (menstruation hygiene)</p> <p><b>Substance Abuse</b></p> <p><b>Its effect on health</b></p> <p><b>Relationship between personal hygiene and community health.</b></p> <p><b>Diseases:</b></p> <p>a) Common communicable</p>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <ol style="list-style-type: none"> <li><b>Presentations /Exposition:</b> Let the learners name the five aspects of good health and discuss them.</li> <li><b>Demonstration:</b> Let learners demonstrate the good hygiene practices in relation to Malaria</li> <li><b>Presentation:</b> Let learners discuss ways we take care of our body parts,</li> </ol>	<p><b><u>A. Primary Text</u></b></p> <p>Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine            Science For Junior High for Liberia            Grade 8 Pupil’s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 2</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b></p> <p><i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>Other Resources/ Supplementary Readings</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>Effective Communication</li> <li>Analytical Skills,</li> <li>Digital Skills,</li> <li>Research and Problem Solving skills</li> <li>Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (Select relevant option)</b></p> <p>Research (report)</p> <ul style="list-style-type: none"> <li>Attendance</li> <li>Participation</li> <li>Role Play</li> <li>Field Trip/Report</li> <li>Oral Presentation</li> </ul>

	<p>Substance and Drug Abuse on the body</p> <ol style="list-style-type: none"> <li>5. Name some common diseases, their occurrence and methods of preventing them</li> <li>6. Clearly explain the concept of reproductive health</li> <li>7. Identify behaviors as it relate to rape and its consequences</li> <li>8. List the vulnerable groups of HIV/AIDS and describe the impact on the individual, family and community</li> <li>9. Discuss the concepts of health, morbidity and mortality</li> </ol>	<p>and communicable diseases</p> <ol style="list-style-type: none"> <li>b) occurrences</li> <li>c) prevention</li> </ol> <p><b>Concept of reproductive health.</b></p> <p><b>Reproductive Tract Diseases (RTD)</b></p> <ol style="list-style-type: none"> <li>a) STIs – definition, causes, effects, prevention, common STIs in Liberia - mode of transmission of STIs</li> <li>b) HIV/AIDS: Acronyms <ul style="list-style-type: none"> <li>- causes</li> <li>- modes of transmission</li> <li>- sign/symptoms</li> <li>- Effects (impact) on individual, family and community.</li> <li>- prevention</li> <li>- vulnerable groups</li> <li>- Care and support of people living with HIV/AIDS.</li> </ul> </li> </ol>	<p>including menstruation hygiene.</p> <ol style="list-style-type: none"> <li>4. <b>Teacher for a day:</b> Learners take turn to facilitate discussion with peers about the relationship between community and personal hygiene</li> <li>5. <b>Assignment:</b> Ask learners to list communicable and non-communicable diseases Let them discuss causes and prevention.</li> <li>6. <b>Teacher for a day</b> Learners take turn to explain what is reproductive health and ask peers to list the reproductive tract infections; modes of transmission, treatment and prevention.</li> <li>7. Resource Person: invite a resource person to discuss</li> </ol>	<p>Shika Express - Biology Version 1.1 Hands-On Activities Companion Guide Tanzania</p> <p><i>Shikanamikono-Biology2016pdf</i></p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Debate</li> <li>• Demonstration</li> <li>• Observation</li> <li>• <b><u>Other essential evaluation tools:</u></b></li> <li>• Quizzes</li> <li>• Group assignments</li> <li>• Individual projects</li> <li>• Demonstrations</li> <li>• Presentations</li> <li>• Role Play</li> <li>• Attendance</li> <li>• Test</li> </ul>
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		<p><b>Rape</b>  Gender issues in rape (myths, attitudes)  Reproductive health rights  How to avoid/get out of risky situations  Steps to take in case of rape  <b>Teenage pregnancy</b> (causes, effects and prevention)</p> <p><b>Morbidity and Mortality</b></p> <ol style="list-style-type: none"> <li>a. definition and causes</li> <li>b. vulnerable groups affected</li> <li>c. methods of prevention</li> <li>b) types of services</li> </ol>	<p>the STI, the causes, mode of transmission, sign/symptoms and impact on individual, family and community as well as prevention.</p> <p><b>Group work:</b> Divide learners into smaller groups to discuss HIV/AIDS, the causes, mode of transmission, sign/symptoms and impact on individual, family and community as well as prevention.</p> <p><b>Non- Experimental research:</b> Conduct case studies about how communicable and non-communicable diseases are spread involving learners sitting close to one another.</p> <p><b>Homework:</b> Learners conduct research on the life styles of drugs and substance users in their communities and make presentation in class relation to the ABC method.</p> <p><b>Assignment:</b> Ask learners to explain what vulnerability</p>		
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			<p>mean and identify vulnerable group of people in their communities.</p> <p><b>Group Work/Debate:</b> organize learners into two groups and let each group discuss: a). Is it good to discriminate against people with HIV/AIDS Why? b). Is it bad to discriminate against people with HIV/AIDS Why?</p> <p><b>Assignment:</b> 1.Lead learners to explain. Send learners to their homes to ask their parents attitudes and values about forced sex. Allow them to report to class. Highlight the gender aspects in the reporting and blame game- especially about the girls.</p> <p><b>Tell:</b> Present to your learners about their reproductive health rights emphasizing that no one has a right to force them to have sex with them Ask the learners what the rights mean to them</p>		
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			<p><b>Hands-on activities:</b> Start a stopwatch and have a learners or teacher slowly pour soapy water over a basin while the learners washes his or her hands. Stop the clock when the learners' hands are completely clean.( See Hand- on manual for more detail p 10)</p> <p><b>Role Plays:</b> A pair of learners where a boy is trying to force a girl into sex. Switch roles. Let the learners use any of the tricks to avoid rape. A girl who has just been raped. Telling a friend and what the friend does to help her. Include not destroying evidence, reporting the rape, medical attention - emergency pill, PEP etc. Give learners opportunities to practice more scenarios about rape.</p> <p><b>Class discussion:</b> the meaning of morbidity and mortality and discuss their causes.</p> <p><b>Assignment:</b> Lead learners to identify the vulnerable group affected by morbidity and mortality and list the types of</p>		
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			support services required by each group		
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**SEMESTER: TWO**

