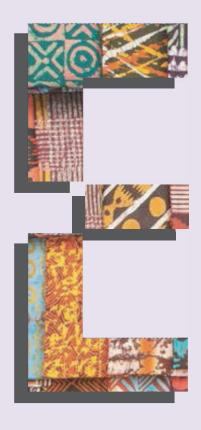


Four-Year B.Ed. Course Manual

Science











GOVERNMENT OF GHANA









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 III for Upper Primary Y3S1

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 Details Course Name Integrated Science III for Upper Primary Pre-requisite Introduction to Integrated Science I, Introduction to Integrated Science II and Integrated Science I and II for Upper Primary school grade level Course Level 300 Course Code Credit Value 3

1. Goal for the Subject or Learning Area

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

2. Course Description

The course for semester one of year two, Integrated Science for Upper Primary III, uses the universal design for learning approach to extend the basic science concepts of the student teacher on the following content areas: flowers, fruits and seeds, air and water, human body systems, light, changes of state of matter and science curriculum studies. This is done through appropriate pedagogies such as Talk for learning approaches, demonstrations, concept mapping, problem-based teaching/learning and video presentations. Authentic assessments mode such as concept mapping, using checklist to identify values and attitudes and, mind maps from which provides for the teachers' attention on the need to ensure equity and the provision for SEN will be used to evaluate the student teacher's level of understanding and learning. This course emphasizes the essential attitudes and values of professional science teaching such as honesty, carefulness and accuracy. The student teacher, in this course, should be introduced to issues of transition in terms of use of the English Language as medium of instruction and characteristics and learning styles of early adolescent (NTS 1a -1c. p12;2c&2e, p. 13).

3. Key Contextual Factors

Several interventions have been initiated by government to promote the teaching and learning of science in schools, as science is the gateway to industrial and technological growth. There are numerous challengesfaced by primary science education which includes the need for science equipment and also qualified science teachers who are trained to integrate ICT into the teaching and learning process.

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

The learning activities for this semester seeks to relate science to the learners' environment, make science culturally relevant and inclusive. The course 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 (K –P3) to middle childhood (Upper Primary)

4. Core and transferable skills and cross cutting issues, including equity and inclusion

Critical and Independent Thinking, Equity and Inclusivity, Social Collaboration/Team work, Creativity, Innovation, Problem solving, Manipulation, Reflection, developing scientific process skills and Inquiry.

5. Course Learning Outcomes	6. Learning Indicators
CLO1. Identify creative ways to teach flowers, fruits formation and dispersal as well as human body systems at the primary level(NTS 1b, 1d, 1g, p12: 2c, p.13 & 21)	 Develop science related activities and experimental designs for upper primary learning on the concepts flowers, fruits, seed and their dispersal.
CLO2. Discuss; the composition of air, its uses and its properties, the nature of changes of state of matter and light as a form of energy. (NTS 3a, 3h, p14: NTS 2c, 2d, 2e, p13))	 Create charts, concept mapsand mind mapsabout Air and its properties as wel as its uses
CLO3. Recognize the stages/phases of water cycle and discuss how the phases are related (NTS 3a, 3h, p14: NTS 2c, 2d, 2e, p13)	 Present a mini project work water cycle and its implication to the environment.
CLO4. Demonstrate basic and higher level of thinking skills in	Prepare improvised, developmentally appropriate

3i, 3j, pg. 14) CLO 5. Demonstrate ab in a differenti	ach, assessment and repositive to co-plan and delivitated and inclusive mannintended learning outconger & 24)	level er varied lessons er that will level Prepal teachi	activities for teaching at the Upper Primary re a reflective report on co planned lessons for ng during STS for a seminar
7. Course Conter			
Unit (Week)	Topic	Subtopic (if any)	Teaching and learning activity to achieve the learning outcomes
Week 1	Review of Year 2 integrated science	 Recap of year 2 lessons and challenges thereof. Introducing the course manual for the Y3S1 Upper Primary specialism 	 Face-to-Face: Demonstrations and discussions on year 2 lessons and unique nature of the Integrated Science III for Upper Primary science specialism Face-to-Face: Scanning through Y3S1 CM and discussing the expectations for use of the Y3S1 Upper Primary Science CM
	Flowers and fruits	 Structure, function and uses of Flowers Pollination and fruit formation 	 Face-to-Face: Shower thoughts, Manipulation (drawing from Nature) and reflecting on the structure and function of Flowers Nature walk and discussion of Pollination and fruit formation Video and online MOOCs viewing of pollination and fruit formation
Week 2	Seeds and Dispersal	 Structure and function of Seeds Fruits and Seed Dispersal 	Face-to Face: Drawing and group discussions of sorting (classifying) of seeds and seed types Nature walk and reflections variety of seeds, based on dispersal types of dispersals, Concept mapping of Seeds to dispersal types e-learning: Simulations, video and Computer presentation of Dispersal in nature
Week 3	Pollination and Fertilization	Pollination and typesFertilization	Face-to Face: Discussions, Drawing and group presentations of types, nature and processes of Pollination and Fertilization in flowering plants e-learning: Video and Computer simulation on teaching activities and assessment strategies for teaching Pollination and fertilization of flowering Plants
Week 4	Air and Water	 Composition and properties of air and water Uses of air and water Conservation of water Water cycle 	Face-to Face: Discussion, Role Playing, Construction of games, creating activities and materials for Air and Water e-learning: Video and Computer simulation on teaching activities and assessment strategies for teaching Air and Water.
Week 5	Light	Light as a form of Energy Sources of, and Uses of Light Light as a form of Energy Light as a form of Energy	Face-to-face: Mixed group discussions and demonstrations/role plays, Concept Mapping and Cartooning about rust and rusting e-learning/Reflections: Video presentations from MOOCs with reflections on values such as Honesty, Accuracy, Precision and critical thinking.
Week 6	Review and STS preparation 1	 Reviewing and reflecting on lessons 1-lesson 5 STS Seminar 	Face-to-face: Discussion, Talk for learning approaches with student teacher presentations on Learning achievements against CLOS and Challenges/Misconceptions that need clarifications

1	T		
			Seminar: Reflections and Presentations of reflections on learning against CLOs and on co planning and co teaching and reflection on Expectations for STS.
Week 7	Change of State of Matter I	melting,evaporation,boiling,	Face-to-face: Mixed group discussions and demonstrations/role plays, Concept Mapping and Cartooning about rust and rusting e-learning/Reflections: Video presentations from MOOCs with reflections on values such as Honesty, Accuracy, Precision and critical thinking.
Week 8	Change of State of Matter II	condensation,freezing andsublimation	Face-to-face: Mixed group discussions and demonstrations/role plays, Concept Mapping and Cartooning about rust and rusting e-learning/Reflections: Video presentations from MOOCs with reflections on values such as Honesty, Accuracy, Precision and critical thinking.
Week 9	Human Body Systems	 The Human Body Organ Systems Interdependence of the Organ Systems 	Face-to-face: Mixed group discussions and demonstrations/role plays, Concept Mapping and Cartooning about rust and rusting e-learning/Reflections: Video presentations from MOOCs with reflections on values such as Honesty, Accuracy, Precision and critical thinking
Week 10	Basic School Science Curriculum Studies I	 Teaching the Basic school curriculum Science Pedagogies 	Face-to-face: Discussion, Talk for learning approaches with student teacher presentations on Science pedagogies Independent Study and Seminars: problembased Lesson planning using the various pedagogies that integrates gender, equity and inclusive education strategies, and Seminars for peer reviewing
	Basic School Science Curriculum Studies II	 Lesson Planning and Co Teaching 	Face-to-face: Discussion, Talk for learning approaches with student teacher presentations on Science lesson planning Independent Study and Seminars: problembased Lesson planning that integrates gender, equity and inclusive education strategies, and Seminars for peer reviewing as well as micro teaching
Week 12	Course Reviewand STS Preparation 2	 Reviewing and reflecting on lessons 7-lesson 11 STS Seminar 	Face-to-face: Discussion, Talk for learning approaches with student teacher presentationson Learning achievements against CLOS and Challenges/Misconceptions that need clarifications Seminar:Reflections and Presentations of reflections on learning against CLOs and on co planning and co teaching and reflection on Expectations for STS.

8. Teaching and Learning Strategies:

Think, Pair, Share, Square, group Discussions, Checklist, Role Play activities, Multimedia presentations, Concept mapping, concept cartoons, video presentations, simulations and Computer assisted instructions, inquiry learning and field trips and seminars, rhyming and song constructions

9. Course Assessment Components:

Component 1: Subject PortfolioAssessment (30% overall score)

- Selected Item of Student work (3 items 10%) = 30%
- Midterm assessment 20%

- Reflective Journal 40%
- Organization of the Subject Portfolio- 10% (How its presented/organized)

Summary of Assessment Method: Peer Review documents/ Evidence of report from school (STS) visits for portfolio/Reflective notes and as prescribed by University of Affiliation

Core skills to be acquired: Pedagogical, observational and cooperative skills

Weighting: 30% (of the 70% from the NTEAP)

CLO4, CLO5 AND CLO6

NTS:

1b) Improves personal and professional development through lifelong learning and

Continuous Professional Development.

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 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 2: Assessment for Learning Presentations/Projects

Summary of Assessment Method: Practical Activities/Nature collections/ evidence of TLM designs/Group work appraisal/Evidence of equity and inclusivity/transferable skills during practical activities and as prescribed by University of affiliation

Core skills to be acquired: Honesty, carefulness, accuracy and tolerance, collaboration

Weighting: 30% (of the 70% from the NTEAP)

e. g.: Write a 1500 word report on what strategies need to be used in science teaching to ensure all learners are included and that the teaching is appropriate to the typical characteristics of the upper primary learner. Include reference: to examples of teaching you have observed and taken part in in school; topics covered during the course and The Basic School Science Curriculum

Core skills to be acquired: collaboration, Honesty, carefulness, accuracy and tolerance,

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 herdevelopment as a professional teacher.
- 1g) Sees his or her role as a potential agent of change in the school, communityand country
- 2c) Has secure content knowledge, pedagogical knowledge and pedagogicalcontent knowledge for the school and grade they teach in.
- 3e) Employs a variety of instructional strategies that encourages studentparticipation and critical thinking.
- 3j) Produces and uses a variety of teaching and learning resources including ICT, toenhance learning

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

Component 3: Summary of Assessment Method: End of Semester Examination on key concepts as shown in the lessonsand as prescribed by the University of affiliation.

