

# Four-Year B.Ed. Course Manual

# ENVIRONMENTAL BIOLOGY









The Government of Ghana









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## FOREWORD

These Initial Teacher Education course manuals were developed by a team consisting of members from Colleges of Education and four universities namely the University of Ghana, Kwame Nkrumah University of Science and Technology, University of Education, Winneba, and University for Development Studies. This team was originally constituted by the National Council for Tertiary Education (now the Ghana Tertiary Education Commission) in 2019 to support the delivery of the new B.Ed. curriculum with assistance from T-TEL and UK Aid. The revision, finalization and printing of these manuals took place in 2021 with support from T-TEL and Mastercard Foundation.

The course manuals have been produced for use as general guides for the delivery of the new four-year B.Ed. curriculum in Colleges of Education in collaboration with their affiliated universities. They are designed to support student teachers, tutors and lecturers in delivering a complete B.Ed. course for training student teachers which meet the requirements of the National Teachers' Standards, enabling them to teach effectively in basic schools.

The first section of the manuals is focused on the course information and vision for the B.Ed. curriculum. The second section presents the course details, goal for the subject or learning area, course description, key contextual factors as well as core and transferable skills and cross-cutting issues, including equity and inclusion. The third section is a list of course learning outcomes and their related learning indicators. The fourth section presents the course content which is broken down into units for each week, the topic and sub-strands and their related teaching and learning activities to achieve the learning outcomes and the teaching and learning strategies. This is followed by course assessment components in section five. Each manual contains a list of required reading and references as well as teaching and learning resources. The final section presents course related professional development for tutors and lecturers to be able to use each section of the manual.

Field instructions to guide Supported Teaching in School are integrated into the course manuals to provide the student teacher with guidance in developing teaching throughout the entire period of study to be able to meet the requirements of the National Teachers' Standards (NTS) and the National Teacher Education Curriculum Framework (NTECF). To ensure maximum benefit the course manuals should be used in addition to other resources such as the NTS, NTCEF, National Teacher Education & Assessment Policy and the National Teacher Education Gender Equality and Social Inclusion (GESI) Strategy and Action Plan. This will help to ensure that student teachers learning is integrated within the wider teacher education policy framework.

Professor Mohammed Salifu Director General, Ghana Tertiary Education Commission

## ACKNOWLEDGEMENTS

The course manuals were developed through the collaborative efforts of a team of individuals from Colleges of Education, University of Ghana, Kwame Nkrumah University of Science and Technology, University of Education, Winneba and University for Development Studies. They were produced in association with the Ghana Tertiary Education Commission of the Ministry of Education, Ghana.

A participatory team approach was used to produce these sets of resources for tutors/lecturers, mentors and student teachers. We are grateful to the specialists who contributed their knowledge and expertise.

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Patricia Appiah-Boateng and Gameli Samuel Hahomene, served as typesetting and formatting coordinators and designed and produced the illustrations, tables and other graphics which appear in the pages. They spent time and effort designing and redesigning the graphic layout and producing the camera-ready copies resulting in a set of materials that are easy to use, read and reference.

Thanks also goes to all T-Tel staff members who worked to support production of these course manuals, particularly Beryl Opong-Agyei and Gideon Okai. Their frankness and co-operative attitude complimented the team is approach used to produce these manual.

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### **CORE WRITING TEAM**

Names of writers	Subject		Names of writers	Subject
Dr. Isaac Eshun			Cletus Ngaaso	Social Studies
Dr. Anthony Baabereyir			Mohammed Adam	-
Ms. Shirley Dankwa	African Studies		Dr. Emmanuel Adjei-Boateng	-
Prof. S.Y. Annor	Agriculture		Dr. Yaw Nyadu Offei	Special Education
Dr. Salome praise Otami			Prof. Samuel Hayford	-
Dr. Samuel Frimpong			Dr. Awuni	-
Robert Quansah	Early Grade		Rev.(Dr) Nyueko Avotri	Technical Vocational
Dr. Abraham Kwadwo Okrah			Elizabeth Lani Ashong	Education and Training
Dr. Sarah Emma Eshun	English Language			
Vivian Acquaye			Michael Tsorgali	-
Felix A. Odonkor			Frnacis Donkor	-
Dr. Cecilia Esinam Agbeh			Dr. Maxwell Nyatsikor	
Ibrahim Osmanu	French		Prof. Salomey Essuman	
Dr. Kofi Adu-Boahen			Dr. Paul Kwadwo Addo	
Dr. M. Kusimi			Dr. Winston Kwame Abroampa	
Dr. Aboagye Dacosta			Mr. Kwaku Esia-Donkoh	
Mr. Alexander Otoo	Geography		Mohammed Z. Abdulmumin	Pedagogy
Dr. Yvonne A.A. Ollennu	Ghanaian		Dr. Mohammed Hafiz	Arabic
Kwasi Adomako	Language		Iddris Mohammed	
Dr. Akwasi Kwarteng Amoako-Gyampah			Mohammed Almu Mahaman	
Anitha Oforiwah AduBoahen			Murtada M. Muaz	
Gertrude Nkrumah	History		Dr M. Q. Adjahoe	Music

Prof Charles Owu-Ewie	Literacy	Prof Cosmas Mereku	
Dr. Ahmed Amihere		Prof. Reginald Ocansey	Physical Education
Zakaria Sadiq	Mathematics	Dr. Emmanuel Osei Sarpong	_
Dr. R. Addai-Mununkum		E. Kwaku Kwaa-Aidoo	ICT
Dr Charles Nyarko Annobil	RME	Victor Anyamful	
Mr. Owusu Afiriyie			
Dr. V. Ankamah-Lomotey			
Jonathan Ayelsoma Samari	Science		
Prof. Ruby Hanson			

### **INTRODUCTION TO COURSE MANUALS**

Welcome to this B.Ed. Course manual.

Following the accreditation of the B.Ed. by the national accreditation Board with its recognition as a world class teacher education curriculum, the decision was taken to support effective implementation through the development of course manuals. the course manuals provide tutors and lecturers with the materials necessary to support teaching each of the B.Ed. courses. The manuals adhere directly to, and emphasise, the principles and standards set out in the NTS, NTECF and in the B.Ed. and will help ensure operationalising the Government's teacher education reform Policy.

The manuals serve the following purposes:

- they are the key educational agreements between the training institution and the student teachers. In this way student teachers know what the expectations are for them and for the training they will receive.
- they lay out the course outcomes, content, strategies, and assessment, thereby providing direction to and consistency in training and B.Ed. implementation among tutors across the country.
- they are explicit documents that provide other institutions with information on which to base transfer/ articulation decisions.

Specifically, they also:

- support coherent lesson planning and teaching which will enable student teachers to achieve the NTS and become good teachers who ensure all pupils' learning whilst offering tutors the flexibility for adaptation for local needs and contexts.
- Provide a lesson by lesson overview of the course, building on and developing the material in the course specifications.
- Inform tutors, student teachers and others working with student teachers about:
  - 1. What is to be taught and why.
  - 2. how it can be taught.
  - 3. how it should be assessed.
- Provide opportunities for student teachers to develop and apply knowledge during supported teaching in school, creating a strong bond between learning in school and in the training institution.
- Reflect the stage of student teacher development, set out in the model for progress across the four years of the B.Ed.
- Can be used as self-study tools by student teachers.
- Ensure that all information necessary to inform teacher training is in one place (serves as reference document).
- The manuals are the basis of the codes and university professional development sessions to ensure Principals, tutors, lecturers and heads of department are fully familiar with the details of: courses, outcomes, content, approaches, assessments and lessons.

Who are course manuals for:

- College of Education Tutors
- Teacher Education University Lecturers
- Student Teachers
- Mentors and Lead Mentors
- All Those with An Interested In Teacher Education.

### **USING THIS MANUAL**

Writers of the manuals engaged widely with colleagues in each subject area at each stage of development. Besides, writers envisaged themselves in varied contexts as they wrote, to suggest methodologies and strategies for teaching the strands which would ensure student teachers are enabled to achieve the learning outcomes. In view of our commitment to creativity, problem solving, collaboration and to lifelong learning, we expect that individual tutors will "own" their manuals and become user-developers. lessons in the manuals will be strands for weekly Pd meetings where tutors/lecturers will situate the lessons in the contexts of their colleges and their student teachers, to maximize the benefits.

It is also expected that tutors will model the best pedagogic practices for student teachers. Key among such practices is the communication of the importance of having a personal teaching philosophy. We expect that tutors and lecturers will explicitly communicate their personal teaching philosophies to their student teachers during the first meeting of every course. in preparation for this, we suggest you set out your personal teaching philosophy and how it will be demonstrated in your teaching using, or adapting, the sample sentence introductions below.

My teaching philosophy is .....

In view of this philosophy, I will facilitate this course by/through .....

### **A.Course Information**

#### ENVIRONMENTAL BIOLOGY

#### The vision for the New B.Ed. Curriculum

The vision is to transform initial teacher education and train highly qualified, motivated new teachers who are effective, engaging and fully prepared to teach the basic school curriculum. This would improve the learning outcomes and life chances of all learners they teach as set out in the National Teachers' Standards. In doing this it would instil in new teachers the Nation's core values of honesty, integrity, creativity and responsible citizenship and to achieve inclusive, equitable, high quality education for all learners

i. Course Details							
Course Name	Envir	onmental Biology					
Pre-requisite	Intro	Introduction to Integrated Science I and Introduction to Integrated Science II (from year 1)					
Course Level	200	Course Code		Credit Value	3		
1 Goal for the Sub	iact or	oorning Aroo					

#### 1. Goal for the Subject or Learning Area

The science programme is designed to transform the upper primary teacher into one imbued with the right knowledge, technology, pedagogy, innovation, content and the core values and attitudes to promote inclusivity and inspire active learning at the upper primary school level.

#### 2. Course Description

The course for semester one of year two uses the universal design for learning approach to extend the basic science concepts of the student teacher on the following content areas: Classification of plants and animals, flowering plants, fruits formation and dispersal, carbon and nitrogen cycle, farming systems, human body I and II, teaching ecosystems, teaching types of ecosystems and the science pedagogy and curriculum. This is done through appropriate pedagogies such as Nature walk, talk for learning approaches, demonstrations, concept mapping, problem-based teaching /learning, and video presentations as well as authentic assessments mode such as concept mapping, using checklist to identify values and attitudes and, mind maps from which provides for the teachers' attention on the need to ensure equity and the provision for SEN. This course continues to emphasize on the essential attitudes and values (NTS, 1a-c)of professional science teaching such as honesty, carefulness and accuracy. The student teacher, in this course, should be introduced to issues of transition in terms of use of the English language as medium of instruction and characteristics and learning styles of early adolescent and Supported Teaching in School (STS) (NTS, 2e), as well as managing transition from to middle childhood (Upper Primary) to Early Adolescent (JHS). (NTS, 2e, p.13), (NTS, 1a-c, p. 12), (NTS, 2c, P. 13).

#### 3. Key Contextual Factors

The Government, in its desire to improve the teaching and learning environment in the Junior High School has initiated several on-going interventions. However, Junior High School education still face a number of challenges including the lack of commitment and involvement of parents, financial constraints and inadequate infrastructure. Some of the attendant challenges are:

- the lack of qualified teachers at the Junior High School level in the various subject areas.
- some school do not have sufficient number of teachers trained to identify, manage and support the learning challenges of adolescents.
- the school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN
- many Junior High School teachers have low ICT competency and are unable to integrate ICT into their teaching and learning
- there are cultural practices and prejudices that prevent the creation of a learning environment conducive to supporting the learning of all learners. An example is the belief that STEM subjects are male specific and home economics is female specific.
- teaching at the Junior high school at the moment mostly focuses on passing the Basic Education Certificate Examination (BECE) and not on quality and depth in learning and personal development: this leads to teaching and learning by rote
- There is a lack of parental involvement in the teaching and learning process.

There is also a need for a conducive learning environment for a section of the early adolescent population who have the conception that STEM subjects are for boys rather girls.

