YEAR 2

SEMESTER 2

Four-Year B.Ed. Course Manual

Early Grade Science II

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FOREWORD

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

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

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

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

Professor Mohammed Salifu Director General, Ghana Tertiary Education Commission

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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.

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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 ……

LESSON 1

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

Title of Lesson	Sunlight				Lesson Duration	3 Hours
Lesson description	In this lesson, the Tutor will assist the student teacher to review previous knowledge on sunlight as source of energy and its importance to plant, aspects of which were studied in senior high school. The lesson will then deepen their conceptual understanding of uses and importance of sunlight to plants. They will be exposed to teaching strategies and material so that they will effectively handle similar topics in their future science classrooms. This first lesson introduces student teachers to the course learning outcomes and the three assessment components of the course.					
Previous student teacher knowledge, prior learning (assumed)	Student teachers have studied solar energy, sunlight and its role in manufacture of food by plants					
Possible barriers to learning in the lesson	Student teacher might still have misconceptions about origin of the sun and a naïve belief that light is not a form of energy.					
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face √**	**Practical Activity √**	**Work-Based Learning**	**Seminars**	**Independent Study√**	**e-learning opportunities**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-face: Discussion, Talk for learning approaches with student teacher presentations, multimedia presentations (video clip clips, animation, and pictures on PowerPoint). NTS 3j, pg. 14 Practical activity: student teachers work in mixed ability and gender based group experimentation and presentation of reports					
• **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**	• Deepen student teachers' basic concepts on the uses and importance of sunlight to plants • Correct student teachers' misconceptions about the origin of the sun and incorrect ideas about light not being a form of energy • Build the necessary support going forward on SEN and Gender issue • The student teacher will develop skills of experimentation. • Provide student teachers with the requisite knowledge and skills to be able to teach the topic use of sunlight and importance of sunlight to plants. The realization of these intentions can be found in the following NTS: 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 3f: Pays attention to all learners, especially girls and students with SpecialEducational Needs, ensuring their progress. 3j: Explains concepts clearly using examples familiar to students.					
• **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
	• Identify misconceptions about the origin of the sun and about light not being a form of energy NTS 2c			• Student teachers construct a checklist of misconceptions about origin of the sun and incorrect idea that light is not a form of energy with corresponding correct science concepts		Develop skills of construction of checklist PD Theme 8, pg 40

	• Demonstrate adequate knowledge and understanding that sunlight is the basic need for most plants	• Use video clips to demonstrate experimental set up illustrating that sunlight is the basic need for plants to produce their own food	Develop skills for setting up experiment to demonstrate that sunlight is the basic need for plants to prepare their food NTS 2c
	• Mention some uses and importance of sunlight	• Student teachers to show sample exercises on the importance of sunlight	
	• Design mini-project to investigate community's cultural beliefs about the origin of the sun and light not being a form of energy	• Student teachers in groups report on investigation on cultural beliefs about origin of the Sun and light not being a form of energy	Developing Social collaboration and attention and care to individual needs (SEN) through group work NTS 3f

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**	**Student Activity**
Sunlight B1.2.1.2.1 B2.2.1.1.1	Introduction to Y2S2 Course Manual	**10minutes**	Face-to-Face: Tutor Initiates discussion to do self-introduction and require of student teachers to do same.	Face-to-Face: Student teachers responds to tutors discussion to do self-introduction.
		10 minutes	Face-to-Face: Make available copies of Y2S2 course Manual to student teachers to introduce Course manual to student teachers and allow them to discuss their expectations for the semester as well as critique the previous semesters challenges	Face-to-Face: discuss the Course manual for Y2S2 and state their expectations for the semester as well as critique the previous semester's manual
	Uses of sunlight	**40 minutes**	Tutor through diagnostic questioning identify student teachers' misconceptions about the origin of the sun and incorrect idea that light is not a form of energy	Student teachers in groups to present list of misconceptions and incorrect ideas that light is not a form of energy with corresponding correct science concepts
		50 minutes	Tutor to show animation/pictures on PowerPoint to stimulate student teachers on the uses of sunlight NTS 3j Tutor to guide student teachers to mention the importance of sunlight	Student teachers to discuss the uses of sunlight by plants and other organisms Student teachers in mixed ability groups to provide reports on importance of sunlight
	Sunlight as a basic need of most plants	**70 minutes**	Tutor to guide student teachers to design and perform an experiment on sunlight as basic need of most plants	Student teachers to, in mixed ability groups/gender-based groups present reports on the experimentation to establish sunlight as a basic need of most plants

Which cross cutting issues will be addressed or developed and how	Equity and SEN: through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. Student teachers specific weakness and Strengths will be identified and catered for.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment for Learning: Student teachers to provide checklist on misconceptions on the origin of the sun and incorrect idea that light is not a form of energy with corresponding correct science concepts NTS3j: Explains concepts clearly using examples familiar to students. • Assessment as Learning: Student teachers present report in diverse ways to demonstrate their knowledge and conceptual understanding of how sunlight is a basic need of most plants NTS 3f: Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress • Assessment of learning: student teachers present group summaries on the uses and importance of sunlight to most plants and other organisms including humans in the environment NTS 2c:Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in.
Teaching Learning Resources	The Course Manual, Computer, video clips, appropriate apparatus and materials for experiments on sunlight as a basic need for plants to produce food, investigate Flip Charts, Pens, Pencils, 'A' 4 sheets, markers, work sheets,
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. 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. 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
Additional Reading List	Yeboah, S. K., Ahordji, & Mensah, S. K. (2016).*Science for primary schools: Pupil's book 5,* Accra: Sam-Woode Ltd. Available Primary and Junior high school science textbooks
CPD Requirement	Training on skills on construction of checklists, skills in designing experiments and developing skills in formation of mixed/differentiated ability groups.
Course Assessment	[1]**Component 1**: Subject Portfolio Assessment (30% overall score) • Selected Item of Student work (3 items – 10%) = 30% • Midterm assessment – 20% • Reflective Journal – 40% • Organization of the Subject Portfolio- 10% (How its presented/organized) [2]**Component 2: Subject Project (30% overall Semester score)** • **Introduction; a clear statement of aim and purpose of the project -10%** • **Methodology; What the student teacher has done and why to achieve the purpose of the project – 20%** • **Substantive/Main section of the work – 40%** • **Conclusion – 30%** **Component 3: End of Semester Examination – (40% overall Semester Assessment**

[1] See rubrics on subject Portfolio Assessment in Annex 6 of NTEAP
[2] See rubrics on Subject Project Assessment in Annex 6 of NTEAP

LESSON 2

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

Title of Lesson	Teaching Food I				Lesson Duration	3 hrs	
Lesson description	This lesson introduces the student-teacher to the concept of the food around us, its uses, kinds and what food type gives energy. The student teachers learn how to develop teaching materials and activities appropriate to teach these concepts to early grade learners.						
Previous student teacher knowledge, prior learning (assumed)	Lessons on food and Nutrition from SHS and concepts from semester 1 year 2.						
Possible barriers to learning in the lesson	Misconceptions on food types and categorisations						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face √**	**Practical Activity**	**Work-Based Learning**	**Seminars**	**Independent Study √**	**e-learning opportunities √**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-Face: Discussion, Same ability, mixed ability and gender based group works. Independent Study: Nature walk e-learning Opportunities: OERs and Video presentations						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	• Understanding the use of games and rhymes to make early grade learning meaningful NTS: 2a) Demonstrates familiarity with the education system and key policies guiding it. 2b) Has comprehensive knowledge of the official school curriculum, includinglearning outcomes. 2c) Has secure content knowledge, pedagogical knowledge and pedagogicalcontent knowledge for the school and grade they teach 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
	• Develop an understanding of the ideas early grade learners may have about food around them • Demonstrate significant ability to design and engage in practical activities and other alternative interactive assessment practices (NTS, 14, 19 & 23)	• Design concept maps on ideas early grade learners may have about food • Present a chart of activities for early grade teaching on the concept foods.	Collaborations, Communication and Research: Through group work and presentation
	• Demonstrate adequate knowledge and understanding that food gives energy, growth and protection to the human body. (NTS, 2c, Pg. 13)	• Provide a reflection report and answer questions on the topic	Equity and Reflection is developed from reflective activities

