

**YEAR 1**

**SEMESTER 2**

# Four-Year B.Ed. Course Manual

INTRODUCTION TO INTEGRATED SCIENCE II





The Government of Ghana



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# FOREWORD

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

The course manuals have been produced for use as general guides for the delivery of the new four-year B.Ed. curriculum in Colleges of Education in collaboration with their affiliated universities. They are designed to support student teachers, tutors, and lecturers in delivering a complete B.Ed. course for training student teachers which 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, NTECF, National Teacher Education & Assessment Policy and the National Teacher Education Gender Equality and Social Inclusion (GESI) Strategy and Action Plan.. This will help to ensure that student teachers' learning is integrated within the wider teacher education policy framework.

**Professor Mohammed Salifu**  
**Director General,**  
**Ghana Tertiary Education Commission**

# ACKNOWLEDGEMENTS

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

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

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

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

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

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

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

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# INTRODUCTION TO COURSE MANUALS

## Welcome to this B.Ed. Course manual.

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

The manuals serve the following purposes:

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

Specifically, they also:

- Support coherent lesson planning and teaching which will enable student teachers to achieve the NTS and become good teachers who ensure all pupils' learning whilst offering tutors the flexibility for adaptation for local needs and contexts.
- Provide a lesson by lesson overview of the course, building on and developing the material in the course specifications.
- Inform tutors, student teachers and others working with student teachers about:
  1. What is to be taught and why.
  2. How it can be taught.
  3. How it should be assessed.
- Provide opportunities for student teachers to develop and apply knowledge during supported teaching in school, creating a strong bond between learning in school and in the training institution.
- Reflect the stage of student teacher development, set out in the model for progress across the four years of the B.Ed.
- Can be used as self-study tools by student teachers.
- Ensure that all information necessary to inform teacher training is in one place (serves as reference document).
- The manuals are the basis of the CoEs 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 interest 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 topics 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 topics for weekly PD meetings where tutors/lecturers will situate the lessons in the contexts of their colleges and their student teachers, in order 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 .....



# INTRODUCTION TO INTEGRATED SCIENCE II

COURSE DETAILS							
Course name	INTRODUCTION TO INTEGRATED SCIENCE II						
Pre-requisite	Introduction to Integrated Science I						
Course Level	100	Semester	2	Course Code		Credit Value	3

## THE VISION FOR THE NEW FOUR-YEAR B.Ed. CURRICULUM

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

## GOAL FOR THE SUBJECT OR LEARNING AREA

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

## COURSE DESCRIPTION

The course for Semester 2 re-caps Semester 1 lessons and consolidates how to teach basic science concepts for the student teacher from Semester 1. Topical issues are: teaching energy, basic electronics, health and hygiene, humans and the environment as well as science and technology and first aid as well as portfolio development.

Real life situations and desired Pedagogical Content Knowledge will be applied to the teaching and learning process. The student teacher will be introduced to the basic school curriculum. Assessment for, of, and as learning will be done through quizzes, presentations, practical activities and reports from work-based school visits. Checklists to identify critical values and skills, mini projects, jigsaw puzzles, modelling and practical activities will also be applied. Student teachers will be able to demonstrate adequate understanding of the course and will be able to apply it in their practice. The student teachers will have the required attitudes and values in their professional career. **(NTS 1a, p. 12; 2c, p. 13; 3e, p. 14).**

## KEY CONTEXTUAL FACTORS

- Science is the study of the structure and behaviour of the physical and natural world through observation and experimentation.
- Science teaching and learning at the basic education level has a myriad of challenges:
- Perceived difficulty of science concepts from both teachers and learners alike because some of the contents do not relate to the learners' environment: Emphasis on male domination in the sciences over females. Females perceive science as a difficult subject and thus shy away from it.
- Indigenous knowledge and cultural beliefs about the nature of science contradict the contents presented by teachers in the classrooms. Also, careers in science are often seen as male careers, culturally.
- The use of foreign language (English language) and the lack of the local dialect (L1) equivalents of most science concepts make science learning difficult.
- Pedagogic deficiencies in connecting learning abilities to content presentation (poor PCKs) complicate learners' abilities to form comprehend scientific concepts and acquire the requisite skills.
- There is inadequate infrastructure to support the volume of science content learning.
- There is a low turn-out of science students and so overhauling of the teaching of the subject at the basic level is recommended.
- Analysis of results from standard (national) examinations show that the non-performance of practical activities has been, and may continue to be, the cause of students' poor performance in science at the basic school.

### Meanwhile

- The learners' primary environment provides primary resources to make science learning relevant, interactive and enjoyable.
- There is extensive literature to make appropriate improvisations and innovations towards improving science learning.
- Innovations make it easy for every student, irrespective of their social, physical and mental ability, to participate in science learning.
- There is human resource at the training, supporting and mentoring institutions to build capacity that can drive the intervention that this strand presents.

### Children basically learn through observation, play and repetition.

- Therefore, learning activities have to be structured in such a manner that all learners will be able to work in free, collaborative and engaging environments to build logical and sequenced concepts from their personal (but guided) experiences. This will imply engaging in integrated teaching- bringing in ideas to facilitate concept formation from various disciplines, cultures and activities.
- Since science is practical, learners must be engaged in hands-on activities, with or without standard laboratories. The introduction of (universal/adaptable) laboratories through micro science kits will be very useful.
- Text and content materials as well as assessment tools must be modelled to take into consideration, the different cultures and gender issues bordering on learning science. The new teacher must be gender sensitive with a sense of inclusivity in their teaching strategies.

## CORE AND TRANSFERABLE SKILLS AND CROSS CUTTING ISSUES, INCLUDING EQUITY AND INCLUSION

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

Course Learning Outcomes	Learning Indicators
1. Review Semester 1 concepts.	<ul style="list-style-type: none"> <li>Make a list of topics that were challenging in Semester 1.</li> <li>Make Poster presentation of how to overcome the challenges.</li> </ul>
2. Recognise misconceptions, incorrect scientific ideas and bias about specific science concepts (NTS 2c, p. 13 & p. 21; NTS 3m, p. 14),	<ul style="list-style-type: none"> <li>Designed diagnostic tools to unearth and explain natural phenomena using scientific knowledge.</li> <li>Provide charts that show student teachers' explanation of natural phenomena using scientific knowledge.</li> </ul>
3. Demonstrate that energy causes change (NTS 2b, p. 12; 2c, p. 13 & 21).	<ul style="list-style-type: none"> <li>Prepare a schematic diagram of energy changes from ice to water vapour.</li> <li>Provide a setup/drawing that shows the effects of energy on matter.</li> </ul>
4. Identify and name some basic electronic appliances as well as basic knowledge of their functions. Demonstrate understanding of the recovery position of the first aid cardio-pulmonary resuscitation (CPR). (NTS 2c, p. 13 & 21),	<ul style="list-style-type: none"> <li>Construct diverse sketches that show named parts of electronic devices.</li> <li>Show models of electronic devices and energy sources by diverse learners.</li> <li>Exhibit recovery positions of resuscitation.</li> <li>Demonstrate how CPR is done.</li> </ul>
5. Demonstrate basic knowledge of the relationship between the environment and fundamental science theories (NTS 1g, 2c, p. 12 & 19).	<ul style="list-style-type: none"> <li>Prepare analytical report on land degradation in the school community.</li> <li>Exhibit a critical review of one fundamental science theory.</li> </ul>
6. Demonstrate significant ability to design and engage in practical activities and other alternative interactive assessment practices (NTS, p. 14, 19 & 23).	<ul style="list-style-type: none"> <li>Design and prepare worksheets for practical activities on lessons treated.</li> </ul>
7. Demonstrate basic ability to work as a professional science teacher in school and to identify their own professional needs in terms of science professional practice, knowledge, values and attitudes. Through this experience, student teacher will be working towards meeting the NTS. (NTS 1b, p. 14 & 18).	<ul style="list-style-type: none"> <li>Provide a checklist to identify values such as patience, critical thinking, precision and accuracy in a peer review exercise.</li> <li>Prepare a list of some examples of professional needs and some characteristics of professional teachers.</li> </ul>

## 1. Course Content

Unit/ Week	Topics	Sub-topic (if any)	Teaching and learning activity to achieve the learning outcomes
1	Review of Semester 1 and Exploring the concept of Energy and associated misconceptions.	1.1 Recap of Semester 1 lessons and challenges thereof as well as Introducing the course manual for Y1S2. 1.2 Forms and Sources of Energy and Fuels. 1.3 Energy Changes and Transformation.	1. Demonstrations and discussions. 2. Reflections, presentations and designing. 3. Role playing. 4. Simulations, video and Computer presentation. 5. Produce charts and illustrations of forms and sources of energy.
2	How to teach the concept of Energy.	2.1 Teaching Energy to elementary school learners.	1. Demonstrations and discussions. 2. Reflections, presentations and designing. 3. Concept mapping. 4. Simulations, video and Computer presentations.
3	Learning about Basic Electronics	3.1 Identification of Household Electronic Appliances. 3.2 Uses of Household Electronic Appliances.	<p><b>Face-to Face:</b> Discussion, student teacher manipulates/uses some household electronic appliances, Tutor and student teacher interactions on the functions of household electronic appliances.</p> <p><b>Practical Activity:</b> Practical manipulation of house hold devices            Independent Study: Inquiry and reflections.</p> <p><b>E-learning opportunities:</b> Use of internet, simulations and video presentations.</p>
4	First Aid	4.1 Basic Recovery Skills. 4.2 Teaching the process and practice of Cardio-Pulmonary Resuscitation (CPR).	<p><b>Face-to-face:</b> Mixed group discussions and demonstrations/role plays, Concept Mapping and Cartooning.</p> <p><b>Practical Activity:</b> Students role play in CPR procedures.</p> <p><b>E-learning opportunities:</b> Video simulations and presentations.</p>