The learning activities for this semester seeks to relate science to the learners' environment, make science culturally relevant and inclusive. It also seeks to promote professional scientific attitudes and skills development such as critical thinking, honesty, patience, sincerity, precision, and accuracy. Sensitive concepts may be explained within the appropriate local dialect and/or practices, in order to remove barriers that could prevent students of diverse abilities and strengths from participating in any science lesson, as well as managing transition from to middle childhood (Upper Primary) to early adolescent (Junior High School)

4. Core and transferable skills and cross cutting issues, including equity and inclusion
Critical and Independent Thinking, Equity and Inclusivity, Social Collaboration/Team work, Creativity, Innovation, Problem solving, Manipulation, Reflection, developing scientific process skills and Inquiry.

solving, Manipulation, Reflection, developing scientific process	skills and inquiry.
5. Course Learning Outcomes	6. Learning Indicators
CLO1:Explain the need for Junior High School students to learn about specific Biology concepts in the JHS(NTS 2c, p.13 & 21)	<ul> <li>Produce reflective reports about links between Junior high school Biology future careers and lifelong learning.</li> </ul>
CLO2:Develop creative learning activities that can make the JHS school learner distinguish between the concepts(NTS 2c, p.13 & 21)	<ul> <li>Create charts, concept maps and mind maps about specific concepts</li> </ul>
CLO3:Recognize that variation and diversity of concepts in biology and explain same to JHS learners(NTS 2c, p.13 & 21), (NTS 2c, p.13 & 21)	<ul> <li>Present a mini project work on at leastone concept.</li> </ul>
CLO4: Develop and use developmentally appropriate TLMs from locally available materials for teaching JHS school (NTS 3j, pg. 14)	<ul> <li>Prepare improvised, developmentally appropriate materials for teaching at the JHS school level</li> </ul>
CLO5: Demonstrate an understanding of the principles of professional development observed during STS through reflective reporting. (NTS, 2c & 3e, Pg. 14 finger & 24)	<ul> <li>Prepare a reflective report on observations during STS for a seminar</li> </ul>
CLO6: Demonstrate knowledge and application of the Teachers' Standards, for JHS school curriculum, laws protecting children and all relevant regulations, and model positive values, attitudes and behaviours student teacher will be working towards meeting the NTS. (NTS 1b p14 & 18, 14)	<ul> <li>Provide a checklist to identify the NTS values, attitudes and behaviours applicable to JHS teaching from the curriculum</li> <li>Prepare a list of some examples of professional needs qualities or traits/and some characteristics of professional teachers</li> </ul>

7. Course Conte	nt		
Unit (Week)	Торіс	Subtopic (if any)	Teaching and learning activity to achieve the learning outcomes
Week 1	Review of Year 1 integrated science TeachingClassification of Plants and Animals	<ul> <li>Recap of year 1 lessons and challenges thereof.</li> <li>Classification systems</li> <li>Divisions and classes of plants</li> <li>Phyla and classes of animals</li> <li>Classification of insects</li> <li>Reflections on classification of insects</li> </ul>	<ul> <li>Demonstrations and discussions</li> <li>Reflections, presentations and designing</li> <li>Role playing/song creations</li> <li>Simulations, video and Computer presentation</li> <li>Produce charts and illustrations of forms and sources of energy</li> </ul>
Week 2	Teaching Flowering Plants	<ul> <li>Reflection on the diversity of the classes</li> <li>Structure and function of flowers</li> <li>Photosynthesis</li> <li>Values</li> </ul>	<ul> <li>Demonstrations and group discussions</li> <li>Reflections, presentations and designing/game development</li> <li>Concept mapping</li> <li>iv. Simulations, video and Computer presentation</li> </ul>
Week 3	Teaching Fruit Formation and Dispersal	<ul> <li>Fruit formation,</li> <li>Fruit and seed Dispersal</li> <li>Reflection on Professional Values</li> </ul>	<ul> <li>Face-to Face: Discussion, Role Playing, Construction of games, Designing rhymes, creating songs about plants and animals</li> <li>e-learning: Video and Computer simulation on teaching activities and assessment strategies.</li> </ul>
Week 4	Carbon and Nitrogen Cycle	<ul> <li>Concepts (Phases of the cycles of Carbon and Nitrogen)</li> <li>Green House effect</li> </ul>	Face-to-face: Mixed group discussions and demonstrations/role plays, Concept Mapping and Cartooning. e-learning/Reflections: Video

		<ul> <li>How to teach the Nitrogen and Carbon Cycles</li> </ul>	presentations from MOOCs with reflections on values such as Honesty, Accuracy, Precision and critical thinking.
Week 5	Farming Systems	<ul> <li>Types of Farming Systems</li> <li>Agricultural Use of Farming Systems</li> <li>Teaching how to teach Farming Systems</li> </ul>	Face-to-face: Discussion, Talk for learning approaches with student teacher presentations, Independent Face-to-face: Discussion, Talk for learning approaches with student teacher presentations, Independent Study: problem-based teaching, e-learning opportunities: multimedia presentations, problem-based teaching, e-learning opportunities: multimedia presentations
Week 6	Course Review I and STS Seminar	<ul> <li>Reviewing and reflecting on lessons 1-5</li> <li>STS Seminar</li> </ul>	<ul> <li>Face-to-Face: Pyramid discussions, Presentations</li> <li>e-learning: OERs and MOOCs</li> <li>Independent Study: reflection on observations made during STS and problem-based learning: on National Teacher's Standards</li> </ul>
Week 7	Teaching about the Respiratory System	<ul> <li>Structure and function of the Respiratory and Digestive systems</li> <li>Gaseous Exchange and Tissue Respiration</li> <li>Teaching how to teach the Respiratory System</li> </ul>	Face-to-face: Discussion, Talk for learning approaches with student teacher presentations, Practical work. e-learning: OERs and MOOCs
Week 8	Teaching about the Digestive System	<ul> <li>Enzymes and Digestion</li> <li>Dentition</li> <li>Teaching how to teach the Digestive system</li> </ul>	Face-to-face discussions, demonstration, mixed group work Computer simulations and OERs sources
Week 9	Teaching the Ecosystem	<ul> <li>Concepts of the Ecosystem</li> <li>Terminologies as used in Ecosystem</li> <li>Dealing with Misconceptions about Ecosystem</li> </ul>	Independent Study: Inquiry and reflections Face-to-Face: Discussions, Role playing and Game e-learning: OERs and MOOCs with report writing
Week 10	Teachingtypes of Ecosystems	<ul> <li>Types of ecosystems</li> <li>Misconceptions of Ecosystem</li> <li>Teaching about the ecosystem</li> </ul>	Face-to-Face: Think, Pair, Share, Share discussions, Reflections e-learning: OERs and MOOCs with report writing
Week 11	Science Pedagogy and Curriculum	<ul> <li>Psychology of early Adolescent in Science teaching</li> <li>Introduction to Science lesson plans and Resources</li> <li>Micro teaching</li> </ul>	Face-to-Face: Modelling, Role playing and developing games. Seminar: Independent Study: Reflections and Inquiry

	Discussions, Checklist, Role	<ul> <li>Reviewing and reflecting on lessons 7-11</li> <li>STS Seminar</li> </ul>	
		puter assisted instructions, inquiry learning and	field trips and
seminars, rhyming and song const			
9. Course Assessment Compo			
Component 1: Subject Portfolio A	-	-	
	t work (3 items – 10%) = 30	J%	
<ul> <li>Midterm assessment – 2</li> <li>Deflective lower lower</li> </ul>			
Reflective Journal – 40%     Organization of the Subi	ect Portfolio- 10% (How its	a procented (organized)	
Component 1: Assessment of Lear	-		
-		on and project work on key concepts as shown i	in the lessons/
Presentations of group work activ			
Core skills to be acquired: Cognitiv			
Weighting: 40%	, ,, ,,	5 5	
CLO3, CLO4, CLO5, CLO6			
Component 2: Subject Project (30	)% overall Semester score)		
<ul> <li>Introduction; a clear stat</li> </ul>	tement of aim and purpose	e of the project -10%	
<ul> <li>Methodology; What the</li> </ul>	student teacher has done	and why to achieve the purpose of the project	- 20%
<ul> <li>Substantive/Main sectio</li> </ul>	n of the work – 40%		
<ul> <li>Conclusion – 30%</li> </ul>			
Component 2: Assessment for Lea	<del>rning (Presentations)quizz، ا</del>	es, multiple assignments, project works, group <b>p</b>	<del>presentations,</del>
sample lesson plans, Charts, conce			
1		ive Notes/ evidence of values learned/Group wo	<del>rk/Evidence of</del>
equity and inclusivity/transferable	01		
Core skills to be acquired: Honesty	<del>y, carefulness, accuracy and</del>	<del>d tolerance,</del>	
Weighting: 30%			
CLO1, CLO2, CLO3, CLO4	· · · · / 400/ · · · ·		
Component 3: End of Semester Ex	-	-	our procentations
sample lesson plans, Charts, conce		quizzes, multiple assignments, project works, gr	<del>Jup presentations,</del>
		ns report from school visits for portfolio/Reflective	notes
Core skills to be acquired: Pedago			notes
Weighting: 30%			
CLO 1 – CLO 6			
9. Required Reading and Re	eference List		
Abbey, T. K., Alhassan, M	. B., Ameyibor, K., Essiah, J	. W., Fometu, E., &Wiredu, M.B. (2008). Ghana	association of
science teachers in	tegrated science for senior	high schools. Accra: Unimax MacMillan.	
-	I. (1995). Ghana associatio	n of science teachers physics for senior high scho	ools. Accra: Unimax
Macmillan.			
-		ation of science teachers' chemistry for senior high	gh schools. Accra:
Unimax MacMillan		and an inverse for the basely set of the set	
		ated science for the basic school teacher I. Winn lafo, V.&Obeng-Ofori, D. (2011). SWL integrated	

Dddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.&Obeng-Ofori, D. (2011 high schools: Students book. Accra, Ghana; Sam-Woode Ltd.

#### **10.** Teaching and Learning resources

Copies of Course Manual for Y2 S1, Smartphones, Tablets, Productivity tools (software that allow teachers to work better), Subject based instructional tools/applications, Instructional laboratories, Smart boards, projectors, Smart screens, Open ERs – YouTube, Coursera, Khan Academy, TESSA and UNESCO OERs, iBox, and standard laboratories

#### 11. Course related professional development for tutors/ lecturers

- Development of Concept Maps/ Concept cartoons Charts/ technical/action research report writing/
- Training in Use of CMs/ Appreciating the place of the Cross-cutting issues in the CLOs and Teaching -Learning Activities/ Assessment component requirement for active learning/ model teaching to reflect the desired PCK students-teachers are required to learn.

Year of B.Ed. 2	Semester	1	Place of	mester	<b>1</b> 23456789101112				
Title of Lesson	Teaching Cl	assificatior	of Plants a	nd Animals	Les	son Duration	3 Hours		
Lesson description	The lesson classificatio integrated s the diversit respect to c	The lesson provides the student teacher the opportunity to deepen pedagogic knowledge of classification of plants and animals, aspects of which was taught at senior high school in integrated science. The studentteacher will extend knowledge of classification to understand the diversity in the science classroom which will lead to collaboration and tolerance with and respect to colleagues during science lessons. This first lesson introduces student teachers to the course learning outcomes and the three							
Previous student teacher					on of plants an	d animals at the p	re-tertiary level		
knowledge, prior learning (assumed)	of educatio						,		
Possible barriers to learning in the lesson	Inadequate	handling c	of the topic a	at the senior l	nigh level of ea	lucation.			
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to- face	Practical Activity	Work- Based	Seminarsv	Independent Studyv	opportunities	Practicum		
<ul> <li>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</li> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Write in full aspects of the NTS addressed</li> </ul>									
<ul> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators for each learning outcome</li> </ul>	her teachin Learning Ou	-		Learning Ind	dicators	cros Issu tran incl and dive the add	ntify which as – cutting es, core and asferable skills, usivity. Equity addressing ersity. How will se be ressed or eloped		