	• Correct misconception/misinformation on the concept foods		• Present concept maps and/or models linking misconceptions/misinformation to new insights	Creativity and critical thinking is developed in developing models and concept maps
Content of lesson picked and developed from the course specification **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** Facilitate and provides the necessary tool for students activities.	**Student Activity**
Teaching Food K1.1.4.1.1	Uses of Food	10 mins 50mins	Face-to-Face: Brainstorming with student – teachers to initiate discussion on food uses, relying on their personal need for food Face-to-Face/e-Learning Opportunities: Put student teachers in groups (mixed ability), provide them with videos/computer simulations/OERs on songs, rhymes and games for student teachers to develop/adapt them that can be use used to teach early grade learners on the uses of food https://www.youtube.com/watch?v=UaqISEs_uj0 (accessed 28/06/2019)	Face-to-Face: Student – Teachers responds to Tutor questions on mentions some uses for food. Face-to-Face/e-Learning Opportunities: student teachers work in groups (mixed ability), Reflecting and discussing how to adapt or develop games (Breakfast energy, Lunch replacement and others), rhymes, songs etc from videos/computer simulations/OERs on songs, rhymes and games provided by the tutor.
	Kinds of Food	10mins 50mins	• Face-to-Face: Brainstorming with student – teachers to initiate discussion on food kinds, relying on the earlier activity. • Face-to-Face/e-Learning Opportunities: Put student teachers in groups (mixed ability), provide them with videos/computer simulations/OERs on songs, rhymes and games for student teachers to develop/adapt them that can be use used to teach early grade learners on the kinds of food	• Face-to-Face: Student – Teachers responds to Tutor questions on mentions some kinds of food. • Face-to-Face/e-Learning Opportunities: student teachers work in groups (mixed ability), Reflecting and discussing how to adapt or develop games (veggie guessing bag, Letter of the week and others), rhymes, songs etc. from videos/computer simulations/OERs on songs, rhymes and games provided by the tutor

	Energy giving Food	15mins 25mins 20mins	Nature Walk: Take student teachers on a nature walk round the school compound and make them observe any food Face-to-Face/e-learning opportunities: Initiate a general discussion for student teachers to share their observations and what use the food plants can be put to. Put student teachers in groups (mixed ability), to list the foods discussed into energy giving foods and non-energy giving foodshttps://www.youtube.com/watch?v=RjPdDL9dNmk	Nature Walk: student teacher take a nature walk with tutor and note any food plant within school compound. Face-to-Face/e-learning opportunities: student teachers respond to discussion and share their observations as well as state what use the food plants can be put to. Student teachers work in groups (mixed ability), to list the foods discussed into energy giving foods and non-energy giving foods
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through mixed and same group work to protect vulnerable student - Teachers and establishing an interactive and inclusive classroom atmosphere. Through modelling and group work, collaboration is established.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Assessment of Learning: End of Semester Examination on concepts in food, kinds of food, uses of food and energy giving foods. NTS: 2a) Demonstrates familiarity with the education system and key policies guiding it, 2c) Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in Assessment for and as learning: Student – Teachers working in groups (checklist for collaborations), Concepts maps, rhymes, songs and reflective report. NTS: 2c) Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in			
Teaching Learning Resources	Cardboards, Course manual, Poster paper, game cards, OERs, Computers, internet, https://www.youtube.com/watch?v=RjPdDL9dNmk, https://www.youtube.com/watch?v=UaqISEs_uj0 (accessed 28/06/2019)			
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). *Ghana association of science teachers integrated science for senior high schools*. Accra: Unimax MacMillan.			
Additional Reading List	Abbey, T. K., &Essiah, J.W. (1995). *Ghana association of science teachers physics for senior high schools*. Accra: Unimax Macmillan. Ameyibor, K., & Wiredu, M. B. (2006). *Ghana association of science teachers chemistry for senior high schools*. Accra: Unimax MacMillan. Asabere-Ameyaw, A., & Oppong, E. K. (2013). *Integrated science for the basic school teacher I*. Winneba: IEDE. Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.,& Obeng-Ofori, D. (2011). *SWL integrated science for senior high schools: Students book*. Accra, Ghana; Sam-Woode Ltd.			
CPD Requirement	Training on developing games, rhymes and songs for food activities.			

LESSON 3

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

Title of Lesson	Further strategies on learning to teach about Food					Lesson Duration	3 Hours
Lesson description	In this lesson, the Tutor will assist the student teacher to review previous knowledge on food for growth, aspects of which were studied in senior high school. The lesson will then deepen their conceptual understanding of how nutrients from the food for growth are used to promote growth and maintain the human body from lesson 2. They will be exposed 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 local food substances including eggs, meat, legumes, and milk which support growth.						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have studied food substances which support growth and welfare substances that are needed in small quantities but protect the human body against infections at the senior high school level and from lesson 2.						
Possible barriers to learning in the lesson	Student teacher might still have some unscientific cultural beliefs about children being fed on protein-rich food substances such as eggs and taboos involving plant and animal species which otherwise could provide good sources of protein and vitamins.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face √**	**Practical Activity √**	**Work-Based Learning√**	**Seminars**	**Independent Study**	**e-learning opportunities**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-face: Discussion, Talk for learning approaches with student-teacher presentations, problem-based teaching, multimedia presentations. Practical activity: student teachers work in groups and present chats checklists, and report on food and how to teach it						
• **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**	• Deepen student teachers' level of understanding of concepts: proteins and food nutrients • Correct student teachers' misconceptions and incorrect ideas about consumption of some protein-rich food substances • Build the necessary support going forward on SEN and Gender issue • The student teacher will develop skills of data collection and presentation on local food substances that promote growth and protection when consumed. • The lesson should help the student teacher develop a chart of local food substances with their corresponding nutrients • Provide student teachers with the requisite knowledge and skills to be able to teach the topic 'Further strategies on learning to teach about food'. The realization of these intentions can be found in the following NTS: 3f: Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. 3j:Assessment as Learning: Student teachers present report to on how to use diverse strategies to demonstrate their knowledge and conceptual understanding of how the human body uses the protein consumed for growth. 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes 3k: Integrates a variety of assessment modes into teaching to support learning						
• **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	
	• Diagnostic test to identify unscientific ideas and misconceptions about consumption of some food substances		• Student teachers should submit a Chart of unscientific ideas and misconceptions about consumption of some food substances			Develop skills for construction of diagnostic tests to identify pupils' misconceptions about consumption of some food substances	

	• Prepare checklist of local food substances that support human growth	• Student teachers in groups should submit checklist on local food substances that support human growth	Develop skills for construction of checklists , on local food substances
	• Demonstrate adequate knowledge and understanding that food gives growth to the human body	• Exhibit scripts on what food does to the body in relation to growth	Developing Social collaboration and attention and care to individual needs (SEN) through role play
	• Design mini-project to investigate community's cultural beliefs about consumption of some food substances that support human growth	• Student teachers in groups present reports on investigation on cultural beliefs about consumption of food substances that promote human growth Demonstrate knowledge and skills to teach the topic, Food for Growth	

