

Four-Year B.Ed. Course Manual

INTEGRATED SCIENCE I

















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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 meets 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 this set of resources for tutors/lecturers, mentors, and student teachers. We are grateful to the specialists who contributed their knowledge and expertise.

Special thanks to Professor Jophus Anamuah-Mensah - T-TEL Key Advisor, Dr. Eric Daniel Ananga - T-TEL Key Advisor for Curriculum reform and Beatrice Noble-Rogers who provided key editorial, review and content input and facilitated the process of drafting and finalising the course manual.

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 copy 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 approach used to produce this manual.

We are indebted to the Ministry of Education and the Ghana Tertiary Education Commission (GTEC) for the general support and specific helpful advice provided during production of the course manuals. Recognition and thanks must go to Chief Technical Advisor for T-TEL and Policy Advisor to the National Education Reform Secretariat, Akwasi Addae-Boahene, Prof. Mohammed Salifu, the Director General of GTEC and Mr. Jerry Sarfo the coordinator for the colleges of education, who in diverse ways supported during the course manual writing workshops.

In addition to all the staff who participated visibly in the development of these materials we would like to acknowledge all those people from the many colleges of education and universities in which we have worked who have, directly or indirectly, shared their views on the curriculum with us.

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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

Integrated Science for Upper Primary 1

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 instill 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 l	i Course Dataile							
Course Name								
Pre-requisite								
Course Level 1. Goal for	200		1.00	Credit Value	3			
		bject or Learning A						
						her into one imbued with the right knowledge, udes to promote inclusivity and inspire active learning		
- · ·				e core values an	uattii	dues to promote inclusivity and inspire active learning		
at the upper prim	,							
					faula	anning annual the automotive basis asis as a second to af		
						arning approach to extend the basic science concepts of		
		-				s, groups of animals, metals, non-metals and rusting,		
	•			••••••		escent learner and science teaching and learning. This is		
						earning approaches, demonstrations, concept mapping,		
	-	-				authentic assessments mode such as concept mapping, hich provides for the teachers' attention on the need to		
						asize on the essential attitudes and values (NTS, 1a-c)of		
						aracy. The student teacher, in this course, should be		
						uage as medium of instruction and characteristics and		
				-	-	STS) (NTS, 2e), as well as managing transition from early		
						S, 1a-c, p. 12), (NTS, 2c, P. 13).		
			· · · · · · · · ·	,, (, <u>=</u> c) p. <u>.</u> c	,,, (, <u> </u>		
3. Key Con								
						e teaching and learning of science in schools, as science		
		-	-			ous challengesfaced by primary science education which		
		ience equipment a	and also	qualmed science	e tea	chers who are trained to integrate ICT into the teaching		
and learning proc	Less.							
There is also a r	head fo	n a conducive lea	rning or	wironment for	2 500	tion of the early adolescent population who have the		
		ubjects are for boys			asec	tion of the early addrescent population who have the		
			STatrici	giris.				
The learning acti	ivities fo	or this semester se	eks to r	elate science to	the le	arners' 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 early childhood (B3) to middle childhood (Upper Primary)								
						equity and inclusion		
						laboration/Team work, Creativity, Innovation, Problem		
		Reflection, develo						
5. Course l	earnin	g Outcomes				6. Learning Indicators		
		vays to teach classi	ification	of plants and a	nimal			
		level(NTS 1b, 1d, 1				play and learn about plant and animal uses.		
		e learning activitie			prima			
school learner distinguish between metals and non-metals (NTS mapsabout metal and non-metals								

	inapourout metal and non metalo
1b, 1d, 1g, p12: 2c, p.13 & 21)	
CLO3. Recognize that some metals and objects made from iron when	• Present a mini project work on the
exposed to moisture in the presence of air will form rust and	conception of metals, non-metals and rusting
explain the effect of rusting on iron and demonstrate methods of	in the immediate environment.
preventing rust (NTS 1b, 1d, 1g, p12:2c, p.13 & 21),	
CLO4. Develop and use developmentally appropriate TLMs from locally	Prepare improvised, developmentally
available materials for teaching primary school measurement	appropriate materials for teaching at the
(NTS 3e, 3i, 3j, pg. 14)	primary school level

CLO 5. Demonstrate an under	standing of the princip	les of professional	• Pre	pare a reflective report on observations
	ved during STS through			ing STS for a seminar
(NTS, 2c & 3e, Pg. 14				
children and all releve attitudes and behavio	e and application of the school curriculum, later the school curriculum, later the school curriculum, later the school curres student teacher works. (NTS 1b, 1d p14 and school curres the schoo	aws protecting odel positive values, vill be working	tea the valu	vide a checklist to identify beginning cherbehaviour and attitudes that meets NTS and a documentary of positive ues, attitudes and relevant laws that tect the learnerfor peer review exercise
7. Course Content				·
Unit (Week)	Торіс	Subtopic (if any)		Teaching and learning activity to achieve the learning outcomes
Week 1	Review of Year 1 integrated science	 Introducing the coumanual for the JHS specialism Recap of year 1 less and challenges the 	sons reof.	 Demonstrations and discussions Reflections, presentations and designing Role playing/song creations Simulations, video and Computer presentation
	Groups of Plants	 Group of plants: erect, creeping and climbing Root systems of plants Characteristics of leaves, and stem and Uses of plants 		 Produce charts and illustrations of forms and sources of energy
Week 2	Groups of Animals	 Grouping of animal based on movemer living space Body covering of ar Uses of some anima pets and care of pe 	nt and nimals als,	 Demonstrations and group discussions Reflections, presentations and designing/game development Concept mapping iv.Simulations, video and Computer presentation
Week 3	Metals and Non- Metals	 Types of Materials Classification of materials into meta and non-metals Characteristics of m and non-metals 	als	Face-to Face: Discussion, Role Playing, Construction of games, Designing rhymes, creating songs about plants and animals e-learning: Video and Computer simulation on teaching activities and assessment strategies.
Week 4	Rusting	 Meaning of Rust Causes, effects and cleaning of rust from surface of iron and methods of preven rust: painting, oiling greasing; insolating surface of iron from 	om Iting g or g the	Face-to-face: Mixed group discussions and demonstrations/role plays, Concept Mapping and Cartooning. e-learning/Reflections: Video presentations from MOOCs with reflections on values such as Honesty, Accuracy, Precision and critical thinking.
Week 5	Measurement in science	i. Temperature: Meanin temperature and unit temperature, reading temperature on analo and digital thermome handling and using thermometers	ts of g ogue	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)	Misconceptions about measurement in science	 Misconceptions about temperature, physical measure (Area/volume of plane figures, 	Face-to-face: Discussion, Talk for learning approaches with student teacher presentations,
Week 7	Course Review I and STS Seminar	Mass/weight) Reviewing and reflecting on lessons 1-6 STS Seminar 	Face-to-Face: Pyramid discussions, Presentations e-learning: OERs and MOOCs Independent Study: reflection on observations made during STS and problem-based learning: on National Teacher's Standards
Week 8	Ventilation I	Meaning of convectionConvection Currents	Face-to-face discussions, demonstration, mixed group work Computer simulations and OERs sources
Week 9	Ventilation II	 Ventilation and Convection Currents Applications of convection (sea breeze, land breeze, air conditioning, fridge, chimney and ventilation of rooms) and causes of poor ventilation 	Independent Study: Inquiry and reflections Face-to-Face: Discussions, Role playing and Rhyme designing
Week 10	Psychology of Early Adolescent Learner and Science Teaching and Learning I	 The Adolescent Learner adapting to Science learning 	Face-to-Face: Think, Pair, Share, Share discussions, Reflections and rhyming e-learning: OERs and MOOCs with report writing
Week 11	Psychology of Early Adolescent Learner and Science Teaching and Learning II	The Adolescent Learner in and inclusive science classroom	Face-to-Face:Modelling, Role playing and developing games.
Week 12	Course Review II with STS seminar	 Reviewing and reflecting on lessons 8-11 STS Seminar 	Face-to-face: Discussion, Talk for learning approaches with student teacher presentations, Independent Study: problem-based learning on National Teacher's Standards and reflection on observations made during STS.
mapping, concep	e, Square, group Discussion	tions, simulations and Computer	Multimedia presentations, Concept r assisted instructions, inquiry learning and
Selected Item of Midterm assessm Reflective Journa Organization of t Component 1: Assessment A work activities and inquiry Core skills to be acquired: Weighting: 40% CLO4, CLO5 AND CLO6 NTS:	rtfolio Assessment (30% o Student work (3 items – 1 nent – 20% al – 40% the Subject Portfolio- 10% t of Learning (End of Seme Method: Exams and project cassignments Cognitive, literacy, accura	0%) = 30% (How its presented/organized) ester Examination)) in the lessons/ Presentations of group -