	<ul> <li>Link concepts in new concepts to classification of animals</li> <li>Student teached demonstrate anidentify misconception scientific about concepts.</li> <li>The student teached should demonstrate and identify divisions/pyhlatof plants and another and another student teached another and another student and another student teached another student teached another student teached another student and another student and another student another anothe</li></ul>	to f plants and ers should bility to s/incorrect t specified achers strate the the various and classes nimals achers should ersity of the relating to the class.		wCommunicationedand Research:list ofThroughideasconstruction oftheirchecklists onscience conceptso chartdevelop the skillsr classof construction ofchecklistsono chartdevelop the skillsr classof construction ofced tochart, aestheticsups, e.and criticalbodythinking throughomenobservation andent aidentificationin theDeveloping Socialcollaboration andattention and careto individual needs(SEN) throughgroup workgroup work
Content of lesson picked and developed from the	Sub Topic	Time or Stage	Teaching and learning to ac depending on delivery mod	e selected. Teacher led,
course specification Topic Title			collaborative group work or ind Teacher Activity	ependent study Student Activity
Teaching Classification of Plants and Animals	Introduction to JHS year 2 course manual	20minutes	<b>Face-to-Face:</b> Tutor initiates showerthoughts discussion with student teachers to identify expectations for and introduce new course manual for specialism to student teachers	Face-to-Face:Student teachers respond to discussions, noting their expectations, drawing from their experience with year 1 course manuals and focusing on the specialism for JHS.
	Recap of Year 1 and the challenges thereof Classification Systems	20 minutes 20 minutes	Face-to-face/Group activity:Tutor initiates a Pyramiddiscussion on the year 1concepts with studentteachers, and encouragesthem to reflect on the newconcepts, the challenges andunique lessonsFace-to-face:Tutor to guide studentteachers to brainstorm andreflect to identifymisconceptions/incorrectideas about taxonomydrawing examples from priorknowledge from SHS. Tutormay provide list fromTaxonomic table to helpstudent teachers reflect ontheir prior knowledgeTutor guides student teachersto name classification systems	Face-to-face/Group activity: Student teachers work individually and in groups to discuss year one lessons, the challenges, unique values and produce a concept map of possible expectations in the content of the JHS science lessons Face-to-face/Group activity Student teachers present a checklist of misconceptions/incorrect ideas about taxonomy, concepts of plant and animal with their matching correct science concepts/ideas Student teachers to provide a list of classification systems
	Divisions and Classes of plants	40 minutes	Face-to-face:Tutor allows student teachers to pick different plants from their environment. Tutor provides student	Face-to-face/Group activity Student teachers in diverse groups collect different plants and develop classification keys

[				
			teachers with classification keys, adequate samples of	and provide a report/chart on identification,
			plant parts and guide them to	classification and naming
			develop their own	of plants in the school
			classification keys and use that	environment
			to identify, classify and name	
			some of the plants in the	
			school environment with	
	Phyla and classes	30	Face-to-face:Tutor to design	Face-to-face/Group
	of animals and	minutes	practical activities on	activity Student teachers
	(insects)		classification of animals	in diverse ability groups
			observed in their	sort out animals into phyla
			environment.	and classes based on the
			Tutor to provide student	physical features of the
			teachers with specimen of	animals and present a
			animal species, pictures of	chart on the classification
			different kind of animals with	with explanation.
			accompanying classification	
	Classification of	30	keys Face-to-face:Tutor to present	Face-to-face/Group
	insects	minutes	Video on features of insect	activity Student teachers
	mseets	minutes	class to student teachers	in diverse/inclusive groups
				observe and provide a list
				of different classes of
				insects with notes on the
				basis of their classification.
	Reflection on	20	Face-to-face:Tutor to guide	Face -to-face:
	diversity in the	minutes	studentteachers to use their	Studentteachers to
	class		knowledge on classification of	present a report on their
			plants and animals to reflect	reflection on the diversity
			on the diversity relating	of the class
			classification to the in the	
			classroom (in terms of se,	
			colour, ethnicity, culture and	
Which areas sutting issues	Fauity and SENI, the	ough cotting	ability levels	student Teachers and
Which cross cutting issues will be addressed or			ground rules to protect vulnerable Iclusive classroom atmosphere. Th	
developed and how	-		ness and Strengths will be identif	<b>e</b>
Lesson assessments –			udent teachers to provide a check	
evaluation of learning: of,		-	eas about taxonomy with their ma	
for and as learning within	-		lent teachers in groups present re	-
the lesson		-	f their knowledge on classificatior	•
	Assessment as	learning: stud	dentteacher present group-develo	ped checklist of keys for
	classification of	f division/phy	la of plants and animals respectiv	ely and classes of these
	organisms.			
Teaching Learning			of some specimens of plant pa	
Resources	-		nputer stimulation on classificatio	-
			on of plants and animals, projecto	rs, Flip Charts, Pens, Pencils,
Required Text (core)	'A' 4 sheets, marke		neyibor, K., Essiah, J. W., Fometu	E & Mirody M. P. (2000)
Required Text (core)			teachers integrated science for	
	Unimax MacMillan.	-	cachers integrated science joi	senior night seniools. Accid.
Additional Reading List			5). Ghana association of science te	achers physics for senior
			imax Macmillan.	
	-		006). Ghana association of science	e teachers chemistry for
			cra: Unimax MacMillan.	
	-		E. K. (2013). Integrated science fo	or the basic school teacher I.
	Winneba:			
	Oddove, E. O. K., Ta	ale, K. D., Ngi	man-Wara, E., Samlafo, V., & Obe	ng-Ofori, D. (2011). <i>SWL</i>
	-	-		
	-	-	enior high schools: Students book	. Accra, Ghana; Sam-Woode

CPD Requirement	Training on developing classification keys, skills for construction of checklist, and how to design practical activities for specific grade levels
Course Assessment	design practical activities for specific grade levels <sup>1</sup> Component 1: Subject Portfolio Assessment (30% overall score)         • Selected Item of Student work (3 items – 10%) = 30%         • Midterm assessment – 20%         • Reflective Journal – 40%         • Organization of the Subject Portfolio- 10% (How its presented/organized) <sup>2</sup> Component 2: Subject Project (30% overall Semester score)         • Introduction; a clear statement of aim and purpose of the project -10%         • Methodology; What the student teacher has done and why to achieve the purpose of the project – 20%         • Substantive/Main section of the work – 40%
	<ul> <li>Conclusion – 30%</li> <li>Component 3: End of Semester Examination – (40% overall Semester Assessment</li> </ul>

<sup>&</sup>lt;sup>1</sup> See rubrics on subject Portfolio Assessment in Annex 6 of NTEAP <sup>2</sup> See rubrics on Subject Project Assessment in Annex 6 of NTEAP

Year of B.Ed.	2	Semester	r 1	Place	of les	son in sem	ester	123	45678910	11	12	
Title of Lesson		Teaching Flo	owering Pla	ints					Lesson Duration		3 Hours	
Lesson descriptio	n	and function misconcepti school in int	e lesson provides the studentteacher the opportunity to embed the teaching of the structure d functions of the flower and the phases of photosynthesis and to identify and correct sconceptions/incorrect ideas about photosynthesis, aspects of which were taught at senior high nool in integrated science.									
Previous student									ower and photos			
knowledge,	prior	conditions n	nditions necessary for photosynthesis to take place in plants at pre-tertiary level of education									
learning (assumed Possible barriers		Inadequate	nedagogic	skills in h	handling	of structure	and functi	on of f	lowers and phot	osvntk	nesis at	
learning in the les		the senior h			-	or structure			lowers and prior	osynti		
Lesson Delivery –		Face-to-	Practical	Work-		Seminars	Indeper	ndent	e-learning	Prac	ticum	
to support studer		face	Activity	Based			Study		opportunities			
achieving the out		٧	٧	Learnin	ng				٧			
Lesson Delivery – mode of delivery to support studer teachers in achiev learning outcome	chosen It /ing the	-						-	nimations /simu t mapping, show			
Purpose for t lesson, what want the stud achieve, serv basis for the outcomes. An expanded ver the description	you dents to es as learning n rsion of	<ul> <li>and fun</li> <li>The less practication to fruit</li> <li>The less photosy</li> <li>The stu</li> </ul>	<ul> <li>and functions of flowers and the stages of photosynthesis.</li> <li>The lesson would help the studentteacher to be able to develop practical skills in organising practical activities to investigate the floral parts, process of pollination and fertilisation leading to fruit formation.</li> <li>The lesson would help the studentteachers to deepen their knowledge of the stages of photosynthesis which they studied at the senior high school level.</li> </ul>								sing	
Write in full a of the NTS addressed		1b: Imp Continu 1c: Den 2c: Has	roves perso lous Profes nonstrates secure con	onal and sional De effective tent kno	profess evelopm growing wledge, nd grad	ional develop ent. g leadership c pedagogical e they teach i	ment thro qualities in knowledge in.	ugh life the cla e and p	e teaching and le long learning ar ssroom and wid edagogical conte	nd er scho ent	ool.	
Learning Out for the lessor picked and developed fro course specif	n, om the ication	Learning Ou				ndicators		lssues, inclusiv diversit addres	y which cross – o core and transfe vity. Equity and a ty. How will the sed or develope	erable addres se be d	skills, ssing	
Learning indi for each learn outcome		<ul> <li>demonstant</li> <li>understant</li> <li>structure</li> <li>of flower</li> <li>The sture</li> <li>should ability tempine</li> <li>phases</li> <li>photosy</li> <li>The sture</li> <li>through</li> </ul>	dent teach demonstrat o use conce g to show t	tions ers te the ept the er	sul the rep flo de fur the • Stu de on ph • Stu	ident teacher omit description of flower as a productive un wering plants scription and actions of part of flower ident teacher signs a concept phases of otosynthesis ident teacher esent a check	ion of it of and ts of pt map	Researd study the develop concep critical and ide Develop attention	ion, Communica ch: Through prac he flower o the skills of cor t maps, aestheti thinking through entification ping Social collal on and care to in SEN) through gr	ctical w nstruct cs and n obser poration	vork to tion of rvation on and al	

	professional		professional values					
	as carefulnes tolerance and	-	such as carefulness, patience, tolerance					
	tolerance and	accuracy	and accuracy					
Content of lesson picked	Sub Topic Time or		· · · · ·	nieve learning outcomes: depending				
and developed from the	·	Stage	acher led, collaborative group work					
course specification		_	or independent study					
Topic Title			Teacher Activity	Student Activity				
Taashiya Elawayiya Dlayta	Structure and	60	Face-to-face:	Face-to-face: Student				
Teaching Flowering Plants	function of flowers	minutes	Tutor guides studentteachers through Showerthoughts to	teachers to present T-charts				
	nowers		discuss the functions of the flo	on parts of the flower and ower their corresponding				
			and its parts drawing experien	1 0				
			from pretertiary concepts.	the parts of the flower into				
			Tutor provides enough flower	-				
			studentteachers for practical	units and their functions				
			activities: to describe parts of	the				
			flowers and their functions; to	с.				
			observe and describe					
			arrangement of the floral who					
			in transverse sections of flow	er				
			buds; and to observe and					
			describe the ovules and their					
-	Photosynthesis	60	arrangement on the placenta Face-to-face/Group activity:	Face-to-face/Group activity:				
	Thotosynthesis	minutes	Tutor guides studentteachers,					
			working in mixed ability group					
			identify and discuss	misconceptions/incorrect				
			misconceptions/incorrect idea	-				
			about photosynthesis school	with the correct science				
			environment with	concepts				
	Values	60	Face-to-face: Tutor to present					
		minutes	jigsaw problems on phases of					
			photosynthesis to	ability groups present report				
			studentteachers to solve. Tuto	, , , , , , , , , , , , , , , , , , ,				
			provide concepts of phases of photosynthesis (chloroplast,	concepts of the phases of				
			energy capturing reactions an					
			synthesis reactions) to constru					
			concept maps					
Which cross cutting	Equity and SEN: t	hrough settin	g ground rules to protect vulne	rable student teachers and				
issues will be addressed	establishing an in	teractive and	inclusive classroom atmospher	e. Through the game of "Tell it",				
or developed and how			<ness and="" be="" iden<="" strengths="" th="" will=""><th></th></ness>					
Lesson assessments –		-	•	necklist of misconceptions/incorrect				
evaluation of learning:			is with their matching correct so					
of, for and as learning within the lesson			s present concept maps on the o					
			pturing phase and synthesis rea	eveloped T-charts on parts of the				
	• Assessment a flower and th	-						
Teaching Learning				s, scarpels/razor blades, pins, hand				
Resources			-	n practical activities on investigation				
	of floral parts, Flip Charts, Pens, Pencils, 'A' 4 sheets, markers							
Required Text (core)	Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). Ghana							
	association of science teachers integrated science for senior high schools. Accra: Unimax							
	MacMillan.							
	Abbey, T. K., &Essiah, J.W. (1995). Ghana association of science teachers physics for senior high							
Additional Reading List	schools. Accra: Unimax Macmillan.							
Additional Reading List				ionco togohors' chamistry for conic-				
Additional Reading List	Ameyibor, K., & V	Viredu, M. B.		ience teachers' chemistry for senior				