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**	**Student Activity**
Further strategies on learning to teach about food K1.1,4.1.1	Teaching Food for Growth	**10 minutes**	Tutor to guide student teachers to explain food for growth, protein, and food substances	Student teachers brainstorm to come out with explanations food for growth, protein, and food substances
		30 minutes	Tutor through diagnostic questioning identify student teachers' cultural beliefs about consumption of some local food substances in the community	Student teachers in groups to present list of cultural beliefs about consumption of some food substances in the community
		40 minutes	Tutor to assist student teachers to identify food substances in their communities that are rich in protein	Student teachers in diverse groups present charts of common food substances that are rich in protein
		60 minutes	Tutor to assist student teachers to discuss how the consumption of the protein rich food substance promote human growth	Student teachers to provide a written report to explain how the body uses the protein form the food substances to grow, repair damaged tissues and to replace worn out tissues
		40 minutes	Tutor to guide student teachers to design a mini project to investigate cultural beliefs in their communities on consumption of some protein rich food substances	Student teachers in groups present designs to investigate cultural beliefs on consumption of some protein-rich food substances in their communities
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. Student teachers specific weakness and Strengths will be identified and catered for.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment for Learning: Student teachers to provide charts of common protein-rich food substances in their communities to show understanding NTS 3j:Produces and uses a variety of teaching and learning resources including ICT, to enhance learning • Assessment as Learning: Student teachers present report to on how to use diverse strategies to demonstrate their knowledge and conceptual understanding of how the human body uses the protein consumed for growth.			

	NTS 3g:Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes NTS 3k: Integrates a variety of assessment modes into teaching to support learning
Teaching Learning Resources	The Course Manual, Computer, Flip Charts, Pens, Pencils, 'A' 4 sheets, markers, work sheets, samples of local food substances rich sources of protein
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. 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. 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
Additional Reading List	Yeboah, S. K., Ahordji, & Mensah, S. K. (2016).*Science for primary schools: Pupil's book 5,* Accra: Sam-Woode Ltd. Available Primary and Junior high school science textbooks
CPD Requirement	Training on diagnostic test construction, skills development on construction of charts on local food substances rich in protein, project proposal writing

LESSON 4

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

Title of Lesson	Simple Electronics				Lesson Duration		3 Hours
Lesson description	In this lesson, the Tutor and student teacher discuss the common electronic gadgets used in homes. For example, the cell phone, the wireless and television. This lesson will enable student teachers to appreciate the importance of science and its inventions that are classified as wonders of the world.						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have been using cell phone, wireless, TV and other electronic gadgets and home or their previous schools.						
Possible barriers to learning in the lesson	Student teachers have fear of using some of the electronic appliances and may not know that some appliances at home are of electronics. Student teacher might not have seen personal computer before or have not being using cell phone.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face** ☒	**Practical Activity** ☒	**Work-Based Learning**	**Seminar**	**Independent Study**	**e-learning opportunities**	
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Discussion: although basic Electronics Components comprises of various types of components, which are classified into two types: active components like transistors, diodes, IC's; and passive components like capacitors, resistors, inductors, etc. student teacher explain part play by these components and how simply life become with the use of electronic gadgets or appliance. Tutor and student teacher interactions on the operation of computers/cell phone. Mixed group activities to press keys on the computer or cell phone.						
• **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**	• Mention the various types of electronic components, such as, resistors, capacitors, transistors, etc., that make the cell phone or TV work. • Mention the various types of electronic gadgets or appliances in the homes and schools. • To enable female student teachers touch and manipulate their cell phones, digital watch and or the computer. • Encourage proper record keeping of most of the appliances they come into contact. For example, Microwave oven, air conditioner, Stacked washing machine and clothes dryer, Gas fireplace, Refrigerators, Vacuum cleaner, Electric water heater tank, Small twin window fan, Cell phone, digital watch, etc. National Teachers' Standards: The teacher 2c) Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 3d) Manages behaviour and learning with small and large classes. 3e) Employs a variety of instructional strategies that encourages student participation and critical thinking. 3f) Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. 3g) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.						

<table>
<tr><td rowspan="3">• Learning Outcome for the lesson, picked and developed from the course specification
• Learning indicators for each learning outcome</td><td colspan="2">Learning Outcomes</td><td colspan="2">Learning Indicators</td><td>Identify which cross – cutting Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed</td></tr>
<tr><td colspan="2">• Identify basic electronic components from basic electronic gadgets around the learners' environment that can be adapted for use to teach early grade learners.</td><td colspan="2">• List of electronic components from readily available electronic gadgets identified by student teacher</td><td rowspan="2">Face-to-face: Student teachers mention some components of cell phone and computer they have heard before.
Face-to-face: Student teachers answer open-ended questions to bring their incorrect ideas on electronic components.
Sharing ideas in class, the Student teachers develop the skills of communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in group work/discussion, well handling of devices, honesty and accuracy.</td></tr>
<tr><td colspan="2">• Develop teaching activities to teach simple electronics to early grade learners</td><td colspan="2">• Poems/Songs/Rhymes/ simple play activities collected for portfolio</td></tr>
<tr><td>Topic/Title</td><td>Sub Topic</td><td>Time or Stage</td><td colspan="3">Teaching and learning to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study</td></tr>
<tr><td></td><td></td><td></td><td>Teacher Activity</td><td colspan="2">Student Activity</td></tr>
<tr><td rowspan="2">Simple Electronics B1.4.2.2.1</td><td>i. Simple Electronic Components</td><td>90 minutes</td><td>i. Face-to-face: Tutor introduces the lesson by asking Student teachers to mention some examples of electronic gadgets they have used/seen before.

ii. Tutorgroups student teachers and provide pictures and/or videos of simple electronic components and ask students to identify them for their uses.</td><td colspan="2">Face-to-face: Student teachers mention some components of cell phone and computer they have heard before.

Student teachers, working in groups sort electronic components according to their use</td></tr>
<tr><td>Simple Electronic Gadgets</td><td>90 minutes</td><td>Face-to-face: Tutor provide pictures of simple electronic gadgets/appliances and ask students to identify the use and the components within and make a concept map for the observation.

i. (a) Open-ended questions to elicit misconceptions/ incorrect ideas about electronic appliances.

Practical Activity: Student Teachers form groups of mixed abilities to perform (Females as leads)</td><td colspan="2">Practical Activity:
Presentation
Each student reviews their thought about the electronic gadgets they brought from home which they presented to the class.
• Student arrange the appliances in categories they again think necessary.

• Student teachers draw concept maps of the appliances.</td></tr>
</table>

			(b) Practical activities that require the students take a tour on the school to identify some electronic appliance use in the school. iii. Concept mapping of electronic gadgets/ appliances. • Face-to-face: Tutor describes the process of designing activities for teaching and the process of inquiry learning to student teachers. • Face-to-face: Teacher allows student teachers to make group power point presentation on how to teach Basic electronics at the basic level of education	
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. Through round table they should discuss various electronic components as far as they can, student teachers' accuracy, honesty and carefulness will be addressed.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment of learning: Student teachers list the electronic gadgets/appliances and their corresponding uses NTS2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in NTS 3d: Manages behaviour and learning with small and large classes teaching and learning • Assessment as learning: Student teachers do group power point presentations on how to simulate some functions of electronic appliances for differentiated teaching NTS 3e: Employs a variety of instructional strategies that encourages student participation and critical thinking NTS 3f: Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. NTs 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes. • Assessment for learning: Drawing of concept maps on electronic gadgets/appliances to assess what student teachers have learnt at the end of the lesson NTS 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in			
Teaching Learning Resources	Electronic components brought by students and/or bought from the market. E.g., resistors, capacitors, transistors, potentiometers, etc.			
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. 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 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	i. Extra reading to understand the basic principles by which these electronic components operate. ii. Training in how to report findings from research (such as classroom studies) honestly and objectively