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
and country
2b) Has comprehensive knowledge of the official school curriculum, including
learning outcomes
2c) Has secure content knowledge, pedagogical knowledge and pedagogical
content knowledge for the school and grade they teach in.
3e) Employs a variety of instructional strategies that encourages student
participation and critical thinking.
3i) Explains concepts clearly using examples familiar to students.
3j) Produces and uses a variety of teaching and learning resources including ICT, to
enhance learning
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%
Conclusion – 30%
CLO1, CLO 2, CLO3, CLO5 AND CLO6
NTS:
1b) Improves personal and professional development through lifelong learning and
Continuous Professional Development.
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
and country
2c) Has secure content knowledge, pedagogical knowledge and pedagogical
content knowledge for the school and grade they teach in.
3e) Employs a variety of instructional strategies that encourages student
participation and critical thinking.
3j) Produces and uses a variety of teaching and learning resources including ICT, to
enhance learning
Component 3: End of Semester Examination – (40% overall Semester Assessment)
Component 3: Assessment as Learning (Review of Reports)
Summary of Assessment Method: Peer Review / Evidence of report from school visits for portfolio/Reflective notes
Core skills to be acquired: Pedagogical, observational and cooperative skills
Weighting: 30%-
CLO1-CLO6
NTS:
1b) Improves personal and professional development through lifelong learning and
Continuous Professional Development.
2c) Has secure content knowledge, pedagogical knowledge and pedagogical
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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	Seme	ster	1 Place o	f lesson in ser	mester 12	234567891	0 11 12	
Title of Lesson	Group of	Plants		L	esson Duration	3		
Lesson description	This lesson reviews the year 1 integrated science course and introduces this course manual with the view to help the student teacher transition into the upper primary science specialism. Also, the lesson will deepen the understanding of the basic concepts of group of plants and animals and classification of plants using their characteristics. The lesson will expose them to teaching strategies and material so that they will effectively handle similar topics in their future science classrooms. The student teacher will also appreciate the relationship between humans and plants. This first lesson introduces student teachers to the course learning outcomes and the three assessment components of the course Student teachers studied aspects of plants in senior high school integrated science course							
Previous student	Student t	eachers stu	died aspects of	plants in senior	high school inte	grated science c	ourse	
teacher knowledge, prior learning (assumed)								
Possible barriers to	The sease	on of the ye	ar may affect th	e availability of	common plant	species in the en	vironment.	
learning in the lesson	1	i			e used as substit			
Lesson Delivery –	Face-	Practical	Work-Based	Seminars	Independent	e-learning	Practicum	
chosen to support	to-face	Activity	Learning	V	Study	opportunities		
students in achieving	V				V	V		
the outcomes								
Lesson Delivery – main mode of delivery			sion, concept ma ouzzles and pres		irning approache	es, nature walk a	na	
chosen to support student teachers in achieving the learning outcomes.								
• Purpose for the	Stude	ent teacher	s deepen their k	nowledge on gi	roups of plants			
lesson, what you			t teacher to be a	ble to classify/	group plants spe	cies using their		
want the students		acteristics						
to achieve, serves as basis for the	 Equip class 	o the stude	nt teacher with a	appropriate peo	dagogic skills to i	nandle the topic	in his future	
learning outcomes.		do student	teacher an unde	arstanding and	appreciation of	plants in the env	ironment	
An expanded						ove teaching and		
version of the						ifelong learning and		
description.		• •	essional Develop			5	-	
					qualities in the c	lassroom and wi	der school.	
Write in full	2c: H	as secure c	ontent knowledg	ge, pedagogical	knowledge and	pedagogical con		
aspects of the NTS			he school and gr					
addressed		Inderstands r teaching	how children de	evelop and lear	n in diverse con	texts and applies	this in his	

 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators 	for the lesson, picked and developed from the course specification Learning indicators				Identify which cross – cutting Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed	
for each learning outcome	 Link concepts in y to new concepts i groups of plants a animals 1 Student teachers classify plants into creeping and clim plants based on t nature of their stees classify and descr system of plants Student teachers describe character of leaves and ster plants a The student teach teach the uses of plants 	in and to o erect, abing he ems to ibe root to eristics ms of her discuss	con con Stud Cha plar thei Stud cha syst dess Stud che leav resp Stud refi	elop Concept Maps to link cepts from year 1 to new cepts yet to be developed dent teachers develop a rt on different types of nts based on the nature of r stems dent teachers submit a rt on different types root em of pants with their criptions dent teachers submit cklists of characteristics of res and stems of plants bectively dent teachers present ective report on the uses lant.	Develop the skills of construction, aesthetics and critical thinking through identification and classification Develop the skills of construction of charts aesthetics and critical thinking through identification and classification Develop skills of construction of checklist and critical thinking skills through identification of characteristics of leaves and stems of plant Reflection, Communication and Research: Through construction of charts achieve learning outcomes:	
Content of lesson	Sub Topic	Time or	Stage	Teaching and learning to	achieve learning outcomes:	
picked and developed			depending on delivery mode selected. Teache			
from the course				collaborative group work or independent study		
specification						
Topic Title				Teacher Activity	Student Activity	
	Introducing the Course Manual for JHS specialism	20 minutes		Face-to-Face:Tutor initiates shower thoughts 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 B4-B6 level specialism	
Group of Plants	Recap of year 1 lessons and challenges thereof.	30 minutes 40 minutes		Face-to-face/Group activity: Tutor initiates a Pyramid discussion on the year 1 concepts with student teachers, and encourages them to reflect on the new concepts, the challenges and unique lessons	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 upper primary science lessons	
	Group of plants: erect, creeping and climbing plants (B4.1.1.1.1, B4.1.1.1.2, B4.2.2.1.1)			40 minutes		Face-to-face/Group activity: Tutor led Nature walk for student teachers to collect different plants for classification.

	Doot queters of	40 minutes	Face to face /Crown	Face to face /Crease		
	Root system of	40 minutes	Face-to-face/Group	Face-to-face/Group		
	plants		activity: Tutor allows Student teachers to	activity:Student teachers		
	(B4.1.1.1.1,			in diverse groups develop,		
	B4.1.1.1.2,		collect plants with	display and discuss their		
	B4.2.2.1.1)		different root systems	developed classification		
			from previous nature	chart according to the		
			walk	categories of root systems		
				of the plants collected.		
	Characteristics of	25 minutes	Face-to-face/Group	Face-to-face/Group		
	leaves and stems of		activity:Tutor to guide	activity:Mixed ability		
	plants		student teachers to use	/gender based group		
	(B4.1.1.1.1,		Jigsaw puzzle and	presentation and		
	B4.1.1.1.2,		matching/mapping to	discussion of their		
	B4.2.2.1.1,		sort out and classify	identification classification		
	B6.1.1.1.1)		different leaves and	of the plant parts		
	,		stems of plants into			
			appropriate categories			
	Uses of plants	25 minutes	Face-to-face/Group	Mixed ability/gender		
	(B6.1.1.1.1)	25 minutes	activity:Tutor puts	group to present and		
	(50.1.1.1.1)		student teachers into	discuss their findings on		
			mixed ability /gender	the uses of plants and to		
			based groups to discuss	demonstrate some of the		
			uses of plants	observed skills Values		
				such as care, sincerity and		
				cross cutting issue like		
				innovation will be learnt		
				through Group work.		
Which cross cutting			rules to protect vulnerable			
issues will be	-		classroom atmosphere. Thr			
addressed or	Student – Teachers sp	ecific weakness an	nd Strengths will be identifie	ed and catered for.		
developed and how						
Lesson assessments –				narts on groups of plants and		
evaluation of learning:			on root systems of plants (2			
of, for and as learning		-	achers to provide reports or			
within the lesson		its and on the uses	of plants. 40 % of total mai	rks for the semester (20		
	marks)					
Teaching Learning			, climbing and erect plants,			
Resources), jigsaw/puzzles on differe	nt leaves and stems of		
	plants, Flip Charts, Bal					
Required Text (core)			ience Curriculum for Primar			
			K., Essiah, J. W., Fometu, E.			
	-	science teachers in	tegrated science for senior l	high schools. Accra: Unimax		
	MacMillan.					
Additional Reading List			a association of science tead	chers physics for senior high		
	schools. Accra: Unima			to a character of the state		
			iuria association of science t	teachers chemistry for senior		
	high schools. Accra: U	nimax Macivillan.				
	Acabara Amarina A	9 Oppong E 1/ /2/	12) Intograted actions for	the basic school teacher '		
		auppong, E. K. (20	013). Integrated science for	the basic school teacher I.		
	Winneba: IEDE.		ara E Camlafa V OCH	Ofari D (2011) CM		
			ara, E., Samlafo, V., &Obeng			
CDD Dequinement			s: Students book. Accra, Gha			
CPD Requirement	-	Jigsaw/puzzies, co	ncept maps and how to des	sign learning activities for		
Course Accessment	specific grade levels	at Dortfolio Accord	ment (30% overall score)			
Course Assessment						
		n of Student Work essment – 20%	(3 items – 10%) = 30%			
	 Reflective Journal – 40% Organization of the Subject Portfolio- 10% (How its presented/organized) 					
	Organization	of the Subject De-	rtfolio 10% (How its press)	ated (organized)		

¹ See rubrics on subject Portfolio Assessment in Annex 6 of NTEAP

² 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%
Conclusion – 30%
Component 3: End of Semester Examination – (40% overall Semester Assessment

² See rubrics on Subject Project Assessment in Annex 6 of NTEAP

Ye	ear of B.Ed. 2	Semester	1	Place o	f lesson in seme	ster ₁ 2	3 4 5 6 7 8 9 10	11 12	
Titl	e of Lesson		Group of P	lants and A		Lesson Duratio	n 3		
Les	son description	In this lesson, the Tutor will assist the student teachers to deepen their understanding of basic concepts of group of plants and animals and classification of animals using their characteristics. The lesson will expose them to teaching strategies and material so that they will effectively handle similar topics in their future science classrooms. The student teacher will also appreciate the relationship between humans and animals.							
kno (as	vious student teacher owledge, prior learning sumed)						chool integrated so		
	sible barriers to						nmon animal spe		
Les to s	rning in the lesson son Delivery – chosen support students in	Face-to- face	Practical Activity	Work- Based	Seminars	internet can b Independen Study	opportunities	te. Practicu m	
	ieving the outcomes son Delivery – main	V	V	Learning			V		
to tea lea	de of delivery chosen support student chers in achieving the rning outcomes.	brainstorming, open-ended questioning techniques and presentations Practical Activity: Manipulating, nature walk and recording							
•	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	 Tutor and student teachers to deepen their knowledge on grouping of animals Student teachers to be able to classify/groups of animals based on their body covering and habitats using observation of their characteristics and where they live Student teacher to identify the uses of some animals, pets and care of pets. Equip student teachers with appropriate pedagogic skills to handle the topic in their future class Student teacher develop an appreciation of animals in the environment 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. 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 2e: Understands how children develop and learn in diverse contexts and applies this in his or 							
•	Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning	I Issues, core and transfera skills, inclusivity. Equity and addressing diversity. How						ferable ty and How will	
	outcome	classify differe habita • Studer knowle coverin	nt teachers edge of bo ng of anim sh observat	ased on ent, and to exhibit dy als	submit a c grouping of based on different movement,	hart on cou animals ae: their thr ide habitats De teachers en- group tol n body aes	evelop the skills of nstruction of charts sthetics and critical ough observation, entification and class evelop the skills of ded questioning, sl erance of different sthetics and critical ough observation	I thinking ssification open- kills of copinions,	

	 Student teachers in inclusive mixed ability groups to brainstorm to come out with uses of animals and pets, and care of pets 		discussion tec Student teachers pre- should present a and report on uses of animals and pets and care of pets for whole class discussion	velop skills of brainstorming hniques, report writing and esentation, communication d critical thinking skills
Content of lesson picked and developed from the	Sub Topic	Time or Stage		o achieve learning outcomes: mode selected. Teacher led,
course specification		0	collaborative group work	-
Topic Title			Teacher Activity	Student Activity
Group of Animals (B4.1.1.1.1, B4.1.1.1.2, B4.2.2.1.1, B6.1.1.1.1)	Grouping of animals based on movement and living space	60 minutes	Face-to-face/Nature walk:Tutor led Nature walk for student teachers to observe movement and living spaces (habitats)of different animals Tutor guides student teachers in diverse groups to use their observation to put animals into various categories based on their movement and habitats	Face-to-face/Group work: Student teachers in groups develop and present classificatory charts and discuss their charts
	Body covering of Animals	60 minutes	Face-to-face: Tutor uses open-ended questions to elicit student- teachers' knowledge gained through observation and daily experiences with different body covering of animals and uses of the body covering. Allow student teachers to watch short video clips on coverings of animals (https://www.youtube.c om/watch?v=Yy4RLd8YV 6Y)	Face-to-face: Student teachers watch short video clips on different animal coverings, summarise and share their reports on the discussion in addition to providing a list of animals with their corresponding body covering and uses of the latter
	Uses of some animals, pets and care of pets	60 minutes	Face-to-face/Group work: Tutor guides student teachers in inclusive/gender groups to brainstorm and come out with uses of animals, and pets and to explore some of the key features of caring for pets including needs of pets	Face-to-face/Group work: Mixed ability/gender group to present and discuss their findings on the uses of animals and pets and caring of pets, to demonstrate some of the observed skills. Values such as care, sincerity and cross cutting issue like innovation will be learnt through group work.