	<ul> <li>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</li> <li>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., &amp; Obeng-Ofori, D. (2011). SWL</li> </ul>
	integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD Requirement	Training on developing jigsaw puzzles, concept mapping techniques, classification keys, skills for
	construction of checklist, and how to design practical activities for specific grade levels

Year of B.Ed. 2	Semest	er 1	Place of	lesson in se	emester	12 <b>3</b> 456789101112				
Title of Lesson	Teaching F	ruit Formatio	n and Dispe	l	esson Duration	3 Hours				
Lesson description		The lesson provides the studentteacher the opportunity to deepen knowledge of fruit formation and dispersal of fruits and seeds.								
Previous student teacher knowledge, prior learning (assumed) Possible barriers to	Studenttea also aware	tudentteachers studied aspects of fruit formation and dispersal of fruits and seeds. They are lso aware of flowering plants within their environment nadequate pedagogic skills in handling of fruit formation and dispersal of fruits and seeds,								
learning in the lesson Lesson Delivery – chosen to support students in achieving the outcomes	-	mostly taught without practical activitiesFace-to- facePractical Activity VWork- BasedSeminars SeminarsIndependent Studye-learning opportunitiesPractical Practical								
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.			-		th video/comp s, and reflectiv	uter animations /s e practice	imulations/			
<ul> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> </ul>	<ul> <li>and di</li> <li>The le practic forma</li> <li>The le and ac and sp</li> <li>NTS: T</li> </ul>	ispersal of fru sson would h cal activities t tion. sson would h daptation of s bines, explosiv The teacher: 1	its and seed elp the stud to investigat elp the stud teeds and fru ve mechanis .a: Critically	s. entteacher to e process of po entteachers to uits to their mo m and collective	be able to dev ollination and f o deepen their ode/means of o ly reflects to in	knowledge on fruit elop practical skills ertilisation leading knowledge on disp dispersal (by wind, pprove teaching an	in organising to fruit persal of seeds water, hooks d learning.			
Write in full aspects     of the NTS     addressed	Contir 1c: De 2c: Ha	nuous Profess monstrates e is secure cont	ional Develo ffective grov ent knowled	opment. wing leadershi	p qualities in t al knowledge	gh lifelong learning ne classroom and v and pedagogical co	wider school.			
Learning Outcome for the lesson, picked and developed from the course specification	Learning C			ning Indicator	r <b>s</b> Ide Issu inc div	ersity. How will the	ferable skills, addressing ese be			
Learning indicators for each learning outcome	should under pollina and fr • Studer should ability mappi disper seeds • The st throug should	<ul> <li>Student teachers should demonstrate the understanding of pollination, fertilization and fruit formation.</li> <li>Student teachers should demonstrate the understanding of pollination, fertilization and fruit formation.</li> <li>Student teachers should demonstrate the ability to use concept mapping to show dispersal of fruits and seeds</li> <li>Student teacher addressed or developed</li> <li>Student teachers should demonstrate the ability to use concept mapping to show dispersal of fruits and seeds</li> <li>Student teacher adaptation of fruits and seeds that favour</li> <li>Student teacher inclusivity. Equity and addressi diversity. How will these be addressed or developed</li> <li>Student teachers should demonstrate the ability to use concept mapping to show dispersal of fruits and seeds</li> </ul>								

	patience, tole accuracy	rance and	professional values such as carefulness, patience, tolerance and accuracy				
Content of lesson picked and developed from the course specification Topic Title	Sub Topic	Time o Stage	-	g to achieve learning outcomes: ry mode selected. Teacher led, k or independent study Student Activity			
	Recap of lesson	20 minutes	-	Face-to-face/Group activity:			
Teaching Fruit formation and Seed Dispersal	2	50 minute	Tutor allows student teachers to work in mixe ability groups to reflect on the previous lesson and list discuss any areas of difficulty Face-to-face:	Student teachers work in mixed ability groups to reflect on previous lesson and list areas that need further clarification for			
	Fruit formation		watchvideo/computer animationon pollination, fertilization and fruit formation to student- teachers Tutor provides practical activities for student- teachers to investigate fertilization in flowers	videos/computer animation on pollination, fertilisation and fruit formation; student-teachers, present evidence of practical activities.			
	Dispersal of fruits and seeds	70 minute	provide different frui and seeds fo	or diverse groups present charts to with explanation to show how fy various seeds and fruits are dispersed and the features that			
	Reflection on professional values	40 minute	guide studentteachers t identify profession	al values as e, as ne			
Which cross cutting issues will be addressed or developed and how	establishing an int	eractive and	l inclusive classroom atmosph	nerable student teachers and nere. Through the game of "Tell it", lentified and catered for.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	<ul> <li>Student teachers specific weakness and Strengths will be identified and catered for.</li> <li>Assessment for Learning: Student teachers to provide samples of drawings of T/S of flower buds, L/S of ovaries of flowers, student teachers in groups provide charts on modes of dispersal of fruits and seeds based on the latter's features.</li> <li>Assessment as learning: studentteachers present reports from observation of videos on pollination and fertilisation of flowers</li> </ul>						
Teaching Learning Resources	different flowers t seeds that are dis markers	that have ur spersed by o	ndergone pollination and po different dispersal agents, fl	nation and fertilization, collection of llination, different kinds of fruits and ip-charts, Pens, Pencils, 'A' 4 sheets,			
Required Text (core)	Ghana association MacMillan.	of science t	teachers integrated science f	, Fometu, E., & Wiredu, M.B. (2008). for senior high schools. Accra: Unimax			
Additional Reading List	-	-	995). Ghana association of sci ax Macmillan.	ience teachers physics for senior high			

	<ul> <li>Ameyibor, K., &amp; Wiredu, M. B. (2006). Ghana association of science teachers chemistry for senior high schools. Accra: Unimax MacMillan.</li> <li>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</li> <li>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., &amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.</li> </ul>
CPD Requirement	Training on developing charts, skills development for construction of checklist, and how to
	design practical activities for specific grade levels, techniques of reflective practice

Year of B.Ed.	2 9	Semester	1 F	Place of lesson in semester			123456789101112				
Title of Lesson	Teaching	3 Ho	ours								
Lesson description	Nitrogen processes	The lesson is intended to student teachers pedagogic content knowledge of the phases of the cycles in Nitrogen and Carbon IV Oxide. It examines the process that make up the cycle, the relevance of the processes in making Nitrogen and carbon available to the ecosystem and how these processes can be made simple and meaningful to the learner.									
Previous student teacher knowledge, prior learning (assumed) Possible barriers to learning in the	Studentt	Studentteachers are conversant with the molecules, Nitrogen and Carbon Studentteachers may: <ul> <li>have difficulty appreciating the cycle of Nitrogen and Carbon availability to the ecosystems</li> </ul>									
lesson				ching the cycle	-						
Lesson Delivery – chosen to support students in achieving the outcomes	Face- to-face √	Practical Activity √	Work- Based Learning	Seminars	Independ Study √		e-learning opportunities √	Practicum			
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning	Independ	Face-to Face: Discussion, lecturrettes Independent Study: Inquiry and reflections e-learning opportunities: Use of internet, simulations and video presentations									
<ul> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Write in full aspects of the NTS addressed</li> </ul>	<ul> <li>Proper scientific explanation of the cycles of carbon and Nitrogen</li> <li>Demonstrate the skill and knowledge to teach the subject matter</li> <li>NTS: The teacher: 1a: Critically and collectively reflects to improve teaching and learning.</li> <li>1b: Improves personal and professional development through lifelong learning and Continuous Professional Development.</li> <li>1c: Demonstrates effective growing leadership qualities in the classroom and wider school.</li> <li>1d. Is guided by legal and ethical teacher codes of conduct in his or herdevelopment as a professional teacher.</li> <li>1g. Sees his or her role as a potential agent of change in the school, communityand country.</li> <li>2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in.</li> </ul>										
<ul> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning</li> </ul>	Dem     unde     proce     nitro	Outcomes onstrate the erstanding of esses in the gen and on cycle.	Prov the     Drav	indicators vide concept ma processes in the w a chart to sho ogen and carbo	aps on Fe cycles constraints withe constraints of the constraints of t	and tran and add <u>be addre</u> Proper in of the Ni Studenti commur	which cross – cu isferable skills, in ressing diversity essed or develop interpretation of itrogen and Carb teachers develop nication, collabor while appreciatir	nclusivity. Equity . How will these bed scientific concep on cycles, o skills of ration and mutua	<b>y</b> e		

indicators for each learning outcome Topic/Title	<ul> <li>Explain the Nitrogen ar Carbon cyc</li> <li>Demonstra ability to te basic schoo science cor of the nitro and carbon</li> <li>Sub Topic</li> </ul>	nd le te an each ol ncepts ogen	Group presentations/peer group teaching on the nitrogen and carbon cycles <b>Teaching and learning to achi</b>	nd abilities, critical thinking and ty through careful participation rk/discussion. outcomes: depending on	
		Stage	delivery mode selected. Teach independent study	her led, collat	
			Teacher Activity		Student Activity
Teaching Carbon and Nitrogen Cycle	and Nitrogen (Phases of the minu		<ul> <li>Face-to-face: Tutor introduce by reviewing Studentteachers on the uses of Nitrogen and Ca Oxide.</li> <li>Face-to-face/Group activity: I groups (gender-based) of 3 mo studentteachers discuss the p keeping and fixing nitrogen in from the atmosphere and mai Carbon IV Oxide in the atmosp</li> </ul>	Face-to-face: Studentteachers discuss the concepts of Nitrogen and carbon IV oxide as useful molecules for plants and animals. Face-to-face/Group activity: Studentteachers discuss the process of keeping and fixing nitrogen in the soil from the atmosphere and maintaining Carbon IV Oxide in the atmosphere. Studentteachers illustrate their discussions on a chart showing the processes	
	Green House effect	60 minutes	<b>Face-to-face/e-learning opportunities:</b> Guide student teachers to use OERs and videos of the greenhouse effect and allow student-teachers to brainstorm (in groups of 5 members of mixed intellectual ability) to come out with the causes and effects of the greenhouse effect. <u>https://study.com/academy/lesson/what- is-greenhouse-gas-definition-causes- effects.html</u>		Face-to-face/e-learning opportunities: Studentteachers use the OER and videos as basis to brainstorm (in groups of 5 members of mixed intellectual ability)tocome out with the causes and effects of the greenhouse effect. Student-teachers produce concept map of processes in the cycles https://study.com/academy/l esson/what-is-greenhouse- gas-definition-causes- effects.html
	How to teach the Nitrogen and Carbon cycles	90 minutes	<b>Face-to-face/E-learning oppo</b> Tutor allows studentteachers power point/poster presentat to teach the Nitrogen and Car Cyclesto the Basic school learr intellectual ability Groups of 3	Face-to-face/E-learning opportunities: Studentteachers in groups do power point/poster presentation on how to teach the Nitrogen and Carbon Cycles the Basic school learner. (each group presents in 10 mins)	

Which cross	Equity and SEN: through setting ground rules to protect vulnerable student-teachers and establishing
cutting issues will	an interactive and inclusive classroom atmosphere.
be addressed or	
developed and	
how	
Lesson	• Assessment for Learning: Samples of exercises on how studentteachers describe/explain Processes
assessments –	in cycles
evaluation of	Assessment as Learning: Groups of student teachers doing short presentations on how to teach
learning: of, for	carbon and Nitrogen cycles to the Basic School Learner (Reflection on presentations), Charts
and as learning	produced by studentteachers on the nitrogen and carbon cycles.
within the lesson	
Teaching	Pen, paper, manila cards for charts and concept maps. YouTube videos on greenhouse effects and
Learning	causes e.g., <a href="https://study.com/academy/lesson/what-is-greenhouse-gas-definition-causes-effects.html">https://study.com/academy/lesson/what-is-greenhouse-gas-definition-causes-effects.html</a>
Resources	
Required Text	Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). Ghana
(core)	association of science teachers integrated science for senior high schools. Accra: Unimax MacMillan;
	Handbook for PD Coordinators Themes 1-10
Additional	Abbey, T. K., & Essiah, J.W. (1995). Ghana association of science teachers physics for senior high schools.
Reading List	Accra: Unimax Macmillan.
	Ameyibor, K., & Wiredu, M. B. (2006). Ghana association of science teachers' chemistry for senior high
	schools. Accra: Unimax MacMillan.
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba:
	IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., & Obeng-Ofori, D. (2011). SWL integrated
	science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD Requirement	Practicing to draw concept maps in cycles
-	