LESSON 1

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

Title of Lesson	Further Teaching Activities on Simple Electronics				Lesson Duration	3 Hours
Lesson description	In this lesson, the Tutor and student teacher discuss the common electronic toys use by children in their homes. For example, the cell phone, toy cars and toy organs. This lesson will enable student teachers to appreciate the importance of science and electronics that are making life easy.					
Previous student teacher knowledge, prior learning (assumed)	Student teachers have been using cell phone, wireless, TV and other electronic gadgets and home or their previous schools.					
Possible barriers to learning in the lesson	Fear of using some of electronic appliances and may not know that some appliances at home of electronics. Student teacher might not have seen toy car before.					
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face** ☒	**Practical Activity** ☒	**Work-Based Learning**	**Seminar**	**Independent Study**	**e-learning opportunities**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Discussion, student teacher explain how simply life become with the use of electronic gadgets or appliance. Tutor and student teacher interactions on the operation of computers/cell phone. Mixed group activities to press keys on the computer or cell phone.					
• **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**	• Mention the various types of electronic toys in the home and school. • To enable female student teachers touch and manipulate their cell phones and or the computer. • Encourage proper record keeping most of the appliances they come into contact. For example, toy cars toy babies, etc. National Teachers' Standards: The teacher 2c) Has secured content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 3d) Manages behaviour and learning with small and large classes. 3e) Employs a variety of instructional strategies that encourages student participation and critical thinking. 3f) Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. 3g) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.					
• **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	
	Further Teaching Activities on Simple Electronics		• Face-to-face: Tutor introduces the lesson by asking Student teachers to mention some examples of electronic gadgets they have used/seen before. • Prepare a list/chart of various electronic appliance		Face-to-face: Student teachers mention some components of cell phone and computer they have heard before. Face-to-face: Student teachers answer open-ended questions to	

			copied from the internet using their cell phones or the computer. • Concept cartoons to illustrated varieties of toys. • Prepare a chart of the risks/injuries from electronic toys. • Prepare a chart of how to reduce the risk of injury from electronic toys. In addition to general toy safety teacher addresses the major electrical, mechanical and thermal hazards of electronic toys. • Show designed activity for teaching safety of electronic toys.	bring their incorrect ideas on electronic components. Sharing ideas in class, the Student teachers develop the skills of communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in group work/discussion, well handling of devices, honesty and accuracy.
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**
Further teaching on Simple Electronics B2.4.2.2.7	Operations Of Electronic Toys	**90 minutes**	Face-to-face: Tutor gives a broad definition of appliance as "an instrument or device designed for a particular use or function" Teachers provide pictures of simple electronic components and ask students to guess what they use for. i. (a) Open-ended questions to elicit misconceptions/ incorrect ideas about electronic components. Practical Activity: Student teachers form groups of mixed abilities to perform hands-on practical with available toys. iii. Concept mapping of the use, danger and safety of electronic toys.	Face-to-face: Student teacher discuss risks and safety precautions associated with the use of electronic toys. Practical Activity: Student teachers • List the different types of electronic toys and their possible risks in our homes and schools. • List the different types of electronic toys and their possible safety measures in our homes and schools. • Student teachers draw concept maps of the toys in relation to their risks and safety precautions
	Electronic Waste	**60 minutes**	Face-to-face: Tutor provides pictures of components (copied form the internet) and suggest possible risks by looking at the tiny and piecing nature of the components. For example, injury as a result of swallowing any of the components. • Face-to-face: Tutor describes the process of	Practical Activity: *Presentation* Face-to-face: Each student could bring a simple electronic gadgets from home and present it to the class. Students should describe their gadgets and explain what they are used for. Practical Activity: Student teachers

			designing activities for teaching toy related accidents. • Face-to-face: Tutor describes the process of designing activities for teaching and the process of inquiry learning to student teachers. • Face-to-face: Teacher allows student-teachers to make group power point presentation on how to teach Basic electronics at the basic level of education	• List the different types of appliances used in our homes, be it electronic or not. . • Student teachers draw concept maps of the appliances.
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. Through the use of electronic toys, the accident/risk/danger and safety precaution, student–teachers' accuracy, honesty and carefulness will be addressed.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment of learning: Student teachers list some electronic the electronic toys and their corresponding uses NTS2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in NTS 3d: Manages behaviour and learning with small and large classes teaching and learning • Assessment as learning: Student teachers do group power point presentations on how to simulate some functions of electronic toys for differentiated teaching NTS 3e: Employs a variety of instructional strategies that encourages student participation and critical thinking NTS 3f: Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. NTs 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes. • Assessment for learning: Design diagrams of electronic gadgets like toys to assess what student teachers have learnt at the end of the lesson • NTS 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in			
Teaching Learning Resources	Electronic toys brought by students and/or bought from the market. E.g., toy cars, phones, babies, etc.			
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. 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 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 teachers to understand the design principles and operations of some electronic toys.			

LESSON 6

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

Title of Lesson	Course Review I and STS Seminar					Lesson Duration	3 Hours
Lesson description	This lesson is a review and audit of the lessons for the first half of the semester as well as review and discussion of lessons learned, reflection on observations made during the supported teaching in schools (STS).						
Previous student teacher knowledge, prior learning (assumed)	Lessons learnt from lesson 1 through lesson 5 in all learning approaches and 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 Learning**	**Seminars √**	**Independent Study √**	**e-learning opportunities √**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-Face: Discussion, Same ability, mixed ability and gender based group works. Practical Activity: Modelling, Concept Mapping and Cartooning, manipulations. Independent Study: Tutor and student-teacher reflections (individually and collectively) and inquiry e-learning Opportunities: OERs and Video presentations Seminar: Presentations on progress in STS and discussions						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	• Ascertain the level of understanding of concepts. • Test various skills and cross – cutting issues • Provide remedial tuition/tutorials on topic (concepts) where necessary • Correct misconceptions and misinformation • Build the necessary support going forward on SEN and Gender issue 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. 2d) At pre-primary the curriculum for the years appropriate to multigrade classes; has good knowledge of how to teach beginning reading and numeracy and speaking, listening, reading and writing, and to use at least one Ghanaian language as a medium of instruction. 3e) Employs a variety of instructional strategies that encourages student participation and critical thinking. 3f) Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. 3g) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.						
• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for**	**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	
	• Identify weakness and strengths in learning the science lesson for the period			• Make a list of weaknesses and strengths on poster papers for sharing		Collaborations, Communication and Research: Through group	