J. J	ity and SEN: through setting ground rules to protect vulnerable student - Teachers and
will be addressed or	establishing an interactive and inclusive classroom atmosphere. Through the game of "Tell it",
developed and how	Student – Teachers specific weakness and Strengths will be identified and catered for.
Lesson assessments –	Assessment for learning: Student teachers to provide charts on grouping of animals based
evaluation of learning: of,	their movement and habitats
for and as learning within	• Assessment as Learning: Student teachers present group reports on their knowledge of
the lesson	body covering of animals and their uses as elicited from group/whole class discussion
	• Assessment of learning: student teachers to provide group reports on uses of animals and
	pets and caring of pets. 40 % of total marks for the semester
Teaching Learning	The Course Manual, pictures of animals in different habitats; pictures from the internet of
Resources	animals with different body covering, pictures of pets, Flip Charts, Ball, Pens, Pencils, 'A' 4
	sheets, markers, short video clips from YouTube
	https://www.youtube.com/watch?v=Yy4RLd8YV6Y
Required Text (core)	NaCCA, Ministry of Education (2019). Science Curriculum for Primary Schools (B4-B6). Accra
	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.
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). 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 observation skills, brainstorming techniques, report writing and how to design
	Learning activities for specific and inclusive multi-grade classroom

Ye	ear of B.Ed. 2	Seme	ster	Place	of lesson in se	emester	12 3 4	5678910	11 12	
Tit	e of Lesson	METALS A	ND NON-M	ETALS (B4-B6)	Lesson Du	ration		3		
Pre tea pri	son description evious student icher knowledge, or learning sumed)	This lesson is designed to equip the student teacher with requisite pedagogic knowledge, understanding and skills necessary to differentiate between metal and non-metals. The course contents are: types of materials, characteristics of metals and non-metals, uses of metals and non-metals. The course will be delivered using the following methods: Discussion, presentations (group/individual), project work/practical work, demonstrations, brainstorming, and simulation. The following assessment modes will be used: Examination, tests, project work, class assignments and presentations, and portfolio. Student teachers have studied the 3 states of matter and have grouped them into solid, liquid and gas in their first year.								
	ssible barriers to				periodic table of		ound in th	ne compound f	orm	
	rning in the lesson				ation in the pur	1		- 1		
cho stu	son Delivery – osen to support dents in achieving e outcomes	Face-to- face ⊠	Practical Activity ⊠	Work-Based Learning	Seminar	Independ Study 🖾		e-learning opportunities ⊠		
cho stu ach	in mode of delivery osen to support dent teachers in hieving the learning tcomes. 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	m R R C B Get th Discar Demo Desigr NTS: The Tb: Impro Profession 1c: Demo 2c: Has set knowledg	 them into metals and non-metals. Compose songs using some chemical properties of metals and non-metals. Brainstorm and use simulations to distinguish between metals and non-metals. Get the conceptual understanding of metals and non-metals. Discard the common misconceptions that student teachers have on chemical elements. Demonstrate understanding of the importance of metals Designing activities to teach metals and non-metals. 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. 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 2e: Understands how children develop and learn in diverse contexts and applies this in his or							
•	Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome	knowl differe differe enviro • Desigr	be and dem edge of hov entiate betw ent material proment. n activities t ent material	nonstrate w to veen ls in the o identify	Produce a rep chats on how differentiate between diffe materials in th environment.	oort and Sh to St erent CC he w . di th th th th	sues, core tills, inclus ddressing hering ide tudent tea tills of con bllaboratio hy apprece fference a hinking an prough car	ich cross – cut e and transfera sivity. Equity ar diversity. How <u>Idressed or der</u> as in class, the achers develop nmunication, on and mutual ciating individu and abilities, cr d responsibilit [*] reful participat t/discussion, w	ble nd will veloped the respect al itical y ion in	

Topic/Title	main group non-metalsUse ICT res to discuss t	Topic Time or Teach			handling of devices, honesty and accuracy. e learning outcomes: depending her led, collaborative group work			
		Juge		dependent study	iner ieu, conaborative group work			
					Student Activity			
Metals and Non- Metals (B5.1.2.2.1, B6.1.2.1.1, B6.1.2.2.1)	Types of materials : Characteristic s of metals and non- metals Modern day uses of metals and non-metals. (B5.1.2.2.1, B6.1.2.1.1,	140 minutes 40 minutes	Teacher ActivityFace-to-face/Group activityTutor guides student teachersto form groups of 3 membersof mixed abilities tobrainstorm, watch videos andperform activities to identifyand describe the distinctfeatures (characteristics) ofmetals and non-metals.https://www.youtube.com/watch?v=ZQ2B- AyxZs(Ensure that different abilitiesand strengths/needs arecatered for to ensure a safeworking environment andequal opportunities)Face-to-face/Group activityTutor guides student teachers,working in mixed ability groupsto discuss the uses of metals		Face-to-face/Group activity Student teachers work in groups to brainstorm and watch videos on the distinct features of metals and non-metals and produce a list of some metals and non- metals found in their environment Student teachers draw concept maps of metals and non-metals according to their characteristics (physical and chemical properties) Mini project: Student teachers design simple processes or activities that can be used to distinguish between metals and non-metals Face-to-face/Group activity Student teachers work in mixed ability groups to produce chats on modern day uses of metals and non-metals			
Which cross cutting issues will be addressed or developed and how Lesson assessments – evaluation of learning: of, for and as learning within the	B6.1.2.2.1)Equity and SEN: through setting ground rules to protect vulnerable student-teachers and establishing an interactive and inclusive classroom atmosphere. Through the differentiation of metals and non-metals and how they react to become useful to society, student-teachers' accuracy, honesty and carefulness will be addressed.Assessment as learning: Student teachers build stock of materials in terms of metals and non- metals and match materials according to their physical and chemical properties.Assessment of learning: Student teachers present mini projects on simple activities to distinguish between metals and non-metals or concept maps of metals and non- metals and							
lesson Teaching Learning Resources	Some resource: teaching would computer, Proc instructional to <u>https://www.yu</u>	match materials. Some resources that would be required to successfully enable an inclusive integrated science teaching would be Laboratory equipment, Chemicals, Smartphones, Tablets, Laptops, Desktop computer, Productivity tools (software that allow teachers to work better), Subject based instructional tools/applications. YouTube videos e.g. https://www.youtube.com/watch?v=ZQ2B- AyxZs						
Required Text (core)	Abbey, T. K., Al	hassan, B.,	Ameyil	oor, K., Essiah, J. W., Fometu	Primary Schools (B4-B6). Accra J, E., &Wiredu, M.B. (2008). <i>Ghana</i> <i>high schools</i> . Accra: Unimax			

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 in improvisation and the use everyday simple materials to teach upper primary science

Year of B.Ed. 2	Semester	1 Pla	ace of lesso	on in semes	ter 123 4 5	6789101112					
Title of Lesson	RUSTING			Lesson	Duration	3					
Lesson description	understanding teacher will be surface of iror insolating the	This lesson is designed to equip the student teacher with requisite pedagogic knowledge and understanding of the skills to identify corrosion as rusting of ferrite metals. The student teacher will be introduced to the causes and effects of rusting of iron, cleaning rust from surface of iron and methods of preventing rusting such as: painting, oiling or greasing; insolating the surface of iron from air.									
Previous student teacher knowledge, prior learning (assumed)	characteristics	Student-teachers have studied the properties of metals and non-metals and their characteristics in the previous lesson.									
Possible barriers to learning in the lesson	Misconceptio	n on iron and	d steel, and	prevention o	f rust.						
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to- face ⊠	Practical Activity⊠	Work- Based Learning	Seminar	Independent Study図	e-learning opportunities⊠					
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	The course wi Face-to-face: Practical activ Independent s e-learning op	Discussion, p ity: demonst Study: projec	resentations rations, bra t work/prac	s (group/indi instorming tical work an	vidual) d						
 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 	 Acquire practical knowledge of the causes of rusting and how it can be prevented. Discard the common misconceptions that student teachers have on rusting of elements Demonstrate understanding of the disadvantages of rusting. Designing activities to teach prevention of rusting. 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. 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 2e: Understands how children develop and learn in diverse contexts and applies this in his on 										
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome 	skills, inclusivity. E addressing diversi these be addresse										
	understan causes of Design pr activities/ preventio Engage in	-	e ing of	Produced re and chats o causes of ru Designed activities or prevention Micro teach the topic ru and its prev	n the Student to sting skills of co collabora respect w of rust individual abilities, o sting participat work/disc	leas in class, the eachers develop the ommunication, tion and mutual hy appreciating difference and critical thinking and ility through careful ion in group cussion, well handling s, honesty and					