**GRADE: 8**

**PERIOD: V**

**TOPIC: EARTH AND SPACE SCIENCE**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Recognize the geosphere as the source of our mineral and appreciate the earth as a supporter of life</p> <p>Understand the theories of space.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>Discuss the atmospheres and compositions of the earth</li> <li>Distinguish between weather and climate</li> <li>Explain the kinds of winds and clouds</li> <li>Determine the sources, properties and usage of water</li> <li>Demonstrate simple methods of purifying water</li> </ol>	<p><b>1. Earth and Space Science.</b> A. The Earth – spheres            B. The Atmosphere:            a) water vapor            b) precipitation and kinds            c) weather and climate            d) kinds of winds            e) conditions influencing            C. Climate –            a). natural            b). artificial</p> <p><b>2. The Hydrosphere:</b>            a). Inland water properties</p> <ul style="list-style-type: none"> <li>Purification of water</li> <li>Sources and supply of water</li> </ul>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <p><b>Assignment:</b> Guide learners to name and define the various spheres of the earth.</p> <p><b>Discussion:</b> Lead discussion on the composition of each sphere.</p> <p><b>Assignment:</b> Guide learners to define weather and climate, differentiate them.</p> <p><b>Discussion:</b> Lead learners to discuss factors that influence climatic change.</p>	<p><b><u>A. Primary Text</u></b>            Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine            Science For Junior High for Liberia            Grade 8 Pupil’s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 2</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b>  <i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>C. Other Resources/ Supplementary Readings</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>Effective Communication</li> <li>Analytical Skills,</li> <li>Digital Skills,</li> <li>Research and Problem Solving skills</li> <li>Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (Select relevant option)</b></p> <ul style="list-style-type: none"> <li>Quizzes</li> <li>Group assignments</li> <li>Individual projects</li> <li>Demonstrations Presentations</li> </ul>

	<p>6. Discuss the nature of the ocean with relationship to currents and tides</p> <p>7. Name and describe the layers of the earth</p> <p>8. List some materials of our environment</p> <p>9. Explain the theories about space and its history</p>	<p>b). The Ocean - current and tides.</p> <p><b>3. The Geosphere:</b></p> <p>a) The earth's crust</p> <p>b) Minerals in the space (space rock).</p> <p>c) Review of the solar system with emphasis on simple observations.</p> <p>d) Theories about space and early space travelers.</p> <p>e) Observation and effects of the phases of the moon.</p>	<p><b>Teacher for a day:</b> Learners take turn to explain the different clouds and winds.</p> <p><b>Demonstration:</b> Guide learners to discuss factors that influence rainfall.</p> <p><b>Assignment:</b> Lead learners to discuss the various properties of hydrosphere.</p> <p><b>Class Discussion:</b> Lead a discussion on the sources of water and how it can be distributed, purified and used.</p> <p><b>Group work:</b> Let learners demonstrate simple purification methods</p>	<p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Role Play</li> <li>• Attendance</li> <li>• Test</li> </ul>
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**SEMESTER: TWO**

**GRADE: 8**

**PERIOD: VI**

**TOPIC: SOIL SCIENCE**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Recognize the types of soil</p> <p>Distinguish seed types and recognize factors that affect plant growth</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Identify the kinds of soil and methods of improving them</li> <li>2. Discuss the components of soil</li> <li>3. Discuss the effects of different kinds of soil on plant growth</li> <li>4. Describe the kinds of fertilizers and their effects on plant growth</li> </ol>	<ol style="list-style-type: none"> <li>1. Definition of fertile soil</li> <li>2. Types of soil</li> <li>3. Methods of improving soil.</li> <li>4. Germination of seeds</li> <li>5. Types of seeds</li> <li>6. Conditions necessary for germination.</li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <p><b>Field Trip:</b></p> <ol style="list-style-type: none"> <li>1. Let learners identify the types of soil in their locality. Collect samples for examination and list the types they have examined.</li> <li>2. Let learners to identify fertile soil among samples collected and examined.</li> </ol> <p><b>Demonstration:</b> Discuss with learners various ways of improving soil fertility.</p> <p><b>Assignment:</b> Discuss definition of germination and the types of</p>	<p><b><u>A. Primary Text</u></b></p> <p>Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine Science For Junior High for Liberia Grade 8 Pupil;s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 2</i> (Longman, 2007)</p> <p><b><u>Secondary Text</u></b></p> <p><i>General Science Revision Notes &amp; Exercise For JSS</i> (Longman)</p> <p><b><u>Other Resources/Supplementary Readings</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (<u>Select relevant option</u>)</b></p> <ul style="list-style-type: none"> <li>• Quizzes</li> <li>• Group assignments</li> <li>• Individual projects</li> <li>• Field trips/ report</li> <li>• Tests</li> </ul>