Core skills to be acquired: Cognitive, literacy, numeracy, writing and reading

Weighting: 40% (of the 70% from the NTEAP)

CLO1-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 herdevelopment as a professional teacher.
- 1g) Sees his or her role as a potential agent of change in the school, communityand country
- 2b) Has comprehensive knowledge of the official school curriculum, includinglearning outcomes
- 2c) Has secure content knowledge, pedagogical knowledge and pedagogicalcontent knowledge for the school and grade they teach in.
- 3e) Employs a variety of instructional strategies that encourages studentparticipation 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, toenhance learning

9. Required Reading and Reference List

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.

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.

10. Teaching and Learning resources

Copies of Year two Semester two course manuals for the specialism, Smartphones, Tablets, Productivity tools (software that allow teachers to work better), Subject based instructional tools/applications, Instructional laboratories, Smart boards, projectors, Smart screens, Open ERs – YouTube, Coursera, Khan Academy, TESSA and UNESCO OERs, iBox, and standard laboratories

11. Course related professional development for tutors/ lecturers

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

Year of B.Ed.	3	Semester	1	Place of lesson in semester	1 2 3 4 5 6 7 8 9 10 11 12
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Title of Lesson	Flowers and fruits		Lesson Duration 3							
Previous student teacher knowledge, prior learning	This lesson reviews the year 2integrated science concepts and introduces this course manual for year 3 with the view to help the student teacher transition into the co – planning and coteaching the upper primary science curriculum. Also, the lesson will deepen the understanding of the basic concepts of plants through flowers and fruits. The lesson will expose them to teaching strategies and material so that they will effectively handle similar topics at the upper primary classrooms. 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 year 1 and 2 course manuals									
(assumed) Possible barriers to learning in	The season of the year may	y affect the availability of common	flower species in the							
the lesson	1	tures obtained from the internet c								
Lesson Delivery – chosen to	Face- Practical Work-			racticum						
support students in achieving	to- Activity Based	Study	opportunities							
the outcomes	face Learni	ing √	V							
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes. • Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description. • Write in full aspects of the NTS addressed	observation, jigsaw puzzles Independent study: Nature e-learning opportunities: V Student teachers deep Equip the student teacher future class Provide student teacher environment NTS: The teacher: 1a: Olearning. 1b: Improves personal Continuous Profession 1c: Demonstrates effects school. 2c: Has secure content knowledge for the school is or her teaching.	e walk and recording video and MOOCs on variety of flow their knowledge on groups of pather with appropriate pedagogic sker an understanding and appreciat Critically and collectively reflects to and professional development throal Development. Crive growing leadership qualities is knowledge, pedagogical knowledge ool and grade they teach in children develop and learn in diver	wers and fruits lants ills to handle the topi ion of plants in the improve teaching an ough lifelong learning in the classroom and vi ge and pedagogical co	c in their ad g and wider ontent es this in						
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome 	Learning Outcomes Learning Indicators Identify which cross – cutting Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed									
	 Link concepts in year two to new concepts in flowers and fruits Student teachers to sort flowers and fruits The student teacher should be able to coplan and co teach using concept of fruits and flowers Develop Concept Maps to link concepts from year 2 to new concepts yet to be developed Student teachers submit a chart on different types fruits and flowers Student teachers submit a chart on different types fruits and flowers Student teachers present reflective report on activities and materials for coplanning and coteaching basic school Develop the skills of construction, aesthetic construction and classification Develop the skills of construction, aesthetical thinking through identification and classification Develop skills of construction prize construction of chart aesthetics and critical thinking through identification and classification Develop skills of construction prize construction of chart aesthetics and critical thinking through identification and classification Develop skills of construction, aesthetics and critical thinking through identification and classification Develop skills of construction, aesthetics and construction and classification Develop the skills of construction, aesthetics and construction, aesthetics and construction, aesthetics and construction, aesthetics and construction and classification Develop the skills of construction and construction and classification and construction and constr									

			ncepts of flowers and uits.	of checklist and critical thinking skills through identification of characteristics of leaves and stems of plant Reflection, Communication and Research: Through construction of charts		
Content of lesson picked and developed from the course specification	Sub Topic	Time or Stage	depending on delivery	to achieve learning outcomes: mode selected. Teacher led, ork or independent study		
Topic Title			Teacher Activity	Student Activity		
	Introducing the Course Manual for Integrated Science III for Upper Primary	20 minutes	Face-to-Face: Tutor initiates shower thoughts discussion with student teachers to identify expectation for and introduce new course manual for Integrated Science III for Upper Primary to student teachers	Face-to-Face: Student teachers respond to discussions, noting their expectations, drawing from their experience with year 2 course manuals and focusing on the specialism for B4-B6 level specialism, discuss expectations for new CM		
Flowers and Fruits	Review of Year 2 integrated science.	20 minutes	Face-to-face/Group activity: Tutor initiates a Pyramid discussion o the year 2 concepts with student teachers, and encourages them treflect on the new concepts, the challenges and unique lessons	work individually and in groups to discuss year two lessons, the challenges,		
	Flowers Fruits (B4.1.1.1.1, B4.1.1.1.2, B4.2.2.1.1)	40 minutes 40 minutes	Independent study/Face-to-face: Tutor led Nature walk for student teachers to collect different flower and fruits for classification for which they will later make presentation in class fo peer review.	flowers and fruits charts for cross sharing on Uses and types. (B4.1.1.1.1. B4.1.1.1.2 and B42.2.1.1)		
			E-Learning: Video and Computer simulations to show to student teachers on the structure of Flowers, Fruits and Seed	E-Learning: Student teachers View video and computer simulations in mixed ability groups, note the structures and draw the structures and cross share with the larger class.		
	Pollination and Fertilization (B4.1.1.1.1, B4.1.1.1.2, B4.2.2.1.1)	40 minutes	Face-to-face/Group activity: Tutor initiates shower thoughts discussions on Pollination and fertilization of flowerin plants and allows Student teachers to Role play fertilization	in diverse groups discuss Pollination and fertilization of flowering		

			for intergroup discussions.		
	Ways to present these concepts to the Primary school Learner	20 minutes	Face-to-face/Group activity:Tutor to guide student teachers to identify appropriate learning strategies they can use to present these concepts to primary school learners	Face-to-face/Group activity:In mixed ability /gender-based group, student teachers Identify appropriate strategies that can be used to deliver lessons for primary school learners using the concepts learned in this lesson.	
Which cross cutting issues will be addressed or developed	establishing an intera	ctive and inclusi	nd rules to protect vulnerab	le student teachers and Through the game of "Tell	
and how Lesson assessments – evaluation of learning: of, for and as learning within the			ness and Strengths will be id teachers Present drawing o		
Teaching Learning Resources	The Course Manual, pictures of creeping, climbing and erect plants, collection of root systems of different plants (dicots and monocots), jigsaw/puzzles on different leaves and stems of plants, Flip Charts, Ball, Pens, Pencils, 'A' 4 sheets, markers				
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	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			and how to design learning a		
Course Assessment	Selected Item Midterm assive Reflective Jo Organization Component 2: Subje Introduction Methodolog of the project Substantive/ Conclusion —	n of Student wo essment – 20% urnal – 40% of the Subject F ct Project (30% o; a clear statem y; What the stu ct – 20% //Main section o - 30%	rssment (30% overall score) rk (3 items – 10%) = 30% Portfolio- 10% (How its presoverall Semester score) ent of aim and purpose of the dent teacher has done and If the work – 40% Simulation – (40% overall Semesters)	the project -10% why to achieve the purpose	

 $^{^{\}rm 1}$ See rubrics on subject Portfolio Assessment in Annex 6 of NTEAP $^{\rm 2}$ See rubrics on Subject Project Assessment in Annex 6 of NTEAP

Year of B.Ed. 3 Semester 1 Place of lesson in semester	1 2 3 4 5 6 7 8 9 10 11 12
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Title of Lesson		Seeds and Dispersal Lesson Duration 3							3	
Lesson description	concep them to	In this lesson, the Tutor will assist the student teachers to deepen their understanding of basic concepts of plants by exploring the seed structure and dispersal of seeds. 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 seed								
Previous student			exposed to	see	eds of various kinds in	the environmen	t.			
teacher knowledge,			•							
prior learning (assumed)										
Possible barriers to	Dispers	sal yields po	ositive resu	ults	when issues of the se	ason of the yea	r ma	ay affect the av	/ailabil	ity of
learning in the lesson	commo	on animal s	pecies in t	the	environment. Howeve	er pictures obta	ined	from the inte	rnet ca	ın be
	used as	substitute								
Lesson Delivery – chosen	Face-	Practical	Work-		Seminars	Independent		e-learning	Pract	ticum
to support students in	to-	Activity	Based			Study		opportunities		
achieving the outcomes	face		Learning			٧	٧	,		
Loccon Dolivery main	√ Face to	Face: Diss	ussion Tal	l, fo	r loarning approaches	observation by	ainst	torming one	ondod	
Lesson Delivery – main mode of delivery chosen		o-Face: Disc oning techn			r learning approaches,	, observation, br	ainst	torming, open-	enaea	
to support student	-	_			and Recording					
teachers in achieving the			•		s on dispersal of seeds					
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.	 Tutor and student teachers to deepen their knowledge on Plants through seeds and dispersal 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 her teaching 									
Write in full aspects										
of the NTS										
addressed		•				T.				
Learning Outcome	Learnin	ng Outcome	es	Lea	rning Indicators			itity which cros		_
for the lesson, picked and								es, core and tra s, inclusivity. Ec		
•								ressing diversit		
developed from the course specification								se be addressed		VVIII
Learning indicators								eloped	101	
for each learning	• Stu	udent teach	ers to	•	Student teachers su	hmit a chart		elop the skills	of	
outcome		ssify anima			on grouping of anim			struction of cha		
		sed on diffe			their different moven			hetics and criti		nking
	mo	ovement, ar	nd d	•	Student teachers p			ugh observatio	n,	
	ha	bitats			reports on body	•		itification and		
		udent teach			animals for whole cla			sification		
		hibit knowl	-	•	Student teachers sho			elop the skills		
		dy covering			report on uses of anii	-		ed questioning		ot
		imals throu	-		and care of pets for	r whole class		rance of differe		
	ob	observation and discussion opinions, aesthetics and								