Topic/Title	Sub Topic	opic Time or Stage Teaching and learning to achieve learning outcomes depending on delivery mode selected. Teacher led,				
			collaborative group work o			
			Teacher Activity	Student Activity		
Ducting	Ducting	EQ minut	-	-		
Rusting (B5.1.2.2.1, B6.1.2.1.1,	Rusting	50 minut	Face-to-face: Tutor guides student teachers	Face-to-face/Group activity: Student teachers work in mixed		
(B5.1.2.2.1, B0.1.2.1.1, B6.1.2.2.1)		es	to brainstorm on the	ability groups to brainstorm on		
D0.1.2.2.1)						
			meaning of rust and the environmental problems	the meaning of rust and the environmental problems		
			associated with the	associated with the disposal of		
			disposal of used metals.	used metals.		
			disposar of used metals.	Student teachers produce a		
				report on their brainstorming.		
(B5.1.2.2.1, B6.1.2.1.1,	Causes of	60 minut	Face-to-face/Group	Face-to-face/Group activity:		
B6.1.2.2.1)	rusting	es	activity: Tutor guides	Student teachers collect and		
2001202020	1000008		student teachers to	examine metal objects from the		
			discuss the causes and	environment for signs of rust		
			effects of rusting, for	and carry out activities to		
			example, gradual	determine causes of rusting.		
			degradation of metals.	, i i i i i i i i i i i i i i i i i i i		
			_	Student teachers work in		
			Tutor guides student	groups to perform activities to		
			teachers to perform	demonstrate the conditions		
			simple activities on the	necessary for rusting to occur.		
			causes of corrosion of			
			metals.			
(B5.1.2.2.1, B6.1.2.1.1,	Preventing	70 minutes	Face-to-face/Group	Face-to-face/Group activity:		
B6.1.2.2.1)	rust		activity: Tutor guides	student teachers brainstorm to		
			student teachers to	come out with methods of		
			discuss methods used to	cleaning and preventing rusting.		
			prevent rusting, for	They then demonstrate and		
			example: painting, oiling or greasing; insolating the	design an activity on how to prevent iron from rusting.		
			surface of iron from air.	Student teachers use concept		
			Other methods worth	mapping to sum up the		
			considering are	discussions on rusting.		
			Alloying			
			Galvanizing	Student teachers work in their		
			 Coating and 	groups to do a 5-minutes micro		
			Painting	teaching of the topic rusting		
			Greasing	and its prevention		
			Humidity control			
Which cross cutting issues				nerable student-teachers and		
will be addressed or	-		inclusive classroom atmosph			
developed and how	-	ts prevention, stu	dent-teachers' accuracy, hon	esty and carefulness will be		
	addressed.					
Lesson assessments –	A		at the share build of the C			
evaluation of learning: of,		-		terials in terms corrosion/rusting		
for and as learning within the lesson			g to their physical and chemic nt teachers submit project we			
the lesson		is, and portfolio	it teachers submit project Wo	איל איז		
Teaching Learning			required to successfully enal	ole an inclusive integrated		
Resources			oratory equipment, Chemica			
		-		at allow teachers to work better),		
		ed instructional too				
Required Text (core)				r Primary Schools (B4-B6). Accra		
			yibor, K., Essiah, J. W., Fome			
			eachers integrated science fo			
	Unimax Mad	-				
	•					

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). 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 sourcing appropriate multimedia resources for use in the upper primary science teaching

Year of B.Ed. 2	Semes	ter 1	Place	of lesson in s	emester	123 4 5 6 7	78910	0 11 12			
Title of Lesson	Measur	rement in S	cience	Lesson Duration	3 Ho	ours					
Lesson description	temper using th enable will also Measur	In this lesson, student teachers are taken through the meaning of temperature and units of temperature, reading temperature on analogue and digital thermometers, handling and using thermometers. Student teachers will engage in measurement activities which will enable them to better understand processes involved in measuring temperature. The lesson will also, enable student teachers to acquire the skill and pedagogic knowledge to teach Measurement of Temperature to the Basic School learner.									
Previous student teacher knowledge, prior learning (assumed)				ngaging in estimations sense of touch.	ations of bo	dy temperature	and de	gree of			
Possible barriers to learning in the lesson	Studen • •	······································									
Lesson Delivery – chosen to support students in achieving the outcomes	Face- to- face √	Practical Activity √	Work-Base Learning		Indepen Study √		-	Practicum			
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to Face: Discussion, Tutor and student teachers' interaction on the use of thermometers for measuring temperatures Practical Activity: Practical manipulation and use of thermometers Independent Study: Inquiry and reflections e-learning opportunities: Use of internet sources, simulations and video presentations							tions			
 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 	 Ide De NT lea 1b: Co 1c: sch 2b out 2c: kno 2e: Uno her tea 	 Identify appropriate tools used for measuring temperature 									
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome 	• Sho	ow derstanding Il of how to	g and	d showing body devices, good identification				rable skills, Idressing be ses of ion of tools			
	me ter	easure body mperature u ermometers	, using	temperatures o classmates and some solids and	of c l liquids fi	ilass, conversion rom degree Cels ahrenheit, Stude	of tem ius to d	perature egree			

Topic/Title	 Demonstrate understanding everyday applications of measurement temperatures Prepare a less for the teaching measurement Sub Topic 	g of hotr • Pres lesso t of teac ton prim ng of	eess and coldness coldness eent a 15-minutes w on plan on how to d h measurement of th peratures in ca nary school w Teaching and learnin depending on deliver collaborative group v collaborative group v	evelop skills of communication, ollaboration and mutual respect while appreciating individual ifference and abilities, critical ninking and responsibility through areful participation in group work/discussion.
Measurement in Science (B5.4.1.2.2)	Review of lesson 4 Estimation of temperatures Meaning of temperature and units of temperature, reading temperature, reading temperature on analogue and digital thermometers, handling and using thermometers	15 minutes 45 minutes 60 minutes	Teacher ActivityFace-to-face: Tutor letter and addresses areas to need further clarificationFace-to-face/Group activity: Tutor introduces the lesson reviewing student teachers' relevant previous knowledge of measurement of temperature. Allows student teachers to win mixed ability group do estimation of body temperatureFace-to-face: Tutor u open-ended question elicit misconceptions/incodi ideas about measurementFace-to-face: Tutor u open-ended question elicit misconceptions/incodi ideas about measurementFace-to-face: Tutor u open-ended question elicit misconceptions/incodi ideas about measurementFace-to-face: Tutor u open-ended question elicit misconceptions/incodi ideas about measurementFace-to-face: Tutor u open-ended question elicit misconceptions/incodi ideas about measurementFace-to-face: Tutor u open-ended question elicit misconceptions/incodi ideas about measurementFace-to-face: Tutor allows student teacher on how to use/handle and units of temperating and units of temperating and units of temperating in the group (gende based) of 3 members guide student teacher on how to use/handle analogue and digital thermometers to take the readings of temperatures of their colleagues in the group to produce a chart.	asson that tionactivity: Student teachers work in groups to discuss lesson 4 and note areas that need further clarificationbyFace-to-face/Group activity: Student teachers tell their previous knowledge on measurement of body temperature. They work in groups to feel each other's body temperature using their palms.vork usesFace-to-face: Student teachers answer open- ended questions to bring their incorrect ideas on measurement.Face-to-face: Student teachers brainstorm to come out with the meaning and units of temperaturer- a groups (gender-based) of 3 members, student teachers practice how to use/handle analogue and digital thermometers to temperatures of their r

	Teaching of how	60 minutes	Face-to-face/E-learning	Face-to-face/Group				
	to teach	co minutes	opportunities: Tutor	activity: Student teachers				
	measurement		allows student teachers	in groups do power				
	(using analogue		to do short power	point/poster presentation				
	and digital		point/poster	on how to teach				
	thermometers in		presentation on how to	measurement (using				
	taking the		teach measurement	analogue and digital				
	readings of body		(using analogue and	thermometers in taking				
	temperature) to		digital thermometers in	the readings of body				
	the Basic school		taking the readings of	temperature) to the Basic				
	learner		body temperature) to the	school learner				
			Basic school learner					
			(Mixed intellectual ability					
			Groups of 3 members).					
Which cross cutting issues	Equity and SEN: th	rough setting gro	und rules to protect vulneral	ble student-teachers and				
will be addressed or			isive classroom atmosphere.					
developed and how	-		-teachers' difficulties in	,, , , , , , , , , , , , , , , , , , , ,				
	manipulating/handling/measuring skills of body temperatures will be addressed.							
Lesson assessments –	Assessment of lear	ning: Charts proc	duced by student teachers of	body temperatures of their				
evaluation of learning: of,	colleagues using ar	nalogue and digit	al thermometers to measure					
for and as learning within	Assessment as lear	ning: Student tea	achers doing short presentati	ions (3-5 minutes each) on				
the lesson	how to teach meas	surement (using a	analogue and digital thermor	neters in taking the readings				
	of body temperatu	re) to the Basic s	chool (Reflection on present	ations).				
Teaching Learning	Digital and analogu	le thermometers	, containers, water, poster p	aper, markers, computers				
Resources								
Required Text (core)	NaCCA, Ministry of	Education (2019). Science Curriculum for Prin	mary Schools (B4-B6). Accra				
			r, K., Essiah, J. W., Fometu, E.					
			ers integrated science for sen					
			D Coordinators Themes 1- 10					
Additional Reading List			Ghana association of science	teachers physics for senior				
	high schools. Accra							
			5). Ghana association of scien	ce teachers' chemistry for				
	senior high schools							
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher							
	I. Winneba: IEDE.							
			n-Wara, E., Samlafo, V., &Ob	- · · ·				
	-	· · ·	chools: Students book. Accra,					
CPD Requirement	Practicing how to h	handle/measure	with analogue and digital the	rmometers accurately				
	1							

Year of B.Ed. 2	Seme	ester 1	Place	of lesson in	semester	123 4 5 6 7 8 9	0 10 11 12			
Title of Lesson	Misconce	Misconceptions about Measurement in Science Lesson Duration 3 Hours								
Lesson description	In this lesson, Tutor discusses with student teachers' common misconceptions about temperature and physical measure Area/volume of plane figures, Mass/weight of objects). In common usage, temperature has been misconstrued to be heat, the mass of an object is often referred to as its weight, though these are in fact different concepts and quantities, and area/volumes of plane figure are often difficult to measure. The lesson will enable students to have conceptual understanding of temperature, use scientific vocabulary like mass and weight appropriately, find areas/volumes of plane figures correctly and teach physical measure of Area/volume of plane figures, Mass/weight. Student teachers can measure the body temperatures of their colleagues using analogue and									
teacher knowledge, prior learning (assumed)		ermometers.		body temper						
Possible barriers to learning in the lesson	Student • •									
Lesson Delivery – chosen to support students in achieving the outcomes	Face- to-face √	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.	machine Practical Indepene	s Activity: Pract dent Study: Ind	tical manipu quiry and re	Ilation of simp		ns on the function presentations	is of simple			
 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 	 Measure accurately with some measuring tools Identify appropriate tools used for measurements Identify appropriate scientific vocabulary usage Demonstrate the skill in teaching the subject matter 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. 2b Has comprehensive knowledge of the official school curriculum, including learning 									
aspects of the NTS addressed	outo 2c: F knov	comes Has secure cor wledge for the erstands how o	ntent knowle school and	edge, pedagog grade they te	gical knowledge ach in.	and pedagogical c	content			