			<p>seeds. Let learners list the types of seeds with examples of each.</p> <p><b>Class Discussion:</b> Lead learners to state conditions necessary for seed germination.</p> <p><b>Experimental Research:</b> Plant seeds in three different polycene bags. Place one in a dark room, second one in an open air (outside) and third one in the classroom. Supply water to all of them.</p> <p>Observe the three plants, ask learners which one of them germinated well, and which one did not.</p>	<p>T.E. Larthey, et al. <i>BECE Agriculture for JSS – Pupil’s Book 2</i> (Sedco, 2005)</p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Experimental research/reports</li> <li>• Presentation</li> <li>• Demonstrations</li> </ul>
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**SEMESTER: ONE**

**GRADE: 9**

**PERIOD: I**

**TOPIC: SCIENTIFIC KNOWLEDGE AND NON-LIVING MATTER**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Demonstrate knowledge and skills to solve basic scientific problems and show desirable attitude towards science</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Distinguish between Science and Technology</li> <li>2. Demonstrate the use of scientific methods in solving problems</li> <li>3. Classify matter into elements, mixtures and compounds, with examples.</li> <li>4. Identify the differences between physical and chemical changes of matter, with examples</li> <li>5. Describe the composition, properties and usage of air</li> </ol>	<p><b>1. Scientific Knowledge:</b></p> <ol style="list-style-type: none"> <li>a) Man and the scientific methods of solving problems;</li> <li>b) Scientific methods of study;</li> <li>c) Difference between Science and Technology;</li> <li>d) The aid of mathematics in describing things qualitatively and quantitatively</li> </ol> <p><b>2. Matter: Non-living matter</b></p> <ol style="list-style-type: none"> <li>a) Elements – atom and its structure;</li> <li>b) Classification of elements (Use the Periodic table only for classification of Elements;</li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <p><b>Class Discussion:</b> Lead learners to discuss the differences between Science and Technology</p> <p><b>Assignment/Fair:</b> Learners to identify a scientific problem that could be solved by using the process of scientific method of study (Observation; experiment; hypothesis; collection of facts and conclusion and future work)</p> <p><b>Demonstration:</b> Ask the learners to solve problems on measurements,</p>	<p><b><u>A. Primary Text</u></b> Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine Science For Junior High for Liberia Grade 9 Pupil’s Book (Pearson, 2014)</p> <p><b><u>B. M.B. Wiredu, et al. A New Integrated Science for JHS - BK 3 (Longman, 2007)</u></b></p> <p><b><u>B. Secondary Text</u></b> <i>General Science Revision Notes &amp; Exercise For JSS (Longman)</i></p> <p><b><u>C. Other Resources/ Supplementary Readings</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (Select relevant option)</b></p> <ul style="list-style-type: none"> <li>• Attendance</li> <li>• Participation</li> </ul>



	<p>6. Categorize the differences between mixtures and compounds, with examples</p> <p>7. Describe the composition, properties and usage of acids, bases and salts; and</p> <p>8. Explain the methods of separating various mixtures.</p>	<p>c) Physical and chemical changes;</p> <p>d) Mixture: Eg. Air and Sea water</p> <p>e) Compounds (Acids, Bases and Salts)</p> <p>f) Differences between Elements, Mixtures and Compounds</p>	<p>converting one system of units to another;</p> <p>Use periodic chart to lead learners to identify and classify the first 20 elements;</p> <p><b>Group work:</b> List some elements and form compounds, and discuss their properties, including mixtures;</p> <p><b>Laboratory:</b></p> <ol style="list-style-type: none"> <li>1. Use the following compounds to show reactions of acids and Salts to produce Bases: (H<sub>2</sub>SO<sub>4</sub>; HCl; and HNO<sub>3</sub> as acids; Na<sub>2</sub>CO<sub>3</sub>; KCl<sub>3</sub>O as salt)</li> <li>2. Lead learners to demonstrate magnetic separation, filtration, distillation;</li> <li>3. Lead learners to demonstrate physical and chemical changes in matter.</li> </ol>	<p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Fairs:</li> <li>• Creativity</li> <li>• Display</li> <li>• Quizzes</li> <li>• Test</li> <li>• Group assignments</li> <li>• Individual projects/reports</li> <li>• Demonstrations</li> </ul>
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**SEMESTER: ONE**

