FOREWORD

The following Grade 10, 11 and 12 Lesson Plans were developed by Subject Advisors during May 2009. Teachers are requested to look at them, modify them where necessary to suit their contexts and resources. It must be remembered that Lesson Plans are working documents, and any comments to improve the lesson plans in this document will be appreciated. Teachers are urged to use this document with the following departmental policy documents: Subject Statement; LPG 2008; SAG 2008 and Provincial CASS Policy / Guidelines.

Lesson planning is the duty of each and every individual teacher but it helps when teachers sometimes plan together as a group. This interaction not only helps teachers to understand how to apply the Learning Outcomes (LOs) and Assessment Standards (ASs) but also builds up the confidence of the teachers in handling the content using new teaching strategies.

It must please be noted that in order to help teachers who teach across grades and subjects, an attempt has been made to **standardise lesson plan templates** and thus the new template might not resemble the templates used in each subject during the NCS training. However, all the essential elements of a lesson plan have been retained. This change has been made to assist teachers and lighten their administrative load.

Please note that these lesson plans are to be used only as a guide to complete the requirements of the Curriculum Statements and the work schedules and teachers are encouraged to develop their own learner activities to supplement and /or substitute some of the activities given here (depending on the school environment, number and type of learners in your class, the resources available to your learners, etc).

Do not forget to build in the tasks for the Programme of Assessment into your Lesson Plans.

Strengthen your efforts by supporting each other in clusters and share ideas. Good Luck with your endeavours to improve Teaching, Learning and Assessment.
**SUBJECT:** LIFE SCIENCES    **GRADE:** 10    **LESSON PLAN 1**    **TERM 3**    **TIME:** 20hrs

**Focus Learning Outcome/s:** LO2 AS 1, 2 & 3

**Integrated Life Sciences LOs and ASs:** LO1# AS1, AS2, AS3, LO2# AS1,AS2,AS3 and LO3# AS1, AS2, AS3

**Possible integration with other subjects** Physical Sciences, English, Agricultural Sciences

**Knowledge Area** Life at the Molecular, Cellular and Tissues Level

**Prior Knowledge** Cell Structure and Function

**Topic** Cells. The Basic Unit of Life

**Links to next lesson** Energy Transformation sustain Life

### LEARNING OUTCOME 1:
- **Scientific Inquiry & Problem solving Skills.**

### LEARNING OUTCOME 2:
- **Constructs & Application of Life Sciences Knowledge.**

### LEARNING OUTCOME 3:
- **Life Sciences and its relationships to Technology, Society and the Environment.**

#### AS1: Learner identifies and questions phenomena and plans an investigation
- √

#### AS2: Learner conducts an investigation by collecting and manipulating data
- √

#### AS3: Learners analyses, synthesizes, evaluates data and communicates findings
- √

#### AS1: Learner accesses knowledge
- √

#### AS2: Learner interprets and makes meaning of knowledge
- √

#### AS3: Learner shows understanding of how Life Sciences knowledge is applied in everyday life
- √

#### AS1: Learner explores & evaluates scientific ideas of past and present cultures
- √

#### AS2: Learner compares & evaluates uses and developments of resources and their products & their impact on the environment & society.
- √

#### AS3: Learner compares the influence of different beliefs, attitudes and values on scientific knowledge
- √

### TEACHING ACTIVITIES

#### Activity 1: Transport/ movement across membranes: LO1# AS1, AS2 LO2# AS 1, AS 2
- Ask learners about their understanding of the processes diffusion, osmosis and active transport. Consolidates discussions.
- Demonstrates and explains how the processes of diffusion, osmosis and active transport take place by means of experimentation e.g.
  - **Diffusion:** Teacher hands out worksheets with instructions.
  - He can also splash ether/ or spray DOOM on the

#### LEARNERS ACTIVITIES
- Respond to questions and come up with explanation of terms.

#### Practical Investigation:
- Learner groups measure the rate of diffusion of potassium permanganate crystals in two different solutions (water and a sugar solution), or may measure the rate various chemicals take to dissolve in different types of

#### RESOURCES
- Test tubes, chemicals, liquids, worksheet, workbook, stopwatch, etc.

#### ASSESSMENT
- Formal assessment: Memorandum

#### DATE COMPLETED

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blackboard to illustrate the speed of gaseous diffusion to the learners.