Content of lesson picked and developed from the	discussion Student teach inclusive mixed ability groups brainstorm to out with uses animals and pand care of p Sub Topic	ed s to o come s of oets,	Time or Stage		critical thinking through observation Develop skills of brainstorming techniques, report writing and presentation, communication and critical thinking skills to achieve learning outcomes: mode selected. Teacher led,
course specification					rk or independent study
Topic Title				Teacher Activity	Student Activity
Seeds and Dispersal (B4.1.1.1.1, B4.1.1.1.2, B4.2.2.1.1, B6.1.1.1.1)	Structure of seed	s	70 minutes	Face-to-face/Nature walk:Tutor led Nature walk for student teachers to observe, collect and record different types of seed ithe environment.	Face-to-face/Group work: Student teachers undertake nature walk to observe, collect and record types of seeds for comparing and sorting when they are seated in mixed ability groups in the classroom later.
				Tutor guides student teachers in mixed ability groups to use their observation and recordings to sort seeds into similarities and differences. Then later, they draw individually, a least a type of a seed.	their observation and recordings to sort seeds into similarities and differences. Then later, they draw individually, at
Disper	sal 80	Face-to	- face: Tutor uses o		Face-to-face: Student
	minutes	elicit stu observa are disp student dispersa with the (https:/ (https:/	Face-to-face: Tutor uses open-ended questions to elicit student teachers' knowledge gained through observation and daily experiences about how seeds are displaced regularly and haphazardly. Allow student teachers to watch short video clips on dispersal and discuss the video while comparing with their experiences in the environment (https://www.youtube.com/watch?v=qRlb7cYWc8k(https://www.youtube.com/watch?v=qRlb7cYWc8k		teachers discuss from their own experiences, how seeds are easily displaced. In groups, student teachers view short video clips on Seed dispersal (Processes, purposes for dispersal and implication for reproduction in plants)
Ways to present these concept the Prischool Learne	nt minutes ots to mary	Face-to-face/Group work: Tuto teachers in inclusive/gender gr appropriate learning strategies present these concepts to prim		der groups to identify tegies they can use to	Face-to-face/Group work: Mixed ability/gender group to identify and discuss appropriate learning strategies they can use to present these concepts to primary school learners. Values such as care, sincerity and cross cutting issue like innovation will be learnt through group work.

Which cross	uity and SEN: through setting ground rules to protect vulnerable student teachers and establishing an
cutting issues	interactive and inclusive classroom atmosphere. Through the game of "Tell it", Student – Teachers specific
will be	weakness and Strengths will be identified and catered for.
addressed or	· ·
developed and	
how	
Lesson	Assessment for learning: Student teachers to provide drawings on Seed types
assessments –	
evaluation of	
learning: of, for	
and as learning	
within the lesson	
Teaching	The Course Manual, Flip Charts, Ball, Pens, Pencils, 'A' 4 sheets, markers, short video clips from YouTube -
Learning	(https://www.youtube.com/watch?v=qRlb7cYWc8k)
Resources	(https://www.youtube.com/watch?v=qRlb7cYWc8k
Required Text	NaCCA, Ministry of Education (2019). Science Curriculum for Primary Schools (B4-B6). Accra
(core)	Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). Ghana
	association of science teachers integrated science for senior high schools. Accra: Unimax MacMillan.
Additional	Abbey, T. K., &Essiah, J.W. (1995). Ghana association of science teachers physics for senior high schools.
Reading List	Accra: Unimax Macmillan.
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	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 observation skills, brainstorming techniques, report writing and how to design Learning activities
Requirement	for specific and inclusive multi-grade classroom

Year of B.Ed. 3 Semester 1 Place of lesson in semester 1 2 3 4 5 6 7 8 9 10 11 12

Title of Lesson	Pollinatio	on and Ferti	lization			Lesson Duration	3
Lesson description	pollinatio that they	on and fertili will effectiv	zation. The le ely handle sin	sson will expose the nilar topics at the	them to teachi upper primar	•	
Previous student teacher	Student t	eachers stu	died seeds flo	wers and fruits in	the previous	lessons	
knowledge, prior learning							
(assumed)							
Possible barriers to learning in the lesson						er species in the e used as substitute	2
Lesson Delivery – chosen to	Face-	Practical	Work-Based		Independen		Practicum
support students in achieving	to-face	Activity	Learning	oc.i.i.i.a.s	Study	opportunities	. racticaiii
the outcomes	V	71001110,			√ v	V	
Lesson Delivery – main mode of		ace: Discus	sion concent	mans talk for lea	-	hes, nature walk ar	nd
delivery chosen to support		ionand prese		mapo, tant to tea	8 app. oac		
student teachers in achieving			Nature walk a	nd recording			
the learning outcomes.				d MOOCs on vari	iety of flowers	and fruits	
the learning outcomes.	c icaiiiii	8 opportun	ities. Viaco an	a widdes dir van	icty of nowers	and mares	
Purpose for the lesson,	Stude	ent teacher	deenen their	knowledge on g	rouns of plants	<u> </u>	
what you want the						pecies using their	
students to achieve, serves	-	acteristics	. teacher to be	. abic to classify/	Proub bigins 3	pecies using triell	
as basis for the learning			nt toachar with	annronriato no	dagogie skille te	o handle the topic i	in their
outcomes. An expanded		re class	it teacher with	i appropriate pet	Jagogic skills to	o nanule the topic	iii tiieii
version of the description.			toachar an un	dorstanding and	annrociation o	of plants in the envi	ronmont
version of the description.				_		prove teaching and	
Write in full aspects of the				•		-	_
NTS addressed					pinent through	n lifelong learning a	iiiu
N13 audiesseu			essional Devel	•	avalities in the	a alacera and wi	dorschool
			_		•	e classroom and wi	
					_	nd pedagogical con	tent
				grade they teach		ontexts and applies	this in his
		er teaching	now children	develop allu leal	ii iii uiveise cc	nitexts and applies	1115 111 1115
Learning Outcome for the		Outcomes	l e	arning Indicators		Identify which cro	nss —
lesson, picked and	Learning	Outcomes	-	arring marcators	,	cutting Issues, co	
developed from the course						transferable skills	
specification							
		inclusivity. Equity					
 Learning indicators for each 							and
Learning indicators for each learning outcome	1					addressing divers	and ity. How
 Learning indicators for each learning outcome 	1					addressing divers	and ity. How
_						addressing divers will these be add developed	and ity. How ressed or
_		ant toachor	s to	Student teach	ors dovalon	addressing divers will these be add developed Develop the skills	y and sity. How ressed or
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_	• Stude expla	ain the conc		a concept map	s to explain	addressing divers will these be add developed Develop the skills construction, aest critical thinking the	y and hity. How ressed or s of thetics and brough
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_	Stude explain Polling Fertile Stude identity polling	ain the conconation and lization ent teachers tify the relevant	epts s to vance of	a concept map concepts Pollir Fertilization Student teacher relevance of the pollination and for plant life of	es to explain nation and ers submit ne concepts	addressing divers will these be add developed Develop the skills construction, aest critical thinking thidentification and classification Develop the skills construction of chaesthetics and critinking through identification and classification Develop skills of construction of chaesthetics and critical thinking skills of construction of chaesthetics and critical thinking skills of construction of chaesthetics of stems of plant Reflection, Comm	y and sity. How ressed or s of thetics and brough s of harts tical hecklist and kills tition of leaves and hunication
_	Stude explain Polling Fertile Stude identity polling	ain the conconation and lization ent teachers tify the relevant	epts s to vance of	a concept map concepts Pollir Fertilization Student teacher relevance of the pollination and for plant life of	es to explain nation and ers submit ne concepts	addressing divers will these be add developed Develop the skills construction, aest critical thinking thidentification and classification Develop the skills construction of chaesthetics and critinking through identification and classification Develop skills of construction of chaesthetics and critical thinking skills of construction of chaesthetics of stems of plant	y and sity. How ressed or s of thetics and brough s of harts tical hecklist and kills tition of leaves and hunication