**GRADE: 9**

**PERIOD: II**

**TOPICS: LIVING MATTER**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b>                      Demonstrate and apply knowledge of the biological characteristic in plants and animals to solve biological problems</p> <p>Appreciate the physical, social and emotional changes that occur in the body.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Classify living matter into two groups: Plants and animals</li> <li>2. Describe the characteristics of plants and animals</li> <li>3. Describe sexual and asexual forms of reproduction in both plants and animals</li> <li>4. Discuss Mendel’s law of Heredity</li> <li>5. Discuss the process of reproduction in human, the development of the Fetus, and the</li> </ol>	<ol style="list-style-type: none"> <li>1. Living matter:                             <ol style="list-style-type: none"> <li>a) Definition and Identification</li> <li>b) Classification</li> <li>c) Characteristics</li> </ol> </li> <li>2. Kingdoms:                             <ol style="list-style-type: none"> <li>a) Plant kingdom</li> <li>b) Animal kingdom</li> </ol> </li> <li>3. Reproduction:                             <ol style="list-style-type: none"> <li>a) Sexual</li> <li>b) Asexual</li> </ol> </li> <li>4. Mendel’s law of Heredity</li> <li>5. Human Reproduction: Development of Fetus to the stage of delivery</li> <li>6. Pregnancy - Its implications:</li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b>  <b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <p><b>Class Discussion:</b> Lead learners to define and identify living things;</p> <p><b>Group work:</b> Organize the class into two groups, and ask them to classify living things by their characteristics;</p> <p><b>Group work:</b> Divide the class into two groups and assign to each a topic (plant kingdom or animal kingdom) two days prior to class time. Ask each group leader to present their group’s report to the rest of the class for discussion and correction.</p>	<p><b><u>A. Primary Text</u></b>                      Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine                      Science For Junior High for Liberia                      Grade 9 Pupil;s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 3</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b>  <i>General Science Revision Notes &amp; Exercise For JSS</i></p> <p><i>BECE Agriculture for JSS – Pupil’s Book 3</i> (Sedco, 2005)</p> <p><b><u>C. Other Resources/</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (<u>Select relevant option</u>)</b></p> <ul style="list-style-type: none"> <li>• Attendance</li> <li>• Participation</li> <li>• Quizzes</li> </ul>

	<p>process of delivery</p> <p>6. Discuss the social and psychological implications related to pregnancy</p> <p>7. Group and discuss plants according to their classes and</p> <p>8. Describe the systems of the human body and outline their functions.</p>	<p>a) Social b) Psychological</p> <p>7. Types of plants and their functions: a) Types of leaves b) Classification of plants</p> <p>8. Systems of the Human Body: a) Structures b) Functions</p> <p>9. Puberty/Adolescence (The Human life cycle): a) Infancy b) Childhood Adolescence (Physical and emotional changes)</p> <p>10. Juvenile delinquency, causes and its impact on youth and society</p>	<p><b>Assignment:</b></p> <p>A. Lead learners to discuss the two systems of reproduction (sexual and asexual).</p> <p>B. Guide learners to discuss the theory of Heredity.</p> <p>C. Let the learners draw the reproductive organs of both male and female and label their parts.</p> <p><b>Class Discussion:</b> Let the learners discuss the development process of the Human Fetus, and the delivery stage.</p> <p><b>Assignment:</b></p> <p>A. Ask learners to outline the implications that accompany pregnancy, with reference to social and psychological stand-points.</p>	<p><b>Supplementary Readings</b></p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Test</li> <li>• Group assignments</li> <li>• Individual projects reports</li> <li>• Non –Experimental Research/</li> <li>• Demonstrations</li> <li>• Field Trip</li> </ul>
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			<p>B. Guide learners to list some types of plants and state their functions.</p> <p><b>Field Trip:</b> Guide learners in to collect several types of plant leaves and classify them according to their structures.</p> <p><b>Assignment:</b> Let the learners draw and label the systems of the human body, and discuss their functions.</p> <p><b>Demonstration:</b> Lead learners to discuss the human life cycle, using chart to depict the various stages.</p> <p><b>Non-Experimental Research:</b> Ask the learners to conduct an investigation into the causes of juvenile delinquencies, and to suggest solutions.</p>	
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**SEMESTER: ONE**

**GRADE: 9**

**PERIOD: III**

**TOPICS: HEALTH AND HYGIENE**

<b>LEARNING OUTCOMES</b>	<b>OBJECTIVES</b>	<b>CONTENTS</b>	<b>ACTIVITIES</b>	<b>MATERIALS / RESOURCES</b>	<b>COMPETENCIES/ ASSESSMENT</b>
<p><b>Learners are able to:</b></p> <p>Apply knowledge and skills acquired to practice good Health care and resist the use of substance and drugs abuse</p> <p>Communicate effectively their feelings about sex and sexuality as it relates to reproductive health</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Distinguish between Health and Hygiene</li> <li>2. Describe activities necessary to promote personal hygiene and optimum care of the body</li> <li>3. Discuss Nutrition in relation to food and its care</li> <li>4. Discuss the causes and effects of teenage pregnancy</li> <li>5. Discuss common sexually transmitted</li> </ol>	<p><b>Health and Hygiene definition;</b></p> <p><b>Personal Hygiene:</b>  <b>Care of the body</b>                      Nutrition                      Food care</p> <p><b>Puberty/adolescence Reproductive Health:</b></p> <ol style="list-style-type: none"> <li>a) Teenage pregnancy</li> <li>b) Causes and effects</li> <li>c) Maternal and child nutrition</li> <li>d) Pregnancy and its implications</li> <li>e) Basic needs of mother and child</li> <li>f) Harmful traditional practices on women health and child survival</li> </ol> <p><b>Infertility and sterility:</b> Causes:</p> <ol style="list-style-type: none"> <li>a) Biological</li> <li>b) Cultural</li> </ol> <p><b>Common Sexually Transmitted Infections:</b></p> <p>- Causes, treatments and prevention (Gonorrhea, syphilis, chancroid, Chlamydia, trichomoniasis,</p>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <p><b>Class Discussion:</b> Let learners define Health and Hygiene, and indicate the differences.</p> <p><b>Research:</b> Ask learners to visit the kitchen regularly and observe activities and report same.</p> <p><b>Assignment:</b> Define puberty, Reproductive Health, and then lead learners to discuss the reproductive health needs.</p> <p><b>Group work:</b> Ask learners to state the common sexually transmitted infections, and</p>	<p><b><u>A. Primary Text</u></b>                      Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine                      Science For Junior High for Liberia                      Grade 9 Pupil’s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 3</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b>  <i>General Science Revision Notes &amp; Exercise For JSS</i>  <i>BECE Agriculture for JSS – Pupil’s Book 3</i> (Sedco, 2005)</p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (<u>Select relevant option</u>)</b></p> <ul style="list-style-type: none"> <li>• Attendance</li> <li>• Assignment</li> <li>• Participation</li> </ul>