Unit/ Week	Topics	Sub-topic (if any)	Teaching and learning activity to achieve the learning outcomes
5	Teaching about personal body care	5.1 Teaching Health and Hygiene. 5.2 Teaching Infections and Disease.	<p><b>Face-to-face:</b> Discussion, Talk for learning approaches with student teacher presentations.</p> <p><b>Independent Face-to-face:</b> Discussion, Talk for learning approaches with student teacher presentations.</p> <p><b>Independent Study:</b> Problem-based teaching.</p> <p><b>E-learning opportunities:</b> Multimedia presentations, problem-based teaching.</p>
6	Humans and their environment	6.1 Natural Resources and their uses. 6.2 Effects of Human activities on the Environment (Gender Issues).	<p><b>Face-to-face:</b> Discussion, Talk for learning approaches with student teacher presentations.</p> <p><b>Independent Study:</b> Problem-based teaching.</p> <p><b>E-learning opportunities:</b> Multimedia presentations.</p>
7	Course Review 1 (Mid-Semester)	7.1 Reflections, lesson audit and Remedial teaching for weeks 1-6.	<p><b>Open-ended questions:</b> To elicit misconceptions/incorrect ideas about physical quantities.</p> <p><b>Practical activities:</b> Activities that require the use of measuring instruments (Ensure that different abilities and strengths / needs are catered for to ensure a safe working environment and equal opportunities).</p>
8	Teaching concepts about Science and Technology I	8.1 Contribution of Science and Technology to food & Nutrition, Health, Transport and Information Management	<p><b>Face-to-face:</b> Discussions, demonstration, mixed group work.</p> <p><b>Materials:</b> Computer simulations and Open Educational Resources (OERs).</p>
9	Teaching concepts about Science and Technology II	9.1 Industrialisation and manufacturing	<p><b>Field trip:</b> To industrial/manufacturing sites and seminars on industrialisation</p> <p><b>Independent studies:</b> Inquiry and reflections.</p>
10	Building a Science Portfolio I	10.1 Reflections on writing the Science Portfolio	
11	Building a Science Portfolio II	11.1 Practice in preparing the Science Portfolio	
12	Course Review 2	12.1 Reflections, lesson audits and Remedial for weeks 8-11	

## 2. Teaching and Learning Strategies

Showers thoughts, Discussions, Checklist, Talk or Learning approaches, Role Play activities, Multimedia presentations, Concept mapping, concept cartoons, Questioning and Brainstorming, Chart, Pictures and video presentations, simulations and Computer assisted instructions, inquiry learning and field trips and seminars.

## 3. Course Assessment Components

### Component 1: Assessment of Learning (End of Semester Examination)

Summary of Assessment Method: Examinations on key concepts as shown in the lessons

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

**Weighting: 40%**

CLO1 to CLO6

NTS:

- 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.
- 3m) Identifies and remediates learners' difficulties or misconceptions, referring learners whose needs lie outside the competency of the teacher

### Component 2: Assessment for Learning (Presentations)

**Summary of Assessment Method:**

Power Point or Poster based presentations on problem-based science teaching, with notes and related TLMs (including ICT)

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

**Weighting: 30%**

CLO1, CLO2 and CLO3

NTS:

- 1b) Improves personal and professional development through lifelong learning and Continuous Professional Development.
- 3e) Employs a variety of instructional strategies that encourages student participation and critical thinking
- 3j) Produces and uses a variety of teaching and learning resources including ICT, to enhance learning.

### Component 3: Assessment as Learning (Review of Reports)

Summary of Assessment Method: Science Portfolio, including: report from school visits on teaching and assessing science; qualities of an effective science teacher; class assignments, TLMs, reflective notes on own learning and peer review

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

**Weighting: 30%** CLO4, CLO5, CLO6 and CLO7

NTS:

- 1b) Improves personal and professional development through lifelong learning and Continuous Professional Development.
- 3e) Employs a variety of instructional strategies that encourages student participation and critical thinking
- 3j) Produces and uses a variety of teaching and learning resources including ICT, to enhance learning.

#### 4. Required Reading List

Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., & Wiredu, M.B. (2008). Ghana Association of Science Teachers integrated science for senior high schools. Accra: Unimax MacMillan.

Abbey, T. K., & Essiah, J.W. (1995). Ghana Association of Science Teachers physics for senior high schools. Accra: Unimax Macmillan.

Ameyibor, K., & Wiredu, M. B. (2006). Ghana Association of Science Teachers chemistry for senior high schools. Accra: Unimax MacMillan.

Asabere-Ameyaw, A., & Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.

Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.& Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.

#### 5. Teaching and Learning resources

Smartphones, tablets, productivity tools (software programmes that allow teachers to work better); subject-based instructional tools/applications; Instructional laboratories; smart boards, projectors, smart screens, open educational resources (OERs) – YouTube, Coursera, Khan Academy, TESSA and UNESCO OERs, iBox, and standard laboratories.

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

- See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 1

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	1 2 3 4 5 6 7 8 9 10 11 12
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<b>Title of Lesson</b>	<b>The concept of Energy</b>						<b>Lesson Duration</b>	<b>3 hours</b>
<b>Lesson description</b>	This topic introduces student teachers to the concept of energy and how to teach it. Tutor first introduces students to the different forms of energy and their interconnections, discuss energy conversion in a range of common devices. The importance of controlled energy conversion is discussed through a case study on a gas explosion. Safety precautions in the transportation system, storage and use of fuels are concurrently emphasised. Survey the kind of fuels and energy sources used in Ghana. Identify electricity as one of the most common sources of energy widely used since it is a clean and convenient form of energy at the consumer end. Pollution challenges arising from the generation of electricity should be discussed in terms of thermal plants compared with solar energy source. In view of this, student teachers should be given opportunities to debate how society might make decisions about energy issues.							
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Student teachers have been using energy in various forms, on daily bases within their environment.							
<b>Possible barriers to learning in the lesson</b>	Possible misconceptions that student teachers may bring to the classroom. For example, it is natural and common sense to assume that conversion of energy from one form to another may be 100 % efficient. Quite often, they also assume that energy is always dissipated in use, and cannot be transformed. Also, the cost of conversion is not taken into account in most cases.							
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b> √	<b>Independent Study</b>	<b>E-learning opportunities</b> √	<b>Practicum</b>	
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<b>Face-to face:</b> Discussion, Demonstrations and observations. <b>Practical Activities:</b> Role Play, and designing. <b>Independent Study:</b> Reflections. <b>E-learning Opportunities:</b> Simulations, video and computer presentations.							



<p><b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></p> <p><b>Write in full aspects of the NTS addressed</b></p>	<ul style="list-style-type: none"> <li>• Exploring the conceptual understanding of energy as explained by the basic school learner.</li> <li>• Identifying possible energy sources and socio-economic benefits to Ghana within the environment for use as TLM.</li> <li>• Limited supply of fossil fuels and our increasing need for energy.</li> <li>• Discard the common misconceptions that student teachers have on energy.</li> <li>• Mention the uses of energy.</li> <li>• Designing activities to teach energy.</li> <li>• (NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p. 14), (NTS 3e, p. 14), (NTS 3p, p. 14), NTS 1a, p. 12).</li> </ul>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify which cross-cutting issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed</b>
<ul style="list-style-type: none"> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	<p>Recap of Year 1 topics</p> <p>Explain the concept of energy in two sentences.</p> <p>Distinguish the different forms of energy Identify the initial and final forms of energy in an energy change Demonstrate the appropriate safety precautions applications for fire.</p> <p>State the energy changes in generating electricity from fuels State some examples of alternate energy resources.</p> <p>List the importance of energy conservation and demonstrate how to be committed to it.</p>	<ul style="list-style-type: none"> <li>• List of topics studied in Year 1.</li> <li>• Prepare a poster on how to overcome challenging topics from Semester 1.</li> <li>• Role play to demonstrate the concepts of energy (PD Theme 1, p. 44; PD Theme 4, p. 112).</li> <li>• Present charts on types of energy.</li> <li>• Model some uses of energy in everyday life (PD Theme 5, p. 37).</li> <li>• Design activities that can be used to teach energy.</li> <li>• Show simulations of conversion of energy from one form to another.</li> <li>• Video shows in relation to energy.</li> </ul>	<p>Sharing ideas in class, 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, as well as handling of devices, honesty and accuracy.</p>

Topic	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher led collaborative group work or independent study.</b>				
<b>Review of Semester 1 and Exploring the concept of Energy and associated misconceptions</b>	Introduction to Y2S2 Course Manual	10 minutes	<b>Face-to-Face:</b> Tutor Initiates discussion to do self-introduction and require of student teachers to do same.	<b>Face-to-Face:</b> Student teachers responds to tutors discussion to do self-introduction.
		10 minutes	<b>Face-to-Face:</b> Make available copies of Y1S2 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 semester challenges	<b>Face-to-Face:</b> discuss the Course manual for Y1S2 and state their expectations for the semester as well as critique the previous semester's manual
	Recap of Semester One (1) lessons	30 min	Provide a check list containing topics from Semester 1 against the NTS for student teachers to work in groups and share with themselves on the Semester one (1) concepts learned	Work in groups to share concepts learned from Semester one (1) using checklist provided by the teacher. Present suggestions on possible changes to the learning styles or strategies on posters.
	Exploring forms and sources of energy and fuels	20 min	Allow student teachers to reflect on forms of energy with their own suggestions in the new concept development process.	Reflect and discuss various sources of energy, in pairs, while attempting to apply their suggested activity/ styles for learning and to basic school pupils.
		40 min	Guide student teachers to form groups of 3 members (with mixed ability) to use simulations and multimedia presentations to describe types of energy and their interconvertibility.	<ul style="list-style-type: none"> <li>Mixed-age, inclusive groups depending on class size</li> <li>To do presentations on of energy by concept mapping (PD Theme 8, p. 40), simulations and multimedia (PD Theme 4, p. 23-46)</li> </ul>

	Exploring misconceptions inherent in Energy changes and transformation	30 min	<ul style="list-style-type: none"> <li>• Guide student teachers to prepare charts/make videos of activities that portray the conversion of energy using language that is appropriate to basic school learners (PD Theme 5, p. 33)</li> <li>• Discuss with student teachers their ideas on the misconceptions/ incorrect ideas on energy. For example, energy release when pedalling on a bicycle. Therefore, one needs enough energy to carry the weight of one's body and that of the bicycle.</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare videos, charts and models appropriate to the different age specifics and grade levels to deliberate on systems that facilitate the transformation of energy using everyday language appropriate to basic school learners. (PD Theme 5, p. 33).</li> </ul> <p>Perform activities by pushing objects on less friction and more friction substances to recognize how friction stops moving objects. While doing these activities, student teachers explain, in their own words the mechanisms involved to their colleagues.</p>
	Energy needs of Ghana	40 min	Demonstrate how to design activities for teaching energy needs of Ghana to basic school learners.	Observe and design activities for teaching energy needs to basic school learners.
	Advance preparation for next lesson	2 min	Direct student teachers to resource materials to read ahead of the next lesson.	Take note of the title for the next lesson and write down the resources and materials for advance preparation on next lesson.