each learning outcome	under review			work and presentation
	• Be able to reflect on lessons learnt so far and state new insights and/or grey areas needing remedies		• Provide a reflection report and answer questions on topics learnt so far through demonstrations and illustrations on a given media	Equity and Reflection is developed from reflective activities
	• Correct misconception/misinformation for earlier (lesson 1 – 5) lessons		• Present concept maps and/or models linking misconceptions/misinformation to new insights	Creativity and critical thinking is developed in developing models and concept maps
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**	**Student Activity**
			Facilitate and provides the necessary tool for students activities.	
Course Review I and STS Seminar	Reviewing the understanding of the lessons Sunlight, Food I, Food II, Simple Electronics I and Simple Electronics II	30 mins 30mins	Face-to-Face: Brainstorming with student teachers to initiate the weaknesses and strengths of student – teachers in the lessons 1 – 5. Face-to-Face: Initiate discussion /Talk for learning approach using groupings (Same ability and then mixed groups) to identify student teachers' strengths and weakness in the lessons learnt so far. The groups are provided with checklist on each topic so that they are able to list weakness and strengths.	Face-to-Face: Student teachers responds to Tutor questions on weaknesses and strengths Face-to-Face: Working in groups and with the checklist student teachers identify and record all possible weaknesses and strengths in the lessons learnt so far.
	Remedies to course topics	60mins	Face-to-Face: Group student teachers according to remedy need and provide specific task assistance in the areas on concept needing remedy.	Face-to-Face: Student teachers work in the special group (Same remedy need group) on tasks to remedy their learning need.
	STS Seminar	60mins	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 from their observation in STS on how science learning is conducted in the schools. 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.
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through mixed and same group work to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. Through modelling and group work, collaboration is established.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment for learning: Student teachers make presentations during group work and model work presentation helps to assess them for professional development NTS 1a: Improves personal and professional development through lifelong learning and continuous Professional Development. • Assessment for and as learning: Student teachers working in groups on remedial tutoring helps to assess them for and as learning NTS 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. NTS 2d: At pre-primary the teacher knows the curriculum for the years appropriate to multigrade classes; has good knowledge of how to teach beginning reading and numeracy and speaking, listening, reading and writing, and to use at least one Ghanaian language as a medium of instruction. NTS 3e: Employs a variety of instructional strategies that encourages student participation and critical thinking. NTS 3f: Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. NTS 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.			
Teaching Learning Resources	Cardboards, Course manual, Poster paper			
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). *Ghana association of science teachers integrated science for senior high schools*. Accra: Unimax MacMillan.			
Additional Reading List	Abbey, T. K., &Essiah, J.W. (1995). *Ghana association of science teachers physics for senior high schools*. Accra: Unimax Macmillan. Ameyibor, K., & Wiredu, M. B. (2006). *Ghana association of science teachers chemistry for senior high schools*. Accra: Unimax MacMillan. Asabere-Ameyaw, A., & Oppong, E. K. (2013). *Integrated science for the basic school teacher I*. Winneba: IEDE. Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.& Obeng-Ofori, D. (2011). *SWL integrated science for senior high schools: Students book*. Accra, Ghana; Sam-Woode Ltd.			
CPD Requirement	Training to be given on preparation of checklist and Reflection guides			

LESSON 7

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

Title of Lesson	Teaching Personal Hygiene					Lesson Duration	3 Hours
Lesson description	This topic introduces student teachers to basic the principles of maintaining cleanliness of their bodies and clothing to preserve overall health and wellbeing. This sub-heading deals with proper ways of handwashing, bathing the body and the importance of keeping the teeth clean.						
Previous student teacher knowledge, prior learning (assumed)	Student teachers are familiar with daily cleanliness activities both at home and in school.						
Possible barriers to learning in the lesson	Possible misconceptions that student teachers may bring to the classroom about the effects of not keeping personal hygiene. For example, the cause certain infections may not be attributed to lack of personal hygiene.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face √**	**Practical Activity√**	**Work-Based Learning**	**Seminars**	**Independent Study√**	**e-learning opportunities √**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to face: Discussions, demonstrations and observations Practical Activities: Individual demonstrations of handwashing, bathing and cleaning teeth Independent Study: Reflections e-learning Opportunities: Simulations, video presentations						
Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description. • **Write in full aspects of the NTS addressed**	• Get the conceptual understanding of personal hygiene in terms of handwashing, cleaning the teeth and bathing the body. • Demonstrate proper ways of handwashing, cleaning the teeth and bathing the body • Discard the common misconceptions that student-teachers have about personal hygiene • Designing activities to teach personal hygiene NTS, The teacher 1a) 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. 3d) Manages behaviour and learning with small and large classes. 3e) Employs a variety of instructional strategies that encourages student participation and critical thinking. 3f) Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. 3g) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.						
• **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		
	• Define and explain what is meant by personal hygiene • Demonstrate understanding and show how to wash hands, clean the teeth and bath the body.		• Define and explain what personal hygiene is. • Role play to demonstrate proper ways of washing hands, cleaning the teeth and bathing the body (PD Theme 1, pg. 44; PD Theme 4, pg. 112) • Present charts and models of proper ways of washing hands and cleaning the teeth. (PD Theme 5, pg. 37)		Through discussions and sharing of ideas in class student teachers develop the skills of communication, collaboration and mutual respect while appreciating individual difference and abilities. They also acquire skills in handling devices, develop critical thinking, honesty, accuracy and responsibility through active participation in group work/discussion.		

	• Erase misconceptions about personal hygiene.	• Designed activities that can be used to teach personal hygiene.	

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**
Teaching Personal Hygiene K1.1.3.1.1 K1.1.5.1.1 K2.1.3.1.1 K2.1.3.1.3 K2.1.3.1.5	Meaning of personal hygiene	**60 minutes**	Face-to-face/Group activity: Tutor led discussion on the meaning of personal hygiene. Allow student teachers to reflect individually and write down their opinions about personal hygiene. Put them in mixed ability groups to discuss their individual views to arrive at a common meaning.	Face-to-face/Group activity: Student teachers reflect individually and write down their views of what personal hygiene is. Work in mixed ability groups to discuss the meaning of personal hygiene and write down their findings for presentation.
	Handwashing	**60 minutes**	i. Face-to-face/Group activity: Tutor allows students teachers to work in groups to agree on proper ways of handwashing. ii. Face-to-face/Group activity: Tutor allows group leaders to demonstrate ways of handwashing and watch videos of handwashing techniques.	i. Face-to-face/Group activity: Student-teachers work in groups of four to discuss the characteristics of living and non-living things. ii. Face-to-face/Group activity: Student teachers work in their groups (inclusive, mixed-age and developmentally appropriate form) to demonstrate and make presentations on proper handwashing techniques, watch videos and simulations on handwashing techniques (PD Theme 8, pg. 40; PD Theme 4, pg. 23-46)
	Importance of cleaning teeth and bathing of the body	**61 minutes**	i. Face-to-face/Group activity: Tutor instructs student teachers to work in groups (mixed ability) to discuss the importance of cleaning the teeth and bathing and how to do it (i.e.; necessary for prevention of illness and infections from bacteria and viruses).	i. Face-to-face/Group activity: Student teachers prepare workbooks, charts and models outlining the importance of cleaning the teeth and bathing the body. Student teachers demonstrate how to clean the teeth. Watch short videos on how to clean the teeth.

Which cross cutting issues will be addressed or developed and how	Equity and SEN: through effective formation of mixed ability groups to undertake classroom activities vulnerable student-teachers are protected and an interactive and inclusive classroom atmosphere is created.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment for learning: student teachers write half a page essays on handwashing and the importance of bathing and cleaning the teeth NTS 1a: Improves personal and professional development through lifelong learning and continuous Professional Development. NTS 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. • Assessment as learning: student teachers provide workbooks on personal hygiene; proper handwashing techniques and how to clean the teeth NTS 3d: Manages behaviour and learning with small and large classes teaching and learning • Assessment of learning: student teachers peer review chats and models showing handwashing techniques and proper methods of bathing and cleaning the teeth NTS 3e: Employs a variety of instructional strategies that encourages student participation and critical thinking. NTS 3f: Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. NTS 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.
Teaching Learning Resources	Cardboards, poster papers, poster colours, phones, tablets, desktop computers with internet access, tooth paste, tooth brushes, chewing sponge and chewing sticks. https://www.youtube.com/watch?v=vYwypSLiaTU https://www.youtube.com/watch?v=KusIuq8wu_0
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. 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 the preparation of models, workbooks and use online learning resources