Year of B.Ed. 2	Semester1Place of lesson in semester				1234 <b>5</b> 6789101112						
Title of Lesson	Teaching Farming Syste	ms	Lesson Dura	tion	31	Hours					
Lesson description	systems. It examines th simple and meaningful	esson 5 is intended to give student teachers the skills and knowledge of teaching farming stems. It examines the process that makes up the cycle and how these processes can be made mple and meaningful to the learners at the Junior High Schools.									
Previous student teacher knowledge, prior learning (assumed)	agricultural products.	Studentteachers have heard of and seen farms in their environments. They are also familiar with									
Possible barriers to learning in the lesson	Student-teachers may ignorant about some fa		-	arming at home	e and therefore r	nay be					
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-Practicalface∨√	Work- Based Learning	Seminars V	Independent Study V	e-learning opportunities √	Practicum					
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes. Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description. Write in full aspects of the NTS addressed	<ul> <li>Seminar: PowerPoint/P Independent Study: Inq e-learning opportunitie</li> <li>Identifying appropri- Demonstrate the sl NTS: The teacher: 1 1b: Improves perso Continuous Profess 1c: Demonstrates e</li> <li>Id. Is guided by legal ar development as a p</li> <li>1g. Sees his or her ro and country. 2c: Has secure continuous</li> </ul>	<ul> <li>Demonstrate the skill and knowledge to teach the subject matter</li> <li>NTS: The teacher: 1a: Critically and collectively reflects to improve teaching and learning. 1b: Improves personal and professional development through lifelong learning and Continuous Professional Development. 1c: Demonstrates effective growing leadership qualities in the classroom and wider school.</li> <li>1d. Is guided by legal and ethical teacher codes of conduct in his or her development as a professional teacher. 1g. Sees his or her role as a potential agent of change in the school, community</li> </ul>									
<ul> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators for each learning outcome</li> </ul>	<ul> <li>knowledge for the</li> <li>Learning Outcomes</li> <li>Distinguish between the various farming systems based on environment and land size.</li> <li>Explain the uses of the various common types of farming systems.</li> <li>Demonstrate some teaching skills in teaching the concept of Farming systems and their uses</li> </ul>	Learning     Chart     types     syste     home     Repo     famin     Prese     Poste     point     teach     syste	ade they teach Indicators Indicators ts on Various ts of farming ms in their e locality rts on uses of ng types entations- er/power i/video –on ning farming ms and their	Identify whice and transfer and addressi addressed of Studentteact communicat respect while difference an responsibilit	ch cross – cutting able skills, inclus ing diversity. How r developed hers develop skil ion, collaboratio e appreciating in nd abilities, critic y through carefu rk/discussion.	ivity. Equity w will these be ls of n and mutual dividual cal thinking and					

Topic/Title	Sub Topic	Time or	Teaching and learning to achieve learning outcomes selected. Teacher led, collaborative group work or i			
		Stage	Teacher Activity	Student Activity		
Teaching Types of 50 Farming Systems Systems		minutes	Face-to-face/e-learning opportunities: Tutor introduces the lesson with some videos or projections from OERs on farming systems for student teachers to identify and labels. For example: <u>https://www.youtube.com/watch?v=vZFiHB0D080</u> <u>Face-to-face/Group activity</u> : In groups (gender- based) of 6 members, studentteachers discuss types of farming systems. (Guide Studentteachers to single out possible misconceptions (e.g.farming is for males only)	Face-to-face/ e-learning opportunities: Studentteachers view materials from OERs/Video and attempt to identify and label based on familiarity. E.g. https://www.youtube.com/wa tch?v=vZFiHB0D080 Face-to-face/Group Activity: Studentteachers discuss the observed farming systems and relate them to their environment and home.		
	Agricultural uses of farming systems	60 minutes	Independent Study/Face-to-face/Group Activity:Tutor allows studentteachers to reflect on their environment and the farming systems used within their home and communities for about 20 minutes. Allow them discuss (in groups of 5 members of mixed gender) to come out with the uses of Farming Systems.	Independent study/Face-to- face/Group Activity: Studentteachers do individual reflections on their home environments, guided by a checklist, and note down the various uses of farming systems. Studentteachers, in groups of 5 members each, then discuss to come out with the uses of farming systems		
	Teaching how to teach Farming Systems	70 minutes	<b>Face-to-face/E-learning opportunities:</b> Tutor allows studentteachers to do short power point/poster presentation on how to teach Farming systems and their uses.	Face-to-face/E-learning opportunities: Discussactivities to use and prepare a 20- minute activity to teach farming systems and their uses in groups using PowerPoint/poster or video simulations.		
Which cross cutting issues will be addressed or		-	n setting ground rules to protect vulnerable student-te e classroom atmosphere.	achers and establishing an		
developed and how Lesson			rning: Concept cartoons on uses of faming systems, Sa	imples of exercises on types of		
assessments – evaluation of learning: of, for and as learning within the lesson		ent as Lear	ning: Student-Teachers doing short presentations (20 flection on presentations).	minutes each) on how to teach		

Teaching	Pen, paper, manila cards for charts. YouTube videos on Farming Systems and use, e.g.,
U	
Learning	https://www.youtube.com/watch?v=vZFiHB0D08o
Resources	
Required	Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). Ghana association of
Text (core)	science teachers integrated science for senior high schools. Accra: Unimax MacMillan; Handbook for PD
	Coordinators Themes 1- 10
Additional	Abbey, T. K., & Essiah, J.W. (1995). Ghana association of science teachers physics for senior high schools. Accra:
Reading List	Unimax Macmillan.
	Ameyibor, K., & Wiredu, M. B. (2006). Ghana association of science teachers' chemistry for senior high schools.
	Accra: Unimax MacMillan.
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., & Obeng-Ofori, D. (2011). SWL integrated science
	for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD	Training on how to identify useful online electronic resources for teaching (Searching the internet on any
Requirement	device)

Year of B.Ed. 2	Semes	ter 1	Place of	lesson in s	emester 1	12345 <b>6</b> 789101112			
Title of Lesson	Course Re	view 1 and ST	S Seminar			Lesson Duratio	n 3 Hours		
Lesson description	semester.		cted that Stu			lessons for the firs ng this lesson on t			
Previous student teacher knowledge, prior learning (assumed)	-	Experiences and observations during STS and lessons learnt from lesson 1 through lesson 5 in all learning approaches.							
Possible barriers to learning in the lesson		-	-	t adequately challenges dι		ons not appropriat	ely		
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to- face V	Practical Activity √	Work- Based Learning	Seminars √	Independent Study V	e-learning opportunities √	Practicum		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-Face: Discussion, Same ability, mixed ability and gender-based group works. Practical Activity: Modelling, Concept Mapping and Cartooning, manipulations. Independent Study: Tutor and student-teacher reflections (individually and collectively) and inquiry e-learning Opportunities: OERs and Video presentations								
<ul> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> </ul>	<ul> <li>Ascertain the level of understanding of concepts.</li> <li>Test various skills and cross – cutting issues</li> <li>Provide remedial tuition/tutorials where necessary for experiences during STS</li> <li>Correct misconceptions and misinformation</li> <li>Build the necessary support going forward on SEN and Gender issue</li> <li>NTS:         <ul> <li>1a) Critically and collectively reflect to improve teaching and learning</li> <li>1c) Demonstrate effective growing leadership qualities in the classroom and wider school</li> <li>1d) Is guided by legal and ethical teacher codes of conduct in his or herdevelopment as a</li> </ul> </li> </ul>								
Write in full     aspects of the NTS     addressed	professional teacher 2a) Demonstrates familiarity with the education system and key policies guiding it. 2b) Has comprehensive knowledge of the official school curriculum, including learning outcomes. 2c) Has secure content knowledge, pedagogical knowledge and pedagogicalcontent knowledge for the school and grade they teach								
• Learning Outcome for the lesson, picked and developed from the course specification	Learning C	-		arning Indicat		Identify which cutting Issues, transferable sk inclusivity. Equ addressing dive will these be ac developed	core and ills, ity and ersity. How		

<ul> <li>Learning indicators for each learning outcome</li> <li>Identify weakness and strengths in learning th science lesson for the period under review</li> <li>Be able to reflect on lessons learnt during ST and state new insights and/or grey areas need remedies</li> <li>Correct misconception/misinfor ation for earlier (lesson – 5) lessons</li> </ul>		arning the for the eview ect on during STS insights eas needing /misinform r (lesson 1	<ul> <li>Make a list of Weaknesses and strengths on poster papers for sharing Provide a reflection report and answer questions on topics learnt so far through demonstrations and illustrations on a given media</li> <li>Provide a reflection report on STS and demonstrations and illustrations on a given media of lessons learnt so far</li> <li>Present concept maps and/or models linking misconceptions/misinform ation to new insights</li> </ul>	Collaborations, Communication and Research: Through group work and presentation Equity and Reflection is developed from reflective activities Creativity and critical thinking are developed in developing models and concept maps		
Content of lesson picked and	Sub Topic	Time or Stage	Teaching and learning to achieve learning outcomes: depending on delivery mode selected. Teacher led,			
developed from		5	collaborative group work or in			
the course specification						
Topic Title Course Review 1			Teacher Activity	Student Activity		
and STS seminar	Reviewing the understanding of the lessons: Classification of Plants and Animals, Flowering Plants, Fruit formation and Seed Dispersal, Carbon and Nitrogen Cycle and Farming Systems.	60 minutes	Face-to-face: Tutor led brainstorming with studentteachers to unearth weaknesses and strengths of student teachers for lessons 1-5.Initiate discussion /Talk for learning approach using groupings (Same ability and then mixed groups) to identify student teachers' strengths and weakness in the lessons learnt so far. The groups are provided with checklist on each topic so that they are able to list weakness and strengths.	Face-to-face/Group Activity: Student teaches review, reflect and brainstorm on lessons 1-5 and provide a checklist identifying and recording all possible weaknesses and strengths. Working in groups and with the checklist studentteachers identify and record all possible weaknesses and strengths in the lessons learnt so far.		
Discussions and observations during STS		90minutes	Seminar: Teacher allows two or three resource persons to make presentations on STS based on the NTS. Tutor then guides student teachers through problem- based learning on National Teacher's Standards and reflection on observations made during STS.	Seminar: Student teachers listen to various presentations. Student teachers then discuss observations made during STS based on the National Teacher's Standards, reflect and provide a checklist of lessons learned and problems identified and how they can be addressed. Student teachers then provide a reflection report on STS		
	Remedies to course topics	30 minutes	Face-to-face/Group Activity:Group student teachers according to remedy need and provide specific task assistance in the areas on concept needing remedy.	Face-to-face/Group Activity:Students teachers work in the special groups (Same remedy need group) on tasks to remedy their learning need.		