<b>Which cross-cutting issues will be addressed or developed and how</b>	<b>Equity and SEN:</b> through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment as learning: Student teachers develop videos or charts on forms of energy as TLM for future practice teaching.</li> <li>• Assessment of Learning: Class exercise. Student teachers list the forms of energy and their corresponding uses to help them appreciate the energy needs of Ghana.</li> <li>• NTS 1e: Engages positively with colleagues, learners, parents, School Management Committees, Parent-Teacher Associations, and wider public as part of a community of practice.</li> <li>• 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach.</li> <li>• 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.</li> </ul>
<b>Teaching Learning Resources</b>	<ul style="list-style-type: none"> <li>• Trolleys, toy cars, tables, pendulum bob, multimedia system, lamp, battery, balance, and other related energy sources.</li> </ul>
<b>Required Text (core)</b>	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.
<b>Additional Reading List</b>	<p><i>Abbey, T. K., &amp; Essiah, J.W. (1995). Ghana Association of Science Teachers physics for senior high schools. Accra: Unimax Macmillan.</i></p> <p><i>Ameyibor, K., &amp; Wiredu, M. B. (2006). Ghana Association of Science Teachers chemistry for senior high schools. Accra: Unimax MacMillan.</i></p> <p><i>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</i></p> <p><i>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.&amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.</i></p>
<b>CPD needs</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 2

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	1 2 3 4 5 6 7 8 9 10 11 12
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<b>Title of Lesson</b>	<b>How to teach the concept of Energy to Elementary School Learners</b>				<b>Lesson Duration</b>	<b>3 hours</b>	
<b>Lesson description</b>	In this lesson, the Tutor discusses with student teachers how to teach energy to elementary school learners. In the previous lesson, student teachers have been introduced to the concept of energy, its sources and transformations. The student teachers are expected to use the knowledge gathered in designing a lesson on how to teach energy to the basic school learner for different age and grade levels.						
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Student teachers have acquired the conceptual understanding/knowledge in 'Energy' in their previous lesson (Week 1).						
<b>Possible barriers to learning in the lesson</b>	Student teachers may not have acquired the skills to teach 'Energy' to the Basic School Learner.						
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b>	<b>Independent Study</b>	<b>E-learning opportunities</b> √	<b>Practicum</b>
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	Discussion, student teacher making presentations on how to teach 'Energy' to Elementary School Learners, Tutor and student teacher interactions on how to teach 'Energy' to the Elementary School Learner.  <b>E-learning opportunities:</b> use of multimedia and other internet resources. <b>Practical activities:</b> mixed-grouping where students work in different ability groupings.						

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed</b></li> </ul>	<p>Acquire the pedagogical skills to teach Energy forms and uses to Basic Elementary School Learners <b>(NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p. 14), (NTS 3e, p. 14), (NTS 3p, p. 14), NTS 1a, p. 12).</b></p>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify which cross-cutting Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed?</b>
	<p>Learn how to teach Energy to the Elementary School Learners.</p>	<p>Present/outline a step-by-step approach in teaching Energy to the Elementary School Learner.</p>	<p>Proper approaches of teaching Energy to the Elementary School Learner, sharing ideas in class, student teachers develop the skills of teaching Energy, communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in group work/discussion.</p>

Topic	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher-led, collaborative group work or independent study.				
Teaching Energy to Elementary School Learners	Teaching forms and sources of energy to elementary school learners	90 min	<ul style="list-style-type: none"> <li>• <b>Face-to face:</b> Introduce lesson by asking student teachers to describe forms and sources of energy, energy changes and transformations (reflection on Energy of lesson 1 study).</li> <li>• <b>Practical activity:</b> Design activities (in mixed ability groups) to teach forms and sources of energy to elementary school learners. For example, design activities to explore: <ul style="list-style-type: none"> <li>• How energy makes things work (batteries in a toy and electricity turning fan blades).</li> <li>• How energy can be obtained from many sources in many ways (sun, water, wind, fire, food, gasoline, electricity, batteries). (PD Theme 4, p. 35-46)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Discussion:</b> Describe forms and sources of energy, energy changes and transformations.</li> <li>• <b>Role play:</b> Present (in groups of two members) how to teach forms and sources of energy to elementary school learners; other student teachers take the role of elementary school learners. (PD Theme 4, P. 112).</li> </ul>

Topic Title	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
	Teaching Energy changes and transformations to elementary school learners.	90 min	<ul style="list-style-type: none"> <li>• <b>Face-to-face:</b> Lead reflective exercise on how to teach energy changes and transformations to elementary school learners (from role-play).</li> <li>• <b>Independent study:</b> Ask student teachers to prepare charts to display step-by-step approaches in teaching energy to elementary school learners (individual task).</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Face-to-face:</b> Reflect orally (in groups of two members) on how to teach energy changes and transformations to basic school learners in peer teaching .</li> <li>• <b>Independent study:</b> Prepare charts to show step-by-step approaches in teaching energy to elementary school learners individually.</li> </ul>
<b>Which cross-cutting issues will be addressed or developed and how</b>	<b>Equity and SEN:</b> through setting ground rules to protect vulnerable student teachers and establish an interactive and inclusive classroom atmosphere. By practising with the use of catapult to show energy transformations, student-teachers' teaching skills of Energy will be improved.			
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment as Learning: Observing student teachers in peer teaching exercise in class.</li> <li>• NTS 1e: Engages positively with colleagues, learners, parents, School Management Committees, Parent-Teacher Associations, and wider public as part of a community of practice.</li> <li>• 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach.</li> <li>• 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.</li> </ul>			
<b>Teaching Learning Resources</b>	Cardboard sheets to make charts, projector, pointer, catapult.			
<b>Required Text (core)</b>	<i>Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., &amp; Wiredu, M.B. (2008). Ghana Association of science teachers integrated science for senior high schools. Accra: Unimax MacMillan.</i>			
<b>Additional Reading List</b>	<i>Abbey, T. K., &amp; Essiah, J.W. (1995). Ghana Association of Science Teachers physics for senior high schools. Accra: Unimax Macmillan.</i> <i>Ameyibor, K., &amp; Wiredu, M. B. (2006). Ghana Association of Science Teachers chemistry for senior high schools. Accra: Unimax MacMillan.</i> <i>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</i> <i>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., &amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.</i>			
<b>CPD needs</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.			



# LESSON 3

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	12 3 4 5 6 7 8 9 10 11 12
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<b>Title of Lesson</b>	<b>Learning about Basic Electronics</b>						<b>Lesson Duration</b>	<b>3 hours</b>
<b>Lesson description</b>	In this lesson, Tutor and Student teachers discuss identification of household electronic appliances and their uses as well as how to present them in a lesson. This will enable student teachers to be conversant with some domestic electrical appliances or instruments, which are designed for a particular use or function, like cooking, cleaning and food preservation. The lesson is also intended to help student teachers to acquire pedagogical skills in teaching basic electronics.							
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Student teachers have been using the electric pressing irons in ironing their clothes, electric stoves/heaters in boiling water or cooking and refrigerators in storing their food items in their homes. They have also been educating their peers informally about electricity and other electrical appliances.							
<b>Possible barriers to learning in the lesson</b>	Student teachers may not be able to: <ul style="list-style-type: none"> <li>• Identify some household electronic appliances correctly.</li> <li>• State the functions of some household electronic appliances.</li> <li>• Comprehend the flow of electricity through appliances.</li> </ul>							
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b>	<b>Independent Study</b> √	<b>E-learning opportunities</b> √	<b>Practicum</b>	
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<b>Face-to Face:</b> use discussion, student teacher manipulates/uses some household electronic appliances, Tutor and student teacher interactions on the functions of household electronic appliances. <b>Practical Activity:</b> Practical demonstration of house hold devices. <b>Independent Study:</b> Use inquiry and reflections. <b>E-learning opportunities:</b> Use of internet, simulations and video presentations.							

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed</b></li> </ul>	<ul style="list-style-type: none"> <li>• Identify some common household electronic appliances or instruments.</li> <li>• Make sketches of household electronic appliances and label them.</li> <li>• Use some common household electronic appliances appropriately.</li> <li>• Acquire the skills and knowledge to teach the subject matter .</li> <li>• (NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p. 14), (NTS 3e, p. 14), (NTS 3p, p. 14), NTS 1a, p. 12).</li> </ul>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify which cross-cutting Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed?</b>
	Identify and name some basic electronic appliances	<ul style="list-style-type: none"> <li>• Construct diverse sketches that show named parts of electronic devices</li> </ul>	<ul style="list-style-type: none"> <li>• Correct handling and uses of devices</li> <li>• Good identification of household electronic appliances</li> <li>• 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.</li> </ul>

Topic:	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher-led, collaborative group work or independent study.</b>				
	Review of previous lesson	40 min	<b>Face-to-face:</b> Ask student teachers to demonstrate how to teach the concept of Energy to specified level of elementary school learners.	<b>Face-to-face:</b> Demonstrate how to teach Energy to basic school learner.
<b>Teaching Basic Electronics</b>	Identification of household electronic appliances	80 min	<p><b>Face-to-face:</b> Use open-ended questions to elicit misconceptions/ incorrect ideas about the use of household electronic appliances. For example, appliances do not use power in standby mode.</p> <p><b>E-Learning opportunities:</b> Lead student teachers to form groups of 3 members of mixed abilities to identify some common household electronic appliances using charts of electronic appliances from the internet and real objects of household and name appliances brought to class (PD Theme 4 p. 23-30).</p> <p><b>Independent study:</b> make sketches of household electronic appliances and label them (individual task).</p>	<p><b>Face-to-face:</b> Answer open-ended questions to bring their incorrect ideas on the use of household electronic appliances.</p> <p><b>E-Learning opportunities:</b> identify some common household electronic appliances using charts of electronic appliances from the internet and real objects of household appliances brought to class and name same appliance.</p> <p><b>Independent study:</b> make sketches of household electronic appliances and label them.</p>