 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome 		Learning Outcomes		 Learning Indicators Produced charts showing measurements of area and volume of plane figures Produced chart showing measurements of mass and weight of 		core Equi these Corre good meas Stud come respe diffe	Identify which cross – cutting Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed Correct/ handling and uses of devices, good identification of tools for measurements, sharing ideas in class, Student-teachers develop skills of communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking		
Topic/Title	Sub To	Mass/weig objects. opic	ht of Time or Stage	objects or Teaching and learning to		parti : o ach i	responsibility through careful cipation in group work/discussion. ieve learning outcomes: depending eacher led, collaborative group work Student Activity		
Misconceptions about Measurement in Science	about measu (Area/ plane	nceptions physical ire ivolume of figures, weight).	120 min	hutes	Teacher ActivityFace-to-face: Tutorintroduces the lesson byallowing Student teacherto reflect and summarizthe previous week's lessFace-to-face: Tutor useopen-ended questions telicitmisconceptions/incorreraive ideas about physicameasure (Area/volumeplane figures, Mass/weilFace-to-face/Groupactivity: Tutor guidesstudentteachers to formgroups of 3 members ead(mixed intellectualability/gender-based) tomeasure area, volume oplane figures and measumass and weight of objeusing rulers, electronic aspring balance (match b)cubes of sugar, chalk boexercise books)Face-to-face/E-learningopportunities: Tutor allistudentteachers to do spower point/posterpresentation on how toteach measurement(Area/volume of planefigures, Mass/weight) toBasic school learner (Miintellectual ability Group3 members).	ers ee soon. ss o cct/n al of ight) n ach of ure ects and oox, ox, sows hort	 Face-to-face: Student teachers reflect and summarize the previous week's lesson. Face-to-face: Student teachers answer open-ended questions to bring their misconceptions/incorrect/naive ideas about physical measure (Area/volume of plane figures, Mass/weight). Face-to-face/Group activity: student teachers in groups of 3 members each (mixed intellectual ability/gender-based) measure area, volume of plane figures and measure mass and weight of objects using rulers, electronic and spring balance (match box, cubes of sugar, chalk box, exercise books) Face-to-face/Group activity: Student teachers in groups do power point/poster presentation on how to teach measurement (Area/volume of plane figures, Mass/weight) to the Basic school learner. 		

	Use of	60 minutes	E-learning/Independent	E-learning/Independent study:					
	appropriat	oo minutes	study: Tutor allows	Individual student teachers search					
	e scientific		individual student teachers	online resources for use of					
	vocabular		to research online	appropriate scientific vocabulary					
	y		resources for use of	with regard to the use of mass and					
	У		appropriate scientific	weight of objects to produce charts.					
			vocabulary especially for	weight of objects to produce charts.					
			when to use mass and						
			weight of objects to						
			produce charts.						
			https://study.com/academy						
			/lesson/what-is-mass-						
			lesson-for-kids.html						
Which cross cutting	Equity and S	EN: through se	tting ground rules to protect vu	Inerable student-teachers and					
issues will be	establishing an interactive and inclusive classroom atmosphere. By practicing with measuring of								
addressed or	area/volume of plane figures and also doing online research on the correct vocabulary of mass								
developed and how	and weight of objects, student-teachers' difficulties in								
	manipulating/handling/measuring/vocabulary usage skills will be addressed.								
Lesson assessments –	Assessment	Assessment of learning: Charts produced by studentteachers online research of appropriate							
evaluation of	scientific vocabulary with regard to the use of mass and weight of objects.								
learning: of, for and	Assessment as learning: Studentteachers' measurement of area/volume of plane figures and								
as learning within the	mass/weight of objects helps to assess their learning (Use checklist to ascertain, no score, just								
lesson	praise)								
Teaching Learning	match box, cubes of sugar, chalk box, exercise books, manila cards multimedia resources.								
Resources	YouTube videos e.g. https://study.com/academy/lesson/what-is-mass-lesson-for-kids.html								
Required Text (core)	NaCCA, Ministry of Education (2019). Science Curriculum for Primary Schools (B4-B6). Accra								
	Abbey, T. K., Alhassan, 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; Handbook for PD Coordinators Themes 1-10								
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.								
	Asabere-Am Winneba: IE		oong, E. K. (2013). Integrated sc	ience jor the basic school teacher I.					
			Naman Wara E Samlafa V	& Ohong Ofori D (2011) SW/					
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., & Obeng-Ofori, D. (2011). SWL								
CPD Requirement	integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.								
Cr D Requirement	Training in selecting appropriate e-resources for teaching upper primary school lessons. Practicing how to handle/measure areas/volume and mass/weight accurately								
			icusure areasy volume and mas	of weight accurately					

Year of B.Ed. 2	Semester 1 Place of lesson in semester					123 4 5 6 7 8 9 10 11 12		
Title of Lesson	Course Review 1 with STS seminar					Lessor	esson Duration 3	
Lesson description Previous student teacher knowledge, prior learning	This lesson is a review and audit of the lessons for the first half of the semester as well as review and discussion of lessons learned, reflection on observations made during the supported teaching in schools (STS). Lessons learnt from lesson 1 through lesson 6 in all learning approaches and observations/experiences during STS.							
(assumed) Possible barriers to learning in the lesson	Misconception to some concepts not adequately dealt with. Lessons not appropriately understood by student - teachers.							
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to- Practica Wo		ork- sed ning	Seminars Indepe V Stu g V		-		Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-Face: Discussion, group work in same ability group works.Modelling, Concept Mapping and Cartooning. Independent Study: Tutor and student teacher reflections (individually and collectively) e-learning Opportunities: OERs and Video presentations Seminar: Presentations, Discussions and reflections of STS							
 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 	 Ascertain the level of understanding of concepts. Test various skills and cross – cutting issues Provide remedial tuition/tutorials on where necessary for experiences during STS Correct misconceptions and misinformation Build the necessary support going forward on SEN and Gender issue NTS: 1a) Critically and collectively reflect to improve teaching and learning 1c) Demonstrate effective growing leadership qualities in the classroom and wider school 1d) Is guided by legal and ethical teacher codes of conduct in his or herdevelopment as a professional teacher 2a) Demonstrates familiarity with the education system and key policies guiding it. 2b) Has comprehensive knowledge of the official school curriculum, includinglearning outcomes. 2c) Has secure content knowledge, pedagogical knowledge and pedagogical 							
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome 	 Identify we and streng learning th lesson for t period und Be able to 	eakness ths in e science the er review	• Ma and pa	ike a list of We d strengths on pers for sharing	aknesses poster 3	Issu skill add the dev Coll and wor	ntify which cross ues, core and tran ls, inclusivity. Equ lressing diversity. se be addressed of reloped laborations, Com I Research: Throu rk and presentation	sferable ity and How will or munication gh group on
	 Be able to file sons lea STS and statistical statistext statistical statistical statistical statistical statistic	rnt so far ate new d/or grey ing tion/misi	on and me • Pre and mis	STS and demo d illustrations of edia of lessons esent concept r d/or models lin sconceptions/r to new insight	nstrations on a given learnt so fai maps iking nisinformat	dev acti r Cre dev	ativity and critica reloped from refle ativity and critica reloped in develo concept maps	ective I thinking is

Content of lesson picked and developed from the	Sub Topic	Time or Stage	Teaching and learning to achieve learning outcomes: depending on delivery mode selected. Teacher led,				
course specification		Slage	collaborative group work or independent study				
Topic Title			Teacher Activity Student Activity				
Topic Title			Facilitate and provides the	Student Activity			
Course Deview 1 with CTC			-				
Course Review 1 with STS			necessary tool for students				
seminar		<u> </u>	activities.				
	Reviewing the	60 minutes	Face-to-face:	Face-to-face:Student			
	understanding of		Tutor led brainstorming	teachers discuss their			
	lessons on groups		session with student teachers	problems in the previous			
	of plants, groups of		to unearth the weaknesses	lessons and provide a			
	animals, metals		and strengths of student	checklist identifying and			
	and non-metals,		teachers in the lessons $1 - 6$.	recording all possible			
	rusting,		Initiate discussion /Talk for	weaknesses and			
	measurement in		learning approach using	strengths.			
	science,		groupings (Same ability and				
	misconceptions		then mixed groups) to				
	about		identify student teachers				
	measurement of		strengths and weakness in				
	science		the lessons learnt so far.				
	Discussion of	90 minutes	Seminar: Teacher allows two	Seminar:Student			
	observations	Jonnates	or three resource persons to	teachers listen to			
	during STS		make presentations on STS	various presentations.			
	during or o		based on the NTS. Tutor then	Student teachers then			
			guides student teachers	discuss observations			
			through problem-based	made during STS based			
			learning on National	on the National			
			Teacher's Standards and	Teacher's Standards,			
			reflection on observations	reflect and provide a			
			made during STS.	checklist of lessons			
			made during 515.	learned and problems			
				identified and how they			
				can be addressed.			
				Student teachers then			
				provide a reflection			
	Demedice to	20 minutes		report on STS			
	Remedies to	30 minutes	Face-to-Fae: Teacher groups	Face-to-Face: Students			
	course topics		student teachers according to	work in the special			
			remedy need and provide	groups (Same remedy			
			specific task assistance in the	need group) on tasks to			
			areas on concept needing	remedy their learning			
			remedy.	need. They then present			
				concept maps and/or			
				models linking			
				misconceptions/misinfor			
M/high anges sutting	Faulty and CENT	l		mation to new insights.			
Which cross cutting			ame group work to protect vulne	raple student - Teachers			
issues will be addressed	-		clusive classroom atmosphere.				
or developed and how	 Through modelling and group work, collaboration is established. Student teachers presentations during group work and model work presentation helps to 						
Lesson assessments –		•	auring group work and model wo	rk presentation helps to			
evaluation of learning:	assess them of le	0					
of, for and as learning		-	Student teachers working in grou	ps on remedial tutoring			
within the lesson	helps to assess t		-				
Teaching Learning	Cardboards, Course	manual, Poster p	aper, Projectors,				
Resources							
Required Text (core)			Science Curriculum for Primary S				
	Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., &Wiredu, M.B. (2008).						
	Ghana association of		s integrated science for senior hig				
Additional Reading List	Ghana association of MacMillan.	f science teachers		h schools. Accra: Unimax			