LESSON 8

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

Title of Lesson	Further Strategies on Teaching Personal Hygiene					Lesson Duration	3 Hours
Lesson description	This is a continuation of Lesson 7 which introduced student teachers to the basic principles of maintaining cleanliness of their bodies and clothing to preserve overall health and wellbeing. The lesson is intended to give student teachers knowledge and skill in relation to keeping their finger nails short and clean and the care of hair in order to prevent contracting illnesses through bacteria and viruses.						
Previous student teacher knowledge, prior learning (assumed)	Student teachers are familiar with daily cleanliness activities both at home and in school and based on Lesson 7 know about the importance of handwashing, bathing the body and cleaning the teeth.						
Possible barriers to learning in the lesson	Possible misconceptions that student-teachers may hold about the effects of not keeping personal hygiene. For example, that keeping long finger nails and long hair is a fashion.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face √**	**Practical Activity√**	**Work-Based Learning**	**Seminars**	**Independent Study√**	**e-learning opportunities √**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to face: Discussions, demonstrations and observations Practical Activities: Individual and group demonstrations of how to keep finger nails and hair clean Independent Study: Reflections e-learning Opportunities: Simulations, video presentations						
Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description. • **Write in full aspects of the NTS addressed**	• Get the conceptual understanding of personal hygiene in relation to keeping finger nails and hair clean. • Demonstrate proper ways of keeping the finger nails and hair clean. • Discard the common misconceptions that student-teachers have about long finger nails and unkempt hair. • Designing activities to teach personal hygiene NTS, The teacher; 2c) Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 3d) Manages behaviour and learning with small and large classes. 3e) Employs a variety of instructional strategies that encourages student participation and critical thinking. 3f) Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. 3g) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.						
• **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	
	• Demonstrate understanding and show how to keep the finger nails and hair clean • Present activity lessons/chats/models to show how to keep the finger nails and hair clean. • Erase misconceptions		• Student teachers describe ways of keeping the finger nails and hair clean. • Role play to demonstrate appropriate ways of keeping the finger nails and hair clean (PD			Through discussions and sharing of ideas in class student-teachers develop the skills of communication, collaboration and mutual respect while appreciating individual difference and abilities. They also acquire skills in handling devices, develop	

	about long finger nails and hair.	Theme 1, pg. 44; PD Theme 4, pg. 112) • Present charts and models on how to keep the nails and hair clean (PD Theme 5, pg. 37) • Designed activities that can be used to teach proper care of the finger nails and hair.	critical thinking, honesty, accuracy and responsibility through active participation in group work/discussion.

Topic/Title	**Sub Topic**	**Time or Stage**	**Teaching and learning to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study**	
			Teacher Activity	**Student Activity**
Further Strategies on Teaching Personal Hygiene B1.5.1.1.1 B1.5.1.1.2 B1.5.1.1.3 B2.5.1.1.1 B3.5.1.1.1	Keeping finger nails short and clean	**90 minutes**	i. Face-to-face/Group activity: Tutor led discussion on the need to keep the finger nails short and clean.	Face-to-face/Group activity: Student teachers work in mixed gender and ability groups to discuss the reasons for keeping the finger nails short and clean. The groups report back to the whole class in 5 minutes presentations.
	Care of the hair	**60 minutes**	i. Face-to-face/Group activity: Tutor allows students teachers to work in groups to agree on proper ways of taking care of the hair. Make available short videos on hair care for both males and females. ii. Face-to-face/Group activity: Tutor allows group leaders to demonstrate ways of taking care of the hair.	i. Face-to-face/Group activity: Student teachers work in groups of four to discuss ways of taking care of the hair. Watch videos on proper care of hair. ii. Face-to-face/Group activity: Student teachers work in their groups (inclusive, mixed gender and ability groups) to demonstrate hair care techniques (PDTheme 8, pg. 40; PD Theme 4, pg. 23-46)
	Handling misconceptions and consequences of bad nail and hair care	**30 minutes**	i. Face-to-face/Group activity: Tutor instructs student teachers to work in groups (mixed ability) to discuss misconceptions and consequences of keeping long finger nails and unkempt hair.	i. Face-to-face/Group activity: Student teachers prepare workbooks, charts and models showing finger nail and hair care techniques. Student teachers demonstrate how to communicate these care techniques.
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through effective formation of mixed ability groups to undertake classroom activities vulnerable student teachers are protected and an interactive and inclusive classroom atmosphere is created.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment of learning: student teachers are taken through a quiz on care of hair and finger nails NTS 2c: Has secure content knowledge, pedagogical knowledge and pedagogicalcontent knowledge for the school and grade they teach in. • Assessment as learning: student teachers provide workbooks on personal hygiene; how to keep finger nails clean and care of hair			

	NTS 3d: Manages behaviour and learning with small and large classes. NTS 3e: Employs a variety of instructional strategies that encourages studentparticipation and critical thinking. • Assessment for learning: student teachers peer review group reports on how to keep finger nails clean and care the of hair. NTS 3f: Pays attention to all learners, especially girls and students with SpecialEducational Needs, ensuring their progress. NTS 3g: Employs instructional strategies appropriate for mixed ability, multilingual andmulti-age classes.
Teaching Learning Resources	Cardboards, poster papers, poster colours, phones, tablets, desktop computers with internet access, nail cutting kit, barbering kit. https://www.youtube.com/watch?v=QJOuM-fpDao
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. 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 the use of online learning resources

LESSON 9

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

Title of Lesson	Teaching Simple Machines					Lesson Duration	3 Hours
Lesson description	In this lesson, Tutor discusses simple machines with student-teachers. Usually, student teachers think of machines as those with complicated systems like automobiles, airplanes, computers and farm machines. This lesson will introduce student teachers to simple machines that we see in our homes, schools and on the playgrounds and how these machines are important for daily life.						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have been using hammer to nail a wood, opener to open bottle-tops, a pair of scissors to to cut materials and incline planes to offload goods from trucks.						
Possible barriers to learning in the lesson	Student teachers may: • Have the misconception that simple machines may also include all the sophisticated systems of machines. • Not have the skills in teaching simple machines to the Basic School learner.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face √**	**Practical Activity √**	**Work-Based Learning**	**Seminars**	**Independent Study√**	**e-learning opportunities √**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to Face: Discussion, Tutor and student teachers' interactions on the functions of simple machines Practical Activity: Practical manipulation of simple machines Independent Study: Inquiry and reflections e-learning opportunities: Use of internet, simulations and video presentations						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	• Identify some common machines or tools as simple machines • Make sketches of some simple machines • Demonstrate the skill and knowledge to teach the subject matter National Teachers' Standards: The teacher; 2c) Has secured content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 3d) Manages behaviour and learning with small and large classes. 3e) Employs a variety of instructional strategies that encourages student participation and critical thinking. 3f) Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. 3g) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.						
• **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		
	• Demonstrate adequate knowledge and understanding on various simple devices/machines and their corresponding functions (bottle opener, scissors, pincers, crowbar, screw driver, pliers, hammer, sheers, wheel barrow, spanner and knives). (NTS, 2c)		• Sketches of simple devices/machines and their corresponding functions.		Correct/ handling and uses of devices, good identification of simple machines, sharing ideas in class, Student teachers develop skills of communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in group work/discussion.		