<b>Which cross-cutting issues will be addressed or developed and how</b>	Equity and SEN: through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. By practising with the household electronic appliances, student teachers' manipulating/handling skills of devices will be addressed.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment as Learning: Exercise in Class - Student teachers' write a one-page exercise of identification of household electronic appliances using charts of electronic appliances from the internet and real objects of household appliances brought to class helps to assess their learning (identification of named electrical appliances placed in portfolio).</li> <li>• Assessment of Learning: Observing Student teachers doing short presentations (5min each) on how to teach identification and uses/functions of household electronic appliances (Reflection on presentations).</li> </ul> <p>NTS</p> <ul style="list-style-type: none"> <li>• 1a: Critically and collectively reflects to improve teaching and learning.</li> <li>• 2b: Has comprehensive knowledge of the official school curriculum, including learning outcomes.</li> <li>• 3b: Carries out small-scale action research.</li> </ul>
<b>Teaching Learning Resources</b>	Projector, electric pressing iron, blenders, water heaters, electric fan, vacuum cleaner, electric stove, refrigerator, television, microwave, toaster, air conditioner and washing machine (simple ones will be carried to the class while bigger ones will be shown on a chart/internet- <a href="https://7esl.com/household-appliances-vocabulary/">https://7esl.com/household-appliances-vocabulary/</a> ).
<b>Required Text (core)</b>	<i>Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., &amp; 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</i>
<b>Additional Reading List</b>	<p><i>Abbey, T. K., &amp; Essiah, J. W. (1995). Ghana Association of Science Teachers physics for senior high schools. Accra: Unimax Macmillan.</i></p> <p><i>Ameyibor, K., &amp; Wiredu, M. B. (2006). Ghana Association of Science Teachers chemistry for senior high schools. Accra: Unimax MacMillan.</i></p> <p><i>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</i></p> <p><i>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., &amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.</i></p>
<b>CPD needs</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 4

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	1 2 3 4 5 6 7 8 9 10 11 12
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<b>Title of Lesson</b>	<b>First Aid</b>						<b>Lesson Duration</b>	<b>3 hours</b>
<b>Lesson description</b>	The lesson is a continuation from Semester 1 lesson 5 (Safety precautions), it is intended to extend the knowledge and skill acquisition in emergency and immediate care that should be provided when a person is injured or ill in the classroom, playground or laboratory before any referral to a qualified medical facility or doctor for full treatment. It is also intended to deepen the skills prepare student teacher to t take a certificate examination later in PEMD lesson 12.							
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Student teachers had a lesson on safety precautions and explored the importance of first aid. They are aware of various household injuries and domestic/traditional treatment for simple injuries.							
<b>Possible barriers to learning in the lesson</b>	Wrong treatments/practices and traditional views about certain illnesses, for example, seizures.							
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b>	<b>Independent Study</b>	<b>E-learning opportunities</b> √	<b>Practicum</b>	
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<p><b>Face-to-face:</b> use mixed group discussions and demonstrations/role plays, concept mapping and cartooning.</p> <p><b>Practical Activity:</b> use student teachers to role play CPR procedures just as is done during PEMD lesson session.</p> <p><b>E-learning opportunities:</b> use video simulations and presentations.</p>							

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed</b></li> </ul>	<ul style="list-style-type: none"> <li>• Ascertain the level of understanding of basic first aid.</li> <li>• Create awareness of basic first aid</li> <li>• Provide basic skills for handling simple household and school injuries.</li> <li>• Correct misconceptions and misinformation about resuscitation</li> <li>• Acquire pedagogic skills to teach first aid</li> </ul> <p>(NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p.14), (NTS 3e, p. 14), (NTS 3p, p. 14), NTS 1a, p. 12)</p>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify which cross-cutting Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed</b>
	Demonstrate understanding and awareness of basic first aid and be able to teach same.	Explain what first aid is and identify common items found in a first aid kit (Knowledge of the content of the kit is indicative of their understanding of the kits functionality).	Communication and Research: through group work and presentations (PD Theme 4, p. 23-30).
	Demonstrate appropriate skills in handling simple injuries and be able to teach same.	<ul style="list-style-type: none"> <li>• Provide charts indicating various injuries and what First Aid will be required.</li> <li>• Discuss how first aid can be taught to learners.</li> </ul>	Equity and reflection are developed from reflective activities.
	Correct misconception/ misinformation about First Aid.	Present concept maps and/or models linking misconceptions/ misinformation to new insights (PD Theme 3, p. 63 – 81).	Creativity and critical thinking are developed in creating models and concept maps (PD Theme 5, p. 37).

Topic:	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher-led, collaborative group work or independent study.</b>				
<b>Teaching First Aid</b>	First aid and basic kit	40 min	<b>Practical activity:</b> Put student teachers into mixed-sex groups to share thoughts on importance of first aid and discuss their understanding of first aid and why it is important when teaching science.	<b>Practical activity:</b> Mixed-sex group discussions of the importance of/and what first aid is and its aims. Provide a report on their understanding of first aid and provide a list of items found in a First Aid kit.
	Basic recovery skills	70 min	<b>Face-to-face:</b> Put student teachers into mixed groups to discuss the ABC of first aid (airway, breathing, and circulation).	<b>Discussion:</b> Demonstrate and discuss recovery positions, what the ABC of first aid involves. Design a chat showing simple injuries and the required first aid.
	Cardio-Pulmonary Resuscitation (CPR)	70 min	<b>Face-to-face:</b> Group student teachers into special ability groups with instructions on how to do chest compressions. Demonstrate CPR to students. Provide web addresses and links for videos and computer simulations on first aid. Teacher needs to emphasize on the need for student teachers to develop appropriate skills required for certification in PEMD Class.  Assign student teachers to prepare a report on local terminologies used for Wellness and disease to be presented for next lesson.	<b>Face-to-Face:</b> Student teachers work in the special groups (Same remedy need group) to practice and demonstrate how to do chest compressions/ CPR.  Watch videos/computer simulations on first aid in action and write their findings.  Produce concept maps of common misconceptions against scientific evidence (PD Theme 3, p. 121; PD Theme 5, p. 33)  Student teachers write down the assignment to prepare a report on terminologies used for wellness and diseases for next lesson.



<b>Which cross-cutting issues will be addressed or developed and how</b>	Equity and SEN: through mixed and same ability group work to protect vulnerable students. Student teachers establish an interactive and inclusive learning environment through group work.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment of Learning: End of Semester Examination – CPR under PEMD.</li> <li>• Assessment as Learning: observation of student-teachers’ presentations during group work and model work presentation in classroom on safety precautions (presentation to last at least 3 mins depending on number of groups).</li> <li>• NTS 1e: Engages positively with colleagues, learners, parents, School Management Committees, Parent-Teacher Associations, and wider public as part of a community of practice.</li> <li>• 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach.</li> <li>• 2e: Understands how children develop and learn in diverse context and applies this in his/her teaching.</li> </ul>
<b>Teaching Learning Resources</b>	<ul style="list-style-type: none"> <li>• Cardboard sheets, Poster paper, first aid box, computer with internet access, smart phone, tablets.</li> </ul>
<b>Required Text (core)</b>	<i>Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., &amp; 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.</i>
<b>Additional Reading List</b>	<p><i>Abbey, T. K., &amp;Essiah, J.W. (1995). Ghana Association of Science Teachers physics for senior high schools. Accra: Unimax Macmillan.</i></p> <p><i>Ameyibor, K., &amp; Wiredu, M. B. (2006). Ghana Association of Science Teachers, chemistry for senior high schools. Accra: Unimax MacMillan.</i></p> <p><i>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</i></p> <p><i>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.&amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd. <a href="http://nhcps.com/lesson/cpr-first-aid-basics">http://nhcps.com/lesson/cpr-first-aid-basics</a> .</i></p>
<b>CPD needs</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 5

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	12 3 4 5 6 7 8 9 10 11 12
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<b>Title of Lesson</b>	<b>Teaching about Personal Body Care</b>						<b>Lesson Duration</b>	<b>3 hours</b>
<b>Lesson description</b>	In this lesson, the Tutor will assist student teacher to review previous knowledge on health and hygiene and infections and diseases, aspects of which were studied in senior high school. The lesson will then deepen their understanding of the concepts and expose them to teaching strategies and material so that they will effectively handle similar topics in their future science classrooms. The student teacher will also appreciate the relationship between humans and their environment with regard to humans' well-being.							
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Student teachers have studied personal hygiene and infectious diseases, including their causative agents, symptoms, and their prevention at the high school level.							
<b>Possible barriers to learning in the lesson</b>	Student teachers might still have some unscientific ideas about causes of diseases and poor attitude towards personal and community health and how to teach them to other learners.							
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b>	<b>Independent Study</b> √	<b>E-learning opportunities</b> √	<b>Practicum</b>	
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<p><b>Face-to-face:</b> Use discussion, talk for learning approaches with student teacher presentations.</p> <p><b>Independent Study:</b> Use problem-based teaching.</p> <p><b>E-learning opportunities:</b> Use multimedia presentations.</p> <p><b>Independent Study:</b> Use mini action research.</p>							

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed</b></li> </ul>	<ul style="list-style-type: none"> <li>• Deepen student teachers' level of understanding of concepts. (Personal and community health, common diseases and their causative agents, symptoms and treatments and/or prevention).</li> <li>• Correct misconceptions and incorrect ideas.</li> <li>• Build the necessary support going forward on SEN and gender issues.</li> <li>• The student teacher will develop skills for data collection and presentation on health issues in the community of practice.</li> <li>• The lesson should help the student teacher develop a chart of activities to improve personal hygiene of future pupils and community health based on gathered data in community of practice.</li> <li>• (NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p.14), (NTS 3e, p. 14), (NTS 3p, p. 14), (NTS 1a, p. 12).</li> </ul>		
<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify which cross-cutting issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed</b>
	Identify unscientific ideas and misconceptions about diseases.	Student teachers should submit a chart of unscientific ideas and misconceptions about diseases with scientific explanation.	Develop skills for construction of diagnostic tests to identify pupils' misconceptions about diseases, skills of communication.
	Prepare checklist to monitor future pupil's personal hygiene.	Student teachers (in groups) should submit checklist to monitor pupil's personal hygiene activities.	Develop skills for construction of checklists, on common diseases in the community.
	Prepare a chart on diseases and their causative agents, symptoms, treatment and/or prevention.	Student teachers provide a checklist of diseases, their causative agents, symptoms, treatment and/or prevention.	Developing social collaboration and attention and care to individual needs (SEN) through role play.
	Design mini-projects to investigate common diseases in the community  Student teachers develop appropriate skills to teach the subject matter based on gathered data	Student teachers in groups present reports on investigation on common diseases in the community and how to do communal sensitisation of health programmes (PD Theme 4, p. 109-110).	Demonstrate skills for investigation and report writing (PD Theme 5, p. 133).