	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). 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	Seme	ster 1	Place o	of lesson in s	emester	123 4 5 67 8 9	9 10 11 12	
Title of Lesson	Teachin	g Ventilatio	nl			Lesson Duration	3 Hours	
Lesson description	This lesson exposes student-teachers to the concept of Convectionas heat transfer due to the bulk movement of molecules within fluids such as gases and liquids. The concept will also give student-teachers understanding of the system and means of the movement of air within the environment.							
Previous student teacher knowledge, prior learning (assumed) Possible barriers to	Student-teachers are aware of the movement or circulation of air around them. Students are familiar with boiling soups and would have observed the movement of the content of the soup Possible misconceptions about the flow of air and how water gets or liquids get heated when							
learning in the lesson			e bottom of the					
Lesson Delivery – chosen to support students in achieving the outcomes	Face- to- face √	Practical Activity√	Work-Based Learning	Seminars	Independe t Study√	n e-learning opportunities √	Practicum	
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to face: Discussions, demonstrations and observations, Group work and designing Independent Study: inquiry and Reflections e-learning Opportunities: Simulations, video presentations							
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	 Get the conceptual understanding of convection Discard the common misconceptions that student-teachers have about convection Designing activities to teach convection NTS: 2b) Has comprehensive knowledge of the official school curriculum, including learning outcomes p.12, 2c) Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. p.13 & 21) 							
 addressed Learning Outcome for the lesson, picked and developed from the course specification 	i 				iss in di ac	Identify which cross- cutting issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed Through discussions and sharing		
Learning indicators for each learning outcome	 curri be p prin Iden exar ever occu conv envi Eras miso abou conv Dem undo the f 	vection rent as woul presented to nary learner tify and give nples of ryday urrences of vection in th ronment. e conceptions	f	effects of con luce charts of	s (models, for rations of on current concept maps on charts of coccurrences of on for their or for their or current concept maps on charts of on for their or current concept maps on charts of current concept maps on charts of current concept maps on charts of current concept maps on charts of current current current current concept maps on charts of current			

Topic/Title	Sub Topic	Time or Stage	Teaching and learning to achieve learning outcomes:				
Topic/Title	Sub Topic	Time of Stage	depending on delivery mode selected. Teacher led,				
			collaborative group work or				
			Teacher Activity	Student Activity			
Teaching Ventilation I	Meaning of	60 minutes	Face-to-face/Group	Face-to-face/Group activity:			
(B5.4.1.2.1)	convection	oo minutes	activity: Teacher puts	Student-teachers brainstorm			
(00.4.1.2.1)	current		student-teachers in groups	and discuss the meaning of			
	current		of 5 to brainstorm and	convection current that can			
			discuss the meaning of	make meaning to the primary			
			convection current that	school learner.			
			can make meaning to the	Student-teachers use concept			
			primary school learner	maps and shower thoughts to			
			(ensure that different	explain convection current.			
			abilities and	Groups present their findings			
			strengths/needs are	to the class.			
			catered for to ensure a	(PD Theme 8, pg. 40; PD			
			safe working environment	Theme 4, pg. 23-46)			
			and equal opportunities).				
			Allow each group 5				
			minutes to present their				
			findings				
	Convection	60 minutes	Face-to-face/Group	Face-to-face/Group activity:			
	currents		activity: Teacher led group	Student-teachers use shower			
			discussions on applications	thoughts/discussions on			
			of convection currents	applications of convection			
			(groups should be	currents. Demonstrate			
			inclusive, multi-age, and	convection current by boiling			
			developmentally	water colored at the base.			
			appropriate).	Report on everyday			
			Assist student-teachers to	occurrences of convention			
			design a simple	current in the environment			
			experiment with boiling	and their homes.			
			water (a straw can be used	(PD Theme 8, pg. 40; PD			
			to colour the bottom of	Theme 4, pg. 23-46)			
			the water) to demonstrate				
			convection currents				
	Application	60 minutes	Face-to-face/Group	Face-to-face/Group			
	of		activity:Instructs student-	activity:Student-teachers			
	convection		teachers provide list/chats	watch short video clips or			
	(B5.4.1.2.1)		of effects of poor	simulations and discuss in			
			ventilation (Examples boiling of water, warm air	mixed ability groups the application of convection and			
			rising toward the ceiling or	produce chats for			
			attic of a house. Warm air	presentation and display.			
			is less dense than cool air,	presentation and display.			
			so it rises). Show short				
			video clips on convection.				
Which cross cutting	Equity and SI	EN: through appror	priate gender and equity sensit	ive group work to protect			
issues will be addressed			tablish an interactive and inclu				
or developed and how							
Lesson assessments –	Assessm	ent of learning: stu	dent-teachers write a short ex	amination on convection			
evaluation of learning:		-	r (determine marks from score				
of, for and as learning			lections designed experiments				
within the lesson			udent-teachers peer review ar				
		ons of convection.	and to a contract of poor review of				
Teaching Learning			kers or cooking pans, source or	f heat, poster colours, phones,			
Resources		top computers with					
			onvection-currents-definition-a	and-examples-4107540			
			the sector currents definition (

Required Text (core)	NaCCA, Ministry of Education (2019). Science Curriculum for Primary Schools (B4-B6). Accra Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., &Wiredu, M.B. (2008). <i>Ghana</i> <i>association of science teachers integrated science for senior high schools</i> . Accra: Unimax MacMillan; Handbook for PD Coordinators Themes 1 – 10. SCIENCE CURRICULUM FOR PRIMARY SCHOOLS (BASIC 4 - 6),SEPTEMBER 2019
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). 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 designing experiments for primary science teaching.

Year of B.Ed. 2	Seme	123 4 5 678 9 10 11 12									
Title of Lesson	Teaching	ventilation II			Lesson Dura	tion	3 Hou	urs			
Lesson description	This lesson exposes student-teachers to conceptualize ventilation in the form of aeration and how to help the primary school learner appreciate the need for fresh air and proper aeration. The concept will also give student-teachers understanding of how to explain to the primary school learner how the system allows the movement of air between the environment and the lungs through inhalation and exhalation. Student-teachers are aware of the need for proper aeration/ventilation in their houses										
Previous student	Student-	teachers are awa	are of the n	eed for pro	per aeration,	/ventilation in	their h	ouses			
teacher knowledge, prior learning (assumed)	through currents	the use of fans, a	air conditio	ners and th	e previous le	sson explained	d conve	ection			
Possible barriers to		Possible misconceptions about causes of illnesses, e.g. headaches, fatigues, suffocation and									
learning in the lesson	lung dise	lung diseases, which may have arisen as a result of poor ventilation.									
Lesson Delivery –	Face-	Practical	Work-	Seminars	Independe	ent e-learni	ng	Practicum			
chosen to support students in achieving the outcomes	to-face √	Activity	Based Learning		Studyv	opportu √	inities				
Lesson Delivery – main	Face-to f	ace: Discussions,	demonstra	ations and o	observations.	Group work a	and des	igning			
mode of delivery chosen to support student teachers in achieving the learning outcomes.	e-learnin	dent Study: Inqui g Opportunities:	Simulatior	ns, video pro							
Purpose for the lesson,	Get	the conceptual u	nderstandi	ng of ventil	ation						
what you want the	Disc	ard the common	misconcep	tions that s	tudent-teach	iers have abou	ut illnes	sses caused			
students to achieve,	as a	result of poor ve	ntilation								
serves as basis for the		gning activities t		ntilation							
learning outcomes. An	NTS:	0 0									
expanded version of the		comprehensive k	nowledge (of the offici	al school curr	iculum. includ	ling				
description.		outcomes p.12,									
• Write in full aspects		ecure content kr	nowledge, r	pedagogical	knowledge a	and pedagogic	al				
of the NTS addressed	content	knowledge for th	e school ar	nd grade th	ey teach in. p	.13 & 21					
 Learning Outcome for the lesson, picked and developed from the course specification 		Outcomes	Lean	ning Indicat		Identify which cross- cutting issues, core and transferable skills, inclusivity. Equity and addressing diversity. How wil these be addressed or develo					
Learning indicators for each learning outcome	conv relat	ne and explain vection current ir tion to the conce entilation	n i pt i	Presents Co maps on the relationship between co currents an	e s nvection d aeration	these be addressed or developed Through discussions and sharing of ideas in class student-teacher develop the skills of communication, collaboration and mutual respect while appreciating individual difference and abilities. They also acquire					
	good	tify conditions o d and poor ilation		Report writ models of g bad condition ventilation	ng on ood and ons for	skills in handli critical thinkin accuracy and t through active	ng devi ng, hone respons e partic	ices, develop esty, sibility ipation in			
	aboı pool	e misconception ut the effects of r ventilation whic s to headaches a gues	ch I	List the effe poor ventila how they ca remedied	tion and	group work/d	iscussic	on.			