Content of lesson picked and developed from the course specification	Sub Topic	Time or Stage	Teaching and learning to achieve learn delivery mode selected. Teacher led, or independent study	
Topic Title			Teacher Activity	Student Activity
Pollination and Fertilization	Review lesson on seeds and dispersal.	20 minutes	Face-to-face/Group activity: Tutor initiates a Pyramid discussion on the lesson 2 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 review lesson 2 concepts – Seeds and Dispersals, the challenges, unique values and produce a concept map of unique lessons learnt from lesson 2
	Pollination, Types and Processes (B4.1.1.1.1, B4.1.1.1.2, B4.2.2.1.1)	40 minutes	Independent study/Face-to-face: Tutor led Nature walk for student teachers to collect different flowers to observe for adaptations for pollination, and later will make presentation in class for discussion. Face-to-Face: Guide student teachers to do group discussions on the adaptations for pollination, structures for pollination, types of	Independent study/Face-to-face: Student teachers undertake Nature walk to collect varieties of flowers, observe and record adaptations for pollination for presentation and cross sharing later in class. (B4.1.1.1.1. B4.1.1.1.2 and B42.2.1.1) Face-to-Face: student teachers do
		minutes	pollination and purpose for pollination	group discussions on the adaptations for pollination, structures for pollination, types of pollination and purpose for pollination. After they cross share their presentations from the nature walk
	Fertilization (B4.1.1.1.1, B4.1.1.1.2, B4.2.2.1.1)	40 minutes	Face-to-face/Group activity e- learning Opportunities: Tutor initiates shower thoughts discussions on fertilization of flowering plants and allows Student teachers to view short videos on fertilization for intergroup discussions. https://www.youtube.com/watch?v= dgFY7WUTASQ https://www.youtube.com/watch?v= 3cmB7bnymnk	Face-to-face/Group activity: Student teachers in diverse groups discuss fertilization of flowering plants after they view short videos on fertilization.
	Ways to present these concepts to the Primary school Learner	20 minutes	Face-to-face/Group activity:Tutor to guide student teachers to identify appropriate learning strategies they can use to present these concepts to primary school learners	Face-to-face/Group activity: In mixed ability /gender-based group, student teachers Identify appropriate strategies that can be used to deliver lessons for primary school learners using the concepts learned in this lesson.
Which cross cutting issues will be addressed or developed and how	an interactive	and inclusiv	setting ground rules to protect vulnerable ve classroom atmosphere. Through the gengths will be identified and catered for	ame of "Tell it", Student – Teachers
Lesson assessments – evaluation of learning: of, for and as learning within the	Assessme	ent of learni	ing: student teachers Present report on a	adaptations for Pollinations

lesson	
Teaching	The Course Manual, pictures of creeping, climbing and erect plants, collection of root systems of
Learning	different plants (dicots and monocots) , jigsaw/puzzles on different leaves and stems of plants, Flip
Resources	Charts, Ball, Pens, Pencils, 'A' 4 sheets, markers
Required Text	NaCCA, Ministry of Education (2019). Science Curriculum for Primary Schools (B4-B6). Accra
(core)	Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). Ghana
	association of science teachers integrated science for senior high schools. Accra: Unimax MacMillan.
Additional	Abbey, T. K., &Essiah, J.W. (1995). Ghana association of science teachers physics for senior high schools.
Reading List	Accra: Unimax Macmillan.
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	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 the use of concept maps and how to design learning activities for specific grade levels
Requirement	

Year of B.Ed.	3	Semester	1	Place of lesson in semester	123 4 56789101112
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Title of Lesson	Air and Wa	ter				Lesson Duration	3	
Previous student teacher knowledge, prior learning (assumed)	This lesson is designed to equip the student teacher with requisite pedagogic knowledge, understanding and skills necessary to appreciate the air and water around them and to explain light as a form of energy. The lesson also introduces to the learner appropriate pedagogies and skills to be able to teach these concepts to upper primary learners Student teachers have studied the matter as a concept in earlier course manuals (year 1 and 2).							
Possible barriers to learning in the lesson Lesson Delivery – chosen to	observation in the pure form.							
support students in achieving the outcomes	face √	Activity	Based Learning		Study √	opportunities √		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Independe implication	to the upper	iry Project primary le	for Student t arner.		ribe the water cycle	and its	
 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 water, air and Light as a form of energy. Discard the common misconceptions that student teachers have on light and the water conservation. 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 							
 the NTS addressed Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome 	of air a enviror Design identification energy Use incomparity to undirequirity description water can be to upplearner	pe and astrate edge of the us activities to y light as a for quiry approacertake a project	eses he e frm c c ff heect vit vit d c c u	roduce a report hats on the use not water in the novironment. Designed active lassification Libert of energy resent a project in the descriptivater cycle and an be demonst	ort and ses of air tene comming ities to gright as a gright as a cect report tion of the dhow it strated to	entify which cross- sues, core and trans ills, inclusivity. Equ Idressing diversity. ese be addressed o haring ideas in class, achers develop the hammunication, colla utual respect why a dividual difference a itical thinking and re rough careful partic oup work/discussio andling of devices, h ecuracy.	iferable ity and How will r developed the Student skills of boration and ppreciating and abilities, esponsibility iipation in n, well	

Tonio/Titlo	Cub Tonic	Time or	Tooching and learning to achieve learning as	teemes depending on				
Topic/Title	Sub Topic	Time or	Teaching and learning to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or					
		Stage		rative group work or				
			independent study	Charlent Astinita				
A: 1347 :		440	Teacher Activity	Student Activity				
Air and Water	Air	140	Face-to-face/Group activity	Face-to-face/Group				
(B5.1.2.2.1,		minutes	Tutor guides student teachers to form	activity				
B6.1.2.1.1,			groups of 3 members of mixed abilities to	Student teachers work				
B6.1.2.2.1)			brainstorm, watch videos and perform	in groups to brainstorm				
			activities to identify and describe the	and watch videos on				
			features (as matter) and composition of Air,	the features (as matter)				
			Air movement and uses	and composition of Air				
			(https://www.youtube.com/watch?v=at6p	as well as Air				
			Eb1EHU)	movement.				
			(https://www.youtube.com/watch?v=I3Jtn	From the videos, student teachers, still				
			oCnQ7w) Let Student Teachers try the activities	working in their groups,				
			specified in the video above to test the	perform the activities				
			characteristics of air.	from the videos with				
			(Ensure that different abilities and	guidance from the				
			strengths/needs are catered for to ensure a	tutor to test the				
			safe working environment and equal	features of air.				
			opportunities)	After the activities,				
				Student teachers cross				
			NB: Its Possible to give student teachers a	share their results and				
			project on designing activities to teach air	discuss air movements				
			properties to upper primary learners.	and uses of air within				
			(Optional)	and across groups.				
	Water	40	Face-to-face/Group activity	Face-to-face/Group				
	(B5.1.2.2.1,	minutes	Tutor guides student teachers, working in	activity				
	B6.1.2.1.1,		mixed ability groups to discuss the	Student teachers work				
	B6.1.2.2.1)		availability of water (Sources, Conservation	in mixed ability groups				
			and purification)and uses of water	to discuss the				
				availability of water				
				(Sources, Conservation				
			Independent Study: Student Teachers are	and purification)and				
			then guided to undertake an Inquiry project	uses of water				
			to describe the Water cycle and how it can	Independent				
			be demonstrated to upper Primary	Study:Student				
			learners.	Teachers Note the				
			(NB: Project to be submitted and cross	Problem to inquire and				
			shared during review meeting)	discuss possible areas				
				to collect data for the				
	<u> </u>	<u> </u>		project.				
Which cross			g ground rules to protect vulnerable studentte					
cutting issues will			ssroom atmosphere. Through the differentiation					
be addressed or		-	become useful to society, student teachers' acc	uracy, nonesty and				
developed and	carefulness will be	e addressed.						
how	According	rning, Dan	to from activities within leaves for some serious					
Lesson	Assessment as lea	arning: Repor	ts from activities within lesson for peer review.					
assessments – evaluation of								
learning: of, for								
and as learning within the lesson								
within the lesson								

Teaching Learning	Some resources that would be required to successfully enable an inclusive integrated science teaching
Resources	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	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.
Additional	Abbey, T. K., &Essiah, J.W. (1995). Ghana association of science teachers physics for senior high schools.
Reading List	Accra: Unimax Macmillan.
	Ameyibor, K., & Wiredu, M. B. (2006). Ghana association of science teachers chemistry for senior high
	schools. Accra: Unimax MacMillan.
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba:
	IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., & Obeng-Ofori, D. (2011). SWL integrated
	science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD Requirement	Training in improvisation and the use everyday simple materials to teach upper primary science

Year of B.Ed.	3	Semester	1	Place of lesson in semester	1234 5 6789101112
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Title of Lesson	Light					Lesso	n Duration	n	3
Lesson description		s designed to e	quip the	studer	nt teacher w			ogic knowledge a	
,								orm of energy to	
	upper prima	_	·			•		0,	
Previous student teacher	Student tead	chers have stud	died the	energy	and energy	types in y	year 1 and	2.	
knowledge, prior learning				-					
(assumed)									
Possible barriers to learning in	Misconcept	ion on energy	forms.						
the lesson									
Lesson Delivery – chosen to	Face-to-	Face-to- Practical Work-Based Seminar					Independent e-learning		
support students in achieving	face	Activity	Learn	ing		St	udy√	opportunitiesv	<i>!</i>
the outcomes	V								
Lesson Delivery – main mode of	The course v	vill be delivere	d using t	he follo	owing metho	ds:			
delivery chosen to support	Face-to-face	: Discussion, p	resentati	ons (g	roup/individ	ual)			
student teachers in achieving	Independen	t Study: Inquir	y based I	earnin	g on light pro	perties			
the learning outcomes.	e-learning o	pportunities: \	ideos an	d com	puter simula	tions.			
 Purpose for the lesson, 	• Discard	the common n	nisconce	otions	that student	teachers	s have on li	ight as a form of	
what you want the	energy.								
students to achieve, serves	• Demons	strate understa	anding of	the co	ncept light.				
as basis for the learning	 Designir 	ng activities an	d teachir	ig reso	urces to tead	ch how to	teach the	concept light!!!	
outcomes. An expanded	 Designing activities and teaching resources to teach how to teach the concept light!!!. NTS: The teacher: 1a: Critically and collectively reflects to improve teaching and learning. 								
version of the description.	1b: Imp	1b: Improves personal and professional development through lifelong learning and							
	Continu	ous Profession	al Develo	pmen	t.				
 Write in full aspects of the 	1c: Demonstrates effective growing leadership qualities in the classroom and wider								
NTS addressed	school.								
	2c: Has	secure content	t knowled	dge, pe	edagogical kr	owledge	and pedag	gogical content	
	knowled	dge for the sch	ool and g	rade t	hey teach in.				
	2e: Understa	ands how child	ren deve	lop and	d learn in div	erse con	texts and a	applies this in his	or
	her teaching	·							
 Learning Outcome for the 	Learning Ou	tcomes	L	earnin	g Indicators		lentify which cross – cutting		
lesson, picked and								d transferable sk	
developed from the course								ity and addressi	ng
specification								will these be	
Learning indicators for						_	essed or de		
each learning outcome		knowledge and	•		oduced			class, the Stude	nt
		anding of the		f chats on the c			teachers develop the skills of		
		t Light as a forr	n of				communication, collaboration and		
	energy			_	nt and uses			why appreciating	-
	_	activities to tea			light			ence and abilitie	
		upper primary	•		signed			and responsibilit	ζy
	light.				ivities to			participation in	
				tea	ich light.			cussion, well	ا
							-	ices, honesty and	ג
Tonic/Title	Sub Toric	Time or Stand		Too	hing and Ica	accui		arning outcome	
Topic/Title	Sub Topic	Time or Stage	•					arning outcomes ed. Teacher led,	
				-	_	-		ndent study	
				_	ther Activity	up work	Student		
Light	Sources	30minute	es		-to-face: Tut			face/Group activ	-
(B5.1.2.2.1, B6.1.2.1.1,	of Light				es student te			teachers work in	
B6.1.2.2.1)					rainstorm on	the		oility groups to	
					ept of light,			m on the concep	t
				sour	ces.		of light, s	sources.	