Which cross	Equity and SEN: through mixed and same group work to protect vulnerable student - Teachers and
cutting issues will	establishing an interactive and inclusive classroom atmosphere.
be addressed or	Through group work and presentations, collaboration is established.
developed and	
how	
Lesson	Assessment of Learning: Student teachers' presentations during group work and model work
assessments –	presentation helps to assess them of learning
evaluation of	Assessment for and as learning: Student teachers working in groups on remedial tutoring helps to
learning: of, for	assess them for and as learning
and as learning	
within the lesson	
Teaching Learning	Cardboards, Course manual, Poster paper
Resources	
Required Text	Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). Ghana
(core)	association of science teachers integrated science for senior high schools. Accra: Unimax MacMillan.
Additional Reading	Abbey, T. K., & Essiah, J.W. (1995). Ghana association of science teachers physics for senior high
List	schools. Accra: Unimax Macmillan.
	Ameyibor, K., & Wiredu, M. B. (2006). Ghana association of science teachers chemistry for senior high
	schools. Accra: Unimax MacMillan.
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher I.
	Winneba: IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., & Obeng-Ofori, D. (2011). SWL integrated
	science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD Requirement	Training on preparation of checklist and Reflection guides

Year of B.Ed. 2	Semester	1	Pl	ace o	ce of lesson in semester		123456789101112		
Title of Lesson	Teaching Respiratory System						1	Lesson Duratio	n 3 Hours
Lesson description	Lesson 7 describes the respiratory processes and emphasizes on the teaching skills obtained for teaching specific science lesson.								
Previous student teacher knowledge, prior learning (assumed)	Studentteachers are conversant with the molecules, Nitrogen and Carbon								
Possible barriers to learning in the lesson	Possible misconceptions and wrong views that student teachers may have about the respiratory and digestive systems. Also, student teachers may have been introduced to the topic from theoretical point.								
Lesson Delivery – chosen	Face-to-					e-learning	Practicum		
to support students in achieving the outcomes	face V	Activity √		sed arning		Study √		opportunities V	
Lesson Delivery – main	Face-to Face: Discussion, Brainstorming								
mode of delivery chosen to		-			pulation and de	emonstratio	on of br	reathing	
support student teachers in achieving the learning			-	-	reflections internet, simul	lations and	video r	presentations	
outcomes.		opportai	increase	0.000			naco p		
<ul> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of</li> </ul>	<ul> <li>Identify the primary function of the lungs and digestive tracts</li> <li>Demonstrate the skill and knowledge to teach the subject matter</li> <li>NTS: Teacher;</li> <li>1a) Critically and collectively reflect to improve teaching and learning</li> <li>1c) Demonstrate effective growing leadership qualities in the classroom and wider school</li> </ul>								
the description.				and e	thical teacher c	odes of cor	nduct ir	n his or herdeve	lopment as a
Write in full aspects of the NTS addressed		ssional tea		niliarit	u with the edu	ation austa	mand	kov policios qui	ding it
the NTS addressed		<ul><li>2a) Demonstrates familiarity with the education system and key policies guiding it.</li><li>2b) Has comprehensive knowledge of the official school curriculum, including learning</li></ul>							
		outcomes.							
						-	ledge a	ind pedagogical	content
Learning Outcome for					nd grade they t ning Indicators		Identi	fy which cross ·	- cutting
<ul> <li>Learning outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators for</li> </ul>	Learning Outcomes		Lean	6		Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed			
each learning outcome	Demonstrate an						Studentteachers develop skills of		
	the st prima the re digest • Acqui	standing ructure and ry functio spiratory cive syster re the skil sary for	nd on of and m	•	describes the st and function of respiratory and digestive syster Designed activit teach the subje matter	the ns ties to	communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in group work/discussion on the structure and function of the		appreciating and abilities, esponsibility cipation in n on the
		ing the to	pic					atory and diges	
Topic/Title	Sub Topic Time o Stage		r			o achieve learning outcomes: mode selected. Teacher led, rk or independent study Student Activity			
Teaching Respiratory System	Structure and function of the Respiratory System20 minute		es	Face-to-face/e-learning opportunities: Tutor introduces the lesson by projecting videos and		Face-to-face, opportunitie Studentteach videos and an	/ e-learning s: ners watch		

			animations of breathing and	breathing and movement	
			movement of food through the	of food in the digestive	
			digestive system for	tract and make comments.	
			Studentteachers to observe,	They link the breathing	
		30	brainstorm and comment.	process with the CPR	
		minutes	https://www.youtube.com/wa	process to explain the	
			tch?v=5JrON_sm5gc	process better.	
			https://www.youtube.com/wa	Face-to-face/ Group	
			tch?v=08VyJOEcDos	Activity/e-learning	
				opportunities: In mixed	
			Face-to-face/Group Activity/e-	groups (mixed	
			learning opportunities: Group	intelligence) of 5	
			studentteachers into groups	members, studentteachers	
			(mixed intelligence) of 5-	discuss the structure of	
			members each and provide for	the Respiratory system	
			them videos, OERs and pictures	and the digestive system	
			of the structures and	using Videos, OERs and	
			animations of the processes in	Picture diagrams provided	
			the respiratory and digestives	by teacher and write-up	
			systems for studentteachers to	the functions of the	
			observe, discuss and report on	structures they observe	
	<u></u>	70	the functions	for reporting.	
	Gaseous	-	Face-to-face/Independent	Face-to-face Independent	
	exchange and	minutes	Study:Tutor allows	Study: Studentteachers	
	tissue		studentteachers to brainstorm	brainstorm and discuss	
	respiration		(in their groups) and discuss gaseous exchange and tissue	tissue respiration and gaseous exchange	
			respiration from Computer	They later reflect and	
			simulations/or video sources.	develop concept cartoons	
			Allows student teachers to	for the processes for	
			reflect on the processes	collection in the portfolio.	
			discussed and develop concept	Student teachers develop	
			cartoons on the tissue	activities, using the	
			respiration and gaseous	concept cartoons that will	
			exchange	be used to teach the basic	
			8-	schools.	
	Teaching how	60	Face-to-face/E-learning	Face-to-face/Group	
	to teach	minutes	opportunities:Tutor leads	Activity/E-learning	
	Respiratory		studentteachers to teach the	opportunities:	
	System		concepts, respiration and	Studentteachers in groups	
			digestion using the concept	teach the concepts,	
			cartoons and activities	respiration and digestion	
			developed in peer teaching.	using the concept	
				cartoons and activities	
				developed in peer	
	Finite Local	 		teaching	
Which cross cutting issues will be addressed or		-	g ground rules to protect vulnerab	ie student-teachers and	
developed and how	establishing an In	iteractive and	inclusive classroom atmosphere.		
Lesson assessments –	Accoccmont	for learning.	enorts from group work will be us	ad to assess students as	
evaluation of learning: of,	<ul> <li>Assessment for learning: Reports from group work, will be used to assess students as learning</li> </ul>				
for and as learning within	learning  Assessment as learning: Concent cartoons produced by studentteachers on tissue				
the lesson	<ul> <li>Assessment as learning: Concept cartoons produced by studentteachers on tissue respiration and gaseous exchange will be used to assess student for learning.</li> </ul>				
Teaching Learning	OERs, Videos of Respiration, tissues respiration, gaseous exchange and digestion. YouTube				
Resources	videos on respiration, and movement of food through the digestive system:				
	https://www.youtube.com/watch?v=5JrON_sm5gchttps://www.youtube.com/watch?v=08Vy				
	JOEcDos				
Required Text (core)	Abbey, T. K., Alha	assan, B., Ame	yibor, K., Essiah, J. W., Fometu, E.,	& Wiredu, M.B. (2008).	
	Ghana association of science teachers integrated science for senior high schools. Accra:				
	Unimax MacMillan; Handbook for PD Coordinators Themes 1- 10				
	-				

Additional Reading List	Abbey, T. K., & Essiah, J.W. (1995). Ghana association of science teachers physics for senior
	high schools. Accra: Unimax Macmillan.
	Ameyibor, K., & Wiredu, M. B. (2006). <i>Ghana association of science teachers' chemistry for senior high schools</i> . Accra: Unimax MacMillan.
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). <i>Integrated science for the basic school teacher I</i> . Winneba: IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., & Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD Requirement	Training on grouping students into mixed ability, mixed intellectual and gender based

Year of B.Ed. 2	Semester	1	Place of	lesson in s	emester	1 2 3 4 5 6 7 <b>8</b> 9	0 10 11 12			
Title of Lesson	Teaching the	e Digestive	Lesson Duration	3 Hours						
Lesson description	The lesson is intended to give studentteachers an understanding of what enzymes are, that is substances that are produced by a living organism which act as a catalyst to bring about a specific biochemical reaction. The lesson further examines the part that enzymes play in the digestion process. The concept of dentition, i.e., the arrangement or condition of the teeth in particular species or individual, is also introduced.									
Previous student teacher knowledge, prior learning (assumed)	Studentteachers have experienced the process of digestion, the existence and use of their teeth Possible misconceptions about how food is digested and the arrangement of the teeth									
Possible barriers to learning in the lesson				-		-				
Lesson Delivery – chosen to support students in achieving the outcomes		Practical Activity √	Work- Based Learning	Seminars	Independent Study √	e-learning opportunities √	Practicum			
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes. Purpose for the lesson,	Face-to face Practical Act Independen e-learning O • Get the	tivities: Grou t Study: Ref Opportunitie	s, demonst up work and lections s: Simulatio	l designing ns, video pre						
what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	<ul> <li>Appreci</li> <li>Underst</li> <li>Discard and der</li> </ul>	ate the role tand the for the common tition	that enzym mation of to n misconce	nes play in th eeth	e digestion of fo tudentteachers	ood. have about enzym	es, digestion			
Write in full aspects of the NTS addressed	2b) Has outcom 2c) Has content kno 3i) Explains o 3m) Iden	nonstrates f comprehen les. secure cont wledge for f concepts cle ltifies and re	ent knowle the school a early using e emediates le	edge of the o dge, pedago and grade the examples fam earners' diffic	fficial school cu gical knowledge ey teach iiliar to students culties or miscol		learning			
<ul> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators</li> </ul>	3m) Identifies and remediates learners' difficulties or misconceptions, referringlearner whose needs lie outside the competency of the teacher.         Learning Outcomes       Learning Indicators         Identify which cross- cuttine issues, core and transferal skills, inclusivity. Equity are addressing diversity. How these be addressed or developed						ansferable quity and :y. How will			
for each learning outcome	<ul> <li>what en and the play in t process</li> <li>Demons knowled concept</li> <li>Erase m</li> </ul>	strate dge of the t of dentition hisconceptio hazymes, on and	n p n p ca n re ns Si d	tudentteache nd explain w re (substance roduced by a rganism whic atalyst to brin becific bioche eaction). tudentteache emonstrate l nzymes influ igestion.	hat enzymes es that are living ch act as a ng about a emical ers now ence	Through discussion sharing of ideas in studentteachers de skills of communica collaboration and r respect while appr individual differend abilities. They also in handling devices critical thinking, ho accuracy and respo through active part group work/discus	class evelop the ation, nutual eciating eciating acquire skills , develop nesty, nesty, onsibility cicipation in			

Topic/Title	• Sub Topic	Demonstrate knowledge and skill to teach topic enzymes, digestion and dentition.		ular
			work or independent study	
			Teacher Activity	Student Activity
Teaching the Digestive System	Enzymes and digestion Dentition	90 Minutes 60 Minutes	Face-to-face/Group activity: Put studentteachers into different ability group activities to discuss what enzymes are and the role that they play in the digestion process (provide appropriate resources/materials to ensure that all students participate fully) Face-to-face/Group activity: Tutor puts student-teachers into mixed ability groups to discuss dentition (provide appropriate resources/materials to ensure that all students participate fully)	<ul> <li>Face-to-face/Group activity: Studentteachers engage in talk for learning/ discussions on enzymes and digestions.</li> <li>Watch videos on enzymes and digestion.</li> <li>Groups make 5-minutes presentations of their findings to the class who observe, ask questions and at the end write a one-page report.</li> <li>(PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)</li> <li>Face-to-face/Group activity: Student-teachers discuss dentition and make models of types of dentition.</li> <li>(PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)</li> </ul>
	Teaching enzymes, digestion and dentition	30 Minutes	participate fully) Face-to-face/Group activity: Select three random groups to make presentations on the day's lesson	Face-to-face/Group activity: Three volunteering groups to make 10 minutes presentations on enzymes, digestion and dentition.
Which cross cutting issues will be addressed or developed and how	student-teach	ners, establish an interac	tive and inclusive classroom a	
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	<ul><li>dentition</li><li>Assessme the diges</li></ul>	ent as learning: studentte tion process		ition on enzymes, digestion and on enzymes and the role they play in rations/chats and report.

