*NOTES ABOUT THE USE OF THIS FORM:*

1. *This form is designed to be completed on a computer. Cells in the table below will expand to accommodate any amount of text … but we suggest that you keep the narrative as succinct as possible!*
2. *Please keep the use of formatting to a minimum. Importing formatted text onto a virtual learning platform presents challenges!*
3. *This form assumes that the “unit of learning” is a module. The module, in turn, would be included in a “course” (which is not referred to here). Each module will have a series of components which have been called “units” – they may be called something different in your design (like “weeks”, or “sections”) and you are free to change the terminology.*
4. *In the section about the authors of and contributors to the course, we have provided space for 5 co-authors (or co-contributors). If there were more than six people on the team, please add additional rows to the table.*
5. *Please ensure that you use student-friendly language. So the intended learning outcomes will be framed using the word “you”, and not “the student”. (This may be at odds with what you understand to be “academic” language. The aim, in online and blended learning, is to use language that includes the student to the greatest extent possible.)*
6. *Please note that module-level outcomes should be “overarching” outcomes onto which the unit-level outcomes map. You should have a few (maybe 4) module-level outcomes, and a very few (two or three at the most) unit-level outcomes for each unit.*
7. *The unit-level template should be copied so that there is a copy of the template for EACH unit/week/section. Thus, if there are 15 units/weeks/sections in a module, you will copy the template 14 times and complete each copy for one unit/week/section.*
8. *In the unit-level template, there is a space for a detailed description of student and teacher engagement with the unit. Here we would expect to see a “blow-by-blow” account of how the unit “hangs together”. What happens first? And then? What resources would students need to access for each part of the unit’s work? Where would they find these? Where is collaboration expected to happen? How is it scaffolded? And so on? What happens in class? What happens online? How do these elements build on each other? How long should students spend on each part of the unit?*

*This is NOT a list of things that students (or teachers) do. It is a* ***detailed description*** *of the* ***process****.*

*We have used a generic set of headings in the template. You are free to change the headings to suit the particular unit, but you are* ***not*** *free to ignore any of the required information.*

*Be sure, when completing the unit-level template to contextualise the content … by which we mean that content needs to be grounded in real life – even mathematical equations need to be demonstrably linked to real life! A student needs to know* ***why*** *they are engaging with the content.*

There are 2 templates on the following pages. The **Module-level template**should be completed once, and the **Unit-level template** should be completed in respect of each of the Units (or Sections, or Weeks) in the Module

MODULE-LEVEL TEMPLATE

|  |  |
| --- | --- |
| **Details of institution that has developed the module** | |
| Name of University | Ebonyi State University, Abakaliki Nigeria |
| Name of institutional contact | Prof Eugene N. Nweke |
| Email address of institutional contact | [eugenenweke@ebsu.edu.ng](about:blank), [dvcacademics@ebsu.edu.ng](about:blank) |

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| --- | --- |
| **Details of Creative Commons licence** ([https://creativecommons.org/licenses/](about:blank)) | |
| Licence type | Attribution-Non-Commercial-Share-Alike 4.0 International (CC BY-NC-SA 4.0) |

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| **Details of the authors of/contributors to the course and their role** *(You can delete any sections that don’t apply.)* | |
| Original author (if applicable) | Assoc. Prof Catherine V Nnamani |
| Lead author (+ email address) | Assoc. Prof Catherine V Nnamani, drnnamanikate@gmail.com |
| *Responsible for:* | The MDF Lead, provided the original content materials on General Biology 1 to be repurposed into Blended Learning, module developer, and provided guidelines and the pedagogical tools used by EBSU-PEBL team for the design and development of the MDF. |
| Co-author/co-contributor | Prof Eugene N. Nweke |
| *Responsible for:* | Module Development |
| Co-author/co-contributor | Assoc. Prof Celestine A. Afiukwa |
| *Responsible for:* | Module Development |
| Co-author/co-contributor | Dr. Ifeyinwa A. Ajah |
| *Responsible for:* | Module Development |
| Co-author/co-contributor  *Responsible for:* | Dr. Chinagolum Ituma |
| Provided technical advice to the module development team |
| Co-author/co-contributor | Dr. Ufere Uka |
| *Responsible for:* | Module Development and Facilitator |
| Co-author/co-contributor | Dr. Godwin Nwaonumara |
| *Responsible for:* | Module Development and Facilitator |
| Co-author/co-contributor | Prof O. C. Ani |
| *Responsible for:* | Provided resource materials for the module development, provided the personnel for the MDF, facilitator and Head of Department of Applied Biology who will facilitate the module. |

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| **Information regarding format of material to upload onto the OER Africa repository** | |
| Primary resource (Not PDF) | Microsoft word |
| Will a Moodle common cartridge be uploaded as well? | No |

*(A Moodle common cartridge is a .ZIP file of your module – if it is created in Moodle – that can be imported into another university’s Moodle platform.)*

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| **Course details** | | | |
| Module title: | General Biology 1 : Code (BIO 101) | | |
| Under- or Post-graduate? | Undergraduate | Year of study: | 1 (first semester) |
| Class contact time (hours): | 29 hours | Number of credits: | 3 |
| Private/online study hours: | 63 hours 30 min | Number of weeks of study: | 13 (9 for teaching and learning, 4 for revision & exams) |
| Total student learning hours: | 92 hours 30 minutes | Number of units of study: | 9 |

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| Programme(s) which might include this Module: | Applied Biology, Applied Microbiology, Biochemistry, Biotechnology, Computer Science, Geology/Exploration, Industrial Chemistry, Industrial Mathematics and Statistics, Industrial Physics, Animal Science, Agricultural Economics and Extension, Fishery and Aqua-Culture, Soil Science and Environmental Management, Medical Laboratory Science, Nursing Science, Anatomy, Medicine and Surgery, Physiology, Home Economics, Human Kinetic and Health Education, Science Education, and Technology and Vocational Education |
| Pre-requisite student abilities and knowledge: | Credit passes in English, Biology, Chemistry, Physics and Mathematics at O’Level for Nigerians or High School for nationals. |
| Pre-requisite (or co-requisite) modules: | Pass in University Matriculation Examination |

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| Aim of the module: | The aim of this module is to introduce you to basic ideas, principles, theories, practices in biology, and its roles in agriculture, human welfare and environmental sustainability. |
| Brief description of module: | This introductory module on general biology 1 defines biology and its connection to other disciplines in sciences. It unveils all-encompassing ideas, principles and theories governing contemporary issues in the biology of plants and animals and its utilization in solving modern-day societal challenges for sustainability. Knowledge acquired in this course will serve as a robust threshold underpinning your future academic road map.  The module is a 3 credits unit course serving as prerequisite to many programmes in all the science related disciplines.  You will find it systematically arranged:   * At the top of the “hierarchy” is the module, * that is broken down into units and * units are subdivided into lecture sessions, * that may be online alone outside or inside LMS * and or with other members of your class * and with or without the tutor to guide you * face-to-face with groups or with the tutor. * Remember to stick to deadlines, * submit all assignments, and * remember to save a copy for your records.   In this module you will explore;   * the scope of biology, and its employability’s * attributes of living things, * diversity, classification and nomenclature of living things, * cell structure, organelles and functions * a quick mention of the DNA, its structure and functions * habitat, and distinct traits of seedless plants, * invertebrate animals with vital economic importance in * agriculture, health, environment and industry. * Ride on the path of principles of inheritance, variations and plant breeding for crop improvement.   In case of any challenge, you may wish to contact your tutors via: [drnnamanikate@gmail.com](mailto:drnnamanikate@gmail.com), [okeyokogwu@gmail.com](mailto:okeyokogwu@gmail.com), [ogonna\_ani@yahoo.com](mailto:ogonna_ani@yahoo.com), [unekebiy@yahoo.com](mailto:unekebiy@yahoo.com), [ufere.uka@ebsu.edu.ng](mailto:ufere.uka@ebsu.edu.ng), [ufereh@gmail.com](mailto:ufereh@gmail.com), [ngnkwuda@gmail.com](mailto:ngnkwuda@gmail.com). |

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| Intended learning outcomes: | *At the end of this* ***module****, you will be able to:*   1. Explain the meaning of biology, its branches with associated career opportunities, and review the attributes of living and non-living things. 2. Systematically identify the taxonomic hierarchy and explain the rules of binomial nomenclature of living things. 3. Explain the meaning and nature of biological cells, describe and draw the structural components of plant and animal cells and state their functions. 4. Analyse and describe the various life forms of non- vascular seedless plants and invertebrates’ animals, highlighting their diversity, habitats, and economic values in agriculture, health, environment and industry. 5. Describe general characteristic of latyhelminthes, nematoda and arthropoda, listing their classes with specific examples and highlighting their economic values in agriculture, health, environment and industry. 6. State and explain the principles, methods and roles of breeding in plant and animal improvement and explain why organisms beget their likes across generations. |
| Indicative content: | This module introduces you to those fundamental principles and theories of plants and animals. Topics covered include;  Unit 1: The scope of biology, its employability and concept of life.  Unit 2: Classification of living organisms.  Unit 3: An overview of cell structure, diversity, organization, cellular organelles and functions.  Unit 4: Seedless plants: algae and fungus  Unit 5: Bryophytes and pteridophyte  Unit 6: Animal kingdom protozoa, porifera, coelenterate  Unit 7: Platyhelminthes, nematodes and arthropods.  Unit 8: Annelida and echinodermata  Unit 9: Principles of inheritance, variations and plant breeding |
| Form of final/summative assessment: | The module will be assessed using the following criteria  1. Attendance = 5% \*  2. Assignments = 20%  3. Ability to complete Assignments = 5%  4. Mid-Semester Examination = 10%  5. End of Semester Examination = 60%  Total points Final grade Grade Point Description  70 - 100 A 5.0 Excellent  60 - 69 B 4.0 Very good  50 - 59 C 3.0 Good  45- 49 D 2.0 Fairly  40- 44 E 1.0 Pass  00 - 39 F 0.0 Fail  \* The threshold for you to gain 5% for attendance is - 1% for attending 20% of the class, 2 % for attending 40%, and 3% for 60 % , 4 for 80% and 5% for 100% attendance. |

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| **Assessment of module-level learning outcomes** | |
| Module-level learning outcome | Module assessment task |
| 1. Explain the meaning of biology, its branches with associated career opportunities, and review the attributes of living and non-living things. | Online quiz, assignments, discussion forum, individual/group presentations, mid- and end of semester examinations. |
| 1. Systematically identify, organize the taxonomic hierarchy, and explain the rules of binomial nomenclature. |
| 1. Explain the meaning and nature of biological cells, describe and draw the structural components of plant and animal cells and state their functions. |
| 1. Analyse and describe the various life forms of non- vascular seedless plants and invertebrate’ animals, highlighting their diversity, habitats, and economic values in agriculture, health, environment and industry. |
| 1. Describe general characteristic of latyhelminthes, nematoda and arthropoda, listing their classes with specific examples and highlighting their economic values in agriculture, health, environment and industry. |
| 1. State and explain the principles, methods and roles of breeding in plant and animal improvement and explain why organisms beget their likes across generations. |