(B5.1.2.2.1, B6.1.2.1.1,	Light	60 minutes	Face-to-face/Group	Student teachers produce a report in groups on their brainstorming. Face-to-face/Group activity:			
B6.1.2.2.1)	properties and Uses		activity: Tutor guides student teachers to discuss the properties and uses of light. Ask student teachers to view short videos and perform a small activity on some properties of light	student teachers to discuss the properties and uses of light. Ask student teachers to view short videos and perform a small activity on some properties of light.			
(B5.1.2.2.1, B6.1.2.1.1, B6.1.2.2.1)	Ways to present these concepts to the Primary school Learner	90 minutes	Face-to-face/Group activity/ e-learning opportunities: Tutor guides student teachers in mixed ability groups, to discuss and design materials and activities that can be used to teach lights as a concept to upper primary learners. Use short videos to guide student teachers design the activities.	Face-to-face/Group activity/ e-learning opportunities: student teachers discuss ways by which materials and activities appropriate to the upper primary grade level can be developed and proceed to develop some for peer reviewing across groups. Student teachers work in their groups to do a 5- minutes micro teaching using the activities and materials developed.			
Which cross cutting issues will be addressed or developed and how	establishing	an interactive and inclu	bund rules to protect vulnera usive classroom atmosphere teachers' accuracy, honesty	. Through the process of			
llow	addressed.	its prevention, student	teachers accuracy, nonesty	and carefulliess will be			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Assessment	as learning: Student tea	achers build stock of materia	als on lights			
Teaching Learning Resources	teaching wo Desktop cor	ould be Laboratory equip	oment, Chemicals, Smartpho ols (software that allow teac	an inclusive integrated science ones, Tablets, Laptops, hers to work better), Subject			
Required Text (core)	Abbey, T. K. Ghana asso Unimax Ma	, Alhassan, B., Ameyibo ciation of science teache cMillan.	r, K., Essiah, J. W., Fometu, E ers integrated science for ser	nior high schools. Accra:			
Additional Reading List	Unimax MacMillan. 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	Tra			for use in the upper primary			

Year of B.Ed. 3 Semester 1 Place of lesson in semester 1 2 3 4 5 6 7 8 9 10 11 12

Title of Lesson	Review and STS prepara	tion 1		Lesson D	uration	3 Hours	
Lesson description	This lesson review studer	nt toachors I	oarning of I	occope 1 to locat	n E against th	o CLOs for those	
Lesson description			_		_		
	lessons and discusses the expectations for STS. The lesson will enable student teachers to evaluate their own learning and guide them to the appropriate remedial process for effective states.						
	learning as well as appropriately prepare them for STS.						
Previous student teacher	Student teachers had les				of the semes	ster.	
knowledge, prior learning				208	, 0		
(assumed)							
Possible barriers to learning	Student teachers may:						
n the lesson	Have misconce	ptions of cor	ncepts				
	Have challenge.	s in the learr	ning period	that may not ha	ve been ident	ified by tutors.	
Lesson Delivery – chosen to	Face-to- Practic V	Nork-	Seminar	Independent	e-learning	Practicum	
support students in		Based	S	Study	opportunit		
achieving the outcomes	face √ Activity L	earning.		٧	ies		
	٧				٧		
esson Delivery – main	Face-to Face: Discussion,	, Tutor and s	tudent tead	chers' interaction	ns on the func	tions of simple	
node of delivery chosen to	machines						
support student teachers in	Seminars: Reflective repo	-					
achieving the learning	Independent Study: Inqu						
outcomes.	e-learning opportunities	:: Use of inte	rnet, simula	ations and video	presentations	S	
Danier - familia la care				:-+			
Purpose for the lesson,	Correct misconception			iate remediai ies	ssons		
what you want the	Prepare adequately						
students to achieve, serves as basis for the	Demonstrate the ski	ill in teaching	g the subjec	t matter			
learning outcomes. An	NTS: The teacher:						
expanded version of the	1a: Critically and coll	lectively refle	ects to imp	rove teaching an	d learning		
description.	1b: Improves person			_	_	rning and	
	Continuous Profession			eropinent timou	Sir inclorigied	Timing arra	
	1c: Demonstrates effective growing leadership qualities in the classroom and wider school.						
 Write in full aspects of 	2b Has comprehensi						
the NTS addressed	outcomes	_					
	2c: Has secure conte	ent knowledg	ge, pedagog	gical knowledge a	and pedagogio	cal content	
	knowledge for the so						
	2e: Understands how children develop and learn in diverse contexts and applies this in his or					es this in his or he	
	teaching						
		T		1.1 1			
Learning Outcome for	Learning Outcomes	Learning Ir	naicators	-		tting Issues, core	
the lesson, picked and						clusivity. Equity How will these b	
developed from the course specification					or developed	now will these b	
Learning indicators for	Identify Learning	Preser	nt Reflective			es of devices, goo	
each learning outcome	Challenges and be		ts of learnin		_	measurements,	
each learning outcome	able to obtain	-	t the CLOs	0	is in class, Stu	•	
		uguinis	of the CLOS	Jilai ilig iaca		nent teachers	
. 0	appropriate remedies			develop skil	ls of commun	ication,	
• •	appropriate remedies for learning against			develop skil collaboratio	ls of commun n and mutual	ication, respect while	
• • • • • • • • • • • • • • • • • • • •	appropriate remedies for learning against the CLOs			develop skil collaboratio appreciating	ls of commun in and mutual g individual di	ication, respect while fference and	
• • • • • • • • • • • • • • • • • • • •	appropriate remedies for learning against the CLOs • Prepare, within the			develop skil collaboratio appreciating abilities, crit	ls of commun in and mutual g individual di tical thinking a	ication, respect while fference and and responsibility	
• • • • • • • • • • • • • • • • • • • •	appropriate remedies for learning against the CLOs • Prepare, within the scope of the content	Provid	le report fo	develop skil collaboratio appreciating abilities, crit through car	Is of commun in and mutual g individual di tical thinking a eful participat	ication, respect while fference and and responsibility	
• • • • • • • • • • • • • • • • • • • •	appropriate remedies for learning against the CLOs • Prepare, within the		le report fo	develop skil collaboratio appreciating abilities, crit through car r work/discus	Is of commun in and mutual g individual di tical thinking a eful participat	ication, respect while fference and and responsibility	
	appropriate remedies for learning against the CLOs • Prepare, within the scope of the content		pectations	develop skil collaboratio appreciating abilities, crit through car r work/discus	Is of commun in and mutual g individual di tical thinking a eful participat	ication, respect while fference and and responsibility	

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 study		
			Teacher Activity	Student Activity	
Review and STS preparation 1	Review of Lesson 1 – Lesson 5	90 minutes	Face-to-face: Tutor introduces the lesson by allowing Student teachers to reflect and summarize the previous week's lesson.	Face-to-face: Student teachers reflect and summarize the previous week's lesson.	
			Face-to-face: Tutor uses openended questions to elicit misconceptions/incorrect/naive ideas about Concepts in Previous lesson. Use Probing questions to help clarify Misconceptions/Incorrect/naïve ideas from previous lesson Face-to-face/Group activity: Tutor guides studentteachers to form groups of 3 members each, or more depending on class size,	Face-to-face: Student teachers answer open-ended questions to bring their misconceptions/incorrect/naive ideas about Previous lessons for further discussions and clarifications and relearning Face-to-face/Group activity: student teachers in groups of 3members each (mixed intellectual ability/gender-based) to reflect and write a reflective report on learning challenges to attaining the CLOs	
			(mixed intellectual ability/gender-based) to reflect and write a reflective report on learning challenges to attaining the CLOs from the previous lessons and how they will suggest remedies and actions for learning to Occur. The reflection should include how that will impact on the upper primary	from the previous lessons and how they will suggest remedies and actions for learning to Occur for them and the upper primary learner Face-to-face/Group activity:	
			Face-to-face/E-learning opportunities: Tutor allows studentteachers to do short power point/poster/post it sticker presentation of their reflection for cross sharing.	Student teachers in groups do power point/poster/post it sticker presentation of their reflection for cross sharing.	
	STS Preparation	90 minutes	Face-to-Face/E-learning/Independent study: Tutor allows individual student teachers to search online resources for use of science subject portfolio and reflective journal as well as discuss in groups (mixed gender) how to plan with the concepts for co teaching https://www.youtube.com/watch?v=sacuuqjHPXohttps://www.youtube.com/watch?v=0nKR0kuDYHM	E-learning/Independent study: Individual student teachers search online resources for use of science subject portfolio and reflective journal as well as discuss in groups (mixed gender) how to plan with the concepts for co teaching	
Which cross cutting issues will be addressed or developed and how	an interactive a plane figures a	and inclusive cland also doing or	ng ground rules to protect vulnerable s assroom atmosphere. By practicing wit Inline research on the correct vocabula In manipulating/handling/measuring/v	h measuring of area/volume of ry of mass and weight of objects,	

Lesson assessments –	Assessment of learning: Reflective reports and co planned lessons with similar concepts from the
evaluation of learning:	basic school curriculum
of, for and as learning	
within the lesson	
Teaching Learning	match box, cubes of sugar, chalk box, exercise books, manila cards multimedia resources. YouTube
Resources	videos e.g. https://www.youtube.com/watch?v=sacuuqiHPXo
	https://www.youtube.com/watch?v=0nKR0kuDYHM
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 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 selecting appropriate e-resources for teaching upper primary school lessons.