	<p>infections (including HIV &amp; AIDS), prevention, treatment and care</p> <p>6. Define the term “human sexuality” and outline responsible attitudes of adolescents</p> <p>7. Explain what is meant by Drug/Substance abuse; its effects and corrective measures and</p> <p>8. Explain and demonstrate simple First Aid methods.</p>	<p>candidiasis)</p> <p><b>HIV/AIDS:</b></p> <ul style="list-style-type: none"> <li>- Definition</li> <li>- Causes</li> <li>- Modes of transmission; sign and symptoms – treatment, Prevention</li> <li>- Care and support of PLWHA</li> <li>- Vulnerable groups for both STIs and HIV/AIDS</li> </ul> <p><b>Human sexuality ( Sex and Sexuality)</b></p> <ol style="list-style-type: none"> <li>a) Definition of sex and sexuality</li> <li>b) Cycles of Sexuality</li> <li>c) Factors that affect sexual behavior with reference to adolescents</li> <li>d) Consequences of irresponsible sexual behavior</li> </ol> <p><b>Effective communication</b></p> <ul style="list-style-type: none"> <li>- Listening</li> <li>- Message</li> <li>- Clarity</li> <li>- Non- verbal communication</li> </ul> <p><b>Negotiation</b>  Listening and understanding the other person’s point of view  Proving alternatives  Compromise  Emotions</p>	<p>outline the causes, treatment and control. And present to the class.</p> <p><b>Assignment:</b>  A. Define HIV &amp; AIDS and lead learners to discuss the causes; mode of transmission; impact; treatment; prevention and care/support of victims.</p> <p>B: Ask learners to describe and identify the segment of the population considered to be vulnerable to STIs and HIV &amp; AIDS.</p> <p>Ask learners to explain what is meant by human sexuality; the factors that affect sexual behavior; and the consequence of irresponsible sexual behavior.</p> <p><b>Debate:</b> Give learners the opportunity to communicate and negotiate their feelings about sex. Some who do not want to have sex and those who do not want to have unprotected sex. Ask learners to evaluate the process using</p>	<p><b>C. Other Resources/Supplementary Readings</b></p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a>  <a href="http://www.dictionary.com">www.dictionary.com</a>  <a href="http://www.khanacademy.com">www.khanacademy.com</a>  <a href="http://www.dison.com">www.dison.com</a>  <a href="http://www.nature.com">www.nature.com</a>  <a href="http://www.sporcle.com">www.sporcle.com</a>  <a href="http://www.sciencekids.org">www.sciencekids.org</a>  <a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Quizzes</li> <li>• Test</li> <li>• Group assignments</li> <li>• Demonstrations</li> <li>• Group work</li> <li>• Project (individual &amp; Group) reports</li> <li>• Research Project</li> </ul>
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		<p><b>Assertiveness</b>  Understand sexual rights  Say what you want understand your sexual triggers  Recognize pressure lines</p> <p><b>Drugs and substance abuse:</b></p> <ol style="list-style-type: none"> <li>a) Effects of alcohol and drugs on the body</li> <li>b) Corrective measure</li> </ol> <p><b>Definition of First Aid:</b></p> <ol style="list-style-type: none"> <li>a) Treatment of wounds, bleeding, bites, cuts, burns, etc.</li> <li>b) Artificial respiration</li> </ol>	<p>the effective communication and negotiation skills or checklist and state challenges of assertiveness based on gender.</p> <p><b>Group work:</b> Divide learners into groups to discuss effects of alcohol and drug abuse and their corrective measures.</p> <p><b>Demonstration:</b> Lead learner to define First Aid, and demonstrate the treatment of wounds, bleeding, cuts, bites and burns, and other emergency treatments, including artificial respiration.</p>		
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**SEMESTER: TWO**

**GRADE: 9**

**PERIOD: IV**

**TOPICS: FORCE, HEAT AND SOUND**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Appreciate the importance of the use of machines to get work done</p> <p>Appreciate the uses and importance of light and temperature.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Discuss the relationship of force, work, energy, motion and machines</li> <li>2. Explain the relationship between velocity and acceleration and speed and velocity</li> <li>3. Demonstrate and explain the Bernoulli's with examples</li> <li>4. Demonstrate the measurement of temperature in °C and °F</li> </ol>	<p><b>1. Energy and machines:</b></p> <ol style="list-style-type: none"> <li>a) Force, motion and energy forces – definition and application</li> <li>b) Inertia, Velocity, speed and acceleration</li> <li>c) Solving of simple problem of energy</li> <li>d) Bernoulli's Principle (Fluid)</li> </ol> <p><b>2. Heat and Temperature:</b></p> <ol style="list-style-type: none"> <li>a) Measurement of temperature               <ul style="list-style-type: none"> <li>- Thermometer scale</li> <li>- °C and °F</li> <li>- Clinical types of thermometers, maximum and minimum thermometers</li> </ul> </li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p>Inclusive seat works or work in mixed groups according to gender, abilities, learning styles, etc.</p> <p><b>Group work:</b> Divide learners into groups and lead them to define and state the application: Force, motion, and energy; -Forces , inertia, velocity Speed and acceleration</p> <p><b>Class Discussion:</b> Lead learners to discuss the Bernoulli's Principle and its application;</p> <p><b>Class Discussion:</b> Lead the learners to define heat and temperature, and describe the difference;</p>	<p><b><u>A. Primary Text</u></b> Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine Science For Junior High for Liberia Grade 9 Pupil;s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 3</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b> <i>General Science Revision Notes &amp; Exercise For JSS</i></p> <p><b><u>C. Other Resources/ Supplementary Readings</u></b></p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (Select relevant option)</b></p> <ul style="list-style-type: none"> <li>• Quizzes</li> <li>• Tests</li> <li>• Group assignments/</li> </ul>