	• [emonstrate		Present reflective				
		inderstanding of 1	the	reports on lesson				
		opic and be able		materials developed.				
	t	each.	1					
Topic/Title	Sub Topic	Time or Stage		eaching and learning to achieve learning outcomes: depending on elivery mode selected. Teacher led, collaborative group work or				
				pendent study				
				her Activity	Student Activity			
Teaching Ventilation II (B5.4.1.2.1)	Ventilation and convection	minutes	stude	 -to-face/Group activity: Put ent-teachers into different y group activities to 	Face-to-face/Group activity: Student-teachers brainstorm to come out with the relation			
	current		conv differ stren to en envir	storm on ventilation and ection currents (ensure that rent abilities and gths/needs are catered for isure a safe working onment and equal irtunities).	between convection and ventilation. Student-teachers use mind maps and shower thoughts to explain ventilation in terms of convection current. Groups make 5-minutes presentations of their findings to the class.			
	Applications	minutes	Face	-to-face/Group	(PD Theme 8, pg. 40; PD Theme 4, pg. 23-46) Face-to-face/Group activity:			
	of convection		activ discu conv sea b cond and v Grou incre home (The multi appre	ity:Teacher led group issions on applications of ection currents (Examples; ireeze, land breeze, air itioning, fridge, chimney ventilation of rooms). ps plan and develop ways of asing ventilation in their es and classrooms. groups should be inclusive, i-age, and developmentally opriate).	Student-teachers use shower thoughts/discussions on applications of convection currents to discuss why and how rooms should be ventilated. Report on everyday applications of ventilation and convention current in their homes. (PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)			
	Causes of poor ventilation and its effect	s	Teach cause how Requ deve prese	 to-face/Group activity: her led discussion of the es of poor ventilation and they can be remedied. ire of student teachers to lop models of how to ent aeration to primary ol learners. 	Face-to-face/Group activity: Discuss in mixed ability groups the effects of poor ventilation and make 2-minute presentations of how they can be resolved. Student-teachers provide list/chats of effects of poor ventilation and how they can be resolved			
Which cross cutting issues will be addressed or developed and how				gender and equity sensitive g tive and inclusive classroom a	roup work to protect vulnerable atmosphere			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	 ventilation Assessmand how Assessmand how 	on ent as learning: si to resolve them ent for learning: s	tudent- student	teachers make presentations	nation on convection currents and on the effects of poor ventilation mind maps and shower thoughts,			
Teaching Learning Resources	Cardboards,	poster papers, po	oster co	lours, phones, tablets, deskto	p computers with internet access.			

Required Text	NaCCA, Ministry of Education (2019). Science Curriculum for Primary Schools (B4-B6). Accra
(core)	Abbey, T. K., Alhassan, 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;
	Handbook for PD Coordinators Themes 1 – 10.
Additional	Abbey, T. K., & Essiah, J.W. (1995). Ghana association of science teachers physics for senior high
Reading 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	Training on developing modelling concepts into concrete models.
Requirement	

Year of B.Ed. 2	Semeste	er 1	Place of I	esson in sem	ester 12 3	456789 10	11 12		
Title of Lesson		y of Early Ac and Learning		mer and Science	Lesson Duratio		rs		
Lesson description	Science le adolescen makes the introduces	Science learning at the basic school can be challenging to the learning especially the early adolescent. Their inclination to risk taking and rapid development in psychosocial activities makes them both venerable and Critical in understanding their environment. This lesson introduces the student-teacher to the way early adolescent adapt into learning science, their cognitive and psychosocial needs and how early adolescents learn science.							
Previous student teacher knowledge, prior learning (assumed)	Learners r	nodel lessor	ns and materia		ry learner from	previous lessons	and have		
Possible barriers to	Student-t	eachers ma	y:						
learning in the lesson	•	Have miscor	nceptions abor	ut age appropria	te learning				
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to- face √	Practical Activity	Work-Based Learning	Seminars √	Independen t Studyv	e-learning opportunitie s √	Practicum		
 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 	 e-learning Seminar: F Stude learni NTS: 1b) Impro Profession 2b) Has cc outcomes 2c) Has see for the sch 2e) Under her teachi 3f) Pays at ensuring to 3g) Emploid classes. 	opportuniti Reflective pr int-teachers ing difficultion ves persona hal Developr omprehensiv coure conter hool and gra- stands how ing ttention to a cheir progres bys instruction	vill adopt mu will adopt mu es l and profession nent ve knowledge the knowledge, ide they teach children deve all learners, es ss. onal strategies	ernet, simulation ich positive outle onal developmen of the official sc pedagogical kno in. lop and learn in pecially girls and	ook to deal with nt through lifeld hool curriculum owledge and peo diverse context d students with mixed ability, r	esentations n early adolescen ong learning and n, includinglearni dagogicalcontent cs and appliesthis SpecialEducation nultilingual and d leads topurpos	Continuous ng knowledge in his or al Needs, nulti-age		
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome 	Explain develops of the adole they reference to the		eed si now access	roduce a chart nowing developr eeds of the early dolescent relatin cience learning.	core and inclusivi diversity address Student communy mutual ing to individu critical t	which cross – cu d transferable sk ty. Equity and ac y. How will these ed or developed -teachers develo nication, collabo respect while ap al difference and hinking and resp careful participa	ills, dressing be p skills of ration and preciating I abilities, onsibility		
		, (NTS 2c, p. NTS2b, p.12 & 21)			group w	ork/discussion.			

Topic/Title	Sub Topic	Time or Stage	Teaching and learning to achieve learning outcomes: depending on delivery mode selected. Teacher led,			
			collaborative group work or i	ndependent study		
			Teacher Activity	Student Activity		
Psychology of Early Adolescent Learner and Science Teaching and Learning I	rly Adolescentorrect ideas aboutarner andadolescentsience Teaching		Face-to-face: Tutor introduces the lesson by reviewing Student-teachers' relevant previous knowledge on adolescent physical characters	Face-to-face: Student- teachers tell their previous knowledge on the adolescent characteristics.		
			Face-to-face: Open-ended questions to elicit misconceptions/incorrect ideas about the adolescent	Face-to-face: Student- teachers answer open- ended questions to bring their incorrect ideas adolescent.		
	The Early Adolescent Learner	30 minutes	Face-to-face: Allow student- teachers to discuss and come out with the Cognitive and psychosocial need of the early adolescent	Face-to-face: Student- teachers discuss and come out with the Cognitive and psychosocial needs of the early adolescent		
		30 minutes	Nature walk to inquire from environment: In mixed groups (gender-based) of 3 members guide student- teachers to walk to the practice school nearby or to randomly gather any young person within the age group of adolescent and gather as much information about learning inclination from	Nature walk to inquire from environment: In mixed groups (gender-based) of 3 members, student-teachers walk to the practice school nearby or to randomly gather any young person within the age group of adolescent and gather as much information about learning inclination from		
		30 minutes	them. Independent study: Provide for teachers, OERs and videos of Early adolescent learners so they can obtain information on how they learn science	them Independent study: student-teachers, still in their groups, Observe carefully and write reports on how early adolescent learners learn science.		
	lii Adapting the early adolescent to learn science	60 minutes	Face-to-face/E-learning opportunities: Tutor allows student-teachers to do short power point/poster presentation on how early adolescent learners can better learn science.	Face-to-face/E-learning opportunities: Student- teachers in groups do power point/poster presentation on how early adolescent learners can better learn science.		
Which cross cutting issues will be addressed or developed and how	an interactive and inc	lusive classroom a nt–teachers' diffic	rules to protect vulnerable stud tmosphere. By practicing with a ulties in manipulating/handling/	nalogue and digital		
Lesson assessments – evaluation of learning: of, for and as learning within the lesson		doing short prese	ports and posters on how early a ntations (3-5 minutes each) on h			

Teaching Learning	Training on reflections and nature walk
Resources	
Required Text	NaCCA, Ministry of Education (2019). Science Curriculum for Primary Schools (B4-B6). Accra
(core)	Abbey, T. K., Alhassan, 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;
	Handbook for PD Coordinators Themes 1- 10
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	N/A

Year of B.Ed. 2	Semester	1	Place of I	esson in sei	mester	12 3 4 5	678910	11 12	
Title of Lesson		gy of Early A and Learnin		earner and Sci	ence	Lesson	Duration	3 Hours	
Lesson description	Science I adolesce makes th continue adolesce	Science learning at the basic school can be challenging to the learning especially the early adolescent. Their inclination to risk taking and rapid development in psychosocial activities makes them both venerable and Critical in understanding their environment. This lesson continues from lesson 10 and emphasizes on the student-teacher to the way early adolescent adapt into learning science, relate with others and considerations for grouping and interactions in a science classroom.							
Previous student teacher knowledge, prior learning (assumed) Possible barriers to learning in the lesson	Student- Lesson 1 needs. Student	Student-teachers have an idea of the transition in growth from childhood to adulthood. Lesson 10 introduced student-teachers to early adolescent psychosocial and cognitive needs. Student-teachers may: • Have misconceptions age appropriate learning							
	•	Imagine th	at the most	pressing consi the opposite s	deration fo			ngling is	
Lesson Delivery – chosen to support students in achieving the outcomes	Face- to-face √	Practical Activity	Work- Based Learning	Seminars √	Independe Studyv	ent e-le	earning portunities	Practicum	
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	learning Indepen	dent Study: I	nquiry and r	groups intera eflections nternet, simul				priate	
 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 	and • Stuc	learning diff	iculties s will be able	much positive e to manage e ations.					
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for 	Learning	Outcomes	Learning I	ndicators	core a inclusi diversi	nd transfo vity. Equi	cross – cutti erable skills ity and addr will these be eveloped	, ressing	
each learning outcome	spec and cons mak lear mea enjo prim lear 2c, p (NTS 21),	tify the cial needs factors to sider to e science ning ningful and yable to nary school ners. (NTS 0.13 & 21), 5 2c, p.13 & (NTS2b, c, p.13 &	check to col atten makir learni and e scient	uce a charts ar dists for issues nsider and pay tion to in ng science ing meaningfu njoyable to ce learning for ary school ing.	nd Studer s comm y mutua individ critical il throug work/o	nt-teachei unication I respect lual differ I thinking	rs develop s a, collaborati while appre rence and ak and respons participatio	on and ciating vilities, sibility	

Topic/Title	Sub Topic	Time or Stage	Teaching and learning to achieve learning outcomes:depending on delivery mode selected. Teacher led,collaborative group work or independent studyTeacher ActivityStudent Activity				
Psychology of Early Adolescent Learner and Science Teaching and Learning II	Adapting the early adolescent to learn science	60 minutes	Face-to-face: Tutor introduces the lesson by reviewing Student-teachers' relevant previous knowledge on how early adolescent learners learn science and list the features of nature and home that can be used to adapt science concepts to the primary school level using discussion and role play in mixed ability groups	Face-to-face: Student- teachers discuss their previous knowledge on how early adolescent learners learn science as well as identify and list the features of nature and home that can be used to adapt science concepts to the primary school level using discussion and role play in mixed ability groups. In doing so, they share their report from nature walk and reflections.			
	The Adolescent Learner in and inclusive science classroom	90 minutes	Face-to-face: Create two sets of groups – one group in mixed sex groups and the other group in unisex (only male/only female), provide a topic for debate from the Basic school science curriculum (Curriculum for Basic school B4-B6) in a stated science topic, for each group e.g. measurement. and Not all elements in the debate/discussions that provides for inclusivity and values for learning science.	Face-to-face: Student- teachers debate and discuss in groups and later cross share their experiences and come out with the Cognitive and psychosocial needs of the early adolescent. They use a checklist designed with the help of the teacher to identify all elements that provides for inclusivity and values for learning science.			
			Independent study: Provide for student-teachers, a checklist on inclusive learning and age appropriate learning styles so that they will reflect on their observations	Independent study: student-teachers, reflects on their observations and using the check list analyse the inclusive styles and age appropriate learning of science.			
	iii. Adapting the early adolescent to learn science	30 minutes	Face-to-face/E-learning opportunities: Tutor allows student-teachers to do short power point/poster presentation on their reflections	Face-to-face/E-learning opportunities: Student- teachers in groups do power point/poster presentation on their reflections.			