Year of B.Ed. 3 Semester 1 Place of lesson in se	semester 1 2 3 4 5 6 7 8 9 10 11 12
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Title of Lesson	Change	of States of N	latter I			Lesson Duration	3 Hou
Lesson description Previous student teacher knowledge, prior	This lesson deepens the student teachers understanding of the concept Matter studied in Year 1 semester 1 (lesson 4). The student teacher will be exposed to how matter can change from one state to another. The teacher will be guided to identify and develop appropriate activities that a gender friendly and socially inclusive to support all learning at the upper primary level. Student teachers have studied matter in year 1 semester 1 (lesson 4).						
learning (assumed) Possible barriers to	Possible	misconceptio	ns about e	evaporation occu	urring only a	t high temperatures.	
learning in the lesson		1	ı				
Lesson Delivery – chosen to support students in achieving the outcomes	Face- to-face √	Practical ActivityV	Work- Based Learning	Seminars	Independe Study/	ent e-learning opportunities v	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Indepen	dent Study: ii	ons, demo nquiry and	nstrations and o		. Group work and desigr	ning
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	DiscDesiNTS:2b) Has of learning2c) Has so content	and the comnigning activition activition activition comprehensive outcomes p.1 secure contention knowledge for activities	non miscor es to teach ve knowled 12, it knowled r the school	change of state lge of the officia ge, pedagogical ol and grade the	vaporation is in the uppe I school curr knowledge a y teach in. p	.13 & 21)	
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome 	exp eva con be p prin Iden exar occu evap conc Deve plan conc Evap Conc Dem unde	lain Boiling, poration and densation as oresented to nary learners itify and give mples of every irrences of coration and densation. elop activities lessons in the tepts Boiling, poration and densation nonstrate erstanding of condition and be able conditions.	would /day to co	Present con maps to illu the meaning the concept Produce chaeveryday occurrences convection their persor portfolio Presents sin learning ma (models, de and lesson pon the concept the concept their persor portfolio	an an be ocept The strate in gof skits an incomments of also de sof accident and work of the sof accident and the	entify which cross- cutti d transferable skills, inc d addressing diversity. I eaddressed or develope rough discussions and s class student teachers of ills of communication, of d mutual respect while dividual difference and a so acquire skills in handle evelop critical thinking, houracy and responsibility tive participation in groonsk/discussion.	clusivity. Equit How will these develop the collaboration appreciating abilities. They ling devices, nonesty, cy through

Topic/Title	Sub Topic	Time or Stage	Teaching and learning to achie	eve learning outcomes:	
	·		depending on delivery mode selected. Teacher led,		
			collaborative group work or in	· ·	
			Teacher Activity	Student Activity	
Change of State of Matter (B5.4.1.2.1)	Reviewing lesson 4 form Year 1 semester 1.	30 minutes	Face-to-face/Group activity: Teacher puts student teachers in groups of 5 (any number depending on class size) to brainstorm and discuss the states of matter and how related they are after viewing a short video (refer to video link below) Allow each group 5 minutes to present their findings https://www.youtube.com/ watch?v=wyRy8kowyM8	Face-to-face/Group activity: Student teachers brainstorm and discuss the states of matter and how related they are after viewing a short video. Student teachers use concept maps to relate the various state of matter. Groups present their findings to the class. (PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)	
	Boiling, Evaporation and Condensation	90 minutes	Face-to-face/Group activity:Teacher led group discussions on Boiling, using examples from lesson 8 (application of convection current), evaporation and condensation. Assist student teachers to design a simple experiment with boiling water (a straw can be used to colour the bottom of the water) to demonstrate Boiling, Evaporation and condensation. The activities should also be used to explain the beads of sweet on cold bottles and glass windows	Face-to-face/Group activity: Student teachers use shower thoughts/discussions on boiling, evaporation and condensation. Design activities to demonstrate boiling water using colour at the base, evaporation and Condensation. Use the activities on condensation to explain the beads of sweat on cold bottles and glass windows. Present these activities in a report for peer review. (PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)	
	Ways to teach the concepts (B5.4.1.2.1)	60 minutes	Face-to-face/Group activity:Guide Student teachers (grouped in separate gender abilities) to use the activities designed to plan science lesson for upper primary teaching. Emphasize on gender equity and social inclusive lessons. Aske them to cross share for peer review/critique.	Face-to-face/Group activity:Student teachers (grouped in separate gender abilities) use the activities designed from step two above to plan science lesson for upper primary teaching. Noting gender equity and social inclusive language, materials, structures (group arrangements etc) lessons. Student Teachers cross share their lesson plans for peer review/critique.	
Which cross cutting	Equity and SEN: thr	ough appropriate	gender and equity sensitive gro		
issues will be addressed			ctive and inclusive classroom atr		
or developed and how					
or developed and now	Assessment of	learning: Present	tation and peer reviewed Lesson	activities and plans	
Lesson assessments – evaluation of learning: of, for and as learning	Assessment of				
Lesson assessments – evaluation of learning: of, for and as learning within the lesson			an analdan a		
Lesson assessments – evaluation of learning: of, for and as learning within the lesson Teaching Learning	Cardboards, poster		or cooking pans, source of heat,	poster colours, phones,	
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Cardboards, poster tablets, desktop co	mputers with inte			

	Abboy T.V. Albassan B. Amayibar V. Essiah I.W. Famatu F. S. Wisady M.D. (2009) Chang
	Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). <i>Ghana</i>
	association of science teachers integrated science for senior high schools. 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. 3 Semester 1 Place of lesson in semester 1 2 3 4 5 6 7 $\frac{8}{9}$ 10 11 12

Title of Lesson	Change of State	es of Matter II				Lesson Dura	tion 3 Hours	
Lesson description	semester 1 (less to another. The friendly and soc	This lesson deepens the student teachers understanding of the concept Matter studied in Year 1 semester 1 (lesson 4). The student teacher will be exposed to how matter can change from one state to another. The teacher will be guided to identify and develop appropriate activities that are gender friendly and socially inclusive to support all learning at the upper primary level.						
Previous student teacher knowledge, prior learning (assumed)	Student teacher	rs have studied	Change of	states I in lesso	on 7.			
Possible barriers to learning in the lesson	Possible miscon	ceptions about	t evaporatio	n occurring on	nly at high temp	eratures.		
Lesson Delivery – chosen to support students in achieving the outcomes		ivity v	Work- Based Learning	Seminars	Independen t StudyV	e-learning opportunities \checkmark	Practicum	
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to face: Di Independent St e-learning Oppo	: udy: inquiry ar	nd Reflection	ns		k and designing		
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	Discard theDesigning aNTS:2b) Has compre learning outcom2c) Has secure of	 Discard the common misconceptions that sublimation is the result of heating or boiling Designing activities to teach change of state in the upper primary classroom 						
Learning Outcome for the lesson, picked and developed from the course	Learning Outcomes Learning Indicators Identify which cross- cutting core and transferable skills, inclusivity. Equity and address diversity. How will these be addressed or developed					skills, addressing se be		
specification • Learning indicators for each learning outcome	and sublimation be presented learners Identify and of everyday of Condensation bevelop act plan lessons concepts Bo Evaporation Condensation Demonstrati	ivities to co in the illing, and on ie ing of the topic	• Pro eve of c the lear (mc less	sent concept n lustrate the aning of the cepts duce charts of ryday occurrer ondensation for personal por sents simple rning materials idels, designs) on plans on the cepts	ideas i develor comm mutua individences They a device trollo hones respor particity work/s	gh discussions ar in class student to op the skills of unication, collab al respect while a dual difference an also acquire skills as, develop criticaty, accuracy and ansibility through pation in group discussion.	oration and ppreciating ad abilities. in handling al thinking,	

Topic/Title	Sub Topic	Time or	Teaching and learning to achieve learning outcomes: depend		
		Stage	on delivery mode selected. Teacher led, collaborative group		
			work or independent study		
Change of State of	Poviowing	30 minutes	Teacher Activity	Student Activity Face-to-face/Group activity: Student	
Change of State of Matter II (B5.4.1.2.1)	Reviewing lesson 7.	30 minutes	Face-to-face/Group activity: Teacher puts student teachers in groups of 5 (any number depending on class size) to brainstorm and discuss lesson 7 (refer to video link below) Allow each group 5 minutes to present their findings https://www.youtube.co m/watch?v=wyRy8kowy M8	teachers brainstorm and discuss the lesson 7 and link it to this new lesson. Groups present their findings to the class. (PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)	
	melting, freezing and sublimation	91 minutes	Face-to-face/Group activity:Teacher led group discussions on Boiling, using examples from lesson 8 (application of convection current) on melting, freezing and sublimation. Assist student teachers to design a simple experiment with to demonstrate melting, freezing and sublimation.	Face-to-face/Group activity: Student teachers use shower thoughts/discussions on melting, freezing and sublimation. Design activities to demonstrate melting, freezing and sublimation. Present these activities in a report for peer review. (PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)	
	Ways to teach the concepts (B5.4.1.2.1)	31 minutes	Face-to-face/Group activity: Guide Student teachers (grouped in separate gender abilities) to use the activities designed to plan science lesson for upper primary teaching. Emphasize on gender equity and social inclusive lessons. Ask them to cross share for peer review/critique.	Face-to-face/Group activity: Student teachers (grouped in separate gender abilities) use the activities designed from step two above to plan science lesson for upper primary teaching. Noting gender equity and social inclusive language, materials, structures (group arrangements etc) lessons. Student Teachers cross share their lesson plans for peer review/critique.	
Which cross cutting issues will be addressed or developed and how Lesson assessments –	studentteachers,	establish an inte	ate gender and equity sensiti ractive and inclusive classroo entation and peer reviewed L		
evaluation of learning: of, for and as learning within the lesson		-	·		
Teaching Learning Resources	desktop compute https://www.thou	rs with internet and internet a	access. vection-currents-definition-a		
Required Text (core)	Abbey, T. K., Alhas association of scie Handbook for PD	ssan, B., Ameyib ence teachers int Coordinators Th	or, K., Essiah, J. W., Fometu, egrated science for senior hig	rimary Schools (B4-B6). Accra E., & Wiredu, M.B. (2008). <i>Ghana</i> gh schools. Accra: Unimax MacMillan; EPTEMBER 2019	

Additional Reading	Abbey, T. K., &Essiah, J.W. (1995). Ghana association of science teachers physics for senior high
List	schools. Accra: Unimax Macmillan.
	Ameyibor, K., & Wiredu, M. B. (2006). Ghana association of science teachers: chemistry for senior
	high schools. Accra: Unimax MacMillan.
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher I.
	Winneba: IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.& Obeng-Ofori, D. (2011). SWL integrated
	science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD Requirement	Training on designing experiments for primary science teaching.