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</table>
| • **Osmosis**: Teachers demonstrates the setup of the apparatus and the investigation procedure. Teacher explains the following terminology i.e. non-permeable, differentially permeable (semi) and fully permeability, solutions, concentrations 
Teacher instructs the learners to do the practical investigation as on the worksheet | Learners observe and make notes. **Practical investigation**: Learners investigate the direction of water movement between two different solutions separated by means of a differentially permeable membrane (e.g. egg membrane, potato, dialysis tubing or a frog skin). Individual reporting of experiment | Retort stand & clamps, cotton/string, water, sugar, egg membrane, rubber bands, spatula/teaspoon, 2 beakers, thistle funnel & spatula | Formal assessment: Memorandum | |
| • **Active Transport**: Teacher explains active transport highlighting important terminology i.e. concentration gradient and energy dependency by means of examples. Teachers instructs the learners to construct a table illustrating the properties of the different processes above | Learners observe and make notes. Learners tabulate the properties of the different processes i.e. diffusion, osmosis and active transport | Workbooks | Informal assessment: Question & Answer (Q & A) Informal Assessment: Test | |
| **Activity 2: Cell division – mitosis**: LO 1# AS2 & AS3, LO2# AS1, AS2, LO3# AS1, AS3 Use suitable resources to explain the cell cycle. Teacher explains the importance of mitosis, the process, as well as the structure of a chromosome. Teacher instruct the learners to do the following: • A practical investigation • Construction of models with playing dough/clay | Learners observe and make summary notes **Practical investigation**: Learners observe the tip of an onion and make drawings of the various division stages using a microscope (if available) or/ • Learners construct models of the various division stages from illustrations using | Textbook drawings, transparencies, models, posters or wall charts. | Informal Assessment: Q & A | |
| | | Microscope, onion root & slides | Informal Assessment: Memorandum of drawing/rubric & feedback | |
Teacher advises the learners to gather additional info about this important life process. Learners summarize the importance of mitosis on all life processes in a paragraph in their workbooks. Workbooks Self / Peer assessment

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<tbody>
<tr>
<td>Teachers give summary on all types of known cancers found e.g. leukemia, breast, lung &amp; prostrate</td>
<td>Learners make summary notes.</td>
<td>Workbooks</td>
<td>Informal Assessment: Q &amp; A</td>
<td></td>
</tr>
<tr>
<td>Instructs that each learner group do research on ONE cancer found in the local or provincial communities. (Groups investigate different cancers)</td>
<td>The learners gather information through interviews and reading. They focus on the causes, prevalence and treatment of the investigated cancer in their presentation their peers</td>
<td>Traditional healers, doctors, nurses, old and new treatment technologies, internet, workbooks</td>
<td>Peer assessment</td>
<td></td>
</tr>
<tr>
<td>Facilitates the class discussion on the beliefs &amp; attitudes of the community concerning the cancers, based on the research findings and consolidates the findings.</td>
<td>The learners discuss and highlighting the views of traditional healers and modern biotechnology i.e. radiotherapy &amp; chemotherapy were possible.</td>
<td>The above research findings</td>
<td>Peer assessment</td>
<td></td>
</tr>
<tr>
<td>Activity 3: Plant and Animal Tissues: LO1# AS1, AS2, AS3, LO2# AS1, AS2, AS3, LO3# AS1, AS2, AS3</td>
<td>Teacher defines the concept of a tissue. Learners make summary notes.</td>
<td>Workbooks</td>
<td>Informal: Q &amp; A</td>
<td></td>
</tr>
<tr>
<td>Explains the different types of plant tissues and focuses on structure and function(s) using drawings</td>
<td>The learners tabulate the various tissues i.e. tissue group, tissue type, structural drawing and function(s).</td>
<td>Workbooks, textbooks, posters, wall charts</td>
<td>Informal: Class Test</td>
<td></td>
</tr>
<tr>
<td>Explains the different types of animal tissues and focuses on structure and function(s) using drawings</td>
<td>The learners tabulate the various tissues i.e. tissue group, tissue type, structural drawing and function(s)</td>
<td>Workbooks, textbooks</td>
<td>Informal: Class Test</td>
<td></td>
</tr>
</tbody>
</table>
The teacher facilitates these activities, helping learners with the identification.