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| **Significant features or elements of module** |
| The most significant features of the module are:   * The constructive alignment of learning outcomes to learning activities and assessments tools. * Its marketability and pathway to entrepreneurship capacity building attributes. * Vast number of pre- topic activity learning resources for scaffolding the module. * The level of the e-tivities and face- to- face activities embedded in the module. * The diversity and inclusiveness of the pedagogical tools and the focus of learner’s centeredness. * Learner – centred feedback mechanisms used to improve the module in the future. |

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| **Student profile in the context of this module:** | |
| What is the target group of students who would do this module? | All the first year undergraduate students in 21 programme offering general biology 1 as University wild module. |
| What **skills** should a *student* have **already** mastered before starting this Module? | Skill on how to login, navigate the LMS domain, access to learning resources, assessment tasks and submit your work. |
| What **prior knowledge** of the subject matter should a *student* have? | Secondary school basic knowledge in biology, chemistry, physics and mathematics. |

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| **Non-expert support:** | |
| What **skills** and **prior knowledge** of the subject matter  should *facilitators* have **already** mastered before starting to deliver this Module? | Skills on how to  Skills on how to;   * teach asynchronously and synchronously online, * use LMS to facilitate learning, * do e-tivities, * structure assessment tasks to align properly with learning outcomes, * e-moderate learning and give learners feedbacks. * Knowledge on basic biological principles and theories |
| What **skills** do *support staff* need in order to support the delivery of this module? | All the technical skill on trouble shooting in LMS environment. |

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| **Quality assurance matters** | | |
| How will feedback on module be obtained from students? | Feedback will include self-feedback, peer feedback, moderator’s feedback.   1. Self-feedback will result from non-scoring quizzes, reading assignments, and successful execution of codes during blended learning and face- to- face sessions. 2. Peer feedbacks will be an account of constructive criticisms from peers during group presentations on assignments. 3. Moderator’s feedback will consequently be on graded assignments, mid-semester and end of semester examination scores. | |
| How will student feedback be used to improve module? | Feed- back will be used to redesign the module to reflect students’ demand  To ensure that the delivery mode will be more learner-friendly | |
| A certificate, signed by the university’s Head of Quality Assurance, confirming that the module meets the requirements of the PEBL QA rubric is attached. | | Yes |

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | The Scope of Biology, its employability and Concept of Life | | |
| Aim of the topic: | The aim of this unit is to provide you with an introduction to the scope of biology, its employment opportunities as well as some basic attributes of living organisms. | | |
| This topic covers: | * Meaning and scope of biology. * Career opportunities in biology. * Concept of life and attributes of living things. | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Explain the meaning of biology and identify the various branches of biology. 2. Describe at least six major career opportunities in the field of biology and explain their relevance to your future career of choice. 3. Analyse the attributes of living things and compare these with those of non-living things. | | |

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| Overview of student activity: | Learners will summarize chapter one of the text “*Foundation of Biology*” by Okogwu *et al*. (2019) and the 8.3 minute video on “[Scope and Career Opportunities in Biology](https://youtu.be/wENhHnJI1ys)”, reflecting on the scope and career opportunities. Then use the knowledge to summarise the employability areas in biology. You will then choose your dream career in biology and justify your choice. Learners will compare a mango tree with a chair in a table and post in the discussion forum for peer review. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Explain the meaning of biology and identify the   various branches of biology | 1 | Download the resource material through the link provided, paying particular attention to the meaning of biology and its branches and then use the knowledge to identify the uniqueness of each branch. | Where: Online in Applied Biology domain on EBSU LMS  How: Writing quiz |
| 1. Describe at least six major career opportunities in the field of biology and explain their relevance to your future career of choice | 1 | Watch the 8.3 minute video on “Scope and Career Opportunities in Biology” with this <https://youtu.be/wENhHnJI1ys>, reflecting on the scope and career opportunities. Then use the knowledge to summarise the employability areas in biology. You will then choose your dream career in biology and justify your choice using the knowledge gained, then post your work on the discussion forum for review feedback | Online through multiple-choice questions (MCQ), group discussion and peer feedback. |
| 1. Analyse the attributes of living things and compare these with those of non-living things | 1 | Face-to-face through case study and discussion group. The moderator will lead learners to the biological garden, where you will be guided on how to identify living and non- living things. Using the knowledge, you got from the pre-learning activities to compare living and non-living things. | Face-to-face: using case study and exchanging your work with colleagues in the discussion groups. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Explain the meaning of biology, its branches with associated career opportunities, and review the attributes of living and non-living things. | | | |
| Purpose of the unit/week/section: | | | |
| The purpose of this unit is three fold. First is to ensure that learners can correctly explain the meaning of biology and identify its various branches, second is to recognize the significance of these branches of biology to their career of choice and be able to justify their choice. Lastly, to ensure that learner can systematically distinguish living from non- living things. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This first unit of the module has three parts and as the first lecture.  First,  You will;   * participate in a face-to-face lecture to familiarise yourselves with your colleagues and with the course facilitator. * participate in pre-topic activities alone by   reading chapter one of the text “*Foundation of Biology*” by Okogwu et al. (2019)  use the knowledge for your online e-tivities   * you will participate in a face-to-face lecture * to familiarise yourselves with your colleagues * and with the course facilitator. * You will participate in pre-topic activities alone * by read chapter one of the text “*Foundation of Biology*” by Okogwu et al. (2019) * use the knowledge for your online e-tivities.   Then:   * You will login to the [EBSU LMS](https://moodle.ebsu.edu.ng), * navigate to BIO 101 Module domain * add information to your personal profile, * standing on netiquette * you will download the learning materials using the link provided. * do the individual and group e-tivities provided. * write the online quiz given * ensure to respect netiquette and stick to deadlines. | | | |
| Pre-topic activity: | | Number of hours | 2 hours |
| 1. Read chapter one of the text “*Foundation of Biology*” by Okogwu et al. (2019) and take note of various branches of biology and how they relate to job opportunities. 2. Observe the things around you and compose a list of them, classify these items into living and non-living things and justify your classification. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 3 hours |
| **Activity 1:1**   * You will participate in a synchronous face-to-face lecture in EBSU Science lecture theatre where the facilitator will introduce you to the topic and give you instructions on how to successfully complete this unit. * You will participate in a synchronous face- to- face lecture in the science lecture theatre where the facilitator will guide you on the attributes of living and non-living things using power point projector.   **Activity 1:2**   * You will participate in a group discussion in the faculty biological garden to identify and compare the attributes of living and non-living things * Post your work in the discussion forum for peer review | | | |
| Online activity: | | Number of hours | 4 hours |
| What should students do? | 1. E-tivity 1.1: Log in to EBSU LMS,  * Log in to EBSU LMS, * navigate to general biology 1 domain and download the 8.3minute video on “Scope and Career Opportunities in Biology” through this link <https://youtu.be/wENhHnJI1ys> * reflect on the content of the video. **(2 hours)**   Then, use the knowledge gained to,   * summarise the employability areas in biology * choose your dream career in biology and justify your choice. * Then, exchange your work with your colleagues for peer review, * rework your own using new ideas from your peers, and post to the tutor on a discussion forum for feedbacks (**2 hours over 48 hours**). * navigate to general biology 1 domain * and download the 8.3minute video on “Scope and Career Opportunities in Biology” * with this <https://youtu.be/wENhHnJI1ys>, (**2 hours)** * You reflecting on the scope and career opportunities. | | |
| Where do they do it? | Online on EBSU LMS | | |
| By when should they do it? | The e-moderator will inform you via the class WhatsApp platform. | | |
| E-moderator/tutor role | | | |
| • Give learners guide on how to log in to EBSU LMS and access the module.  • Create and manage a WhatsApp platform for the class  • Remind learners about the rules (netiquette) and timelines via the WhatsApp platform  Post learning resources, assignments tools, assessment tasks and the assessment criteria.  • Monitor discussion forum and provide feedbacks  • Provide insight activities and e-tivities | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 3 hours 2o minutes |
| * 1. Log in to EBSU LMS, navigate to General Biology I (BIO 101) module and   2. Attempt the assignment on Unit 1 on the scope of biology, its employability (**20 minutes**).   3. You will exchange your works for peer review, rework their assignments using new ideas from their peers, and post to the tutor on the discussion forum for feedback (2 hours but **within 48 hours**).   4. 3. Your level of participation and contribution at the discussion forum on your choice career will be assessed using rubric (**1 hour**). | | | |
| How does this section link to other sections of the module? | | | |
| Unit 1 that covers the scope of biology, its employability and concept of life is robustly linked to Unit 2 which deals on classification of living organisms, by the fact that having recognised the diverse nature of living things discovered their ambiguity and the confusion posed by the different names attached to each organism by your colleagues and finally on whether they are related or not. Consequently, bggtt6 unit 2 brings to bare the solution to such uncertainties. Therefore, knowledge of unit 1 is a prerequisite to unit and other units in the module. | | | |

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| = Total number of hours | 12 hours 20 minutes |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | 1. Okogwo, I. O., Nnamani, C. V., Ani, O. C. and Uka, U. N. (2019). Foundation Biology. Meks Printing and Publishing Concept Ltd, Nigeria, 318 pp. 2. Dutta, A.C. (2000). Botany for degree students; India. Oxford Press. 3. https://www.peoi.org/Courses/Coursesen/bot/frame14.html https://leverageedu.com/blog/branches-of-biology/ |
| How are students enabled to access the resources? | 1. Okogwo *et al.* (2019) can be accessed from the Consultancy Unit of Ebonyi State University, Nigeria. Please, contact the Consultancy Unit at [Consultancy@ebsu.edu.ng](mailto:Consultancy@ebsu.edu.ng). |
| Where in this unit are students expected to work collaboratively? | E-tivity 1.1 and Activity 1.2 |
| How has an inclusive approach been incorporated in this unit? | Provision of pre-topic learning resources, diverse e-tivities, different learning resources (hard and soft copies), video clips and discussion forum - where learners could work individually at their own pace, time and preferred learning environment. |
| How will feedback on unit be obtained from students? | 1. Pre-course evaluation (online survey) will be used to assess the students’ prior knowledge of the topic 2. Peer-evaluation and tutor-evaluation in E-tivity 1.2 where learners will exchange their works for peer review and post their reworked assignments to the tutor on the discussion forum for feedback. 3. End of course evaluation (online survey) will be used to assess students’ perception of the topic delivery. |
| How will student feedback be used to improve unit? | Feedbacks from students will be analysed to identify aspects of the topic learning that are not meeting the expectations of even as low as 10% of the students, and efforts will be focused on improving on such aspects. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Learners will receive formative assessment at two points in this unit.   * E-tivity 1.1 where they will do a summary of a learning resource that they will read, exchange their works among themselves for peer review, rework their own using new ideas from their peers, and then post to the tutor on a discussion forum for feedback. * E-tivity 1.1 where they will participate and contribute ideas in a group discussion, and post for feedback by the moderator. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Diversity and classification of living things. | | |
| Aim of the topic: | To introduce learners to the basic principles and practice in the identification, description, ordering, and naming of living things in relation to their peculiar features, relatedness and protocols using binomial system of nomenclature. | | |
| This topic covers: | * Concept of classification * Taxonomic Hierarchy of classification * Binomial nomenclature, trend, rules and regulations. | | |
| Intended learning outcomes: | * Explain the meaning of biological classification * Identify and organize systematically the seven taxonomic hierarchies * Describe the rules of binomial nomenclature. | | |