Topic	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher led, collaborative group work or independent study.</b>				
<b>Teaching about Personal Body Care</b>	Teaching health and hygiene	40 min	<b>Face-to-face:</b> guide student teachers to explain health and hygiene in terms of wellness, disease, prevention and recognitions of symptoms. Put students in groups to present their report on local terminologies used to refer to these terms; wellness, disease, preventions and symptoms and how they can be better presented to basic school learners.	<b>Face-to-face:</b> brainstorm to come out with explanations of the concepts of health and hygiene. Working in groups, student teacher presents a report on local terminologies used for the following terms: wellness, disease, preventions and symptoms and how they can be better presented to basic school learners.  (PD Theme 3, p. 64-73)
		20 min	<b>E-learning opportunity:</b> Put students in mixed ability groups and present video and computer simulations (source: MOOCs, OERs) on good and bad hygiene practices to student teachers.	<b>E-learning opportunity:</b> Work in mixed ability groups and make health cards on good and bad hygiene practices from video and computer simulation for presentation.
	Infections and diseases	30 min	<b>Face-to-face/E-learning opportunities:</b> Questioning identifies student teachers' misconceptions about causes of diseases and connection between personal health and infectious diseases. Provide videos on communicable and non-communicable diseases for student teachers to view and report.	<b>Face-to-face/E-learning opportunities:</b> Present designs of diagnostic tool in groups to unearth learners' misconceptions on diseases and personal hygiene

Topic Title	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
		50 min	<p><b>E-learning:</b> Maintain students-teachers in mixed ability groups and present them with video on the causes of common communicable and non-communicable diseases and directs student teachers to make mini projects that will document mode of transmission, symptoms, treatment/prevention (PD Theme 5, p. 33).</p>	<p><b>E-learning:</b> Reflect on the videos presented and make T-charts on communicable and non-communicable diseases and their causes.</p> <p>Use the T-charts as TLM to demonstrate how they can be used to teach the topic at the basic school.</p>
		40 min	<p><b>E-learning/face-to-face:</b> Briefly explain what action research is to student teachers.</p> <p>Maintain mixed ability groups and assign tasks to investigate various groups, organizations and institutions that work towards community and environmental hygiene through a mini action research.</p>	<p><b>E-learning/independent study:</b> Work in groups to design guidelines for mini action research with the help of the teacher, to study institutions, organizations and groups working towards community and environmental hygiene. The study should be presented in the next week during lesson on Humans and their environment</p>

<b>Which cross-cutting issues will be addressed or developed and how</b>	<b>Equity and SEN:</b> through setting ground rules to protect vulnerable Student teachers and establish an interactive and inclusive classroom atmosphere. Student teachers' specific weaknesses and strengths will be identified and catered for.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment for learning: Student teachers to provide T-charts on common communicable and non-communicable diseases in the community as classroom assignment.</li> <li>• Assessment as learning: Student teachers present report on mini project on modes of transmission, symptoms, treatment and/or prevention.</li> <li>• NTS 1a: Critically and collectively reflects to improve teaching and learning</li> <li>• 1g: sees his/her role as a potential agent of change in the school, community and country.</li> <li>• 2c: Has secure content knowledge, pedagogical knowledge and pedagogical content knowledge for the school and grade they teach.</li> <li>• 3h: Sets meaningful tasks that encourages learner collaboration and leads to purposeful learning.</li> </ul>
<b>Teaching Learning Resources</b>	<ul style="list-style-type: none"> <li>• The Course Manual, Computer, projectors, Flip Charts, Pens, Pencils, 'A' 4 sheets, markers, health cards, work sheets, slides, videos.</li> </ul>
<b>Required Text (core)</b>	<p><i>Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., &amp; Wiredu, M.B. (2008). Ghana Association of Science Teachers integrated science for senior high schools. Accra: Unimax MacMillan.</i></p> <p><i>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.&amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd Handbook for PD Coordinators Themes 1- 10.</i></p>
<b>Additional Reading List</b>	<p><i>Yeboah, S. K., Ahordji, &amp; Mensah, S. K. (2016). Science for primary schools: Pupil's book 5, Accra: Sam-Woode Ltd.</i></p> <p><i>Available Primary and Junior high school science textbooks.</i></p>
<b>CPD needs</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 6

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	12 3 4 5 6 7 8 9 10 11 12
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<b>Title of Lesson</b>	<b>Humans and their Environment</b>						<b>Lesson Duration</b>	<b>3 hours</b>
<b>Lesson description</b>	In this lesson, the Tutor will assist the student teachers to review previous knowledge on natural resources and their uses and effects of human activities on the environment as well as discuss the results from the mini action research from lesson 5. Student teachers will acquire sufficient knowledge on higher concepts of humans and their environment so that they will effectively handle similar topics in their future science classrooms. The student teacher will learn how to teach learners to also appreciate the effects of humans' activities on the environment.							
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Student teachers have studied some concepts of natural resources and their uses and human activities that degrade the environment at junior high school level. They have also had a pre-lesson (Lesson 5) on their environment.							
<b>Possible barriers to learning in the lesson</b>	Student teachers might still have some unscientific ideas about the environment after learning about taking care of their bodies within the environment in which they live, so as to prevent the contraction of diseases							
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b>	<b>Independent Study</b> √	<b>E-learning opportunities</b> √	<b>Practicum</b>	
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<p><b>Face-to-face:</b> use discussion, questions and answers and group presentation.</p> <p><b>Independent Study:</b> use nature walk, photo chat, classroom resource hunt.</p> <p><b>E-learning opportunities:</b> use multimedia presentations.</p>							

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed.</b></li> </ul>	<ul style="list-style-type: none"> <li>• To deepen student teacher’s understanding of natural resources as renewable and non-renewable resources, and appreciate the effects of human activities on the environment. Student teachers should understand that all products that people use are obtained from the earth.</li> <li>• Test various skills and cross-cutting issues</li> <li>• Correct misconceptions and misinformation.</li> <li>• Build the necessary support going forward on SEN and gender issues.</li> <li>• The lesson should help the student teacher to carry out a mini-project to map out natural resources and their uses in the community and to investigate some effects of human activities on the environment.</li> <li>• Acquire pedagogical skills to teach about humans and their environment.</li> </ul>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify which cross-cutting Issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed</b>
	Prepare a T-chart to classify natural resources into renewable and non-renewable resources.	Student teachers to present T-chart of natural resources as renewable and non-renewable resources and describe their uses in the community.	Develop skills of observation and notes taking, and skills for construction of charts on natural resources and their uses identified in the community.
	Prepare flash cards on human activities identified in the community that affect the environment.	Student teachers in groups present flash cards of human activities that affect the environment.	Develop social collaboration and attention and care to individual needs (SEN) through role play.
	Design mini-project to investigate human activities that affect the environment of the community and how to teach them.	Student teachers in groups present reports on investigation on human activities that affect the environment of the community and attempt to teach them as a way of combining learning and practising teaching at various grade levels.	Developing social collaboration and attention and care to individual needs (SEN) through teaching role play.



Topic	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher led, collaborative group work or independent study.</b>				
<b>Humans and their environment</b>	Mini Action Research (findings from lesson 5)	30 min	<b>Face-to-Face:</b> Initiate a discussion on the success and outcome of the mini action research undertaken by student teachers on various groups, organizations and institutions that work towards community and environmental hygiene.	<b>Face-to-Face:</b> Student teachers, working in their groups, present their mini action reports and discuss the outcomes (for a minimum of 5 mins each).
	Natural Resources and their Uses	60 min	<b>Independent Study/ Face-to-Face:</b> lead student teacher, in mixed ability groups, to undertake nature walk around the community to look for natural resources.	<b>Independent Study/ Face-to-Face:</b> undertake nature walk with tutor (in mixed ability groups) carrying clip boards to take notes and later in class, categorise natural resources they saw into renewable and non-renewable resources.  Groups write a paragraph on each resource they saw and how the resources are used in the community (PD Theme 4, p. 109).
	Effects of human activities on the environment and how to disseminate information	90 min	<b>Face-to-Face/E-learning:</b> show video and provide student teachers with media evidence (newspapers, internet news) on human activities that affect the environment, e.g. 'galamsey' (illegal mining) activities, indiscriminate felling of trees, etc. and puts student teachers in groups to discuss and develop model lessons that will convince basic school learners to protect the environment.	<b>Face-to-Face/E-learning:</b> share experiences from their communities and their observations from the video. Each group will then develop model lessons on how to protect the environment from these human activities. (PD Theme 5, p. 33).