Teaching	Projectors, Computers with internet access, Plants and animal Models, Online educational resources such
Learning	as massive online open resources (MOOCs), YouTubes, khan academy
Resources	https://www.youtube.com/watch?v=WbXmJXBt-Vk
	https://www.youtube.com/watch?v=QaN00b1WSGg
<b>Required Text</b>	Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). Ghana
(core)	association of science teachers integrated science for senior high schools. Accra: Unimax MacMillan;
	Handbook for PD Coordinators Themes 1 – 10.
Additional	Abbey, T. K., & Essiah, J.W. (1995). Ghana association of science teachers physics for senior high schools.
Reading List	Accra: Unimax Macmillan.
	Ameyibor, K., & Wiredu, M. B. (2006). Ghana association of science teachers: chemistry for senior high
	schools. Accra: Unimax MacMillan.
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba:
	IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.& Obeng-Ofori, D. (2011). SWL integrated
	science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD	Training in effective use of online learning resources
Requirement	

Year of B.Ed.	2	Semester	1	Place of les	son in semester	12345678 <b>9</b> 101112					
Title of Lesson	Teeshi	Teaching the Ecosystem 2 Hours 3 Hours									
Title of Lesson Lesson description				student teach							
Lesson description		The lesson is intended to give student teachers an understanding of the concepts, misconceptions and terminologies as used in ecosystem (a biological community of interacting organisms and their									
		-		ecosystem (a bi		y of interacting organi	sins and their				
Previous student		physical environment.) Student teachers have lived experiences about the ecosystem within their environments, both at									
teacher		scudent teachers have lived experiences about the ecosystem within their environments, both at									
knowledge, prior	501001										
learning (assumed)											
Possible barriers to	Possible	e misconcepti	ons and	incorrect ideas	about the ecosyste	m. For example, that	an ecosystem				
learning in the		ses of only liv			· · · · · · · · · · · · · · · · · · ·		· · · · · <b>,</b> · · ·				
lesson			0 0								
Lesson Delivery –	Face-	Practical	Work-	Seminars	Independent	e-learning	Practicum				
chosen to support	to-	Activity	Based		Study	opportunities					
students in	face	v	Learnin	ng	v	v					
achieving the	V		V								
outcomes											
Lesson Delivery –				nonstrations an							
main mode of			-	rk and designin	5						
delivery chosen to		ndent Study: I									
support student	e-learn	ing Opportun	ities: Sim	ulations, video	presentations						
teachers in											
achieving the											
learning outcomes.											
Purpose for the				rstanding of eco							
lesson, what you				-	associated with ecc	-					
want the students			mon mis	conceptions/ind	correct ideas that st	tudent-teachers have	about				
to achieve, serves		osystems									
as basis for the learning outcomes.	• De	signing activit	ies to tea	ach at least four	types of ecosyster	ns					
An expanded											
version of the	NTS, Te		<b>f</b> a	امم ماه ماهند بالفن		d kou noticico outdino.					
description.	-				•	d key policies guiding rriculum, including lea					
Write in full		-		-	gogical knowledge	-	ining outcomes.				
aspects of the				• •	grade they teach						
NTS addressed			-		es familiar to stude	ents.					
	-		-			nceptions, referring le	arners whose				
				ency of the tead							
Learning		g Outcomes	-	Learning Indica		Identify which cross-	cutting issues,				
Outcome for						core and transferable	-				
the lesson,						inclusivity. Equity an	d addressing				
picked and						diversity. How will th					
developed						addressed or develop					
from the		fine and expla			eachers define	Through discussions	-				
course		at ecosystem		-	ain what an	ideas in class student					
specification	~	Demonstrat		-	m is and produce	develop the skills of					
Learning		knowledge			at least four	collaboration and mu	-				
indicators for		concept of t			ecosystems.	while appreciating in					
each learning		ecosystem a		Studentte		difference and abiliti	-				
outcome		the differen		demonst		acquire skills in hand					
		terminologi			nding of the	develop critical think					
		associated v	vith it		terminologies	accuracy and respon					
	~	Erase	ione		d with an	active participation in	ngroup				
		misconcepti		ecosyste		work/discussion.					
		and incorre ideas about		-	lesson plans as						
		ideas about	uie	evidence	of ability to						

	eco	system	teach ecosystem			
		nonstrate				
		wledge and				
		to teach				
Topic/Title	Sub Topic	system Time or	Teaching and learning to achiev	ve learning outcomes: depending on		
Topic, The		Stage		er led, collaborative group work or		
			Teacher Activity	Student Activity		
Teaching	Concepts of	90 minutes	Face-to-face/Group activity:	Face-to-face/Group activity:		
Ecosystems	ecosystems		Put studentteachers into	Studentteachers engage in talk for		
			different ability groups to	learning/songs discussions on what		
			discuss what an ecosystem is	an ecosystem is.		
			that is, a biological community of interacting organisms and	Watch short YouTube videos on the		
			their physical environment.	meaning of ecosystem. E.g.,		
			Tutor provides appropriate	https://www.youtube.com/watch?v=		
			resources/materials to ensure that all students participate	JPHqUxxyLsY		
			fully.	Groups make 5-minutes		
				presentations of their findings to the		
				class who observe, ask questions and		
				at the end write a one-page report. (PD Theme 8, pg. 40; PD Theme 4, pg.		
				23-46; PD Theme 1, 79-83)		
	Terminologi	60	Face-to-face/Group activity:	Face-to-face/Group activity:		
	es as used in	minutes	Tutor puts studentteachers	Studentteachers discuss and create a		
	ecosystems		into mixed ability groups to	list of terminologies associated with		
			discuss different	ecosystems.		
			terminologies associated with ecosystems and talk of	Groups prepare a one-page report of the terminologies.		
			important ecosystem	the terminologies.		
			terminologies such as abiotic:	(PD Theme 8, pg. 40; PD Theme 4, pg.		
			physical, or nonliving, factors	23-46)		
			that shape an ecosystem.			
			Examples include rocks,			
			climate, pressure, soils, precipitation, sunlight, winds			
			and humidity.			
	Dealing with	30 minutes	Face-to-face/Group activity:	Face-to-face/Group activity:Groups		
	misconcepti		Put studentteachers into	to present their findings on		
	ons about		groups to engage in	misconceptions and incorrect ideas		
	ecosystems		discussions to identify	about ecosystems and the		
			misconceptions/incorrect ideas about the ecosystem.	corresponding correct views in group reports.		
Which cross	Equity and SEI	N: through appr	1 · · · · · · · · · · · · · · · · · · ·	e group work to protect vulnerable		
cutting issues will			n interactive and inclusive classroo			
be addressed or						
developed and						
how Lesson	Assessme	nt of loarning: a	tudentteachars write a short assa	y on ecosystems and discuss at least		
assessments –		s of ecosystems		y on ecosystems and discuss at least		
evaluation of		-		ns on Misconceptions and wrong ideas		
learning: of, for			ations/chats and reports on ecosys			
and as learning						
within the lesson	Drojactore C-	moutors with !	tornat accors Diants and anim-1	Andels Online educational recourses		
Teaching Learning Resources	-	-	iternet access, Plants and animal N esources (MOOCs), YouTubes, kha	Aodels, Online educational resources		
Resources			atch?v=JPHqUxxyLsY	ar 1		
			rg/science/high-school-biology/hs	-ecology/hs-introduction-to-		
		systems-and-bi				

Required Text	Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). Ghana
(core)	association of science teachers integrated science for senior high schools. Accra: Unimax MacMillan;
	Handbook for PD Coordinators Themes 1 – 10.
Additional	Abbey, T. K., &Essiah, J.W. (1995). Ghana association of science teachers physics for senior high schools.
Reading List	Accra: Unimax Macmillan.
	Ameyibor, K., & Wiredu, M. B. (2006). Ghana association of science teachers: chemistry for senior high
	schools. Accra: Unimax MacMillan.
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher I.
	Winneba: IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.& Obeng-Ofori, D. (2011). SWL integrated
	science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD Requirement	Training in effective use of online learning resources

Year of B.Ed. 2	Semeste	er 1	Place of le	esson in se	emester	1234567	789 <b>10</b> 11 12				
Title of Lesson	Teaching Typ	nes of ecosy	stems		less	on Duration	3 Hours				
Lesson description	The lesson is gained in the of ecosystem	The lesson is intended to further consolidate knowledge and understanding that student teachers gained in the study of Ecosystems I and associated terminologies by examining the different types of ecosystems. The lesson goes further to inculcate in studentteachers the knowledge and skills to									
Previous student teacher knowledge, prior learning (assumed)	both at scho	Student teachers have experiences about different types of ecosystem within their environments, both at school and at home.									
Possible barriers to learning in the lesson	comprises of	-		ideas about	the ecosyst	em. For example	e, that an ecosystem				
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-	Practical ActivityV	Work- Based LearningV	Seminars	Independ Studyv	ent e-learnin opportu V	-				
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes. Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description. • Write in full aspects of the NTS addressed	<ul> <li>Face-to face: Discussions, demonstrations and observations</li> <li>Practical Activities: Group work and designing</li> <li>Work-based learning</li> <li>Independent Study: Reflections <ul> <li>e-learning Opportunities: Simulations, video presentations</li> </ul> </li> <li>Get the conceptual understanding of the types of ecosystems.</li> <li>Acquire the knowledge and skills to teach at least four types of ecosystem.</li> <li>Discard further misconceptions/incorrect ideas that student-teachers may have about ecosystems</li> <li>Designing activities to teach at least four types of ecosystems</li> </ul> <li>NTS, Teacher; <ul> <li>2a) Demonstrates familiarity with the education system and key policies guiding it.</li> </ul> </li>										
	outcome 2c) Has s knowled 3i) Explain 3m)	es. secure conte lge for the so ns concepts Identifies an	ent knowledge, chool and grad clearly using e	, pedagogica le they teach xamples fam earners' diff	l knowledgo i iliar to stuc iculties or n						
Learning Outcome for the lesson, picked and developed from the course	Learning Out		Learning Inc	•	lc cc ir d	ore and transfe	y and addressing vill these be				
specification <ul> <li>Learning indicators for each learning outcome</li> </ul>	at least t ecosyste ✓ Den kno skill eco ✓ Eras miso s an idea	nonstrate wledge and s to teach systems	and ex types prepa least f • Stude produ differe ecosy: • Prepa most : teach	nt teachers of xplain different of ecosyster re a report of our types. nt teachers ce chats sho ent types of stems. re short less 10 minutes) any of the types stems.	define T ent ic ns and d on at ca wing. a owing. a d owing. a to W	hrough discussion leas in class stud evelop the skills ollaboration and while appreciation ifference and at cquire skills in h evelop critical th	ons and sharing of dent teachers s of communication, d mutual respect ng individual pilities. They also andling devices, hinking, honesty, ponsibility through on in group				

Topic/Title	Sub Topic	Time or	Teaching and learning to achie	eve learning outcomes: depending
		Stage	-	acher led, collaborative group work
			or independent study Teacher Activity	Student Activity
Teaching types of	Types of	90	Face-to-face/Group activity:	Face-to-face/Group activity:
Ecosystems	ecosystems	minutes	Put student teachers into	Student teachers engage in talk
,	,		different ability groups to	for learning/ discussions on the
			discuss the types of	types of ecosystems.
			ecosystems (the eight major	
			ecosystems: temperate forest, tropical rain forests,	Watch short U-tube videos on the
			deserts, grasslands, the taiga,	types of ecosystem.
			the tundra, the chaparral and	Groups make 5-minutes
			the oceanor marine).	presentations of their findings to
			(Provide appropriate	the class who observe, ask
			resources/materials to	questions and at the end write a
			ensure that all students participate fully).	one-page report. (PD Theme 8, pg. 40; PD Theme 4,
			Make available to student	pg. 23-46)
			teachers short YouTube video	
			clips on the types of	
	Misconception	60	ecosystems. Face-to-face/Group	Face-to-face/Group
	s about types	minutes	activity:Keep student	activity:Groups to present their
	of ecosystems	iiiiiuteo	teachers in the same groups	findings on misconceptions and
			to engage in discussions to	incorrect ideas about ecosystems
			identify "	and the corresponding correct
			misconceptions/incorrect	views in group reports.
			ideas about the ecosystems.	(PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)
	How to teach	30 minu	Face-to-face/Group	Face-to-face/Group
	ecosystems	tes	activity:Allow student teacher groups to prepare at	<pre>activity:Student teachers, working in their groups make</pre>
			most a 10-minute lesson of	presentations to the class on the
			what they have learnt	types of ecosystems while other
				groups critique.
Which cross cutting		•	opriate gender and equity sensiti	•
issues will be addressed or	vulnerable stude	nt teachers, e	establish an interactive and inclus	sive classroom atmosphere
developed and how				
Lesson assessments –	Assessment	as learning: s	tudent teachers make presentati	ons on at least four types of
evaluation of learning:	ecosystems.			
of, for and as learning within the lesson		-	student teachers peer review pre	esentations/chats and reports on
Teaching Learning		ecosystems. outers with int	ternet access, Plants and animal	Models. Online educational
Resources			ine open resources (MOOCs), You	
	https://www.you	utube.com/wa	atch?v=QGrNhojSAZg	
			atch?v=I8Uj4yD0g6M	
Required Text (core)			eyibor, K., Essiah, J. W., Fometu, I s integrated science for senior hig	E., & Wiredu, M.B. (2008). Ghana
	-		Coordinators Themes 1 – 10.	
Additional Reading List	Abbey, T. K., &Es	siah, J.W. (19	95). Ghana association of science	e teachers physics for senior high
		ccra: Unimax		
			(2006). Ghana association of sciences max MacMillan.	ence teachers: chemistry for senior
			max Macivillian. ng, E. K. (2013). <i>Integrated scienc</i>	ce for the basic school teacher I
	Winneba:			
	Oddoye, E. O. K.,	Taale, K. D., I	Ngman-Wara, E., Samlafo, V.& Ol	
	-		<u>–</u>	. Accra, Ghana; Sam-Woode Ltd.
CPD Requirement	Iraining in effect	ive use of onl	ine learning resources	
			·	