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| Overview of student activity: | Learners will summarize chapter one of the text “*Foundation of Biology*” by Okogwu*et al*. (2019) on classification of living things and watch a 3.5 minute video on taxonomic hierarchy using this [https://byjus.com/biology/taxonomic-hierarchy/](#_top) “reflecting on the taxonomic hierarchies and this 6.46 minutes [https://www.youtube.com/watch?v=dGMP4qZ\_K8Y](#_top) on binomial nomenclature . They will then use the knowledge to summarise, identify and organize systematically the seven taxonomic hierarchies stating the feature of each level and noting how to use binomial nomenclature and the rules governing it, respectively . |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Explain the meaning of biological classification | 1 | You will read the pre-topic learning material chapter one of the text “Foundation of Biology” by Okogwu et al. (2019) on classification of living things | Face to – face (outside and alone) through multiple-choice questions (MCQ) |
| 1. Identify and organize systematically the seven taxonomic hierarchies | 1 | Watch a 3.19 minute video on taxonomic hierarchy using this https://byjus.com/biology/taxonomic-hierarchy/ “reflecting on the taxonomic hierarchies. You will then use the knowledge to identify and organize systematically the seven taxonomic hierarchies stating the basic attributes of each. Participate in the quiz at the bottom of the video. Post your work on the discussion forum for review feedback. | Where: Online  How: multiple-choice questions (MCQ) below the video and Rubric to assess level of participation and contribution of each learner at the discussion forum |
| 1. Describe the rules of binomial nomenclature. | 1 | Watch the 6.46 minutes video using this link https://www.youtube.com/watch?v=dGMP4qZ\_K8Y on binomial nomenclature and rules governing its use. You will then use the knowledge to summarize why it became necessary to adopt binomial nomenclature, note the rules governing binomial nomenclature | Where: Online  How: multiple-choice questions (MCQ) below the video and Rubric to assess level of participation and contribution of each learner at the discussion forum |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *beforecoming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Systematically identify, organize the taxonomic hierarchy, and explain the rules of binomial nomenclature. | | | |
| Purpose of the unit/week/section: | | | |
| The purpose of this unit is threefold. First is to guide learners on how to appropriately explain the meaning of biological classification, identify, and organize systematically the seven taxonomic hierarchies noting the peculiar attribute of each hierarchical level. Then be able to pin point why binomial nomenclature was adopted above polynomial nomenclature. Lastly, to ensure that they describe the rules governing binomial nomenclature using specific example. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This second unit of the module has two parts. First, you will read the pre-topic learning material on chapter one of the texts “Foundation Biology” by Okogwu et al. (2019) on classification of living things. As you read this note and summarize the meaning of taxonomy, trend, taxonomic hierarchy and relating this to binomial nomenclature with specific example as shown in table 1. Attempt and written the quiz on page 17 of the foundation biology”. Post your work on the discussion forum for feedback.  Secondly, you will watch the videos provided on the taxonomic hierarchy, and binomial nomenclature and rules governing it. Participate on the quiz below the video. You will then peer review each other’s assignment, use the new ideas to rework your assignment and post this on the discussion forum for the e-moderator for feedback. | | | |
| Pre-topic activity: | | Number of hours | 2 hour |
| * Read chapter one of the text “*Foundation of Biology*” by Okogwu et al. (2019) and take note of and summarize the meaning of taxonomy, trend, and taxonomic hierarchy, relate this to binomial nomenclature with specific example as shown in table 1. Attempt the quiz on number 17, page 20. * Exchange your work with your peer for review, use the new ideas from the work you reviewed to rework your assignment and post this on the discussion forum for feedback from the facilitator. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 00 |
| Not applicable | | | |
| Online activity: | | Number of hours | 4 hours |
| What should students do? | 1. tivity 2.1   Watch the video with the provided on this link [https://byjus.com/biology/taxonomic-hierarchy/](#_top) on taxonomic hierarchy, noting the seven taxonomic hierarchies, summarizing the features of each level and after that participate on the quiz below the video. Access your mark and Post your score on the discussion forum after the second attempt for feedbacks (2 hours but **within 48 hours**).  e- tivity 2.1  Watch the second videos provided on binomial nomenclature and pay particular attention on the rules governing binomial nomenclature. Recall the assignment you participate in pre-topic activity, use the knowledge and information from this video to rework your assignment and post this on the discussion forum for the e-moderator for feedback (**2 hours but within 48 hours**). | | |
| Where do they do it? | Online on EBSU LMS and individually when you access the text. | | |
| By when should they do it? | The e-moderator will inform you via the class WhatsApp platform. | | |
| E-moderator/tutor role | | | |
| • Create and manage a WhatsApp platform for the class  • Remind learners about the rules (netiquette) and timelines via the WhatsApp platform  • Monitor discussion forum and provide feedbacks  • Provide insight on the assessment criteria. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 3 hours 20 minutes |
| * + you will be assessed on the quiz with number 17 on page 20 in foundation biology on the meaning of taxonomy, trend, and taxonomic hierarchy, relate this to binomial nomenclature with specific example as shown in table 1. Feedback from for peer review, and that of the facilitator feedback (2 hours).   + Log in to EBSU LMS, navigate to General Biology I (BIO 101) module, unit 2 and attempt the quiz in e- tivity 2.1 (20 minutes).   + Your level of participation and contribution at the discussion forum on the meaning of taxonomy, trend, and taxonomic hierarchy, relate this to binomial nomenclature with specific example as shown in table 1 (1 hour). | | | |
| How does this section link to other sections of the module? | | | |
| Unit 2 that covers diversity and classification of living things is strongly linked to unit 3 on an overview of cell, diversity, organization; cellular activity and functions because species as classified in unit 2 has its building block from the cell as the unit of life. | | | |

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| = Total number of hours | 9 hours 20 minutes |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | 1.Okogwuet al. (2019) *Foundation Biology* on classification of living things  2.video on taxonomic hierarchy using this https://byjus.com/biology/taxonomic-hierarchy/  3. https://www.youtube.com/watch?v=dGMP4qZ\_K8Y on binomial nomenclature. |
| How are students enabled to access the resources? | 1. Okogwo *et al.* (2019) can be accessed from the Consultancy Unit of Ebonyi State University, Nigeria. Please, contact the Consultancy Unit at [Consultancy@ebsu.edu.ng](mailto:Consultancy@ebsu.edu.ng).   https://www.peoi.org/Courses/Coursesen/bot/frame14.html |
| Where in this unit are students expected to work collaboratively? | E-tivity 2.1 and E-tivity 2.2 |
| How has an inclusive approach been incorporated in this unit? | Provision of pre-topic learning resources, diverse e-tivities, different learning resources (hard and soft copies), video clips and discussion forum - where learners could work individually at their own pace, time and preferred learning environment. |
| How will feedback on unit be obtained from students? |  |
| How will student feedback be used to improve unit? | Feedbacks from students will be analysed to identify aspects of the topic learning that are not meeting the expectations of even as low as 10% of the students, and efforts will be focused on improving on such aspects. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Learners will receive formative assessment at two points in this unit.  •E-tivity2.1 where they will do a summary of a learning resource that they will read, exchange their works among themselves for peer review, rework their own using new ideas from their peers, and then post to the tutor on a discussion forum for feedback.  •E-tivity 2.2 where they will participate and contribute ideas in a group discussion, and the e-moderator will comment on their ideas. |

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | An overview of cell structure, diversity, organization, cellular organelles and functions | | |
| Aim of the topic: | The aim of this unit is to provide you with theoretical and practical knowledge of the nature, types, key structural components of biological cells and their functions. | | |
| This topic covers: | * Meaning and nature of biological cells * Cell structure, cell organelles and their functions * Cell types and their distinctive features | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   * Explain the meaning and nature of biological cells * Describe the structural components of plant and animal cells and their functions * Identify cellular structures universal to all cell types and the distinctive structures of major cell types, and relate these features to their functional differences * Draw and label a typical plant cell, animal cell, eukaryotic cell, and prokaryotic cell. | | |