**Actualization of content:**
- Utilizing a microscope and various slides the learner consolidates the new content or/
- The learner identifies different tissue types as illustrated on a worksheet/transparency or/
- Identify and examine some plant and animal tissues using bio-strips with bio-viewer, micrographs
- or watching a video.

**RESOURCES**
- Microscopes, slides, textbooks, transparencies, internet drawings, worksheet, bio-viewer with stripes, video micrographs, workbooks.

**ASSESSMENT**
- Informal: Memorandum Peer

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### TEACHING ACTIVITIES

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<tr>
<th>Teacher instructs the learners to do an investigation on biotechnology utilizing ONE of the plant or animal tissues e.g. cloning, stem-cell research.</th>
<th>The learner investigates and collects information on ONE field of biotechnology, relating to plant and animal tissues and summarizes his/her findings on a <em>poster</em>. The learner should focus on the ethics and legislation aspects of this research.</th>
<th>Textbooks, internet, biotechnology companies, brochures &amp; pamphlets, newspaper articles, University staff and departmental officials, traditional healers</th>
<th>Informal: Peer using Rubric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher can also invite a knowledgeable speaker to give learners information on possible career opportunities in biotechnology.</td>
<td>Learners take notes and ask questions</td>
<td>As above</td>
<td>Informal: Q &amp; A</td>
</tr>
<tr>
<td>Teacher can also invite a traditional healer to give learners information on the use of traditional medicines by referring to indigenous plants.</td>
<td>Learners take notes and ask questions</td>
<td>As above</td>
<td>Informal: Q &amp; A</td>
</tr>
<tr>
<td><strong>Activity 4: Organs: LO1# AS1, LO2# AS2, AS3</strong></td>
<td>Learners take notes and ask questions</td>
<td>Workbook, Leaves</td>
<td>Informal: Q &amp; A</td>
</tr>
<tr>
<td>The Teacher defines an organ and a system using a leaf</td>
<td>The learner makes a cross-section drawing of</td>
<td>Workbook, Memorandum of</td>
<td></td>
</tr>
</tbody>
</table>

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Grade 10 Life Sciences Lesson Plans Term 3
<table>
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<tr>
<th>The teacher facilitates this activity and ensures that the learners correctly identify the tissue and its function</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Learners using drawings from prepared microscope slides/ micrograph, poster or textbook illustration to explain the tissue structures in terms of its function in the organ (leaf) i.e. photosynthesis, gaseous exchange and transport to his peers.</td>
</tr>
<tr>
<td>Textbook, poster, reference books, micrographs, microscope and slides</td>
</tr>
<tr>
<td>Informal</td>
</tr>
<tr>
<td>Q &amp; A</td>
</tr>
</tbody>
</table>

**Teacher facilitates the links of the plant tissues, appropriate cell organelles, movement across membranes and movement of molecules into, through and out of the leaf by using a transparensy.**

| Learners use mind map/ flowchart to illustrate the various movements on a worksheet |
| Transparency with arrows or/ worksheet with illustration |
| Informal: Controlled Test |

**Homework:**

The learners are tasked to make a daily glossary of new biological terms used throughout this lesson

**Enrichment/Expanded Opportunities:** Additional informative articles

**Teacher Reflections:**

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**SIGNATURES:**

________________________  ______________________  ___________________  ________________  
TEACHER                  DATE                    HOD / SMT                 DATE
**Focus Learning Outcome/s:**
LO2 AS 1, 2 & 3