Year of B.Ed. 2	Sem	ester	1	Place of	f lesson in s	emester	123456789101112				
Title of Lesson	Science	e Pedagogy a	and Ci	urriculum			Lesson Duration	3 Hours			
Lesson description Previous student teacher knowledge,	attitude enviror in term experie 3a, c, f Studen	In this course, student teachers would be expected to demonstrate knowledge of and develop the attitudes in biology that would lead to a better appreciation of the biological, physical and social environment and work as professional biology teachers to identify their own professional needs in terms of science professional practice, knowledge, values and attitudes. Through this experience the student teacher will be working towards meeting the NTS (NTS 1a, b and f, p12; 3a, c, f and j, p14). Student teachers are familiar with the integrated science course (SCE 121) which was introduced									
prior learning (assumed) Possible barriers to		in Level 100. Student teachers might have forgotten about the basic features of a science curriculum and									
learning in the lesson	revision	n would be r	equir	ed							
Lesson Delivery – chosen to support students in achieving the outcomes	Face- to- face√	Practical Activity	-	ork-Based Irning	Seminar √	Independen Study	t e-learning opportuniti √	Practicum es			
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	the add approp & 21) V have to Semina Face-to	olescent lear priate resour We have son o define all in ars: o-face:	ner so ces su ne NT n full.	o that they uitable for t S here and	learn to plan hat category some in the n	lessons and in of learners (NT ext session. Is	culum vis-a-vis its i teractive assessme 'S 3a, 3h, p14: NTS this how it has to	ents with 5 2c, 2d, 2e, p13 be? Then we			
<ul> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> </ul>	ap • De on an the	appreciation of the biological, physical and social environment.									
• Write in full aspects of the NTS addressed	1f: 2c: kno 2e he 3a: Plan outcom 3c: 3f:Pays Ed 3h: Set	Develops a Has secure owledge for Understand r teaching ns and delive nes of their t Creates a s attention to ucational Ne s meaningfu	positi conte the s ds hov ers va ceachi afe, e o all le eeds, il task	ive teacher ent knowled chool and g w children ried and ch ing. ncouraging earners, esp ensuring th s that enco	identity and a dge, pedagogi grade they tea develop and lo hallenging less glearning envi becially girls a heir progress. burages learne	cal knowledge ch in. earn in diverse ons, showing a ronment. nd students w r collaboratior	role model for stur and pedagogical of contexts and app a clear grasp of the	content lies this in his or eintended oseful learning.			

• Learning Outcome for the lesson,	Learning Outcomes	Learning I	ndicators	Identify which cross-cutting Issues, core and transferable		
picked and developed from th				skills, inclusivity. Equity and addressing diversity.		
<ul> <li>Learning indicator for each learning outcome</li> </ul>	• Demonstrate	d value prec ogy orde a activ ion sket nd for a prov Mak sic port s a philo logy mee l Teac heir lesso il Mak profi	check list to identify the es of accuracy, honesty, ision, patience and rliness in a Biology practical ity ch of expected class setting biology lesson that will ide for inclusion e a list of some items in a folio. E.g. Teaching osophy, minutes from ting with Supported hing in Schools (STS), on plan. e a list of student teacher's essional needs to develop	By providing checklist of key features of the curriculum, sharing ideas in class, student-teachers develop the skills of writing portfolio, communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in group work/discussion.		
Topic/Title	Sub Topic	Time or Stage	Teaching and learning to ac depending on delivery mod collaborative group work or	ode selected. Teacher led, or independent study		
Science Pedagogy and Curriculum	Psychology of the early adolescent in science studies	90 minutes	<b>Teacher Activity</b> <u>Face-to-face:</u> Tutor allows studentteachers in groups or mixed abilities to peruse the science curriculum with respect to adolescent learner and present oral reports PD Theme 4, pg 23-30 Tutor shows videos of adolescent behaviour followed by discussions to identify misconceptions abo adolescents and science learning	<ul> <li>groups of mixed abilities make power point</li> <li>presentations on how to help adolescents to cope in class PD Theme 4, pg 35-46</li> </ul>		
	Introduction to science lesson plans and resources	45 minutes	Face-to-face: Tutor initiates discussions or key aspects of a lesson plan and how to develop it	Activity: Student teachers work in mixed groups to develop 10- minute lesson plans on a given topic, suitable for teaching adolescents		
	Micro teaching	45 min utes	Face-to-face: Tutor led discussion and demonstratio	Develop a mini micro scale activity model for pupils' use from the curriculum and micro teach the introductory part for 5 minutes (2 groups at most) to reflect on aspects of a lesson plan		

Which cross cutting	Equity and SEN: through setting ground rules to protect vulnerable student-teachers and establishing
issues will be	an interactive and inclusive classroom atmosphere. By analysing components of the curriculum,
addressed or	student-teachers' will develop skills in compiling, reviewing, and evaluating literature on policies.
developed and how	
Lesson assessments	Assessment as learning: Student teachers show evidence of mini lesson plans and their
<ul> <li>evaluation of</li> </ul>	implications for adolescent children's learning habits.
learning: of, for and	
as learning within	
the lesson	
Teaching Learning	JHS Science Curriculum, projector, micro equipment or standard laboratory equipment, pens and
Resources	papers.
Required Text (core)	JHS Science Curriculum; Handbook for PD Coordinators Themes 1-10
CPD Requirement	i. Practicing how to review Science Curriculum.
	ii. Critical examination, analysis and reflection by a student teacher.

Year of B.Ed. 2	Semester	1	Place of I	esson in se	mester 1 2	3 4 5 6 7 8 9 1	0 11 12				
Title of Lesson		Course Review 2         Lesson Duration         3 Hours           To available of the second ball of the second ball         5 the second ball         11)									
Lesson description		To review and audit the lessons for the second half of the semester (from lesson 7-lesson 11).									
	It is also expected that student teachers will reflect during this lesson on their own progress										
		in the course. Lessons learnt from lesson 7 through lesson 11 in all learning approaches.									
Previous student teacher	Lessons lea	rnt from les	sson / throi	ign lesson 11	in all learning ap	proacnes.					
knowledge, prior learning											
(assumed) Possible barriers to learning	Misconcon	tion to com	o conconte	not adoquato	ly doalt with Lo	ssons not approp	vriatoly				
in the lesson	understood		-	not adequate	iy dealt with. Le	ssons not approp	matery				
Lesson Delivery – chosen to	Face-to-	Practical	Work-	Seminars	Independent	e-learning	Practicum				
support students in	face	Activity	Based	V	Study √	opportunities	i lacticulii				
achieving the outcomes	V	√ v	Learning	•	otady o	V					
Lesson Delivery – main	-		_	ility, mixed at	oility and gender	-based group wo	orks.				
mode of delivery chosen to				-	and Cartooning.	0.00	-				
support student teachers in		-	-		-	idually and colle	ctively)				
achieving the learning	e-learning (	Opportuniti	es: OERs an	d Video prese	entations.						
outcomes.											
• Purpose for the lesson,				anding of con							
what you want the	<ul> <li>Test va</li> </ul>	rious skills	and cross –	cutting issues	<b>i</b>						
students to achieve,				rials on where							
serves as basis for the		-		nisinformatio							
learning outcomes. An				oing forward	on SEN and Gen	der issue					
expanded version of	-	ne teacher:		<b>6</b>							
the description.		-	-		prove teaching a	-					
• Write in full aspects of						ole model for stu					
the NTS addressed				edge, pedago grade they te		and pedagogical	content				
		-				contexts and ap	olios this in				
		ner teaching			icani in aiverse						
			-	nd challengin	g lessons, showi	ng a clear grasp o	of the				
	intended or			-	8.000010,011011						
				ng learning en	vironment.						
			-			s with Special Ed	ucational				
	Needs, ensi			, -							
	3h: Sets	s meaningfu	ul tasks that	encourages l	earner collabora	tion and leads to	purposeful				
	learning.										
	-	s and uses	a variety of	teaching and	learning resourc	es including ICT,	to enhance				
	learning.										
Learning Outcome for	Learning O	utcomes	Lear	ning Indicato	rs	Identify which c					
the lesson, picked and						cutting Issues, o					
developed from the						transferable ski					
course specification						inclusivity. Equivaddressing dive	-				
Learning indicators for each learning outcome						will these be ad					
each learning outcome						developed					
						acteropeu					

	<ul> <li>Identify weakness and strengths in learning the science lesson for the period under review</li> <li>Be able to reflect on lessons learnt so far and state new insights and/or grey areas needing remedies</li> <li>Correct misconception/misinf ormation for lessons (lesson 7 – 11)</li> </ul>	<ul> <li>Make a list of weaknesses and strengths on poster papers for sharing</li> <li>Provide a reflection report and answer questions on topics learnt so far through demonstrations and illustrations on a given media</li> <li>Present concept maps and/or models linking misconceptions/misinform ation to new insights</li> </ul>		Collaborations, Communication and research: through group work and presentation Equity and Reflection is developed from reflective activities Creativity and critical thinking are developed in creating models and concept maps	
Content of lesson picked and developed from the	Sub Topic Course Review 2	Time or Stage	Teaching and learning to achieve learning outcomes: depending on delivery mode		
course specification			selected. Teacher led, collaborative group work		
Topic Title			or independent study Teacher Activity Student Activity		
Course Review 2			Facilitate and provi the necessary tool student activities.		,
	Reviewing the understanding of the lesson Human Body I, Human Body II, Ecosystem I, Ecosystem II and Science Pedagogy and Curriculum	30 minutes	Face-to- face:Brainstorming with student teachers to initiate the weaknesses and strengths of student teachers in the lessons 7 − 11.		Face-to-face:Studentteachersrespondstorutorquestionsonweaknessesstrengths
		90minutes	Initiate discussion , for learning approa using groupings (Sa ability and then mi groups) to identify student teachers' strengths and weal in the lessons learn far. The groups are pro with checklist on en- topic so that they a able to list weakne strengths.	ach ame xed kness nt so vided ach are	Working in groups and with the checklist student teachers identify and record all possible weaknesses and strengths in the lessons learnt so far.
	Remedies to course topics	60minutes	Face-to-face/Grou Activity:Group stud teachers according remedy need and p specific task assista the areas on conce needing remedy.	dent to provide ance in pt	Face-to-face/Group Activity:Students teachers work in the special groups (Same remedy need group) on tasks to remedy their learning need.
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through mixed and same group work to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. Through modelling and group work, collaboration is established.				
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	<ul> <li>Assessment as learning: Student teachers' presentations during group work and model work presentation.</li> <li>Assessment of learning: Student teachers working in groups on remedial tutoring (Checklist to identify and praise students for working collaboaratively)</li> </ul>				

Teaching Learning Resources	Cardboards, Course manual, Poster paper
Required Text (core)	Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M. B. (2008). <i>Ghana association of science teachers integrated science for senior high schools</i> . Accra: Unimax MacMillan.
Additional Reading List	<ul> <li>Abbey, T. K., &amp;Essiah, J.W. (1995). Ghana association of science teachers physics for senior high schools. Accra: Unimax Macmillan.</li> <li>Ameyibor, K., &amp; Wiredu, M. B. (2006). Ghana association of science teachers chemistry for senior high schools. Accra: Unimax MacMillan.</li> <li>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</li> <li>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., &amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.</li> </ul>
CPD Requirement	Training on preparation of checklist and Reflection guides

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