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| Overview of student activity: | Learners will summarize chapter two of the book “Foundation Biology” by Okogwu et al. (2019), the text “Fundamental of Biology”, and a 7 min video “Cell Structure”. They will then reflect on the knowledge gained and use it to identify cell organelles and their functions and to differentiate between major cell types. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| * Explain the meaning and nature of biological cells | 3 | Learners will attend an introductory face-to-face lecture and participate in a group discussion on the topic “meaning and nature of biological cells”. | Where: Online in EBSU Learning Management System (LMS)  How: You will do a quiz |
| * Describe the structural components of biological cells and their functions | 3 | Learners will individually read and summarize chapter two of the book “Foundation Biology” by Okogwu et al. (2019) and the text “Cell Structure and function” highlighting the structural constituents of biological cells and their specific functions. You will exchange your work with one of your peers for peer-review, rework your own using ideas from your peers, and then submit to your tutors for feedback. | Where: In EBSU LMS  How: Your tutor will give you feedback on your reworked assignment. You will also do an online quiz. |
| * Identify cellular structures universal to all cell types and the distinctive structures of major cell types, and relate these features to their functional differences | 3 | Each learner will post one cell component and its function on a discussion forum and indicate whether it is universal or distinctive. You will also critique each other’s posts | Where: In EBSU LMS  How: Your tutor will use assessment rubric to grade the level of individual learner’s participation in the discussion forum |
| * Draw and label a typical plant cell, animal cell, eukaryotic cell, and prokaryotic cell. | 3 | You will download and study the structures of typical plant and animal cells and prokaryotic and eukaryotic cells. You will then participate in a face-to-face group activity where each group will draw and label a given type of cell and critique another group’s work. | Where: Face-to-face lecture classroom in EBSU  How: Your tutor will use assessment rubric to grade the level of participation of learners. You will also write end of semester examination. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Learners will be able to describe cell structures and functions, and differentiate between plants/animal cells and between prokaryotic/eukaryotic cells based on their unique structural features and functions | | | |
| Purpose of the unit/week/section: | | | |
| The purpose of this unit is to ensure that learners can appropriately;   1. Explain biological cells as units of life and describe the basic structure of a typical biological cell 2. Identify cell organelles and their specific functions. 3. Differentiate major types of cells (plant and animal, prokaryotic and eukaryotic) using their unique structural features and be able to relate the structural variations to their functional differences | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This unit process is in five parts;  • First, you will attend a face-to-face introductory lecture where the course facilitator will introduce you to the topic, ascertain your current knowledge of the subject matter, and provide you with guidelines for successful completion of the topic.  • Second, you will read and summarize some learning resources on cell structures and functions. Thereafter, you will critique each other’s work, rework your own using ideas from your peers and submit the reworked version to your tutor for feedback.  • Third, you will participate in a synchronous online group discussion on “common and distinctive features of biological cells in relation to cell types and functional differences”.  • Fourth, you will participate in a face-to-face group activity on drawing and labelling the structures of different types of cells.  •Lastly, you will attempt a short quiz. | | | |
| Pre-topic activity: | | Number of hours | 3 hours |
| 1. Read chapter two of the book “*Foundation Biology*” by Okogwu *et al.* (2019), read also the text [Cell Structure and function](https://nios.ac.in/media/documents/SrSec314NewE/Lesson-04.pdf), and watch the 7 minutes video [Overview of Cell Structure](https://www.youtube.com/watch?v=URUJD5NEXC8). As you explore these resources, ensure to take notes on the structural elements of biological cells and their specific functions, structural and functional differences between plant and animal cells, and between prokaryotic and eukaryotic cells. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 4 hours |
| 1. You will attend an introductory lecture at the beginning of the unit where the course facilitator will introduce you to the topic, discover your current knowledge of the topic, and provide you with guidelines for successful completion of the topic. (2 hour)  2. In the last part of the unit, you will study the images in this text and participate in a face-to-face group activity on drawing and labelling cell structures showing the distinctive features of different types of cells. (2 hour) | | | |
| Online activity: | | Number of hours | 4 hours |
| What should students do? | * E-tivity 3.1: Log in to [EBSU LMS](https://moodle.ebsu.edu.ng) navigate to BIO 101 module. Download the text Cell [Structure and function](https://nios.ac.in/media/documents/SrSec314NewE/Lesson-04.pdf) and watch the short video [Overview of Cell Structure](https://youtu.be/URUJD5NEXC8). Use the knowledge to summarize the structures of typical biological cells highlighting the cell organelles and their specific functions, structural and functional differences between plant & animal cells and between eukaryotic & prokaryotic cells. Exchange your work with your peer by email for peer-review, rework your own using ideas from your peers, and post to your tutor for feedback. **(2 hours but within 48 hours)** * E-tivity 3.2: Log in to EBSU LMS, locate BIO 101 module and participate in a synchronous online group discussion on “common and distinctive features of biological cells in relation to cell types and functional differences”. (2 hour) | | |
| Where do they do it? | 1. Face-to-face activities will be done in the Faculty of Science Lecture Theatre in Ebonyi State University (EBSU).  2. E-tivity 3.1 and E-tivity 3.2 will take place online in EBSU LMS. | | |
| By when should they do it? | The e-moderator will inform you via the class WhatsApp platform. | | |
| E-moderator/tutor role | | | |
| The E-moderator will;   * Give learners guides on how to log in to EBSU LMS and access the module and its learning resources * Create and manage a WhatsApp platform for the class * Remind learners about the rules (netiquette) via the WhatsApp platform * Moderate discussion forum and provide feedbacks * Prompt learners on upcoming deadlines via the WhatsApp platform | | | |
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| How are the learning outcomes in this unit assessed? | | Number of hours | 4 hours 10 minutes |
| 1. Learners ability to accurately explain the meaning and nature of biological cells will be assessed through an online quiz. Log in to EBSU LMS, locate BIO 101 module and attempt the short quiz in Unit 3 (10 minutes). 2. Learners will receive formative feedbacks and do online quiz to evaluate their mastery of the structural components and organelles of biological cells and their functions (2 hours but within 48 hours). 3. Your mastery of learning outcomes 3 and 4 will be assessed using rubric to grade your levels of participation and contribution at the discussion forum (2 hour). | | | |
| How does this section link to other sections of the module? | | | |
| Unit 3 on the overview of cell structure, diversity, organization, cellular organelles and functions is linked to unit 4 that covers seedless plants comprising of algae and fungi, because cell is the basic building block of life. Life started from a cell and algae was the first organism to evolve from cell. | | | |

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| = Total number of hours | 15 hours 10 minutes |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | 1. Chapter two of Okogwu, I. O., Nnamani, C. V., Ani, O. C. and Uka, U. N. (2019). Foundation Biology. Meks Printing and Publishing Concept Ltd, Nigeria, 318 pp. 2. Cell Structure and Function, <https://nios.ac.in/media/documents/SrSec314NewE/Lesson-04.pdf> 3. Overview of Cell Structure, <https://www.youtube.com/watch?v=URUJD5NEXC8> |
| How are students enabled to access the resources? | 1. Okogwu et al. (2019) can be accessed from the Consultancy Unit of Ebonyi State University, Nigeria. Please, contact the Consultancy Unit at [Consultancy@ebsu.edu.ng](mailto:Consultancy@ebsu.edu.ng). 2. Structures and functions in living organisms can be accessed from the link…. 3. Cell structure can be accessed from the link…. |
| Where in this unit are students expected to work collaboratively? | 1. E-tivity 3.1 and E-tivity 3.2 2. Face-to-face group activity on drawing and labelling cell structures showing distinctive features different types of cells |
| How has an inclusive approach been incorporated in this unit? | Provision of pre-topic learning resources, different e-tivities, different kinds of learning resources (hard and soft copies, video clip) and discussion forum. Also by allocation of sufficient time for various activities to accommodate both fast and slow learners. |
| How will feedback on unit be obtained from students? | * Pre-course evaluation (online survey) will be used to assess the students’ prior knowledge of the topic * End of course evaluation (online survey) will be used to assess students’ perception of the topic design and facilitation. |
| How will student feedback be used to improve unit? | Feedbacks from students will be analysed to identify aspects of the topic learning that are not meeting the expectations of even as low as 10% of the students, and efforts will be focused on improving on such aspects |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Learners will receive formative assessment at three points in this unit.   * E-tivity 3.1 where learners will do a summary of a learning resource, exchange their works for peer review, rework their own using ideas from their peers, and post to their tutors for feedback. * E-tivity 3.2 where learners will participate and contribute ideas in a group discussion, and the e-moderator will comment on their ideas. * Face-to-face group activity where the e-moderator will comment on learners’ contributions. |

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| **Unit-level overview** | | **Unit/week/section** | **4** |
| Topic name: | Unit 4: Seedless Plants: Algae and fungi | | |
| Aim of the topic: | The goal of this unit is to introduce you to a diverse microscopic group of plants collectively called the Cryptogams, non-flowering or seedless plants and their differentiating attributes, life cycles and their biological importance. | | |
| This topic covers: | • Description, characteristics and classification of algae and fungi  • Life cycle of algae and fungi  • Biological importance of algae and fungi | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   * Describe and classify algae and fungi using their distinctive characteristics. * Identify and explain the various stages in the life cycles of algae and fungi highlighting their differences * Identify and explain the economic importance of algae and fungi in agriculture, health, environment and industry | | |

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| Overview of student activity: | Learners will read the Introduction to botany and organismal biology with this link <https://www.peoi.org/Courses/Coursesen/bot/frame14.html> and [https://organismalbio.biosci.gatech.edu/biodiversity/fungi-2/](#_top), respectively and take note of the characteristics of algae and fungi. Also watch the short video therein and use the knowledge to draw and describe the life cycles of algae and fungi. Then, learners will be shared into 4 groups with each group assigned to discuss the importance of algae and fungi either in agriculture, health, environment or industry in a discussion forum. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Describe and classify algae and fungi using their distinctive features | 4 | Download the resource material through the link provided, summarize the characteristics of algae and fungi, and use the knowledge to identify the classes of algae and fungi | Where: Online in Applied Biology domain on EBSU LMS  How: Writing quiz |
| 1. Identify and explain the various stages in the life cycles of algae and fungi highlighting their differences | 4 | Watch the short videos on life cycles of algae and fungi and sequentially identify the various stages of the life cycles. Then, describe the events at each stage and highlight the differences between the two cycles | Where: Online forum in Applied Biology domain on EBSU LMS  How: Learners will write assignments, exchange for peer review, rework their assignments using new ideas from their peers, and post to the tutor for final feedbacks on a discussion forum |
| 1. Identify and explain the economic importance of algae and fungi in agriculture, health, environment and industry | 4 | Learners will attend a synchronous online lecture on the overview of economic importance of algae and fungi. They will then participate in group discussion where each group will discuss the economic importance of algae and fungi either in agriculture, health, environment and industry. | Where: Where: Online forum in Applied Biology domain on EBSU LMS  How: Rubric to assess level of participation and contribution of each learner at the discussion forum |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Analyse and describe the various life forms of non- vascular plants and invertebrate animals, highlighting their diversity, habitats, and values to human wellbeing. | | | |
| Purpose of the unit/week/section: | | | |
| The purpose of this unit is to ensure that learners can accurately explain the characteristics of different classes of algae and fungi and deduce their economic importance in the areas of agriculture, health, environment and industry | | | |
| Over to you: *(a description of the process of the section)* | | | |
| In this unit, you will log in to General Biology I (BIO 101) Module in EBSU LMS and download the reading material and watch the videos provided to learn the characteristics and life cycles of algae and fungi. You will write a quiz and do a written assignment. You will then peer review each other’s assignment, use the new ideas to rework your assignment and send to the e-moderator for feedback. Lastly, you will attend a synchronous online lecture, participate in a discussion forum and contribute ideas on the economic importance of algae and fungi to life. | | | |
| Pre-topic activity: | | Number of hours | 1 hour |
| You will read the chapter eight of Okogwu, *et al*. (2019). Foundation Biology on the characteristics of algae and fungi, note the basic features of each of the organisms and the functions of each of the features | | | |
| Face to face time: *(if applicable)* | | Number of hours | 00 |
| Not applicable | | | |
| Online activity: | | Number of hours | 5 hours |
| What should students do? | 1.E-tivity 4.1:  Log in to EBSU LMS and download the course the “Introduction to botany” with this link <https://www.peoi.org/Courses/Coursesen/bot/frame14.html>,  <https://organismalbio.biosci.gatech.edu/biodiversity/fungi-2/>, read the characteristics of algae and fungi (1 hour).  2.E-tivity 4.2:  Log in to EBSU LMS and watch the short videos on life cycles of algae and fungi. Use the knowledge to summarize the morphological features of algae and fungi and their life cycles. Then, exchange your work with your colleagues for peer review, rework your own using new ideas from your peers, and post to the tutor on a discussion forum for feedbacks (2 hours within 48 hours).  3.E-tivity 4.3:  Participate in a synchronous online lecture on EBSU LMS on overview of economic importance of algae and fungi, and take part in a group discussion where each group will discuss the economic importance of algae and fungi either in agriculture, health, environment and industry (2 hours). | | |
| Where do they do it? | Online on EBSU LMS | | |
| By when should they do it? | The e-moderator will inform you via the class WhatsApp platform. | | |
| E-moderator/tutor role | | | |
| Give learners guide on how to log in to EBSU LMS and access the module.  • Create and manage a WhatsApp platform for the class  • Remind learners about the rules (netiquette) and timelines via the WhatsApp platform  • Monitor discussion forum and provide feedbacks  • Provide insight on the assessment criteria. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 3 hour 20 minutes |
| 1. Log in to EBSU LMS, navigate to General Biology I (BIO 101) module and attempt the quiz in Unit 4 on characteristics and classification on algae and fungi (20 minutes). 2. Learners will do an assignment in Unit 4 of the module on life cycles of algae and fungi identifying the various stages and highlighting the biological features of each stage. They will exchange their works for peer review; rework their assignments using new ideas from their peers, and post to the tutor on the discussion forum for feedback (2 hours within 48 hours). 3. Your level of participation and contribution at the discussion forum on economic importance of algae and fungi will be assessed using rubric (1 hour). | | | |
| How does this section link to other sections of the module? | | | |
| Unit 4 dealing on seedless plants covering algae and fungi is robustly linked to Unit 5 which dealt on bryophytes and pteridophytes. Algae were the first to colonize terrestrial habitats approximately 450 years ago; their appearance was one of the most important evolutionary histories of life on earth because it laid a foundation for bryophytes and pteridophytes existence in any ecosystem. Therefore, knowledge of unit 4 is a prerequisite to unit 5 and other units in the module. | | | |