Topic/Title	Sub Topic	Time or Stage	Teaching and learning to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
			Teacher Activity	**Student Activity**
Teaching about Simple Machines B1.4.3.2.1	i. Simple devices/machines for work (bottle opener, scissors, pincers, crowbar, screw driver, pliers, hammer, wheel barrow, spanner and knives)	**120 minutes**	i. Face-to-face: Tutor introduces the lesson by asking Student teachers to mention some examples of machines they have used before. ii. Face-to-face: Open-ended questions to elicit misconceptions/ incorrect ideas about simple machines iii. E-Learning/Practical Activity opportunities: Tutor guides Student teachers to form groups of 3 members of mixed intellectual ability to identify simple machines using charts from the internet and manipulate real simple machines (PD Theme 4 pg 23-30). iv. Independent study: Student teachers to make sketches of simple machines (individual task).	i. Face-to-face: Student teachers mention examples of machines they have used before. ii. Face-to-face: Student teachers answer open-ended questions to bring their incorrect ideas on simple machines. iii. E-Learning opportunities: Student teachers identify some simple machines using charts from the internet and manipulate real simple machines. iv. Independent study: Individual student teachers make sketches of simple machines.
	ii. Teaching of Simple Machines to the Basic School Learner	**60 minutes**	ii. Face-to-face: Tutor allows student teachers to do short power point/poster presentation on how to teach simple machines to Basic school learner (Group presentation).	ii. Face-to-face: Student teachers do power point/poster presentation on how to teach simple machines to the Basic School Learner.
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. By practicing with simple machines, student–teachers' difficulties in manipulating/handling skills of simple machines will be addressed.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment as learning: Student teachers' identification of simple machines using charts from the internet and real objects of simple machines (identification of named simple machines/tools) NTS 3e: Employs a variety of instructional strategies that encourages student participation and critical thinking. NTS 3f: Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. • Assessment of learning: Student teachers sketch simple machines to demonstrate critical			

	observation skills and adequate manipulation of appliances (Examinable sketches) NTS 2c: Has secured content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. NTS 3d: Manages behaviour and learning with small and large classes. • Assessment for learning: Student teachers do short presentations (3-5 minutes each) on how to teach simple machines and reflection on presentations. NTS 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.
Teaching Learning Resources	Projector, bottle opener, a pair of scissors, pincers, crowbar, screw driver, pliers, hammer, wheel barrow, spanner and knives (some simple machines like pulley, wheel and axle, wedge and inclined planes will be shown on chart/ desktop computers with internet access). https://www.youtube.com/watch?v=jtk2V0M6k3M https://www.education.com/activity/article/simple-machines-at-home/ https://www.buildingmoxie.com/simple-machines-home/ https://www.livescience.com/49106-simple-machines.html
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. 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	i. Practicing how to handle simple machines appropriately

LESSON 10

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

Title of Lesson	Teaching the uses of Simple Machines				**Lesson Duration**	**3 Hours**	
Lesson description	In this lesson, the Tutor discusses the uses of simple machines with student teachers. Basically, student teachers have read and used some simple machines without necessary knowing that they are simple machines. For instance, student teachers have read about how a ramp helps one to do work and also use a shovel to do work. A ramp is a type of inclined plane, and a shovel is a type of lever. An inclined plane and a lever are both simple machines. Student teachers will get to know that there are six machines on which all other mechanical machines are based (inclined plane, lever, the wheel and axle, pulley, wedge, and screw). This lesson will introduce student teachers to the uses of the six simple machines.						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have studied examples of simple machines in their previous lesson, like bottle opener, scissors, pincers, crowbar, screw driver, pliers, hammer, wheel barrow, spanner and knives.						
Possible barriers to learning in the lesson	Student teachers may: • Have doubt that certain tools are simple machines, like wheel and axle, misconception that simple machines may also include all the sophisticated systems of machines. • Not know the uses of some simple machines. • Not have the skills in teaching the six types of simple machines and their uses to the Basic School learner.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face √**	**Practical Activity √**	**Work-Based Learning**	**Seminars**	**Independent Study√**	**e-learning opportunities √**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to Face: Discussion, Tutor and student teachers' interactions on the functions of simple machines Practical Activity: Practical manipulation of simple machines Independent Study: Inquiry and reflections e-learning opportunities: Use of internet, simulations and video presentations						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	• Identify some common machines or tools as simple machines • Acquire the skills of using the six types of simple machines • Demonstrate the skill and knowledge to teach the six types of simple machines. National Teachers' Standards: The teacher 2c) Has secured content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 3d) Manages behaviour and learning with small and large classes. 3e) Employs a variety of instructional strategies that encourages student participation and critical thinking. 3f) Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. 3g) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.						
• **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	
	• Demonstrate adequate knowledge and understanding on various simple devices/machines			State the functions/uses of the six simple machines.		Correct/ handling and uses of devices, good identification of simple machines, sharing ideas in class, Student	

	and their corresponding functions (inclined plane, lever, the wheel and axle, pulley, wedge, and screw). (NTS, 2c)		teachers develop skills of communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in group work/discussion.

Topic/Title	**Sub Topic**	**Time or Stage**	**Teaching and learning to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study**	
			Teacher Activity	**Student Activity**
Teaching the uses of Simple Machine B2.4.3.2.1 B3.4.3.2.1	i. Functions/ uses of simple machines	**60 minutes**	i. Face-to-face: Tutor introduces the lesson by asking Student teachers to mention some examples of simple machines they studied in their previous lesson. ii. Face-to-face: Open-ended questions to elicit some of the doubts student teachers may have in some simple devices to belong to simple machines for correction. iii. E-Learning/Practical Activity opportunities: Tutor guides Student teachers to form groups of 3 members of mixed intellectual ability, on the functions/uses of the six simple machines using charts from the internet and real objects of simple machines (PD Theme 4 pg 23-30). iv. Independent study: Student teachers list 5 examples each of the six simple machines (individual task).	i. Face-to-face: Student teachers mention examples of simple machines they studied in their previous lesson. ii. Face-to-face: Student teachers answer open-ended questions to bring some of the doubts they have in some simple devices to belong to simple machines. iii. E-Learning/ Practical Activity opportunities: Student teachers practice on the functions/uses of the six simple machines using charts from the internet and real objects of simple machines. iv. Independent study: Individual student teachers list 5 examples of the six simple machines.
	ii. Skills for using the Six Simple Machines	**60 minutes**	E-Learning/Practical Activity opportunities: Tutor guided Student teachers to form groups of 3 members of mixed intellectual ability to manipulate simple machines using charts from the internet and manipulate real simple machines (PD Theme 4 pg 23-30).	E-Learning/ Practical Activity opportunities: Student teachers manipulate the six simple machines using charts from the internet and real simple machines (Group work)
	iii. Teaching of the functions/uses of the Six Simple Machines to the Basic School Learner	**60 minutes**	Face-to-face: Tutor allows student teachers to do short power point/poster presentation on how to teach the functions/uses of the six simple machines to Basic school learner (Group presentation).	Face-to-face: Student teachers do power point/poster presentation on how to teach the functions/uses of the six simple machines to Basic school learner (Group presentation).

Which cross cutting issues will be addressed or developed and how	Equity and SEN: through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. By practicing with simple machines, student–teachers' difficulties in manipulating/handling skills of simple machines will be addressed.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment of learning: Student teachers' identification of the functions of the six simple machines using charts from the internet and real objects of simple machines (identification of functions/uses of the six simple machines/tools) NTS 2c: Has secured content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. NTS 3d: Manages behaviour and learning with small and large classes. • Assessment as learning: Student teachers list 5 examples each on the six types of simple machines NTS 3e: Employs a variety of instructional strategies that encourages student participation and critical thinking. NTS 3f: Pays attention to all learners, especially girls and students with Special Educational Needs, ensuring their progress. • Assessment for learning: Student teachers do short presentations (3-5 minutes each) on how to teach functions/uses of the six simple machines NTS 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes
Teaching Learning Resources	Projector, some simple machines like pulley, wheel and axle, wedge and inclined planes (real objects and charts/ desktop computers with internet access https://www.youtube.com/watch?v=fvOmaf2GfCY https://www.vexrobotics.com/vexiq/education/iq-curriculum/simple-machines-and-motion/six-types-of-simple-machines https://www.livescience.com/49106-simple-machines.html
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. 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	i. Practicing on the functions/uses of the six simple machines appropriately ii. Tolerating others in group work