	Equity and SEN: through setting ground rules to protect vulnerable student-teachers
be addressed or developed and a	and establishing an interactive and inclusive classroom atmosphere. By practicing
how	with analogue and digital thermometers, student-teachers' difficulties in
r	manipulating/handling/measuring skills of body temperatures will be addressed.
Lesson assessments –	 Assessment of learning: Reflections report on inclusive science learning.
evaluation of learning: of, for	• Assessment as Learning: Student-Teachers doing short presentations (3-5
and as learning within the	minutes each) on reflections.
esson	
Teaching Learning Resources	Training on reflections and nature walk and inclusive science classrooms.
Required Text (core)	NaCCA, Ministry of Education (2019). Science Curriculum for Primary Schools (B4-B6).
A	Accra
A	Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., &Wiredu, M.B.
((2008). Ghana association of science teachers integrated science for senior high
5	schools. Accra: Unimax MacMillan; Handbook for PD Coordinators Themes 1-10
-	Abbey, T. K., & Essiah, J.W. (1995). Ghana association of science teachers physics for
5	senior high schools. Accra: Unimax Macmillan.
4	Ameyibor, K., &Wiredu, M. B. (2006). Ghana association of science teachers'
(chemistry for senior high schools. Accra: Unimax MacMillan.
A	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school
t	<i>teacher I</i> . Winneba: IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., &Obeng-Ofori, D. (2011).
2	SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-
N	Woode Ltd.
CPD Requirement	Training for preparing checklist for identifying inclusivity and values for learning
S	science
1	Training on how to identify tolerance in group work

Year of B.Ed. 2	Seme	ster 1	l Pl	lace	of lesson i	n semeste	r	12 3 4 5 6 7 8 9	10 11 12		
Title of Lesson	Course Re	eview II with	STS sen	ninar	•		Less	on Duration	3 hours		
Lesson description	review an	d discussior	n of lesso	ons le		tion on obse	ervati	If of the semeste ons made during			
Previous student	1				igh lesson 11			proaches and			
teacher knowledge,	observatio	ons/experie	nces dui	ring S	STS.						
prior learning (assumed)											
Possible barriers to						ly dealt with	n. Les	sons not approp	riately		
learning in the lesson		od by studer							[
Lesson Delivery –		Practical	Work-		Seminars	Independe	ent	e-learning	Practicum		
chosen to support	to-face √	Activity	Based		V	Study √		opportunities √			
students in achieving the outcomes	v		Learni	ng		v		v			
Lesson Delivery – main	Eace-to-E	ace: Discuss	ion grou	in w	ork in same a	hility group	work	s. Modelling, Co	ncent Manning		
mode of delivery chosen	and Carto		ion, grou	up w	UIK III Sairie a	onity group	WUIK	s. would link the second	incept wiapping		
to support student		0	utor and	d stu	dent teacher	reflections (indivi	dually and colled	tively)		
teachers in achieving					d Video prese			adding and conce			
the learning outcomes.					ns and reflect						
Purpose for the					anding of con						
lesson, what you					cutting issues						
want the students							for ex	periences durin	g STS		
to achieve, serves					nisinformatio						
as basis for the			•		oing forward		Gend	er issue			
learning outcomes.			7 1-1-	. 0	0						
An expanded	NTS:										
version of the	1a) Critica	ally and coll	ectively	refle	ct to improve	teaching ar	nd lea	rning			
description.	1c) Demc	onstrate effe	ective gr	owin	g leadership o	qualities in t	he cla	assroom and wid	er school		
• Write in full aspects	1d) Is gui	ded by lega	l and eth	nical	teacher codes	of conduct	in his	or her developr	nent as a		
of the NTS		nal teacher									
addressed								policies guiding			
	2b) Has c	omprehens	ive know	ledg	ge of the offici	al school cu	rricul	um, including lea	arning		
	outcome										
				-		-	and	pedagogical con	tent		
					de they teach						
			v childre	n de	velop and lea	rn in diverse	e cont	exts and applies	this in his or		
	her teach					_					
Learning Outcome	Learning	Outcomes	1	.earr	ning Indicator	S		dentify which cro	0		
for the lesson,								sues, core and t			
picked and								kills, inclusivity. I ddressing divers			
developed from the course specification								nese be addresse			
Learning indicators								eveloped			
			· c	• •	Make a list of						
for each learning	Ident	ify weaknes				Mosknesses		ollaborations C	ommunication		
for each learning		ify weaknes trengths in		and strengths in and strengths on poster and Research: Through group							
for each learning outcome	and s	trengths in			and strengths		а	nd Research: Th			
-	and s learni	trengths in ing the scier	nce			on poster	а		rough group		
-	and s learni lessor	trengths in	nce		and strengths	on poster	а	nd Research: Th	rough group		
-	and s learni lessor under	trengths in ing the scier n for the pe r review	nce riod	F	and strengths papers for sha	on poster ring	a w	nd Research: Thi ork and present	rough group ation		
-	and s learni lessor under • Be ab	trengths in ing the scier n for the pe	nce riod	Þ F	and strengths	on poster ring	a w t E	nd Research: Thi vork and present quity and Reflec	rough group ation tion is		
-	 and s learni lessor under Be ab lessor 	trengths in ing the scier n for the pe r review lle to reflect	nce riod : on far	F C	and strengths papers for sha Provide a refle	on poster ring ection report	a w t E d	nd Research: Thi ork and present	rough group ation tion is		
-	 and s learni lessor under Be ab lessor STS at 	trengths in ing the scien n for the pe r review le to reflect ns learnt so nd state new	nce riod : on far w	۽ ا د د	and strengths papers for sha Provide a refle on STS and demonstration	on poster ring ection report	a w t E d	nd Research: Thi vork and present quity and Reflec eveloped from r	rough group ation tion is		
-	and s learni lessor under Be ab lessor STS a insigh	trengths in ing the scien n for the pe r review le to reflect ns learnt so	nce riod : on far w	F C C	and strengths papers for sha Provide a refle on STS and	on poster ring ection report ns and n a given	a w t E d a	nd Research: Thi vork and present quity and Reflec eveloped from r	rough group ation tion is		
-	and s learni lessor under Be ab lessor STS a insigh	trengths in ing the scien n for the per r review ole to reflect ns learnt so nd state new hts and/or g needing	nce riod : on far w	F C C I I r	and strengths papers for sha Provide a refle on STS and demonstration llustrations or	on poster ring ection report ns and n a given	a w t E d a	nd Research: Thi vork and present quity and Reflec eveloped from r	rough group ation tion is		
-	 and s learni lessoi under Be ab lessoi STS a insighting areas 	trengths in ing the scien n for the per r review le to reflect ns learnt so nd state new ths and/or g needing dies	nce riod : on far w	F C C I I f	and strengths papers for sha Provide a refle on STS and demonstration llustrations or nedia of lesso far	on poster ring ection report as and a given ns learnt so	a w t E d a	nd Research: Thi vork and present quity and Reflec eveloped from r	rough group ation tion is eflective		
-	 and s learni lessoi under Be ab lessoi STS ai insigh areas reme Corre 	trengths in ing the scien n for the per r review le to reflect ns learnt so nd state new ths and/or g needing dies	nce riod : on far w rey	F C C I I F F	and strengths papers for sha Provide a refle on STS and demonstration Ilustrations or nedia of lesso	on poster ring ection report ns and n a given ns learnt so pt maps	a w t E d a C	nd Research: Thi vork and present quity and Reflec eveloped from r ctivities	rough group ation tion is eflective :ical thinking is		
-	 and s learni lessor under Be ab lessor STS a insigh areas reme Corre miscor 	trengths in ing the scien n for the per r review le to reflect ns learnt so nd state new this and/or g needing dies	nce riod : on far w rey	F C C C C C C C C C C C C C C C C C C C	Provide a refle on STS and demonstration llustrations or media of lesso ar Present conce	on poster ring ection report ns and n a given ns learnt so pt maps s linking	a w t E d a C d	nd Research: Thi vork and present quity and Reflec eveloped from r ctivities reativity and crit	rough group ation tion is eflective cical thinking is eloping models		

Content of lesson picked and developed from the course specification	Sub Topic	Time or Stage	Teaching and learning to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
Topic Title			Teacher Activity Facilitate and provides the necessary tool for students activities.	Student Activity
Course Review II with STS seminar	Reviewing the understanding of lessons on Ventillation I, Ventillation II, Psychology of Early Adolescent learner and Science Teaching and Learning I and Psychology of Early Adolescent learner and Science Teaching and Learning II	60 minutes	Face-to-face: Tutor led brainstorming session with student teachers to unearth the weaknesses and strengths of student teachers in the lessons 8 – 11. 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.	Face-to-face:Student teachers discuss their problems in the previous lessons and provide a checklist identifying and recording all possible weaknesses and strengths.
	Discussion of observations during STS	90 minutes	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: Teacher groups student teachers according to remedy need and provide specific task assistance in the areas on concept needing remedy.	Face-to-Face: Students work in the special groups (Same remedy need group) on tasks to remedy their learning need. They then present concept maps and/or models linking misconceptions/misi nformation to new insights.
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	 Assessment as Learning: Student teachers' presentations during group work and model work presentation helps to assess them of learning Assessment for and as learning: Student teachers working in groups on remedial tutoring 			

the lesson	helps to assess them for and as learning
Teaching Learning Resources	Cardboards, Course manual, Poster paper, Projectors,
Required Text (core)	NaCCA, Ministry of Education (2019). Science Curriculum for Primary Schools (B4-B6). Accra 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	 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). 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

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