	<p>5. Identify and describe the use of the various types of thermometers</p> <p>6. Describe heat change in relation to work</p> <p>7. Describe the production and transmission of sound waves</p> <p>8. State the audibility range of the human ear; and</p>	<p>b) Effects of heat change – Practical application</p> <p>c) transfer and application (Conductors and their application) - Convection and radiation</p> <p>3. <b>Sound Energy:</b></p> <p>a) Production and transmission with water waves;</p> <p>b) Characteristics of sound waves;</p> <p>c) Audibility range</p> <p>d) Musical instruments</p> <p>4. <b>Light Energy:</b></p> <p>a) Definition</p> <p>b) Speed of light; and characteristics of light shadows and images;</p> <p>c) Reflection and refraction of light rays;</p>	<p><b>Non experimental Research:</b> Let the learners determine and then record the temperature of water placed under the sun, and in the room;</p> <p><b>Practice solving:</b> Provide sample problems on heat and temperature;</p> <p><b>Assignment:</b> Ask learners to convert temperatures in degrees centigrade into Fahrenheit, and vice-versa.</p> <p><b>Non experimental Research:</b> Lead learners to discover effect of heat on metallic and non-metallic substances, and lead them to discuss conduction, convection and radiation processes.</p> <p><b>Class Discussion:</b> Lead learners to discuss the height, pitch, depth of sound waves;</p> <p>Let learners discuss and state the characteristics of sound;</p>	<p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<p>Individual projects Demonstrations.</p> <ul style="list-style-type: none"> <li>• Individual presentation</li> <li>• Group report</li> <li>• Research</li> <li>• Report</li> <li>• Demonstration</li> <li>• Non experimental research</li> <li>• Participation</li> </ul>
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		<p>d) Colors of the spectrum;</p> <p>e) Mirrors and Lenses: - Types; and their usages</p> <p>f) Effects of light on substances: - Transparent - Translucent</p> <p>d) Opaque</p>	<p><b>Research:</b> Lead them to identify the sources of sound in relation to musical instruments;</p> <p>Let learners define light and explain how it is produced;</p> <p><b>Research:</b> Let learners discuss and compare the speed of light to sound;</p> <p><b>Group Work:</b> Let learners describe shadows and images;</p> <p><b>Demonstration:</b> Lead learners to demonstrate the law of reflection of light rays; and also demonstrate the principles of refraction;</p> <p><b>Group Work:</b> Organize the class into two groups, and ask them to use the prism to disperse light into the colors of the spectrum; and describe the seven colors of the spectrum;</p> <p><b>Demonstration:</b> Display the following to the class:</p>		
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			<p>a Concave &amp; convex mirrors</p> <p>b Concave &amp; convex lenses</p> <p><b>Individual Report:</b> and discuss with learners their uses.</p> <p><b>Group Work:</b> Divide the learners into three groups, and let them discuss:</p> <p>a Effects of light on translucent materials</p> <p>b Effects of light on transparent materials</p> <p>c Effects of light on opaque materials</p> <p><b>Group Work:</b> Let each group leader give a summary of the report of the discussion to the whole class.</p>		
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**SEMESTER: TWO**

**GRADE: 9**

**PERIOD: V**

**TOPICS:           MAGNETISM AND ELECTRICITY**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Apply skills in electronics and electricity to solve problems using SI Units.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Discuss the causes of magnetism and its properties</li> <li>2. State electrostatic laws; and discuss static electricity and how it is produced</li> <li>3. Describe the effects of current electricity on both metallic and non-metallic substances,</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>Magnetism:</b> <ol style="list-style-type: none"> <li>a) Causes</li> <li>b) Properties</li> <li>c) Magnetic field</li> <li>d) Magnetic field production</li> </ol> </li> <li>2. <b>Types of magnets:</b> <ol style="list-style-type: none"> <li>a) Horse-shoe</li> <li>b) Bar</li> <li>c) Electro-magnets</li> <li>d) The Graham bell</li> </ol> </li> <li>3. Compass: - Uses</li> <li>4. Motor and Dynamo:</li> <li>5. Effect of lightning and thunder on electrical appliances</li> <li>6. Electric Current:           <ol style="list-style-type: none"> <li>a) Types</li> </ol> </li> </ol>	<p style="text-align: center;"><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Inclusive seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <p><b>Class Discussion:</b> Lead learners to discuss magnetism and its causes. Ask learners to list the causes of magnetism;</p> <p><b>Assignment:</b> Lead learners to describe the magnetic field of current. Ask them to explain the process of induction;</p> <p><b>Lab Demonstration:</b> Lead learners to explain the uses and nature of electromagnets, using the electric bell as example;</p>	<p><b><u>A. Primary Text</u></b>            Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine            Science For Junior High for Liberia            Grade 9 Pupil’s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 3</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b>  <i>General Science Revision Notes &amp; Exercise For JSS</i></p> <p><b><u>C. Other Resources/ Supplementary Readings</u></b></p> <p>Facilitators are encouraged to utilize internet links to source additional materials</p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies</b>  <i>(Select relevant option)</i></p> <ul style="list-style-type: none"> <li>• Quizzes</li> <li>• Tests</li> <li>• Group assignments</li> <li>• Individual projects</li> </ul>