**Integrated Life Sciences LOs and ASs:**
LO1# AS1, AS2, AS3, LO2# AS1, AS2, AS3, LO3# AS1, AS2, AS3

**Possible integration with other subjects:**
Agricultural Sciences, Mathematics, English

**Knowledge Area:**
Life Processes in Plants and Animals

**Prior Knowledge:**
Cells: The Basic unit of Life

**Topic:**
Energy Transformation to sustain Life

**Links to next lesson:**
Energy Transformation to sustain Life (continue)

### LEARNING OUTCOME 1:

| AS1: Learner identifies and questions phenomena and plans an investigation | ✓ | AS1: Learner accesses knowledge | ✓ | AS1: Learner explores & evaluates scientific ideas of past and present cultures | ✓ |
| AS2: Learner conducts an investigation by collecting and manipulating data | ✓ | AS2: Learner interprets and makes meaning of knowledge | ✓ | AS2: Learner compares & evaluates uses and developments of resources and their products & their impact on the environment & society | ✓ |
| AS3: Learners analyses, synthesizes, evaluates data and communicates findings | ✓ | AS3: Learner shows understanding of how Life Sciences knowledge is applied in everyday life | ✓ | AS3: Learner compares the influence of different beliefs, attitudes and values on scientific knowledge | ✓ |

### LEARNING OUTCOME 2:
Constructs & Application of Life Sciences Knowledge.

### LEARNING OUTCOME 3:
Life Sciences and its relationships to Technology, Society and the Environment.

### ASSESSMENT
Informal: Q &A

### RESOURCES
Workbook, textbooks

### DATE COMPLETED

**TEACHER ACTIVITIES**

**LEARNER ACTIVITIES**

**Activity 1: Photosynthesis: LO1# AS2, AS3, LO2# AS1, AS2, AS3, LO3# AS2, AS3**

Teacher defines and gives a description of the process in words and equation. He refers to the intake of raw materials, trapping and storing of energy, formation of food in the chloroplasts and its storage.

![Photosynthesis Equation](image)