<b>Which cross-cutting issues will be addressed or developed and how</b>	<b>Equity and SEN:</b> through setting ground rules to protect vulnerable student teachers and establish an interactive and inclusive classroom atmosphere. Through the game of 'Tell it', student teachers' specific weaknesses and strengths will be identified and catered for.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment for learning: Classroom assignment on student teachers' report on nature walk to identify natural resources in their community as assessment for learning.</li> <li>• Assessment as learning: Observe student teachers activity on developing model lesson activities for collaboration and cooperation among group members.</li> <li>• NTS 1c: Demonstrate effective growing leadership qualities in the classroom and wider school.</li> <li>• 1g: Sees his/her role as a potential agent of change in the school, community and country.</li> <li>• 2c: Has a secure content knowledge, pedagogical knowledge and content pedagogical knowledge for school and grade they teach in.</li> <li>• 3i: Explains concepts clearly using examples familiar to students.</li> </ul>
<b>Teaching Learning Resources</b>	<ul style="list-style-type: none"> <li>• The Course Manual, Computer, projectors, Flip Charts, Pens, Pencils, 'A' 4 sheets, markers, pairs of scissors, glue, magazines and other newsprints, videos on human activities that degrade the environment, clipboards etc.</li> </ul>
<b>Required Text (core)</b>	<p><i>Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., &amp; Wiredu, M.B. (2008). Ghana Association of Science Teachers integrated science for senior high schools. Accra: Unimax MacMillan.</i></p> <p><i>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., &amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd Handbook for PD Coordinators Themes 1- 10</i></p>
<b>Additional Reading List</b>	<p><i>Yeboah, S. K., Ahordji, &amp; Mensah, S. K. (2016). Science for primary schools: Pupil's book 5, Accra: Sam-Woode Ltd.</i></p> <p><i>Available Primary and Junior high school science textbooks.</i></p>
<b>Lesson Policy</b>	
<b>CPD needs</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 7

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	12 3 4 5 6 <b>7</b> 8 9 10 11 12
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<b>Title of Lesson</b>	<b>Course Review 1 (Mid-Semester)</b>						<b>Lesson Duration</b>	<b>3 hours</b>
<b>Lesson description</b>	To review and audit the lessons for the first 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.							
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Lessons learnt from lesson 1 through lesson 6 in all learning approaches.							
<b>Possible barriers to learning in the lesson</b>	Misconception on some concepts not adequately dealt with. Lessons not appropriately understood by student teachers.							
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b> √	<b>Independent Study</b> √	<b>E-learning opportunities</b> √	<b>Practicum</b>	
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<p><b>Face-to-face:</b> use discussion and demonstration.</p> <p><b>Independent Study:</b> use reflections, modelling concept maps and cartoons.</p> <p><b>Seminar:</b> use presentation of models, cartoons and maps of the concepts.</p> <p><b>E-learning opportunities:</b> use computer simulations and OERs on content and teaching activities for contents.</p>							

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed</b></li> </ul>	<ul style="list-style-type: none"> <li>• Ascertain the level of understanding of concepts.</li> <li>• Test various skills and cross-cutting issues</li> <li>• Provide remedial tuition/tutorials where necessary</li> <li>• Correct misconceptions and misinformation</li> <li>• Build the necessary support going forward on SEN and sender issues (NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p.14), (NTS 3e, p. 14), (NTS 3p, p. 14), NTS 1a, p. 12)</li> </ul>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify which cross-cutting issues, core and transferable skills, inclusivity. Equity and addressing diversity. How will these be addressed or developed</b>
<ul style="list-style-type: none"> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	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, p. 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. P. 12-15; p. 41).
	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 are developed in developing models and concept maps.

Topic	Sub-Topic:	Stage/ time	Teacher Activity Facilitate and provide the necessary tools for student teachers' activities	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher-led collaborative group work or independent study.</b>				
<b>Course Review 1</b>	Review understanding of the lesson: Energy and teaching Energy, Basic electronics, first aid, and Humans and their environment I & II	30 mins          90 mins	<ul style="list-style-type: none"> <li>• Brainstorming with student – teachers to initiate the weaknesses and strengths of student – teachers in the lessons 2 – 5.</li> <li>• Initiate discussion /talk for learning approach using groupings (Same ability and then mixed groups) to identify student – teachers' strengths and weaknesses in the lessons learnt so far.</li> <li>• The groups are provided with checklist on each topic so that they are able to list weaknesses and strengths.</li> </ul>	<ul style="list-style-type: none"> <li>• Respond to tutor questions on weaknesses and strengths.</li> <li>• Identify, reflect and record all possible weaknesses and strengths in the lessons learnt so far.</li> </ul>
	Remedies to course topics	60 mins	<ul style="list-style-type: none"> <li>• Group student – teachers according to remedy need and provide specific task assistance in the areas on concept needing remedy.</li> </ul>	<ul style="list-style-type: none"> <li>• Work in the special group (Same remedy need group) on tasks to remedy their learning need.</li> </ul>

<b>Which cross-cutting issues will be addressed or developed and how</b>	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.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment for Learning: Observe student teachers' presentations during group work and model work presentation (Presentations to last for each group a 3-5mins) for collaboration.</li> <li>• Assessment of learning: Student – observe student demonstration of understanding of concepts while working in groups on remedial tutoring.</li> <li>• NTS 1f: Developing positive teacher identity.</li> <li>• 2c: Secure content pedagogical, and pedagogical content knowledge</li> <li>• 3: Professional practice</li> </ul>
<b>Teaching Learning Resources</b>	<ul style="list-style-type: none"> <li>• Cardboard sheets, Course manual, poster paper, internet</li> </ul>
<b>Required Text (core)</b>	<i>Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., &amp; 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.</i>
<b>Additional Reading List</b>	<p><i>Abbey, T. K., &amp; Essiah, J.W. (1995). Ghana Association of Science Teachers physics for senior high schools. Accra: Unimax Macmillan.</i></p> <p><i>Ameyibor, K., &amp; Wiredu, M. B. (2006). Ghana association of science teacher's chemistry for senior high schools. Accra: Unimax MacMillan.</i></p> <p><i>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</i></p> <p><i>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.&amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.</i></p>
<b>CPD needs</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 8

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	12 3 4 5 6 7 <b>8</b> 9 10 11 12
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<b>Title of Lesson</b>	<b>Teaching concepts about Science and Technology I</b>					<b>Lesson Duration</b>	<b>3 hours</b>
<b>Lesson description</b>	In this lesson, the student teacher explores the contribution of science and technology to food and nutrition, health, transport, information management, and builds on the concepts of the resources in the environment. The lesson will guide student teachers to develop teaching strategies for teaching this topic at the basic school.						
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Student teachers have studied some concepts of natural resources and used various transport systems.						
<b>Possible barriers to learning in the lesson</b>	Student teachers might have some misconceptions about the relationship between science and technology.						
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b>	<b>Independent Study</b> √	<b>E-learning opportunities</b> √	<b>Practicum</b>
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<b>Face-to-Face:</b> use discussion and group presentation <b>Independent Study:</b> use nature walk, photo chat, classroom resource hunt, <b>E-learning opportunities:</b> use multimedia presentations.						

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed.</b></li> </ul>	<p>To provide for student teachers, an opportunity to experience technology and its influence on the teaching and learning of science. <b>(NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p.14), (NTS 3e, p. 14), (NTS 3p, p. 14), NTS 1a, p. 12)</b></p>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> </ul>	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
<ul style="list-style-type: none"> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	Identify the relationship between science and technology.	Student teacher to present concept maps showing the relationship between science and technology	Develop awareness of the relationships in diversity.
	Explain the value of technology in science.	Student teachers in groups present posters on the value of technology in science learning.	Develop social collaboration and attention and care to individual needs (SEN) through role play.
	Design activities to help learners at the basic school recognise the relationship between science and technology.	Student teachers in groups produce activity guides for teaching basic school science and technology	Develop social collaboration, creativity and attention and care to individual needs (SEN) through role play.



Topic	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher led, collaborative group work or independent study.</b>				
Teaching concepts about Science and Technology I	Recapitulation	10 min	<b>Face-to-Face:</b> review lesson on resources and their benefits in the society and how value can be added to raw resources using whole class discussion (lesson 6).	<b>Face-to Face:</b> discuss resources and their benefits in the society and how value can be added to raw resources.
	Contribution of Science and Technology to food & Nutrition, Health, Transport and Information	60 min	<b>Independent study/ Face-to-Face:</b> direct student teachers to undertake nature walk around the school compound to look for natural resources, student teachers are taught how to use clip boards to take notes.	<b>Independent study/ Face-to-Face:</b> undertake nature walk round the school compound, take notes using clip boards and return to class and in groups prepare concept maps to relate science with the environment using notes collected from the environment. (PD Theme 8, p. 40).
		60 min	<b>Independent Study:</b> group student teachers according to mixed ability and sex, assign them to the different grade levels of the basic school, and refer them to magazines, newspapers and other newsprints as well as OERs. Student teachers reflect and select material appropriate to the different grades they are assigned to so that they can develop and teach a lesson on the contribution of science to food, nutrition, health, transport and information. These lesson activities should be familiar with the language to use. (PD Theme p. 33).	<b>Independent Study:</b> work in groups, reflect and select appropriate materials from referred resources, adjust language appropriate to the grade levels and develop lesson (NB: Make student teachers transfer knowledge from STS) activities that can be used to teach grade levels assigned.

		50 min	<ul style="list-style-type: none"> <li>Face-to-Face: guide student teachers to demonstrate how to teach the topic on science and industry using the materials gathered from independent study and the activities developed from previous activity. Use 10 minute per group.</li> </ul>	<ul style="list-style-type: none"> <li>Face-to-Face: design lessons/activities as poster to demonstrate how to teach various grade levels with developed materials and activities.</li> </ul>
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<b>Which cross-cutting issues will be addressed or developed and how</b>	<b>Equity and SEN:</b> through setting ground rules to protect vulnerable Student teachers and establishing an interactive and inclusive classroom atmosphere. Through the game of 'Tell it', Student teachers' specific weaknesses and strengths will be identified and catered for.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li><b>Assessment as Learning:</b> Observe student teachers develop learning materials and learning activities for grade specific learning.</li> <li><b>Assessment of Learning:</b> Observe student teachers teach in peer teaching. Observe for interactive teaching.</li> <li>NTS 1f: Develops a positive teacher identity and acts as a good role model for students.</li> <li>2d: At pre-primary and primary the teacher knows the curriculum for the years appropriate to multi-grade 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.</li> <li>2e: Understands how children develop and learn in diverse contexts and applies this in his/her teaching.</li> <li>3a: Plans and delivers varied and challenging lessons, showing a clear grasp of the intended outcomes of their teaching.</li> <li>3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.</li> <li>3j: Produces and uses a variety of teaching and learning resources including ICT to enhance learning.</li> </ul>
<b>Teaching Learning Resources</b>	The Course Manual, Computer, projectors, Flip Charts, Pens, Pencils, 'A' 4 sheets, markers, pairs of scissors, glue, magazines and other newsprints, videos on human activities that degrade the environment, clipboards.
<b>Required Text (core)</b>	<p>Abbey, T. K., Alhassan, B., Ameyibor, K., Essiah, J. W., Fometu, E., &amp; Wiredu, M.B. (2008). <i>Ghana Association of Science Teachers integrated science for senior high schools</i>. Accra: Unimax MacMillan.</p> <p>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V. &amp; Obeng-Ofori, D. (2011). <i>SWL integrated science for senior high schools: Students book</i>. Accra, Ghana; Sam-Woode Ltd Handbook for PD Coordinators Themes 1- 10.</p>
<b>Additional Reading List</b>	<p>Yeboah, S. K., Ahordji, &amp; Mensah, S. K. (2016). <i>Science for primary schools: Pupil's book 5</i>, Accra: Sam-Woode Ltd.</p> <p>Available Primary and Junior high school science textbooks; Handbook for PD Coordinators Themes 1- 10.</p>
<b>CPD Requirement</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 9