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| = Total number of hours | 9 hours 20 minutes |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * Okogwo, I. O., Nnamani, C. V., Ani, O. C. and Uka, U. N. (2019). Foundation Biology. Meks Printing and Publishing Concept Ltd, Nigeria, 318 pp. * Dutta, A.C. (2000). Botany for degree students; India. Oxford Press. * https://organismalbio.biosci.gatech.edu/biodiversity/fungi-2/ |
| How are students enabled to access the resources? | * Okogwo *et al.* (2019) can be accessed from the Consultancy Unit of Ebonyi State University, Nigeria. Please, contact the Consultancy Unit at [Consultancy@ebsu.edu.ng](mailto:Consultancy@ebsu.edu.ng). * 2. Dutta, A.C. (2000). Botany for degree students; India. Oxford Press. |
| Where in this unit are students expected to work collaboratively? | E-tivity 4.2 and E-tivity 4.3 |
| How has an inclusive approach been incorporated in this unit? | Provision of pre-topic learning resources, diverse e-tivities, different learning resources (hard and soft copies), video clips and discussion forum - where learners could work individually at their own pace, time and preferred learning environment. |
| How will feedback on unit be obtained from students? | 1. Pre-course evaluation (online survey) will be used to assess the students’ prior knowledge of the topic 2. Peer-evaluation and tutor-evaluation in E-tivity 4.2 where learners will exchange their works for peer review and post their reworked assignments to the tutor on the discussion forum for feedback. 3. End of course evaluation (online survey) will be used to assess students’ perception of the topic delivery. |
| How will student feedback be used to improve unit? | Feedbacks from students will be analysed to identify aspects of the topic learning that are not meeting the expectations of even as low as 10% of the students, and efforts will be focused on improving on such aspects. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Learners will receive formative assessment at two points in this unit. |

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| **Unit-level overview** | | **Unit/week/section** | **5** |
| Topic name: | Bryophytes and pteridophyte | | |
| Aim of the topic: | The goal of this unit is to introduce you to a diverse group of plants consisting of bryophytes and pteridophyte (tracheophytes), also known as non-flowering or seedless plants and their differentiating attributes, the new traits that enabled their first appearance on land life cycles and their biological importance in the ecosystem. | | |
| This topic covers: | * General characteristics of bryophytes and pteridophyte. * Classification and life cycles of bryophytes and pteridophyte * Economic importance of bryophytes and pteridophyte | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   * Discuss those importance features which facilitated bryophytes and pteridophyte adaptations to life on land. * Describe the major classes of bryophytes and pteridophyte, reviewing the lifecycle of a fern. * Identify and explain the economic importance of algae and fungi in agriculture, health, environment and industry. | | |

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| Overview of student activity: | * Learners will read chapter eight of the text “*Foundation of Biology*” by Okogwu*et al*. (2019) on bryophytes and pteridophytes, noting and summarizing the general characteristics of bryophytes and pteridophyte and their classification highlighting those importance features which facilitated their adaptations to life on land. * You will attend a face – to – face synchronous lecture with the facilitator. After which your class will be shared into 4 groups with each group assigned to discuss the economic importance of bryophytes and pteridophytes either in agriculture, health, environment or industry. * Exchange your work within your group for peer review; rework your assignments using new ideas from their peers work, and post to the tutor on the discussion forum for feedback (within 48 hours). |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Discuss those importance features which facilitated bryophytes and pteridophyte adaptations to life on land. | 4 | You will read chapter eight of the text “Foundation of Biology” by Okogwuet al. (2019) on bryophytes and pteridophytes, noting and summarizing the general characteristics of bryophytes and pteridophyte and their classification. Identify, note and highlight those importance features which facilitated their adaptations to life on land. | Online through multiple-choice questions (MCQ) and rubric. |
| 1. Describe the major classes of bryophytes and pteridophyte , reviewing the lifecycle of a fern. | 4 | Face-to-face through Case study and group discussion and peer feedback. |
| 1. Identify and explain the economic importance of bryophytes and pteridophytes in agriculture, health, environment and industry. | 4 | You will attend a face – to – face synchronous lecture with the facilitator the economic importance of bryophytes and pteridophytes. After this your class will be shared into 4 groups with each group assigned to discuss the economic importance of bryophytes and pteridophytes either in agriculture, health, environment or industry.  Exchange your work within your group for peer review, rework your assignments using new ideas from their peers work, and post to the tutor on the discussion forum for feedback. | Face-to-face and  How using discussion forum |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Analyse and describe the various life forms of non- vascular seedless plants and invertebrates’ animals, highlighting their diversity, habitats, and economic values in agriculture, health, environment and industry. | | | |
| Purpose of the unit/week/section: | | | |
| This unit is to guide you to explore a diverse group of plants consisting of bryophytes and pteridophyte (tracheophytes), also known as non-flowering or seedless plants and their differentiating attributes facilitate their first appearance on land, life cycles and their biological importance in the ecosystem, agriculture, environment, health and industry. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| In this unit, you will first,   * read chapter eight of the text “Foundation of Biology” by Okogwuet al. (2019) on bryophytes and pteridophytes, * noting the general characteristics of bryophytes and pteridophyte and * their classification, * highlighting and summarize those importance features, * which facilitated their adaptations to life on land.   Then,   * You will attend a face – to – face synchronous lecture with the facilitator. * After which your class will be shared into 4 groups, * with each group assigned to discuss the economic importance of bryophytes and pteridophytes, * either in agriculture, health, environment or industry. * Exchange your work within your group for peer review, * rework your assignments using new ideas from you peers work, and * post the rework material to the tutor on the discussion forum for feedback **within 48 hours**. | | | |
| Pre-topic activity: | | Number of hours | 2 hours |
| * Read chapter eight of the text “*Foundation of Biology*” by Okogwu et al. (2019) on bryophytes and pteridophytes individually and outside the class. Take time to explore diverse classes in this group of non-flowering and their differentiating attributes which facilitated their first appearance on land, life cycles and their biological importance in the ecosystem, agriculture, environment, health and industry. * Botany for degree student by Duta https://usakochan.net/download/botany-for-degree-students/ | | | |
| Face to face time: *(if applicable)* | | Number of hours | 2 hours |
| Activity 4:1   * You will attend a face – to – face synchronous lecture with the facilitator. * After which your class will be shared into 4 groups, * with each group assigned to discuss the economic importance of bryophytes and pteridophytes, * either in agriculture, health, environment or industry. * Exchange with your peer for review, use the information to rework yours and then post this on the discussion forum for the moderator for feedback **(2 hours but within 48 hours)**.   Activity 4:2   * Exchange your work within your group for peer review, * rework your assignments using new ideas from you peer’s work, and * post the rework material to the tutor on the discussion forum for feedback (2 hours but within 48 hours). | | | |
| Online activity: | | Number of hours | 2 hours |
| What should students do? | Not applicable | | |
| Where do they do it? | Individually asynchronously and Face –to – face in the classroom (2 hours) | | |
| By when should they do it? | The moderator will inform you via the class WhatsApp platform on the time for this lecture. | | |
| E-moderator/tutor role | | | |
| Give learners guide on when and to access the learning resource.  • fixes the date for the synchronous face- to- face lecture informing you via the WhatsApp platform.  • presents the lecture on using power point slides.  •After which he guides you on how to shared your class into 4 groups,  • with each group assigned to discuss the economic importance of bryophytes and pteridophytes,  •either in agriculture, health, environment or industry.  •provide the activity and assessment tasks  • Monitor discussion forum and provide feedbacks  • Provide insight on the assessment criteria. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 3 hours |
| 1. Learners will do an assignment in Unit 5 of the module on life cycles of algae and fungi identifying the various stages and highlighting the biological features of each stage. They will exchange their works for peer review; rework their assignments using new ideas from their peers, and post to the tutor on the discussion forum for feedback (2 hours but within 48 hours).  3. Your level of participation and contribution at the discussion forum on economic importance of algae and fungi will be assessed using rubric (1 hour). | | | |
| How does this section link to other sections of the module? | | | |
| Unit 5 dealing on seedless plants covering bryophytes and pteridophytes is actually linked to unit 6 on animal kingdom covering protozoa, porifera, and coelenterate. For the fact that they were the first to acquire adaptive features which supported them to colonize land ecosystem ensured and supported the organisms in unit 6 with favourable opportunity of existence on terrestrial ecosystem. Therefore, knowledge of unit 5 is a prerequisite to unit 6 and other units in the module. | | | |