Learners take down equation and write descriptive notes.
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| Teacher hands out worksheets with instructions on the two practical investigations:  
  - The production of starch during photosynthesis  
  - Light is an essential for the process of photosynthesis. | **Practical investigations:**  
  - Learner groups investigate the production of starch during photosynthesis (doing the iodine test).  
  - Learner groups investigate the role of light in the process of photosynthesis by isolating sections on the leaf with aluminum foil.  
  Learners hand in a scientific write-up of the experiments | Worksheets, leaves, iodine, beaker, Petri-dish, aluminum foil, test tube etc. | Formal: Rubric or/ memorandum |  |
| Teacher hands out worksheets and demonstrates the following three factors to the learners by means of experimentation.  
  - Carbon dioxide is necessary for photosynthesis  
  - Chlorophyll is necessary for photosynthesis  
  - Photosynthesis gives off oxygen |  
  - Learners observe and complete the worksheets.  
  - Learners hand in a scientific write-up of the experiments | Apparatus, worksheets, workbooks | Informal |  |
| Teacher explains the concept **rate of photosynthesis.** Utilizing a transparency and hand-outs he facilitates the discussion. | Looking at the graphs on the transparency and on the handouts the learners discuss and summarize  
  - the effects of variable amount of light,  
  - carbon dioxide, and  
  - temperature on the rate of photosynthesis. | Graphs, transparencies, handouts, Workbooks | Informal : Class Test |  |
<p>| The teacher hands out a table of raw data temperature and instructs the learners to draw a graph and calculate the rate of photosynthesis | The learners plot a graph and calculate the rate of photosynthesis | Graph paper | Informal Assessment: Rubric |  |
| The teacher provides a text extract/ newspaper articles for the learners to read. | The learners read and debate the role of carbon dioxide enrichment, optimum light exposure and temperatures in greenhouses. | Newspaper clippings or extract | Informal: Q &amp; A |  |</p>
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<tr>
<td>The teacher explains the concept of <strong>deforestation</strong>, listing the benefits and consequences of this agricultural practice.</td>
<td>Learners listen and take notes. The learner summarizes the consequences of large scale removal of vegetation in a essay</td>
<td>Reference books, textbooks, internet articles</td>
<td>Informal: Q &amp; A, Rubric</td>
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<tr>
<td><strong>Activity 2: Animal Nutrition: LO1# AS1, AS2 LO2# AS2, AS3, LO3# AS2, AS3</strong></td>
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<td>Teacher introduces the concept of <strong>Balanced diet</strong> by comparing food intake vs. energy growth and health requirements. He tasks the learners to investigate different dietary information on three different cereal packing and design a balanced diet.</td>
<td>Learners interpret dietary information on the packing and design a balanced diet plan to present to their peers.</td>
<td>Cereal Packing, textbook</td>
<td>Informal Assessment: Peers, Rubric, Q &amp; A (select a few individuals)</td>
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<tr>
<td>Teacher introduce the topics and facilitates the group discussion</td>
<td>Learner groups discuss how age, sex and activities can change its demands on a balanced diet.</td>
<td>Above findings</td>
<td>Informal Assessment: Peers, Rubric, Q &amp; A (select a few individuals.)</td>
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<tr>
<td>Teacher introduces the concept of <strong>malnutrition</strong> with examples. He hands out newspaper clippings/ text extracts for learners to read. Teacher shows a video/ news extract (if available).</td>
<td>Learners listen and take notes. The learners read and do a data analysis of magnitude of people suffering from malnutrition. Watch the video.</td>
<td>Newspaper clippings, reference books, extracts, video, internet articles</td>
<td>Informal: Class Test</td>
<td></td>
</tr>
<tr>
<td>Teacher tasks the learners to do a summary on the. They discuss and tabulate their summary in their workbooks the reasons for and the effects of nutritional disorders (malnutrition) with respect to: - unbalanced diets (e.g. kwashiorkor)</td>
<td></td>
<td>reference books, textbooks, newspaper extracts, internet articles</td>
<td>Informal: Rubric</td>
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<td>Teacher distributes relevant articles and identifies individuals beforehand to briefly share with the rest of the class the information on different diets. He summarizes the complexity and differences of human preferences.</td>
<td>The learners read the <strong>Case study</strong> and briefly discuss the different diets e.g. Cultural, religious, personal and health choices of diet, e.g. lacto-vegetarian, vegetarian, halal and kosher. Learners listen and take notes.</td>
<td>Newspaper clippings, reference books, extracts, video, internet articles, work books</td>
<td>Informal Assessment on group participation</td>
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<tr>
<td><strong>Activity 3: Processes of Nutrition: LO2# AS1, AS2</strong></td>
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<tr>
<td>Teacher introduces and highlights the significance of the following processes: <strong>Ingestion, Digestion, Absorption, Assimilation and Egestion.</strong></td>
<td>The learner groups discuss and summarize each processes involved during nutrition in their workbooks</td>
<td>Teacher, workbooks</td>
<td>Informal: Q &amp; A.</td>
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<tr>
<td>Teacher introduces and defines the following nutritional lifestyles with examples: <strong>Producers (Autotrophs)</strong> and <strong>Consumers (Heterotrophs), Herbivores, Carnivores and Omnivores.</strong></td>
<td>Learners listen and take notes Learners revisit the characteristics of an ecological pyramid. After a group discussion identify the logical place where each of the nutritional lifestyles could be found.</td>
<td>Workbooks, Textbooks</td>
<td>Informal: Q &amp; A.</td>
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<td><strong>Activity 4: Human nutrition: LO2# AS1, AS2, AS3</strong></td>
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<tr>
<td>Teacher tasks the learners to complete the worksheet using their textbooks and other reference materials</td>
<td>Identify the <strong>macrostructures</strong> of the human digestive system with its alimentary canal and the associated organs as illustrated on the worksheet. The functions of the different parts/ organs contributing towards nutrition must also be defined.</td>
<td>Textbooks, reference books, worksheet, OHP or labeled drawing</td>
<td>Transparency of digestive system with correct labels</td>
<td></td>
</tr>
<tr>
<td>Teacher tasks and assesses the learners in the completion of the table.</td>
<td>The learners construct a table with the headings: Ingestion, Digestion, Absorption,</td>
<td>Textbooks, Memorandum of table</td>
<td></td>
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</table>
Assimilation and Egestion.

They use this table to compare the various nutritional lifestyles, different anatomical structures and energy relationships.

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<tr>
<td>Teacher compiles a controlled test to assess the knowledge of the learners on work done in term 3.</td>
<td>Write controlled test in their workbooks.</td>
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<td>Formal Assessment: Controlled Test</td>
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<td>100 Marks 1hour</td>
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Homework: The learners are tasked to make a daily glossary of new biological terms used throughout this lesson

Enrichment/Expanded Opportunities: Additional informative articles

Teacher Reflections:

SIGNATURES:

_________________  ___________________  ___________________  ___________________
TEACHER         DATE              HOD / SMT              DATE