	<p>including aqueous solutions</p> <p>4. State the difference between direct and alternating current</p> <p>5. Explain how current electricity is measured</p> <p>6. Identify fuse and circuit-breaker in an electric circuit and explain their functions and</p> <p>7. Demonstrate electrolysis.</p>	<p>b) Effects on metals and non-metals</p> <p>7. Measurement of electric current</p> <p>8. Ohm's Law</p> <p>9. The S.I. Units</p> <p>10.Types of transformers: a) Step-up b) Step-down</p> <p>11.Circuits: a) Series b) Parallel</p> <p>12.Circuit breakers and fuses</p> <p>Electrolysis</p>	<p><b>Demonstration:</b> Lead learners to identify various types of electromagnets, electrodes and their uses;</p> <p>Demonstrate the use of compass and ask learners to do the same; and find the direction of the north pole;</p> <p><b>Non Experiment Research:</b> Lead learners to describe how compass is used in both sea and space navigation;</p> <p><b>Assignment:</b></p> <p>A. Lead learners to state the types of magnets and describe them;</p> <p>B. Lead learners to discuss electromagnetism, and name the father of electromagnetism;</p> <p>C. Ask learners to explain the causes of lightning and thunder; and state the effects associated with them.</p> <p>D. Let learners define electric current and state its uses;</p>	<p>and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Demonstrations</li> <li>• Experimental Research (Laboratory)</li> <li>• Peer Work</li> <li>• Assignment</li> <li>• Participation</li> <li>• Non Experimental Research</li> </ul>
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			<p><b>Laboratory:</b> Lead learners to build a parallel circuit with a partner. State differences between Direct Current (DC) and Alternating Current (AC); and explain how they are produced and ask learners to investigate whether all materials conduct electricity.</p> <p><b>Peer Work:</b> Ask learners to differentiate between dry cell and the lead-acid accumulator;</p> <p><b>Assignment:</b></p> <ul style="list-style-type: none"> <li>A. Lead learners to discuss and state Ohm's Law;</li> <li>B. Ask learners to discuss S.I. Units for measuring electrical quantities. Let them solve some problems using S.I. units;</li> <li>C. Ask learners to discuss types of circuits; Breakers; Fuses; and list them;</li> </ul>		
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			<p><b>Experimental Research:</b> Lead learners to construct electric circuits and label them;</p> <p><b>Demonstration:</b> Lead learners to demonstrate electrolysis;</p>		
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**SEMESTER TWO**

**GRADE: 9**  
**PERIOD: VI**

**TOPICS: ENVIRONMENTAL SCIENCE**

LEARNING OUTCOMES	OBJECTIVES	CONTENTS	ACTIVITIES	MATERIALS / RESOURCES	COMPETENCIES/ ASSESSMENT
<p><b>Learners are able to:</b></p> <p>Learners practice proper disposal of wastes, and recognize the importance of water (Hard and soft water, pH) and their sources.</p> <p>Acquire knowledge in astronomy and develop interest in Farming.</p>	<p>Upon completion of this topic, learners will:</p> <ol style="list-style-type: none"> <li>1. Discuss the sanitary conditions of environment, community and market places, and ways of improving them.</li> <li>2. Test for (Hard and soft water, pH)</li> <li>3. List the sources of water supply</li> <li>4. Discuss the treatment and usage of water</li> <li>5. Explain air pressure and its effects</li> <li>6. Describe how fluid pressure work as machines</li> </ol>	<p><b>1. Sanitation:</b></p> <ol style="list-style-type: none"> <li>a) Disposal of wastes               <ul style="list-style-type: none"> <li>- Human waste</li> <li>- Solid wastes (Garbage)</li> </ul> </li> <li>b) Ways of disposing wastes               <ul style="list-style-type: none"> <li>- Feces</li> <li>- Garbage</li> <li>- Cleaning of school community and market places</li> </ul> </li> </ol> <p>Effects of human solid wastes (Kinds of diseases caused: Diarrhea; cholera; Polio; Typhoid; Malaria; etc.)</p> <p><b>2. Hydrosphere:</b></p> <ol style="list-style-type: none"> <li>a) Water supply - Water cycle               <ul style="list-style-type: none"> <li>- Water table</li> <li>- Water sources</li> <li>- Water treatment</li> <li>- Water transportation</li> </ul> </li> </ol>	<p><b><u>Inclusive and Differentiated Learning</u></b></p> <p><b>Individual seat works or work in mixed groups according to gender, abilities, learning styles, etc.</b></p> <p><b>Discussion:</b> Lead learners to discuss the sanitary conditions on school campuses as well as homes, market places and state the causes of such conditions.</p> <p>Lead learners to discuss the effects of human and solid wastes to the survival of life and state ways of prevention</p> <p><b>Assignment:</b> Ask learners to state how wastes can be managed both in school and at home.</p> <p>Group Work:</p>	<p><b><u>A. Primary Text</u></b> Williams K- Fullick, Ann, Gardner, Sue- Jones, Catharine Science For Junior High for Liberia Grade 9 Pupil’s Book (Pearson, 2014)</p> <p>M.B. Wiredu, et al. <i>A New Integrated Science for JHS - BK 3</i> (Longman, 2007)</p> <p><b><u>B. Secondary Text</u></b> <i>General Science Revision Notes &amp; Exercise For JSS</i></p> <p><i>BECE Agriculture for JSS – Pupil’s Book 3</i> (Sedco, 2005)</p>	<p><b>EXPECTED COMPETENCIES:</b></p> <ul style="list-style-type: none"> <li>• Effective Communication</li> <li>• Analytical Skills,</li> <li>• Digital Skills,</li> <li>• Research and Problem Solving skills</li> <li>• Organizational ability</li> </ul> <p><b>ASSESSMENT STRATEGIES to be used to check competencies (Select relevant option)</b></p> <ul style="list-style-type: none"> <li>• Quizzes</li> <li>• Tests</li> <li>• Group assignments</li> <li>• Individual projects (report)</li> </ul>