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| = Total number of hours | 9 hours |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | 1. Okogwo, I. O., Nnamani, C. V., Ani, O. C. and Uka, U. N. (2019). Foundation Biology. Meks Printing and Publishing Concept Ltd, Nigeria, 318 pp. 2. Dutta, A.C. (2000). Botany for degree students; India. Oxford Press. |
| How are students enabled to access the resources? | * 1. Okogwo *et al.* (2019) can be accessed from the Consultancy Unit of Ebonyi State University, Nigeria. Please, contact the Consultancy Unit at [Consultancy@ebsu.edu.ng](mailto:Consultancy@ebsu.edu.ng). |
| Where in this unit are students expected to work collaboratively? | Activity 4:1 and Activity 4:2 |
| How has an inclusive approach been incorporated in this unit? | Provision of pre-topic learning resources, diverse activities, different learning resources (hard and soft copies), and discussion forum - where learners could work individually at their own pace, time and preferred learning environment. |
| How will feedback on unit be obtained from students? | * Pre-course evaluation (online survey) will be used to assess the students’ prior knowledge of the topic * Peer-evaluation and tutor-evaluation in activity 5.2 where learners will exchange their works for peer review and post their reworked assignments to the tutor on the discussion forum for feedback. * End of course evaluation (online survey) will be used to assess students’ perception of the topic delivery. |
| How will student feedback be used to improve unit? | Feedbacks from students will be analysed to identify aspects of the topic learning that are not meeting the expectations of even as low as 10% of the students, and efforts will be focused on improving on such aspects. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Learners will receive formative assessment at two points in this unit.   * Activity 5.1 where they will do a summary of a learning resource that they will read, exchange their works among themselves for peer review, rework their own using new ideas from their peers, and then post to the tutor on a discussion forum for feedback. * Activity 5.2 where they will participate and contribute ideas in a group discussion, and the e-moderator will comment on their ideas. |

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| **Unit-level overview** | | **Unit/week/section** | **6** |
| Topic name: | Animal Kingdom: protozoa, porifera, coelenterate | | |
| Aim of the topic: | The aim of this unit is to provide an overview of the general characteristic of the protozoa, porifera, coelentrata, their classes and specific examples of some species that belong to each class, and their economic importance to man. | | |
| This topic covers: | General characteristics of protozoa, porifera, and coelentrata.  Classification of protozoa, porifera, and coelentrata  Economic importance of protozoa, porifera, and coelentrata to man. | | |
| Intended learning outcomes: | At the end of this topic, you will be able to:  • Discuss those major features of protozoa, porifera, and coelentrata.  • Describe the major classes of protozoa, porifera, and coelentrata with specific examples.  • Identify and explain the economic importance of protozoa, porifera, and coelentrata in agriculture, health, environment and industry. | | |

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| Overview of student activity: | Learners will summarize chapter thirteen of the text “Foundation of Biology” by Okogwu et al. (2019) and a 3-minute video on “phyla protozoa, porifera, and coelentrata” reflecting on the characteristics, classes and economic importance of these group. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| State the characteristics of the Phyla protozoa, porifera, coelentrata and platyhelminthes. | 4 | Download the resource material through the link provided, summarize the characteristics of the Phyla Protozoa, Porifera, and Coelentrata, noting the major classes of each Phyla and a specific example(s) of each class. | Online in Applied Biology domain on EBSU LMS through quiz. |
| State the economic importance of the Phyla Protozoa and Platyhelminthes. | 4 | Learners will download a PowerPoint that will be sent through EBSU LMS BIO 101 domain, read through and note the economic /medical importance of the Phylum Protozoa. | Online forum in Applied Biology domain on EBSU LMS. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| 4. Analyse and describe the various life forms of non- vascular seedless plants and invertebrates’ animals, highlighting their diversity, habitats, and economic values in agriculture, health, environment and industry. | | | |
| Purpose of the unit/week/section: | | | |
| The purpose of this unit is to ensure that learners can correctly describe the general characteristics of the protozoa, porifera, and coelentrata with their basic features, identify the major classes in each phyla and state the economic importance of members. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| In this unit, you will login to General Biology 1 (BIO 101) Module in EBSU LMS and download the reading material to learn the characteristics and the classes of the phyla protozoa, porifera, and coelentrata. You will also download and study a PowerPoint that will be send to through a link on EBSU BIO 101 LMS. Thereafter, you will attempt a quiz on the general characteristics and classes of the phyla protozoa, porifera, coelentrata and do an assignment on the economic/medical importance of the Phylum Protozoa. The assignment will be exchanged for peer review by your co-learner, corrected with contributions from co-learners, and sent to the e-moderator for feedback. Lastly, you will attend a synchronous online lecture, participate in a discussion forum and contribute ideas on the economic /medical importance of parasitic protozoa. | | | |
| Pre-topic activity: | | Number of hours | 2 hours |
| You will read the text on chapter thirteen of the text “Foundation of Biology” by Okogwu et al. (2019) and a 3-minute video on “Phyla protozoa, porifera, and coelentrata” reflecting on the characteristics, classes and economic importance of protozoa, porifera, and coelentrata, identify the classes in each phyla with their specific examples and the economic/medical importance of the protozoa. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 00 |
| Not applicable. | | | |
| Online activity: | | Number of hours | 6 hours |
| What should students do? | 1. E-tivity 6.1: Login to EBSU LMS and download the link on https://www.youtube.com/watch?v=1P7Mwx3d5RM and note and summarise the characteristics and classes of the phyla protozoa, porifera, and coelentrata (2 **hour**). 2. E-tivity 6.2: Equally watch the 2.11 minutes video on the economic importance of the phylum protozoa through this link https://www.youtube.com/watch?v=1P7Mwx3d5RM on the LMS noting and crystalize the economic importance of protozoa as a member of this group in relation to agriculture, health, environment and industry (**within 2 hours**). 3. E-tivity 6.3: Participate in a synchronous online lecture on EBSU LMS on overview of economic/medical importance of the phylum protozoa again, and restructure your assignment. Your will be shared with co-learners for review. Using the information as gained, reworked and posted your work to the facilitator on a discussion forum for feedback **(2 hours but within 48 hours**). | | |
| Where do they do it? | Online on EBSU LMS | | |
| By when should they do it? | The e-moderator will inform you via the class WhatsApp platform. | | |
| E-moderator/tutor role | | | |
| Give learners guide on how to login to EBSU LMS and access the module.  • Create and manage a WhatsApp platform for the class  • Remind learners about the rules (netiquette) and timelines via the WhatsApp platform  • Monitor discussion forum and provide feedbacks.  Provide criteria for assessment. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 3 hours 20 minutes |
| 1. Log in to EBSU LMS, navigate to General Biology I (BIO 101) module and attempt the quiz in Unit 7 on the characteristics and classes of the phyla platyhelminthes, nematoda and arthropoda (20 minutes).  2. Learners will do an assignment in Unit 6 of the module on the economic importance of the Phyla platyhelminthes, nematoda and arthropoda. They will exchange their works for peer review; rework their assignments using new ideas from their peers, and post to the tutor on the discussion forum for feedback (2 hours but within 48 hours).  3. Your level of participation and contribution at the discussion forum on economic importance of the Phyla Platyhelminthes, Nematoda and Arthropoda will be assessed using rubric (1 hour). | | | |
| How does this section link to other sections of the module? | | | |
| Unit 7 that covers the Phyla Platyhelminthes, Nematoda and Arthropoda is a prerequisite for studying unit 8 which covers Phyla Annelida and Echinodermata. These invertebrates are arranged in their evolutionary order and knowledge of the contents of unit 7 will enhance the understanding of unit 8. | | | |

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| = Total number of hours | 11 hours 20 minutes |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * Okogwo, I. O., Nnamani, C. V., Ani, O. C. and Uka, U. N. (2019). Foundation Biology. Meks Printing and Publishing Concept Ltd, Nigeria, 318 pp. * Nwani, C. D, Odikamnoro O. O., Ike, I. M and Okogwu, O.I. (2005). Fundamental of Biology for the Basic Science, Folsun technies, Nigeria, 240. * Powerpoint (Link sent by facilitator) |
| How are students enabled to access the resources? | * Okogwo *et al.* (2019) and Nwani et al. (2005) can be accessed from the Consultancy Unit of Ebonyi State University, Nigeria. Please, contact the Consultancy Unit at [Consultancy@ebsu.edu.ng](mailto:Consultancy@ebsu.edu.ng). |
| Where in this unit are students expected to work collaboratively? | E-tivity 6.3 |
| How has an inclusive approach been incorporated in this unit? | Provision of pre-topic learning resources, diverse e-tivities, different learning resources (hard and soft copies), Powerpoint, and discussion forum - where learners could work individually at their own pace, time and preferred learning environment |
| How will feedback on unit be obtained from students? | 1. Pre-course evaluation (online survey) will be used to assess the students’ prior knowledge of the topic 2. Peer-evaluation and tutor-evaluation in E-tivity 6.3 where learners will exchange their works for peer review and post their reworked assignments to the tutor on the discussion forum for feedback. 3. End of course evaluation (online survey) will be used to assess students’ perception of the topic delivery. |
| How will student feedback be used to improve unit? | Feedbacks will be analysed to identify aspects of the topic learning that are not meeting the expectations of even as low as 10% of the students, and adjustment made in line with the learners’ suggestions. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Learners will receive formative assessment in this unit at;   1. E-tivity 6.3 where learners will do assignment that will be shared with co-learners, reworked based on new ideas and posted to the facilitator on a discussion forum for feedback |

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| **Unit-level overview** | | **Unit/week/section** | **7** |
| Topic name: | **Animal Kingdom: Platyhelminthes, Nematoda and Arthropoda** | | |
| Aim of the topic: | The aim of this unit is to provide an overview of the general characteristic of the phyla platyhelminthes, nematoda and arthropoda, their classes and specific examples of some species that belong to each class, and their economic importance. | | |
| This topic covers: | * General characteristics and classes of platyhelminthes, nematoda and arthropoda with specific examples. * Economic importance of the phyla platyhelminthes, nematoda and arthropoda. | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   * State the general characteristics of the phyla platyhelminthes, nematoda and arthropoda outlining the major classes with specific examples. * State the economic importance of the phyla platyhelminthes, nematoda and arthropoda. | | |