Year of B.Ed.	3	Semester	1	Place of lesson in semester	1 2 3 4 5 6 7 8 9 10 11 12
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Title of Lesson	Teaching V	entilation II				Lesson Duration	3 Hours					
Lesson description	and techno learning ac	The lesson is designed to provide the student teachers with the relevant learning experiences and technological skills that will enable them to teach creatively through hands-on exploratory learning activities and effective authentic assessment. It is also structured to enable them to learn about the human body system as will be presented to the Upper primary learner.										
Previous student teacher knowledge, prior learning (assumed)	Student te	tudent teachers are aware of their bodies.										
Possible barriers to learning in the lesson	Possible m	ossible misconceptions about the human body.										
Lesson Delivery – chosen to	Face-to-	Practical	Work-	Seminars	Independent	e-learning	Practicum					
support students in	face V		Based		Study	opportunities						
achieving the outcomes	1000	-	Learning		- Commy	√						
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Independe	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,	Get th	e conceptual un	derstandin	a of Body Org	anc							
what you want the						e about the Hum	an Rody					
students to achieve, serves			-			re about the num	іан войу					
as basis for the learning	DesignNTS:	ning activities to	teach the r	iuman bouy s	systems							
outcomes. An expanded	_	mnrohonsiyo kn	suladaa af	the official co	shool curriculum	including						
version of the description.		mprehensive kno	wieuge oi	the Official Sc	citooi curricululli	, including						
Write in full aspects of	_	utcomes p.12, cure content kno	wlodgo no	dagogical kn	auladga and nac	lagogical						
the NTS addressed		owledge for the										
	Learning O			grade they to		which cross- cut	tina issues					
 Learning Outcome for the lesson, picked and 	Learning O	utcomes	Learning	ginuicators	-	d transferable sk	-					
developed from the						ity. Equity and a						
course specification						y. How will these						
-						sed or developed						
Learning indicators for	• Define	and avalain the	a Dro	wing of parts								
each learning outcome	humar	e and explain the n body systems	the Sys	Drawing of parts of the Human Body Systems Through discussions an ideas in class student to develop the skills of collaboration and mutu while appreciating individifference and abilities acquire skills in handlin develop critical thinking accuracy and responsible active participation in general contents.								
	organs Body S Demoi	onship of the sof the Human System estrate standing of the and be able to	sho bet boo • Pre rep	showing relationship between the human body systems		iscussion.	очь					

Topic/Title	Sub Topic	Time or		earning outcomes: depending on delivery mode
		Stage	Teacher Activity	group work or independent study Student Activity
The Human Body System (B5.4.1.2.1)	Body System (B5.4.1.2.1) Organizati on and Interralate d ness of the Organs in the Human Body systems Body s		Face-to-face/Group activity: Put student teachers into different ability group to brainstorm and discuss the structure of the Human Body system using Diagram, Pictures and videos as guide.	Face-to-face/Group activity: Student teachers working in groups, discuss the structure of the Human Body parts using diagrams, Pictures and Models provided by the tutor as guide. Each group draw the parts and cross share later Groups make 5-minutes presentations of their drawings to the class. (PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)
			(The groups should be inclusive, multi-age, and developmentally appropriate). https://www.youtube.com/watch?v=i5aXwiC3wWc https://www.youtube.com/watch?v=GYtJKrbqhiQ Guide the groups to later cross share their concept maps.	Face-to-face/Group activity: Student teachers working in their groups, view, short videos on the structure of the organs in the Human Body, discuss and draw concept maps to show how related the organs and cells are related in the Human Body systems. Student teachers cross share their concept maps to the larger groups. (PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)
	Ways to teach these Concepts	45minut es	Face-to-face/Group activity:Guide discussion on developing activities to co plan and co teach using concepts of human body systems Require of student teachers to develop models of how to present the activities to primary school learners.	Face-to-face/Group activity: Discuss in mixed ability groups how to develop activities to co plan to teach upper primary learners about the Human Body systems and make 2-minute presentations of the models.
Which cross cutting issues will be addressed or developed and how			I .	itive group work to protect vulnerable student nosphere
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Assessr	nent of leari	ning: Presentation of Models of activi	ties and drawings of Human Body Systems
Teaching Learning Resources Required Text (core)	NaCCA, Min Abbey, T. K.	istry of Educ , Alhassan, E eachers integ	cation (2019). Science Curriculum for 3., Ameyibor, K., Essiah, J. W., Fometu grated science for senior high schools	Primary Schools (B4-B6). Accra u, E., & Wiredu, M.B. (2008). Ghana association . Accra: Unimax MacMillan; Handbook for PD

Additional	Abbey, T. K., &Essiah, J.W. (1995). Ghana association of science teachers physics for senior high schools.
Reading List	Accra: Unimax Macmillan.
	Ameyibor, K., & Wiredu, M. B. (2006). Ghana association of science teachers: chemistry for senior high
	schools. Accra: Unimax MacMillan.
	Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba:
	IEDE.
	Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.& Obeng-Ofori, D. (2011). SWL integrated science
	for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.
CPD	Training on developing modelling concepts into concrete models.
Requirement	

Year of B.Ed. 3 Semester 1 Place of lesson in semester 1 2 3 4 5 6 7 8 9 10 11 12

Title	e of Lesson	Science Cu	ırriculum Stı	udies- Pedag	ogies		Less	on Duration	3 Hours				
Les	son description	adolescen	Science learning at the basic school can be challenging to the learning especially the early adolescent. This lesson looks at how to identify and use challenging , hand on pedagogies to facilitate learning at the upper primary level.										
Pre	vious student teacher					nary learne	r from	n previous lesso	ns and have				
	wledge, prior learning												
	sumed)		In idea of the transition in growth from childhood to adulthood from lesson 10 and 11 from lear 2 semester 1										
_	•												
	sible barriers to learning in		Student teachers may:										
	lesson		Have misconceptions about age appropriate learning										
	son Delivery – chosen to		ace-to- Practical Work- Seminars V Independent e-learning Practicum										
-	port students in achieving	face √	Activity	Based		StudyV		opportunities					
	outcomes			Learning				٧					
Les	son Delivery – main mode					ions on con	cepts	of age appropr	iate learning				
of c	lelivery chosen to support	Independe	ent Study: In	quiry and re	flections								
stu	dent teachers in achieving	e-learning	opportuniti	es: Use of in	ternet, simulat	ions and vio	deo pr	resentations					
the	learning outcomes.	Seminar: F	Reflective pr	esentations									
•	Purpose for the lesson,	 Stude 	nt teachers	will adopt m	uch positive ou	ıtlook to de	al wit	h early adolesce	ent crises				
	what you want the		earning diffic		·			•					
	students to achieve, serves												
	as basis for the learning	NTS:											
	outcomes. An expanded	_	vec nercona	and profess	ional developn	nent throug	h lifa	long learning					
	version of the description.		uous Profes			nent tinoug	311 1110	iong learning					
	•					school our	المنادية	m includingless	nina				
•	Write in full aspects of the			e knowledge	e or the official	SCHOOL CUIT	icului	n, includinglear	ning				
	NTS addressed	outcomes											
				_		_	and pe	edagogicalconte	ent				
		_		_	le they teach ir								
				children dev	elop and learn	in diverse o	conte	cts and appliest	his in his or				
		her teachi	-										
		3f) Pays a	ttention to a	II learners, e	specially girls a	and student	s with	n SpecialEducati	onal Needs,				
			heir progres										
		3g) Emplo	ys instructio	nal strategie	es appropriate	for mixed a	bility,	multilingual and	dmulti-age				
		classes.											
		3h) Sets m	neaningful ta	sks that end	ourages learne	r collaborat	tion a	nd leads topurp	oseful				
		learning											
•	Learning Outcome for the	Learning (Outcomes	Lear	ning Indicators	10	dentif	y which cross –	cutting				
	lesson, picked and							, core and trans					
	developed from the course							vity. Equity and					
	specification							ity. How will the	_				
	Learning indicators for							sed or develop					
	each learning outcome	Explai	in the	•	Produce a char	_		nt teachers deve					
	cas icag outcome		opmentalap		showing			unication, colla					
			earning		developmental			I respect while					
			gogies for		appropriate			lual difference a					
			, ,					thinking and re					
			ce learning. (pedagogies for								
			13 &21), (NT		primary science		_	sh careful partic					
			13 & 21),		learning.	8	group	work/discussion	n.				
			b, p.12, 2c,	0.13									
		& 21)											