	<p>7. Explain water dams and water wheels</p> <p>8. Illustrate and measure density and specific gravity</p> <p>9. Describe the solar system and surface of the moon</p> <p>10. Explain the causes of Eclipses</p> <p>11. Explain the methods of farming in Liberia and</p> <p>Discuss private and Government farms in Liberia</p>	<p>b) Water as solvent Testing(Hard and soft water, pH)</p> <p>c) Water Usage Water pressure Water wheel &amp; dam construction</p> <p>d) Properties of water</p> <ul style="list-style-type: none"> <li>- Adhesion</li> <li>- Cohesion</li> <li>- Surface tension</li> </ul> <p>e) Application of fluid pressure – Hydraulic machine</p> <p>f) Buoyancy – determining density and specific gravity (Use simple experiments)</p> <p><b>3. Space:</b></p> <p>a) Moon and sun relationship</p> <p>b) The moon – surface and life</p> <p>c) Eclipses: Causes; Solar and Lunar Eclipses;</p>	<p>Divide the class into two groups:</p> <p>Lead one group to discuss the effects of human waste and the other group to discuss the effects of solid waste to human survival.</p> <p><b>Assignment:</b> Lead learners to discuss and state the different sources of water supply and determine which one is safe or unsafe and how they can be treated.</p> <p><b>Class discussion:</b> Explain the cycle of water and how the water table is determined.</p> <p><b>Assignment:</b> Ask learners to state the properties of water and explain each.</p> <p><b>Group work:</b> Lead learners to brainstorm and discuss the usage of water in relation to water pressure, water wheel and dam construction.</p>	<p><b>C. Other Resources/ Supplementary Readings</b></p> <p>Shika Express - Biology Version 1.1 Hands-On Activities Companion Guide Tanzania <i>Shikanamikono-Biology2016pdf</i></p> <p>Facilitators are encouraged to utilize internet links to source additional materials and texts concerning individual topic.</p> <p><a href="http://www.owlcation.com/stem">www.owlcation.com/stem</a></p> <p><a href="http://www.dictionary.com">www.dictionary.com</a></p> <p><a href="http://www.khanacademy.com">www.khanacademy.com</a></p> <p><a href="http://www.dison.com">www.dison.com</a></p> <p><a href="http://www.nature.com">www.nature.com</a></p> <p><a href="http://www.sporcle.com">www.sporcle.com</a></p> <p><a href="http://www.sciencekids.org">www.sciencekids.org</a></p> <p><a href="http://www.sciencefun.org">www.sciencefun.org</a></p>	<ul style="list-style-type: none"> <li>• Demonstrations</li> <li>• Assignment</li> <li>• Non experimental Research(Report)</li> <li>• Participation</li> <li>• Group Report</li> <li>• Laboratory report</li> </ul>
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		<p>Meteoroids and shooting stars</p> <p><b>4. Agriculture</b></p> <p>a) Definition of Farming</p> <p>b) Types of farming:  - Family farms  - Commercial farm - Private and Govt.</p>	<p><b>Demonstration:</b></p> <p>A. Lead learners to demonstrate the use of hydraulic machine to display the application of fluid pressure to work (car jack).</p> <p>B. Lead learners to demonstrate the use of hydraulic machine to display the application of fluid pressure to work (car jack).</p> <p>C: Lead learners to demonstrate the simple experiment of buoyancy by putting water into a pan or tub and immersing an object in it for displacement of water.</p> <p><b>Group Work:</b> Let learners discuss the relationship between the moon and the sun and their impact on the surface of the earth and life.</p> <p><b>Non experimental Research:</b>  Lead learners to discuss what is meteoroids and shooting star.</p>		
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			<p><b>Simple Hands-on experimental activities:</b> Water Purity Surveys- Learners test for hardness of water, pH, or other impurities and harmful bacteria present in water samples. *(see simple hands-on laboratory manual)</p> <p><b>Assignment:</b> Lead learners to discuss what is meant by farming and state two types of farming.</p> <p><b>Non experimental Research:</b> Ask learners to discuss the advantages and disadvantages of the two types of farming (family farming and commercial farming).</p>		
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