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| Overview of student activity: | First, read chapter thirteen of the text “Foundation of Biology” by Okogwu et al. (2019), noting down those distinctive features in platyhelminthes, nematoda and arthropoda” reflecting on their classes and economic importance of these organisms.  Secondly you will log in to EBSU LMS, and download the learning resources on concepts of biology using this link https://opentextbc.ca/conceptsofbiologyopenstax/chapter/flatworms-nematodes-and-arthropods/ available in unit 7 of this module and fine turn their characteristics, mode of life and classification. You will post your work in a discussion forum, read the post of others, and use the knowledge to improve yours and repost in the discussion forum for e-moderators feedback.  Lastly, you will participate in the quiz on same link. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | | |
| 1. State the general characteristics of the phyla platyhelminthes, nematoda and arthropoda outlining the major classes with specific examples. | 5 | Download the resource material through the link provided, summarize the characteristics of the Phyla Platyhelminthes, Nematoda and Arthropoda, and the major classes of each Phyla with a specific example(s). | Online in Applied Biology domain on EBSU LMS  Through quiz. | |
| * 1. Describe the economic importance of the Phyla Platyhelminthes, Nematoda and Arthropoda. | 5 | Secondly you will log in to EBSU LMS, and download the learning resources on concepts of biology using this link https://opentextbc.ca/conceptsofbiologyopenstax/chapter/flatworms-nematodes-and-arthropods/ available in unit 7 of this module and fine turn their characteristics, mode of life and classification. You will post your work in a discussion forum, read the post of others, and use the knowledge to improve yours and repost in the discussion forum for e-moderators feedback.  Lastly, you will participate in the quiz on same link. | Online forum in Applied Biology domain on EBSU LMS.  peer review feedback, tutor feedbacks and discussion forum, quiz. | |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *beforecoming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Describe the general characteristics of members of the Platyhelminthes, Nematoda and Arthropoda, identify the classes and species under each phyla and state their economic importance. | | | |
| Purpose of the unit/week/section: | | | |
| The purpose of this unit is: To ensure that learners can correctly describe the general characteristics of the Phyla Platyhelminthes, Nematoda and Arthropoda with their basic features, identify the major classes in each phyla and state their economic importance. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| In this unit, you will login to General Biology I (BIO 101) Module in EBSU LMS and download the reading material to learn the characteristics and the classes of the phyla platyhelminthes, nematoda and arthropoda. You will also download the learning material on concept of biology that will guide you more. Thereafter, you will attempt a quiz on the general characteristics and classes of the phyla platyhelminthes, nematoda and arthropoda, and do an assignment on the economic importance of the three phyla. The assignment will be exchanged for peer review by your co-learner, corrected with contributions from co-learners, and post this on the discussion forum for the e-moderator for feedback.  Lastly, your level of participation in a discussion forum and contributory ideas will be assessed. | | | |
| Pre-topic activity: | | Number of hours | 2 hours |
| You will read chapter thirteen of Okogwo, I. O., Nnamani, C. V., Ani, O. C. and Uka, U. N. (2019). *Foundation Biology*. Meks Printing and Publishing Concept Ltd, Nigeria, 318 pp and download the learning resources on concepts of biology using this link https://opentextbc.ca/conceptsofbiologyopenstax/chapter/flatworms-nematodes-and-arthropods/ available in unit 7 of this module and fine turn their characteristics, mode of life and classification as reviewed in Okogwo, I. O., et al.,2019. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 00 |
| Not applicable | | | |
| Online activity: | | Number of hours | 4 hours |
| What should students do? | * + E-tivity 7.1: Login to EBSU LMS and download the course material and study the characteristics and classes of the phyla platyhelminthes, nematoda and arthropoda (**1 hour**).   + E-tivity 7.2: Login to EBSU LMS and download the learning resources on concepts of biology using this link https://opentextbc.ca/conceptsofbiologyopenstax/chapter/flatworms-nematodes-and-arthropods/ available in unit 7 of this module and fine turn their characteristics, mode of life and classification as reviewed in Okogwo, I. O., et al.,2019. ( **1 hour**).   + E-tivity 7.3: Participate in the quiz that will be shared with your co-learners, rework and post to the facilitator on a discussion forum for feedback (2 hours but 48 **hours**). | | |
| Where do they do it? | Online on EBSU LMS | | |
| By when should they do it? | The e-moderator will inform you via the class WhatsApp platform | | |
| E-moderator/tutor role | | | |
| Give learners guide on how to login to EBSU LMS and access the module.  • Create and manage a WhatsApp platform for the class  • Remind learners about the rules (netiquette) and timelines via the WhatsApp platform  • Monitor discussion forum and provide feedbacks.   * Provide insight on the assessment criteria. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 3 hours 20 minutes |
| 1. Log in to EBSU LMS, navigate to General Biology I (BIO 101) module and attempt the quiz in Unit 7 on the characteristics and classes of the phyla platyhelminthes, nematoda and arthropoda (**20 minutes**). 2. Learners will do an assignment in Unit 6 of the module on the economic importance of the phyla platyhelminthes, nematoda and arthropoda. They will exchange their works for peer review; rework their assignments using new ideas from their peers, and post to the tutor on the discussion forum for feedback (2 hours but **within 48 hours**). 3. Your level of participation and contribution at the discussion forum on economic importance of the Phyla Platyhelminthes, Nematoda and Arthropoda will be assessed using rubric (**1 hour**). | | | |
| How does this section link to other sections of the module? | | | |
| Unit 7 that covers the Phyla Platyhelminthes, Nematoda and Arthropoda is a prerequisite for studying unit 8 which covers Phyla Annelida and Echinodermata. These invertebrates are arranged in their evolutionary order and knowledge of the contents of unit 7 will enhance the understanding of unit 8. | | | |

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| = Total number of hours | 9 hours 20 minutes |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | 1.Okogwo, I. O., Nnamani, C. V., Ani, O. C. and Uka, U. N. (2019). Foundation Biology. Meks Printing and Publishing Concept Ltd, Nigeria, 318 pp.   1. Nwani, C. D, Odikamnoro O. O., Ike, I. M and Okogwu, O.I. (2005).   Fundamental of Biology for the Basic Science, Folsun technologies, Nigeria, 240 |
| How are students enabled to access the resources? | Okogwo, I. O., Nnamani, C. V., Ani, O. C. and Uka, U. N. (2019). Foundation Biology. Meks Printing and Publishing Concept Ltd, Nigeria, 318 pp.  2.Nwani, C. D, Odikamnoro O. O., Ike, I. M and Okogwu, O.I. (2005).  Fundamental of Biology for the Basic Science, Folsun technologies, Nigeria, 240, can be accessed from the Consultancy Unit of Ebonyi State University, Nigeria.Please, contact the Consultancy Unit at Consultancy@ebsu.edu.ng |
| Where in this unit are students expected to work collaboratively? | E-tivity 7.3 |
| How has an inclusive approach been incorporated in this unit? | Provision of pre-topic learning resources, diverse e-tivities, different learning resources (hard and soft copies), Powerpoint, and discussion forum - where learners could work individually at their own pace, time and preferred learning environment |
| How will feedback on unit be obtained from students? | 1. Pre-course evaluation (online survey) will be used to assess the students’ prior knowledge of the topic 2. Peer-evaluation and tutor-evaluation in E-tivity 7.3 where learners will exchange their works for peer review and post their reworked assignments to the tutor on the discussion forum for feedback. 3. End of course evaluation (online survey) will be used to assess students’ perception of the topic delivery. |
| How will student feedback be used to improve unit? | Feedbacks will be analysed to identify aspects of the topic learning that are not meeting the expectations of even as low as 10% of the students, and adjustment made in line with the learners’ suggestions. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Learners will receive formative assessment in this unit at; |

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| **Unit-level overview** | | **Unit/week/section** | **8** |
| Topic name: | Annelida and Echinodermata | | |
| Aim of the topic: | The goal of this unit is to introduce you to the most familiar group of invertebrates (Annelids and Echinoderms), their characteristics and importance to the environment | | |
| This topic covers: | 1. Characteristics, mode of life and reproduction of annelids and echinoderms  2. Diversity and classification annelids and echinoderms  3. Biological significance and uses of annelids and echinoderms | | |
| Intended learning outcomes: | Upon successful completion of this unit, you will be able to:   * Describe the characteristics, mode of life and reproduction of annelids and echinoderms * Explain the diversity and classification of annelids and echinoderms * Analyse the biological significance and uses of annelids and echinoderms | | |

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| Overview of student activity: | You will attend a synchronous online class where the course facilitator will introduce you to the general knowledge of the two phyla, Annelids and Echinoderms. Click [here](https://en.wikipedia.org/wiki/Annelid) and [here](https://en.wikipedia.org/wiki/Echinoderm) to download and summarize the characteristics, classification, mode of life and biological significance of Annelids and Echinoderms. You will peer-review each other’s work and use the new knowledge from your peer’s work to rework your own and post in a discussion forum for your tutor’s evaluation and feedback. Click [here](https://www.youtube.com/watch?v=YQv_QXj4AbU) and [here](https://www.toppr.com/guides/biology/animal-kingdom/phylum-echinodermata/) to watch 3:30 minutes videos on the characteristics and ways of life of these organisms and then participate in a group laboratory experiment to identify annelids in soil. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Describe the characteristics, mode of life and reproduction of Annelids and Echinoderms | 5 | Learners will use learning resources provided in this unit to summarize the characteristics, classification, mode of life and biological significance of Annelids and Echinoderms and post their works on the discussion forum. Thereafter, read each other’s works and use the new ideas from there to rework your own and repost. | Where: Online in EBSU LMS  How: Learners will do a short quiz. |
| Explain the diversity and classification of Annelids and Echinoderms | 5 | Watch short videos of [annelids](https://www.youtube.com/watch?v=YQv_QXj4AbU) and [echinoderms](https://www.toppr.com/guides/biology/animal-kingdom/phylum-echinodermata/) and use the knowledge to participate in a group laboratory experiment to sketch and identify annelids in soil around the school laboratory. Each group will present their work to the class for comments. | Where: EBSU Applied Biology Laboratory  How: You will do a quiz. The facilitator will grade each group’s work and provide formative feedback. |
| Analyse the biological significance and uses of annelids and echinoderms | 5 | Learners will participate in a discussion forum to contribute ideas on the biological significance and usefulness of the organisms to man. You will post your contribution in a discussion board and comment on other’s posts. | Where: In EBSU LMS  How: Rubric will be used to grade each learners contributions |
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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *beforecoming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Making learners understand annelids and echinoderms and learning the common characteristics that all annelids and echinoderms share, as well as the discovery of the value of annelids and echinoderms as well as their importance to the environment | | | |
| Purpose of the unit/week/section: | | | |
| The purpose of this unit is to ensure that learners can correctly describe the characteristics, mode of life and classification of Annelids and Echinoderms, and can explore their economic importance. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| First, you will log in to EBSU LMS, download the learning resources on Annelids and Echinoderms available in Unit 8 of this module and summarize their characteristics, mode of life and classification. You will post your work in a discussion forum, read others posts and use the knowledge to improve yours and repost in the discussion forum. Then, you will do a quiz. You will also watch 3:30 minutes video on each phylum and use the knowledge to participate in a face-to-face laboratory experiment to identify annelids. Lastly, you will participate in asynchronous group discussion on biological significance of annelids and echinoderms. | | | |
| Pre-topic activity: | | Number of hours | 2 hours |
| Read and summarize the characteristics, classification and economic importance of [annelids](https://en.wikipedia.org/wiki/Annelid) and [echinoderms](https://en.wikipedia.org/wiki/Echinoderm). Read also Chapter 4 of Fundamentals of Biology for Basic Sciences and note the similarities and differences between these two large groups of invertebrates. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 2 hours |
| You will participate in a face-to-face group experiment in the laboratory to sketch and identify annelids in soil around the school laboratory. Each group will present their work to the class for comments and tutor’s assessment (2 hour). | | | |
| Online activity: | | Number of hours | 27 hours |
| What should students do? | * E-tivity 8.1: Log in to EBSU LMS and participate in a synchronous short lecture at the beginning of the unit where the course facilitator will introduce you to the topic, ascertain your current knowledge of the topic, and provide you with instructions for successful completion of the topic. (1 hour) * E-tivity 8.2: You will post your summary of the characteristics, classification and economic importance of annelids and echinoderms from your pre-topic activity in the BIO 101 discussion forum in EBSU LMS. Read your colleagues’ work, use the knowledge to improve your work and repost in the discussion forum for your tutor’s assessment and feedback. (2 hours but within 24 hours) * E-tivity 8.3: Watch the 3:30 minutes videos on [Annelids](https://www.youtube.com/watch?v=YQv_QXj4AbU) and [Echinoderms](https://www.toppr.com/guides/biology/animal-kingdom/phylum-echinodermata/). The, Log in to EBSU LMS and participate in BIO 101 discussion forum (asynchronous) on biological significance of annelids and echinoderms making sure to contribute significantly in the discussion. (2 hours). | | |
| Where do they do it? | 1. The face-to-face laboratory experiment will take place in Applied Biology Laboratory, Permanent Site, Ebonyi State University (EBSU)  2. The online activities will take place in EBSU LMS. | | |
| By when should they do it? | The e-moderator will inform you via the class WhatsApp platform | | |
| E-moderator/tutor role | | | |
| • Give learners guide on how to log in to EBSU LMS and access the module.  • Create and manage a WhatsApp platform for the class  • Remind learners about the rules (netiquette) and timelines via the WhatsApp platform  • Monitor discussion forum and provide feedbacks  • Provide insight on the assessment criteria. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 5 hours 20 minutes |
| 1. You will log in to EBSU LMS and attempt the quiz in Unit 8 of BIO 101 module on characteristics and classification of annelids and echinoderms (20 minutes).  2. The tutor will grade the performance of learners in group laboratory experiment on identification of Annelids in soil (3 hours).  3. Your level of participation and contribution at the discussion forum on economic importance of annelids and echinoderms will be assessed using rubric (2 hours). | | | |
| How does this section link to other sections of the module? | | | |
| Unit 8 on annelids and echinoderms is linked with other units in the module and 7 in particular by been the modern relative of an ancient group that probably formed an evolutionary bridge between annelids and  arthropods. | | | |