LESSON 11

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

Title of Lesson	EGE Science Student-teachers as Resources				Lesson Duration	3 Hours
Lesson description **EGE Science Student-teachers as Resources**	In this lesson, the Tutor further discusses the nuances embedded in the Early Grade Science Curriculum and how it could be translated practically. The importance of understanding the way it is sequenced and its role within the training of the early grade child is emphasised. This will enable student-teachers to conceptualise their own roles as teachers in the life of the early grade child in a more holistic manner as it will enable young student-teachers to create inclusive learning environments by providing the necessary adaptable and safe environment for the early grade learner.					
Previous student teacher knowledge, prior learning	Student teachers have already been introduced to the science curriculum studies course, EGE 211					
Possible barriers to learning in the lesson	Studentteachers may lack knowledge about the features of early grade science.					
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face √**	**Practical Activity**	**Work-Based Learning**	**Seminar √**	**Independent Study**	**e-learning opportunities √**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes	Discussion: student teachers make presentations (in mixed ability groups) on what they consider as important variables in early grade science Seminar: E-learning opportunities: use of internet, simulations, video and computer demonstrations					
• **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**	• Accentuate the studentteacher to the essential attitudes and values of professional science teaching such as honesty, carefulness, accuracy and many more. • Emphasise child study styles taking into consideration cultural and gender issues • Appreciation of gender responsive and child-adaptive teaching strategies • Continue to peruse the new Early grade science curriculum and how to interpret the requirements • Acquire the skills to compile/document academic work and other educational evidence for portfolios • Acquire skills to evaluate coursework, learning progress and academic achievement NTS, The teacher: 1a) Critically and collectively reflects to improve teaching and learning 2c) Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 3b) Carries out small scale action research to improve practice. 3g) Employs a variety of instructional strategies that encourages student participation and critical thinking. 3e) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.					
• **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.		
	Demonstrate the characteristics of student teachers as resources	• Student teachers as resources about diversity (NTS, 2e, Pg. 13)		Student teachers prepare Concept Maps, Practical Activities, & story boards or others that are embedded with evidence of values learned/group work/ equity and inclusivity and transferable skills Core skills to be acquired: Honesty, carefulness, accuracy and tolerance		

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**
Science Curriculum Studies II	i. Modelling inclusivity and appropriate values/attitudes in the EGE Science classroom	**90 minutes**	i. Face-to face:Tutor introduces the lesson by asking student teachers to recall some of the themes/concepts they studied in Semester 1 (Science Curriculum I & II) and tools that will be required to achieve concept acquisition	i.Face-to-face: Student teachers reflect and come out with some themes/concepts in the science curriculum
	ii. Creation of gender-friendly and inclusive science teaching materials	**90 minutes**	ii. Face-to-face: Tutor led discussions with student teachers on the development of simple teaching/learning materials for EG learners iii. Group activity: Tutor allows student teachers to form groups of mixed abilities to prepare science TLMs PD Theme 4, pg. 23-30	ii.Face-to-face: Student teachers discuss with tutor parameters for the creation/improvisation of SEN-friendly science resources iii. Group activity: Student teachers in groups of mixed abilities prepare science TLMs PD Theme 4, pg. 35-46
Which cross cutting issues will be addressed or developed and how	Equity and SEN: Through the establishment of an interactive, inclusive and demonstrative classroom atmosphere.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment of learning: Student-teachers in groups prepare EGE Science TLMs for teaching NTS 1a: Critically and collectively reflects to improve teaching and learning NTS 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. • Assessment as and for learning: Student-teachers prepare professional inclusive, multi-age, and developmentally appropriate resources NTS 3b: Carries out small scale action research to improve practice. NTS 3g: Employs a variety of instructional strategies that encourages student participation and critical thinking. NTS 3e: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.			
Teaching Learning Resources	The EGE Science syllabus, pens and papers.			
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. Early Grade Science Syllabus; Handbook for PD Coordinators Themes 1- 10			
CPD Requirement	i. Techniques on innovation and improved teaching ii. Practice how to interpret the science curriculum to prepare inclusive and child-friendly resources			

LESSON 12

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

Title of Lesson	Course Review II					Lesson Duration	3 Hours
Lesson description EGE Science	To review and audit the lessons for the second half of the semester. It is also expected that student teachers will reflect during this lesson on their own progress in the course so far.						
Previous student teacher knowledge, prior learning	Lessons learnt from lesson 7 through lesson 11						
Possible barriers to learning in the lesson	Misconceptions about some concepts not adequately dealt with or misunderstood by student teachers.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face √**	**Practical Activity**	**Work-Based Learning**	**Seminar √**	**Independent Study**	**e-learning opportunities √**	**Practicum**
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes	**Independent Study:** Reflections, Modelling concept maps and cartoons Seminar: Presentations of models, cartoons and maps of the concepts e-learning opportunities: Computer simulations and OERs on content and teaching activities for contents.						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	• Ascertain the level of understanding and teaching methods of concepts. • Test various skills and cross-cutting issues • Provide remedial tuition/tutorials where necessary • Correct misconceptions and misinformation • Build the necessary support going forward on SEN and Gender issue NTS, 1a, Pg. 12; NTS 2c, pg. 13, NTS 3b, 3e & 3g, pg. 14; NTECF pg. 20 1a) Critically and collectively reflects to improve teaching and learning 2c) Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. 3b) Carries out small scale action research to improve practice. 3e) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes. 3g) Employs a variety of instructional strategies that encourages student participation and critical thinking.						
• **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.		
	Identify weaknesses and strengths in learning the science lesson for the period under review		• Make a list of weaknesses and strengths on poster papers for sharing PD Theme 4, pg. 111		Collaborations, Communication and Research through group work and presentation		
	Reflect on lessons learnt so far and state new insights and/or grey areas needing remedies		• Provide a reflective report and answer questions on topics learnt so far through demonstrations and illustrations on a given media		Equity and Reflection is developed from reflective activities PD Theme 1. pg. 12-15; pg. 41		
	Correct misconception/misinformation for earlier (lesson 7 – 11) lessons		• Present concept maps and/or models linking misconceptions or misinformation to new insights		Creativity and critical thinking are developed in developing models and concept maps		

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**
Course Overview II	i. Reviewing the understanding and teaching of lessons on Personal Hygiene, Simple Machines, and preparation of Resources for EGE	**120 minutes**	• Brainstorming with student teachers to initiate the weaknesses and strengths of student-teachers in 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. The groups are provided with checklist on each topic so that they are able to list weakness and strengths.	i. Student teachers responds to Tutor questions on weaknesses and strengths Working in groups and with the checklist student-teachers identify, reflect and record all possible weaknesses and strengths in the lessons learnt so far. PD Theme 4, pg. 35-46
	Remedial Teaching (Formal Tutorial)	**60 minutes**	Group student teachers according to remedy need and provide specific task assistance in the areas on concept needing remedy.	Students work in the special group (Same remedy need group) on tasks to remedy their learning need.
Which cross cutting issues will be addressed or developed and how	Equity and SEN: through mixed and same group work to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. Through modelling and group work, collaboration is established.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	• Assessment of learning: Student teachers make presentations in groups (Presentations to last for each group a 3-5mins). NTS 1a: Critically and collectively reflects to improve teaching and learning NTS 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach in. • Assessment for learning: Student teachers engage inpeer remedial lessons NTS 3b: Carries out small scale action research to improve practice. NTS 3g: Employs a variety of instructional strategies that encourages student participation and critical thinking. • Assessment as learning: Written assessment will be used to assess progress NTS 3e: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.			
Teaching Learning Resources	The EGE Science syllabus, pens and papers.			
Required Text (core)	NaCCA, Ministry of Education (2019). *Science Curriculum for Kindergarten and Lower Primary*. Accra: Ministry of Education. Early Grade Science Syllabus; Handbook for PD Coordinators Themes 1- 10			
CPD Requirement	iii. Training on preparation of teaching and learning resources			