Topic/Title	Sub Topic	Time or Stage						
			depending on delivery mode select collaborative group work or indep					
			Teacher Activity	Student Activity				
Science Curriculum - Pedagogies	Reviewing Activities for teaching in lesson 9 and transition to early adolescent learning from Lesson 10 and 11,	40 minutes	Face-to-face: Tutor introduces the lesson by reviewing Student teachers' relevant previous knowledge on adolescent learning (lessons 10 and 11, year 2 semester 1)	Face-to-face: Student teachers discuss their previous knowledge on the adolescent learning and behaviour from previous lessons.				
	year 2 semester 1.		Face-to-face: Open-ended questions to review teaching activities and model from lesson 9	Face-to-face: Student teachers answer openended questions to review teaching learning activities from lesson 9.				
	Developmentally Appropriate and inclusive pedagogies for science learning	140 minutes	Face-to-face/e-learning opportunities/independent Study: Put student teachers in mixed gender groups, provide short videos on inclusive and gender appropriate pedagogies for science learning and allow student teachers to discuss the issues and report to the larger class on the models of pedagogies that will be appropriate for upper primary learning Independent study (project): Provide for teachers, OERs and videos in of inclusive learners so they can obtain information on how they learn science https://www.youtube.com/watc h?v=BWaatwkW 6g https://www.youtube.com/watc	Face-to-face/e-learning opportunities/independe nt Study: Student teachers, working in mixed gender groups, view short videos provided by tutor, discuss and write a report to share with the larger group, on the models of pedagogies that will be appropriate for upper primary learning Each groups has 5 minutes to make presentation and get critiqued Independent study: Each student teacher is required to use the information from OERs to design a model of pedagogy that would be				
			h?v=wBz6glO5x5Q	developmentally appropriate to teaching upper primary science				
Which cross cutting issues will be addressed or developed and how	an interactive and inc thermometers, stude temperatures will be	clusive classroom ent teachers' diffic addressed.	d rules to protect vulnerable student atmosphere. By practicing with anal culties in manipulating/handling/mea	ogue and digital asuring skills of body				
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	marks), Student be adapted to le	teachers doing sh arn science. (30 n	,					
Teaching Learning Resources	Training on reflection	ns and nature wal	k					
Required Text (core)	Abbey, T. K., Alhassar	n, B., Ameyibor, K e teachers integra	Science Curriculum for Primary Schoo , Essiah, J. W., Fometu, E., & Wiredu ted science for senior high schools. A s 1- 10	ı, M.B. (2008). <i>Ghana</i>				
Additional Reading List	Abbey, T. K., &Essiah, schools. Accra: Unima		na association of science teachers pl	nysics for senior high				

	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.	3 Semester	Place of lesson in semester	12345678910 11 12
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Title of Lesson	Science Curric	culum Stuc	lies- Co	o- plann	ing and Co -	Teaching	Lesson Duration	3 Hours				
Lesson description	adolescent. The co plan for co	Science learning at the basic school can be challenging to the learning especially the early adolescent. This lesson looks at how to identify and use challenging, hands-on pedagogies to co plan for co teaching in order to prepare the student teacher to adequately benefit from the STS experience at the upper primary level.										
Previous student teacher knowledge, prior learning (assumed) Possible barriers to learning in	appropriate a Upper Primar	Student teachers have undertaken a lesson on science pedagogies that are developmentally appropriate and are on a project to develop inclusive pedagogies for science learning at the Upper Primary level Student teachers may:										
the lesson	 Have misconceptions age appropriate learning Imagine that the most pressing consideration for early adolescent mingling is from the awareness of the opposite sex and adolescent sexuality. 											
Lesson Delivery – chosen to support students in achieving the outcomes	face √	Practical Activity	Worl Base Lear	d ning	Seminars √	Independe StudyV	opportunities v	Practicum				
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Independent S	Study: Inq	uiry an	d reflec	tions		epts of age appropri o presentations	ate learning				
 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 	 Student teachers will adopt much positive outlook to deal with early adolescent crises and learning difficulties Student teachers will be able to manage excesses from egos and other considerations for early adolescent collaborations. 											
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for 	Learning Outo	Learning Indicators			core ar inclusiv diversi	Identify which cross – cutting Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed						
each learning outcome	Co plan and co teach science lessons at the upper primary level. (NTS 2c, p.13 & 21), (NTS 2c, p.13 & 21), (NTS2b, p.12, 2c, p.13 & 21) (NTS2b, p.12, 2c, p.13 & 21)			Produce science lesson plan and model teaching in micro teaching.		Studen commu mutual individi critical throug	Student teachers develop skills of communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in growork/discussion.					
Topic/Title	Sub Topic Time o Stage			depen collab	ding on deli	very mode s	eve learning outcon selected. Teacher le adependent study Student Activi	d,				
Science Curriculum Studies- Co- planning and Co - Teaching	Reviewing lesson 10	30 min	30 minutes		Face-to-face: Tutor introduces the lesson by reviewing Studentteachers' relevant previous knowledge on developmentally appropriate and inclusive pedagogies that		Face-to-face: S teachers review previous know developmenta appropriate an pedagogies cal	w their ledge on lly d inclusive				

			can be used to adapt science concepts to the primary school level using discussion and role play in mixed ability groups	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.
	Co planning	90 minutes	Independent Study/e-learning: Put Students into groups (between 3 members to 5 members per group) and direct to select topics, apply the knowledge of developmentally appropriate and inclusive pedagogies, and plan lessons they will micro teach. Provide short videos to guide them. https://www.youtube.com/watc h?v=wBz6glO5x5Q	Face-to-face: Student teachers working in groups co plan lessons they will micro teach for their peers to critique
	Co teaching	90 minutes	Face-to-face/Seminar: Tutor allows student teachers to do micro teaching in groups to demonstrate co-teaching for 10 minutes each Allow other groups to ask questions and make suggestions for improvement.	Face-to-face/Seminar: opportunities: Student teachers in groups do micro teaching in their groups to demonstrate co-teaching while the larger group make quick suggestions for improvements.
Which cross cutting issues will be addressed or developed and how Lesson assessments – evaluation of learning: of, for	establishing an and digital ther skills of body te	interactive and mometers, stu emperatures w	ng ground rules to protect vulnerabl d inclusive classroom atmosphere. B udent–teachers' difficulties in manipu ill be addressed. ing of Co planned lessons	e student teachers and by practicing with analogue
and as learning within the lesson Teaching Learning Resources	Training on refl	ections and na	ature walk and inclusive science class	srooms.
Required Text (core)	Abbey, T. K., All Ghana associat	hassan, B., Am tion of science	(2019). Science Curriculum for Prim leyibor, K., Essiah, J. W., Fometu, E., teachers integrated science for senion k for PD Coordinators Themes 1-10	& Wiredu, M.B. (2008).
Additional Reading List	Abbey, T. K., & E high schools. Ad Ameyibor, K., & senior high scho Asabere-Ameya I. Winneba: IED Oddoye, E. O. K	Essiah, J.W. (19 ccra: Unimax N & Wiredu, M. B <i>ools</i> . Accra: Un aw, A., & Oppo JE. C., Taale, K. D.,	995). Ghana association of science te	for the basic school teacher
CPD Requirement			st for identifying inclusivity and valu plerance in group work	es for learning science

Year of B.Ed.	3	Semester	1	Place of lesson in semester	1234567891011 12
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Title of Lesson	Review a	and STS prepa	aration 2			Lesson [Ouration	3 hou	rs			
Lesson description	lessons a evaluate	This lesson review student teachers learning of lessons 7 to lesson 11 against the CLOs for these lessons and discusses the expectations for STS. The lesson will enable student teachers to evaluate their own learning and guide them to the appropriate remedial processes for effective learning as well as appropriately prepare them for STS.										
Previous student teacher	Lessons	Lessons learnt from lesson 8 through lesson 11 in all learning approaches and										
knowledge, prior learning (assumed)	observat	observations/experiences during STS.										
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-face √	Practical Activity	Work- Based Learnin	٧	minars	Independent Study V	t e-learn opport	_	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	 Test Prov Corr Build NTS: 1a) Critic 1c) Dem 1d) Is gu professi 2a) Dem 2b) Has outcome 2c) Has for the s 2e) Und 	secure conter school andgra erstands how	and cros tuition/to ptions an ry suppor ectively re ctive grov and ethic miliarity we we knowled	s – cuttin utorials of d misinfort going for effect to in wing lead cal teached with the endeded of the edge of the edge, ped each in.	g issues n where no ormation orward on mprove te ership qua er codes of ducation s ne official s agogical kr	ecessary for e SEN and General aching and lead lities in the claim of the conduct in his ystem and keed school curricumowledge and	der issue arning assroom an s or herdeve y policies gu lum, includi pedagogica	d wider elopmer iding it. nglearni ilconten	school nt as a ing t knowledge			
Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome	her teaching Learning Outcomes			Learning Indicators			Identify which cross – cutting lissues, core and transferable skills, inclusivity. Equity and addressing diversity. How we these be addressed or developed					
	strei the s the i revie	atify weakness ngths in learn science lessor period under ew ble to reflect	ing n for	and s	trengths or	•	Collaboration Communication Through graph presentation Equity and	ation and oup wor on				
	expe and so fa insig area	ectations for S on lessons les ar and state n ghts and/or gr is needing edies	STS arnt ew	on ST demo illustr		and a given	developed activities					

•	Correct	•	Present concept maps	Creativity and critical thinking
	misconception/misinf		and/or models linking	is developed in developing
	ormation for earlier		misconceptions/misinform	models and concept maps
	(lesson 7-11) lessons		ation to new insights	

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		
Review and STS preparation 2	Reviewing the understanding of lessons 7 to 11 against the CLOS	60 minutes	Face-to-face: Tutor led brainstorming session with student teachers to unearth the weaknesses and strengths of student teachers in the lessons 7 – 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 and reflection of expectations for 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 m i n u t e s	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/misinformat ion to new insights.		
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through mixe establishing an interactive and Through modelling and group	d inclusive cl work, collab	assroom atmosphere. oration is established.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	 Assessment as Learning: Student teachers' presentations during group work and model work presentation helps to assess them of learning (25 marks) Assessment for and as learning: Student teachers working in groups on remedial tutoring helps to assess them for and as learning (10 marks) 					

Teaching Learning	Cardboards, Course manual, Poster paper, Projectors,			
Resources				
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). <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			