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	12 3 4 5 6 7 8 9 10 11 12
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<b>Title of Lesson</b>	<b>Teaching concepts about Science and Technology II</b>				<b>Lesson Duration</b>	<b>3 hours</b>	
<b>Lesson description</b>	The lesson covers the nature of science and technology the identification and the benefits to industries in Ghana.						
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Previous Lesson (lesson 8), was a lesson on teaching concepts about science and technology I, which explored the contribution of science to technology and life in general.						
<b>Possible barriers to learning in the lesson</b>	The inability of students to identify simple set ups similar to industries in their within and outside immediate environment						
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b> √	<b>Independent Study</b>	<b>E-learning opportunities</b> √	<b>Practicum</b>
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	Use mixed group activities, discussions and reporting, demonstration, observation & role play.						

<ul style="list-style-type: none"> <li>• <b>Overarching outcome, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed.</b></li> </ul>	<p>Students will connect Science and Technology to Industries in Ghana <b>(NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p.14), (NTS 3e, p. 14), (NTS 3p, p. 14), NTS 1a, p. 12).</b></p>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify the cross-cutting issues- core and transferable skills, inclusivity, equity and diversity. How will these be addressed or developed?</b>
<ul style="list-style-type: none"> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	<p>Identify industries and their features.</p> <p>Connect resources in immediate environment to industries.</p> <p>Design activities to teach industrialisation to basic school learners.</p>	<p>Produce charts, posters, and models that show the features and connections of industries to resources in the environment.</p>	<p><b>Equity and Inclusivity:</b> Communication, critical thinking, collaboration, creativity and problem solving.</p>

Topic	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher led, collaborative group work or independent study.</b>				
Science and Technology II	Industrialisation	30 min	<b>Face-to-Face:</b> initiate whole class discussion using open-ended questions for the identification of misconceptions /incorrect ideas on industries and industrialisation. (PD Theme 5, p. 33; PD Theme 5, p. 219-223).	<b>Face-to-Face:</b> discuss and prepare posters and charts about misconceptions held about the terms 'industry' and 'manufacture'. Student teachers list difficult terms and specific language variations for further clarification.
		60 min	<b>Face-to-Face/E-learning opportunities:</b> Initiate discussion with students in mixed ability groups, to identify industry features and nature using videos, OERs and Charts. (PD Theme 5, p. 33; PD Theme 5, p. 219-223)	<b>Face-to-Face/E-learning:</b> Identify and discuss the nature and features of industries drawing examples from videos, OERs and charts. (PD Theme 5, p. 33; PD Theme 5, p. 219-223)
		90 min	<b>Face-to-Face:</b> Group student teachers into mixed ability and mixed sex groups and direct them to prepare lesson activities and assessment protocols to teach and assess basic school learners on nature and features of industries.	<b>Face-to-Face:</b> Work in groups to prepare lesson activities using examples from STS and assessment protocols and do peer teaching on nature and features of Industries.

<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment as Learning: Observe classroom peer teaching by student.</li> <li>• NTS 1a: Critically and collectively reflects to improve teaching and learning.</li> <li>• 2d: At pre-primary and primary the teacher knows the curriculum for the years appropriate to multi-grade 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.</li> <li>• 3a: Plans and delivers varied and challenging lessons, showing a clear grasp of the intended outcomes of their teaching.</li> <li>• 3g: Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.</li> </ul>
<b>Teaching Learning Resources</b>	<ul style="list-style-type: none"> <li>• Tools for drawing, poster paper, poster colour.</li> </ul>
<b>Required Text (core)</b>	<p><i>Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., &amp; 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.</i></p>
<b>Additional Reading List</b>	<p><i>Abbey, T. K., &amp; Essiah, J.W. (1995). Ghana Association of Science Teachers physics for senior high schools. Accra: Unimax Macmillan.</i></p> <p><i>Ameyibor, K., &amp; Wiredu, M. B. (2006). Ghana Association of Science Teachers chemistry for senior high schools. Accra: Unimax MacMillan.</i></p> <p><i>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</i></p> <p><i>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V., &amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.</i></p> <p><i>Zumdahl, S. S., &amp; Zumdahl, S. A. (2009). Chemistry. Belmont, CA: Cengage Learning.</i></p>
<b>CPD needs</b>	<p>See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.</p>

# LESSON 10

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	12 3 4 5 6 7 8 9 <b>10</b> 11 12
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<b>Title of Lesson</b>	<b>Building a Science Portfolio I</b>				<b>Lesson Duration</b>	<b>3 hours</b>	
<b>Lesson description</b>	In this lesson, the Tutor discusses with student teachers the importance of building a science portfolio and how to prepare a portfolio, drawing experiences from STS. This will enable student teachers to conceptualise portfolio as the compilation of academic work and other forms of educational evidence/ assemblage in science learning. This will facilitate the evaluation of the quality of science coursework, learning progress and academic achievement.						
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Student teachers have been introduced to portfolios in STS in previous lessons. They can write and analyse reports.						
<b>Possible barriers to learning in the lesson</b>	Some student teachers may lack the skill in writing report on case study.						
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b>	<b>Work-Based Learning</b>	<b>Seminars</b>	<b>Independent Study</b>	<b>E-learning opportunities</b>	<b>Practicum</b>
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<b>Face-to-face:</b> use discussion with student teachers to make presentations on how to write academic portfolio. Tutor and student teachers interact on how to write academic portfolio.						

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed.</b></li> </ul>	<ul style="list-style-type: none"> <li>• Acquire the skills to compile/documents on useful artefacts for teaching, academic work and professional practice.</li> <li>• Acquire skills to evaluate coursework, learning progress and academic achievement.</li> <li>• Helping students to reflect on their academic goals and progress as learners. (NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p.14), (NTS 3e, p. 14), (NTS 3p, p. 14), NTS 1a, p. 12)</li> </ul>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify which cross-cutting issues, core and transferable skills, inclusivity. Equity and addressing diversity.</b>
	Demonstrate basic ability to work as a professional science teacher in school and to identify their own professional needs in terms of science professional practice, knowledge, values and attitudes - through these experience student teachers will be working towards meeting the NTS. (NTS 1b p. 14 & 18, 14).	<ul style="list-style-type: none"> <li>• Provide a checklist to identify the values of patience, critical thinking, precision and accuracy in a peer review exercise.</li> <li>• Prepare a list of some examples of professional needs and some characteristics of professional teachers.</li> </ul>	Providing checklist of writing portfolio, sharing ideas in class, student teachers develop the skills of writing portfolio, communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in group work/discussion.



Topic:	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher led, collaborative group work or independent study.</b>				
Building Science Portfolios	The essence of a Portfolio as evidence of professional development	30 min	<b>Face-to face:</b> Introduce lesson (whole class discussion) by asking student teachers to give a brief description (revision from previous lesson) of the contribution of science and technology to industrialisation (reflection on Week 9).	<b>Face-to-face:</b> Reflect and discuss about the contribution of science and technology to industrialisation. They may raise questions on further misconceptions and language/ terminology difficulties and discuss them.
		60 min	<b>Face-to-face:</b> Lead whole class discussion with student teachers on professional portfolio in an inclusive, multi-age, and developmentally appropriate classroom.	<b>Face-to-face:</b> Discuss with tutor the essence of a professional portfolio while noting down the specifics for science learning.
		90 min	<b>Face-to-face/Group activity:</b> Allow student teachers to form groups of three members with mixed abilities, to discuss what goes into a science portfolio. (PD Theme 4, 35-46).	<b>Face-to-face/Group activity:</b> Discuss what goes into building a portfolio. For example: <ul style="list-style-type: none"> <li>• Writing and keeping examples of lesson plans or the materials that are used in teaching.</li> <li>• Students' feedback.</li> <li>• Feedback to students.</li> <li>• Writing and keeping copies of tests and exercises that are prepared for students.</li> <li>• Writing and keeping records of students that are mentored, supervised, or tutoring.</li> <li>• Keeping records on leadership experiences.</li> <li>• Keeping records of collaborative work done with others.</li> <li>• Preparing a checklist on critical values (Honesty, Patience, critical thinking, accuracy, precision) and how to identify them in students while they work in groups (PD Theme 4, p. 23-30).</li> </ul>

<b>Which cross-cutting issues will be addressed or developed and how</b>	<b>Equity and SEN:</b> through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. By practising how to build portfolios, student-teachers will develop skills in compiling, reviewing, and evaluating students' work over time will be addressed.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment of Learning: Class exercise of student teachers in groups of three members using checklist to write a professional portfolio.</li> <li>• NTS 1: Professional Values and attitudes.</li> <li>• 2: Professional Knowledge.</li> <li>• 3: Professional Practice.</li> </ul>
<b>Teaching Learning Resources</b>	<ul style="list-style-type: none"> <li>• Projector.</li> <li>• Pens.</li> <li>• Papers.</li> </ul>
<b>Required Text (core)</b>	<i>Students' Handbook for Internship; Handbook for PD Coordinators Themes 1- 10</i>
<b>CPD Requirement</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 11