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| = Total number of hours | 10 hours 20 minutes |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | 1. Nwani, C. D., Odikamnoro, O. O., Ike I. M. and Okogwu, O. (2005). Fundamentals of Biology for Basic Sciences. Folsun Technologies, Nigeria, Pages 102 – 106 & 129 – 130.  2. Echinoderms, https://en.wikipedia.org/wiki/Echinoderm  3. Phylum Echinodermata, <https://www.toppr.com/guides/biology/animal-kingdom/phylum-echinodermata/>  4. Annelids, <https://en.wikipedia.org/wiki/Annelid>  5. Annelida, <https://www.youtube.com/watch?v=YQv_QXj4AbU> |
| How are students enabled to access the resources? | Learners will use the links above to access the Echinoderms, phylum echinodermata, annelids and annelida, while Nwani et al. (2005) can be found in hard copy from Ebonyi State University Consultancy bookshop (Contact: [Cunsultancy@ebsu.edu.ng](mailto:Cunsultancy@ebsu.edu.ng)) |
| Where in this unit are students expected to work collaboratively? | Learners will collaborate with their colleagues in E-tivity 8.2 and E-tivity 8.3. They will also work collaboratively in the face-to-face laboratory experiment. |
| How has an inclusive approach been incorporated in this unit? | Provision of pre-topic learning resources, different e-tivities, different kinds of learning resources (hard and soft copies, video clip) and discussion forum. Also by allocation of sufficient time for various activities to accommodate both fast and slow learners. |
| How will feedback on unit be obtained from students? | 1. Pre-course evaluation (online survey) will be used to assess the students’ prior knowledge of the topic |
| How will student feedback be used to improve unit? | 2. End of course evaluation (online survey) will be used to assess students’ perception of the topic design and facilitation. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Feedbacks from students will be analysed to identify aspects of the topic learning that are not meeting the expectations of even as low as 10% of the students, and efforts will be focused on improving on such aspects |

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| **Unit-level overview** | | **Unit/week/section** | **9** |
| Topic name: | Principles of Inheritance, Variation and Plant Breeding | | |
| Aim of the topic: | This unit will introduce you to Mendel’s laws of inheritance and variations among individuals in a population and how man has exploited these principles to improve plants to meet his food needs | | |
| This topic covers: | 1. Introduction to Mendel’s laws of inheritance 2. Non-Mendelian inheritance 3. Monohybrid and dihybrid inheritance 4. Principles of plant breeding | | |
| Intended learning outcomes: | *Upon successful completion of this unit, you will be able to:*   * Explain the principles of Mendelian and non-Mendelian inheritance. * Relate the principle of inheritance to plant breeding | | |

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| Overview of student activity: | Learners will read these texts [Mendelian inheritance](https://en.wikipedia.org/wiki/Mendelian_inheritance) and [Principles of inheritance and variation](https://ncert.nic.in/textbook/pdf/lebo105.pdf) and summarize the laws of inheritance. You will post your work on the discussion forum, read those of your colleagues, use the new ideas to rework your own and repost for your tutor’s evaluation and feedback. Learners will read this text and use the knowledge to participate in group discussion online to analyse the relationship between Mendel’s Laws of inheritance and plant breeding. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| Explain the principles of Mendelian and non-Mendelian inheritance | 6 | Learners will summarize the laws of inheritance using the texts [Mendelian inheritance](https://en.wikipedia.org/wiki/Mendelian_inheritance) and [Principles of inheritance and variation](https://ncert.nic.in/textbook/pdf/lebo105.pdf), post their works in a discussion forum, read others’ posts, rework theirs using new ideas from others and repost for your tutor’s evaluation and feedback. | Where: Online in EBSU LMS  How: Learners will do a quiz |
| Relate the principle of inheritance to plant breeding | 6 | You will also read Chapter 2 of Dutta, A.C. (2010),  Pages 616-626 and use the knowledge to participate in a discussion forum to relate the principles of inheritance to plant breeding. | Where: Online in EBSU LMS  How: Learners contributions in the discussion forum will be scored with a rubric. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| 6. Explain the principles of Mendelian and non- Mendelian inheritance, discuss the molecular bases of inheritance relating the principles inheritance to plant breeding. | | | |
| Purpose of the unit/week/section: | | | |
| The purpose of this unit is to make sure that Learners can correctly explain the principles of inheritance and its molecular basis and relate it properly with the principle of plant breeding. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| First, you will summarize the laws of inheritance using the texts [Mendelian inheritance](https://en.wikipedia.org/wiki/Mendelian_inheritance) and [Principles of inheritance and variation](https://ncert.nic.in/textbook/pdf/lebo105.pdf) and post your work in a discussion forum. You will also read your colleagues posts and use new ideas therefrom to rework own and repost for your tutor’s evaluation and feedback. You will also read Chapter 2 of Dutta, A.C. (2010), Pages 616-626 and use the knowledge to contribute in a discussion forum to relate the principles of inheritance to principles of plant breeding. | | | |
| Pre-topic activity: | | Number of hours | 2 hours |
| Read these texts [Mendelian inheritance](https://en.wikipedia.org/wiki/Mendelian_inheritance) and [Principles of inheritance and variation](https://ncert.nic.in/textbook/pdf/lebo105.pdf) and summarize the laws of Mendelian and non-Mendelian inheritance | | | |
| Face to face time: *(if applicable)* | | Number of hours | 00 |
| Not applicable | | | |
| Online activity: | | Number of hours | 4 hours |
| What should students do? | E –tivity 9.1: Post your reworked summary of laws of inheritance in BIO 101 discussion forum on EBSU LMS, read your colleagues posts and use their ideas to improve your own and repost for your tutor’s evaluation and feedback (2 hours).  E-tivity 9.2: You will log in to EBSU LMS and participate in a discussion forum to examine the links between the principles of inheritance to the principles of plant breeding (2 hours). | | |
| Where do they do it? | Online on EBSU LMS | | |
| By when should they do it? | The e- moderator will inform you using the class WhatsApp platform. | | |
| E-moderator/tutor role | | | |
| The E-moderator will;  1. Give learners guides on how to log in to EBSU LMS and access the module and its learning resources  2. Create and manage a WhatsApp platform for the class  3. Remind learners about the rules (netiquette) via the WhatsApp platform  4. Moderate discussion forum and provide feedbacks  5. Prompt learners on upcoming deadlines via the WhatsApp platform | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 1 hour |
| * Learners will participate on quiz in this unit.   • Rubric will be used to score their contributions in discussion forum | | | |
| How does this section link to other sections of the module? | | | |
| This unit links directly to unit 4 dealing on cell, structures and functions. So inheritance is controlled by DNA which is a component of cells. It is therefore generally applicable to all living things. | | | |

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| = Total number of hours | 7 hours |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | 1. Mendelian Inheritance: <https://en.wikipedia.org/wiki/Mendelian_inheritance>  2. Principles of inheritance and variation: <https://ncert.nic.in/textbook/pdf/lebo105.pdf>  3. Dutta, A.C. (2010). Botany for Degree Students. Vines and Rees. Plant and  Animal Biology. Part VIII. Chapter 2. Pg 616-626 |
| How are students enabled to access the resources? | Links to Mendelian inheritance and that of Principles of inheritance and variation are provided here, while Dutta (2010) is accessible at Ebonyi State University Consultancy Bookshop (Contact: [Consultancy@ebsu.edu.ng](mailto:Consultancy@ebsu.edu.ng)) |
| Where in this unit are students expected to work collaboratively? | In E-tivity 9.1 and E-tivity 9.2. |
| How has an inclusive approach been incorporated in this unit? | In this unit, pre-topic learning resources, e-tivities, both soft and hard copies of reading resources and discussion forum are provided to enable learners learn in a way that is most suitable to them. |
| How will feedback on unit be obtained from students? | 1. Pre-course evaluation (online survey) will be used to assess the students’ prior knowledge of the topic  2. End of course evaluation (online survey) will be used to assess students’  perception of the topic design and facilitation. |
| How will student feedback be used to improve unit? | Feedbacks from students will be analysed to identify aspects of the topic learning that are not meeting the expectations of even as low as 10% of the students, and efforts will be focused on improving on such aspects |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Learners will receive formative assessment at two points in this unit.  E-tivity 9.1 and E-tivity 9.2 where the tutor will give learners feedbacks on their contributions in discussion forum. |