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	12 3 4 5 6 7 8 9 10 <b>11</b> 12
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<b>Title of Lesson</b>	<b>Building a Science Portfolio II</b>						<b>Lesson Duration</b>	<b>3 hours</b>
<b>Lesson description</b>	In this lesson, student teachers are allowed to do PowerPoint presentations on ideas learned from the previous lesson on how to build science portfolio. This will enable student teachers to acquire the skill of building academic portfolio. It is hoped that student teachers will appreciate this lesson as it is one of the major requirements of their professional development.							
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Student teachers can write and analyse reports. They have been introduced to portfolios in their STS class and Lesson 10 of their science class.							
<b>Possible barriers to learning in the lesson</b>	Student teachers may lack the skill in writing reports.							
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b> √	<b>Work-Based Learning</b>	<b>Seminars</b>	<b>Independent Study</b>	<b>E-learning opportunities</b> √	<b>Practicum</b>	
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<p><b>Face-to-Face:</b> Use discussion with student teachers in making presentations on how to write/build academic portfolio. Tutor and student teachers interact on how to write/build academic portfolio.</p> <p><b>Independent Study:</b> practising and using classroom resource for writing portfolios on their own.</p> <p><b>E-learning opportunities:</b> learn and use examples from multimedia and internet sources.</p>							

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed.</b></li> </ul>	<p>Acquire the skills of building a portfolio.</p>
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<ul style="list-style-type: none"> <li>• <b>Learning Outcome for the lesson, picked and developed from the course specification</b></li> </ul>	<b>Learning Outcomes</b>	<b>Learning Indicators</b>	<b>Identify which cross-cutting issues, core and transferable skills, inclusivity. Equity and addressing diversity.</b>
<ul style="list-style-type: none"> <li>• <b>Learning indicators for each learning outcome</b></li> </ul>	<p>Demonstrate basic ability to work as a professional science teacher in school and to identify their own professional needs in terms of science professional practice, knowledge, values and attitudes. Through these experiences student teachers will be working towards meeting the NTS. (NTS 1b p. 14 &amp; 18, 14).</p>	<ul style="list-style-type: none"> <li>• Provide a checklist to identify the values of patience, critical thinking, precision and accuracy in a peer review exercise.</li> <li>• Prepare a checklist of some examples of professional needs and some characteristics of professional teachers.</li> </ul>	<ul style="list-style-type: none"> <li>• Providing checklist of writing Portfolio, sharing ideas in class, student teachers develop the skills of writing portfolio, communication, collaboration and mutual respect while appreciating individual difference and abilities, critical thinking and responsibility through careful participation in group work/discussion.</li> </ul>

Topic	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher led, collaborative group work or independent study.</b>				
Building Science Portfolios	Teaching a Portfolio	180 min	<b>Face-to-face/Practical Activity:</b> Allow student teachers in groups of three members of mixed abilities to present PowerPoint on building a portfolio and portfolio needs, drawing examples from the last lesson and observing for critical thinking from student teachers. (PD Theme 4, p. 23-30).	<b>E-learning:</b> Student teachers make PowerPoint presentations on building science portfolio, the other groups, listening should make a checklist for the presenters for review on portfolio needs and Professional values. (PD Theme 4, p. 35-46).

<b>Which cross-cutting issues will be addressed or developed and how</b>	Equity and SEN: through setting ground rules to protect vulnerable student teachers and establishing an interactive and inclusive classroom atmosphere. By practising how to build portfolios, student-teachers will develop skills in compiling, reviewing, and evaluating students' work over time.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Assessment of Learning: Observe student teachers show PowerPoint presentation on building portfolio (Assessment for learning).</li> <li>• NTS 1: Professional Values and Attitudes.</li> <li>• 2: Professional Knowledge.</li> <li>• 3: Professional Practice.</li> </ul>
<b>Teaching Learning Resources</b>	<ul style="list-style-type: none"> <li>• Projector.</li> <li>• Pens.</li> <li>• Papers.</li> </ul>
<b>Required Text (core)</b>	<i>Students' Handbook for Internship; Handbook for PD Coordinators Themes 1- 10.</i>
<b>CPD Requirement</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.

# LESSON 12

## DUPLICATE THE PLANNER FOR EACH LESSON

Plans for each lesson in the semester.

The following format should be completed for each lesson in the semester.

<b>Year of B.Ed.</b>	1	<b>Semester</b>	2	<b>Place of lesson in semester</b>	12 3 4 5 6 7 8 9 10 11 12
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<b>Title of Lesson</b>	<b>Course Review 2 (End of Semester)</b>						<b>Lesson Duration</b>	<b>3 hours</b>
<b>Lesson description</b>	The review will audit the lessons for the second part of the Semester (from lesson 8 to 10). It is also expected that student teachers will reflect during this lesson on their own progress in the course.							
<b>Previous student teacher knowledge, prior learning (assumed)</b>	Lessons learnt from lesson 7 through to lesson 11 in all learning approaches.							
<b>Possible barriers to learning in the lesson</b>	Misconceptions about some concepts not adequately dealt with. Lessons not appropriately understood by student teachers.							
<b>Lesson Delivery - chosen to support student teachers in achieving the outcomes</b>	<b>Face-to-face</b> √	<b>Practical Activity</b>	<b>Work-Based Learning</b>	<b>Seminars</b> √	<b>Independent Study</b> √	<b>E-learning opportunities</b> √	<b>Practicum</b>	
<b>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</b>	<p><b>Face-to-face:</b> use discussion and demonstration.</p> <p><b>Independent Study:</b> use reflections, modelling concept maps and cartoons.</p> <p><b>Seminar:</b> use presentations of models, cartoons and maps of the concepts.</p> <p><b>E-learning opportunities:</b> use computer simulations and OERs on content and teaching activities for contents.</p>							

<ul style="list-style-type: none"> <li>• <b>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</b></li> <li>• <b>Write in full aspects of the NTS addressed.</b></li> </ul>	<ul style="list-style-type: none"> <li>• Ascertain the level of understanding of concepts.</li> <li>• Test various skills and cross-cutting issues.</li> <li>• Provide remedial tuition/tutorials where necessary.</li> <li>• Correct misconceptions and misinformation.</li> <li>• Build the necessary support going forward on SEN and gender issues (NTS 1b, 2b, 3a, p. 13) (NTS 1d, p. 12, p. 14), (NTS 3e, p. 14), (NTS 3p, p. 14), NTS 1a, p. 12).</li> </ul>
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• Learning Outcome for the lesson, picked and developed from the course specification	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
• Learning indicators for each learning outcome	Identify weakness and strengths in learning the science lesson for the period under review.	Make a list of weaknesses and strengths on poster papers for sharing.	<b>Collaborations, Communication and Research:</b> Through group work and presentation.
	Be able to 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 reflective skills are developed from reflective activities.
	Correct misconception/misinformation for lessons (lesson 8– 10).	Present concept maps and/or models linking misconceptions/misinformation to new insights.	Creativity and critical thinking are developed in developing models and concept maps.

Topic:	Sub-Topic:	Stage/ time	Teacher Activity	Student Activity
<b>Teaching and learning to achieve learning outcomes: Depending on delivery mode selected; teacher led, collaborative group work or independent study.</b>				
Course Review 1	Reviewing the understanding of the lessons on Science and Technology I and II	30 min	<ul style="list-style-type: none"> <li>• <b>Face-to-face:</b> Brainstorming with student teachers to initiate a discussion on the weaknesses and strengths of student teachers in the lessons 2 – 5.</li> </ul>	<ul style="list-style-type: none"> <li>• Respond to questions on weaknesses and strengths and present a poster on weakness/ strengths identified.</li> </ul>
		90 min	<ul style="list-style-type: none"> <li>• 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.</li> <li>• The groups are provided with checklist on each topic so that they are able to list weakness and strengths.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and record all possible weaknesses and strengths in the lessons learnt so far.</li> <li>• Student teachers use checklist to develop a reflective report on weakness and strengths of the lessons learnt so far!!!</li> </ul>
	Remedies to course topics	60 min	<ul style="list-style-type: none"> <li>• Group student teachers according to remedy need and provide specific task assistance in the areas on concept needing remedy.</li> </ul>	<ul style="list-style-type: none"> <li>• Work in the special groups (Same remedy need group) on tasks to remedy their learning needs.</li> </ul>



<b>Which cross-cutting issues will be addressed or developed and how</b>	<b>Equity and SEN:</b> through mixed and same group work to protect vulnerable student teachers and establish an interactive and inclusive classroom atmosphere. Through modelling and group work, collaboration is established.
<b>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</b>	<ul style="list-style-type: none"> <li>• Student teachers’ presentations during group work and model work presentation helps to assess their learning (Presentations to last for 3-5mins for each group). working in groups score 10% of score for group presentation.</li> <li>• Assessment of learning: Student teachers working in groups on remedial tutoring helps in the assessment of learning.</li> <li>• Written assessment will be used as learning and will be marked over 20 marks.</li> <li>• NTS 1f: Developing positive teacher identity.</li> <li>• 2c: Secure content pedagogical, and pedagogical content knowledge.</li> <li>• 3: Professional practice.</li> </ul>
<b>Teaching Learning Resources</b>	<ul style="list-style-type: none"> <li>• Cardboard sheets.</li> <li>• Course manual.</li> <li>• Poster paper.</li> </ul>
<b>Required Text (core)</b>	<i>Abbey, T. K., Alhassan, M. B., Ameyibor, K., Essiah, J. W., Fometu, E., &amp; Wiredu, M.B. (2008). Ghana Association of Science Teachers integrated science for senior high schools. Accra: Unimax MacMillan. Ltd; Handbook for PD Coordinators Themes 1- 10.</i>
<b>Additional Reading List</b>	<p><i>Abbey, T. K., &amp;Essiah, J.W. (1995). Ghana Association of Science Teachers physics for senior high schools. Accra: Unimax Macmillan.</i></p> <p><i>Ameyibor, K., &amp; Wiredu, M. B. (2006). Ghana Association of Science Teachers chemistry for senior high schools. Accra: Unimax MacMillan.</i></p> <p><i>Asabere-Ameyaw, A., &amp; Oppong, E. K. (2013). Integrated science for the basic school teacher I. Winneba: IEDE.</i></p> <p><i>Oddoye, E. O. K., Taale, K. D., Ngman-Wara, E., Samlafo, V.&amp; Obeng-Ofori, D. (2011). SWL integrated science for senior high schools: Students book. Accra, Ghana; Sam-Woode Ltd.</i></p>
<b>CPD needs</b>	See PD Material on Year 1 Semester 2 Course on Introduction to Integrated Science II.



