

# Tutor Professional Development Handbook: B.Ed. in Initial Teacher Education - Science Year 2 Semester 1

HANDBOOK FOR COORDINATORS





The Government of Ghana



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# Foreword

I am grateful that you are reading and using this Professional Development Handbook for the Bachelor of Education (B.Ed.) in Initial Teacher Education Year 2 Semester 1 courses.

These Professional Development Handbooks are at the heart of Ghana’s ambitious teacher education reforms and have played a key role in the successes achieved to date. The Handbooks aim to ensure that tutors in Colleges of Education are reflecting critically on their methods of teaching and learning and supporting each other to implement the B.Ed. in line with the National Teacher Education Curriculum Framework and National Teacher Education Assessment Policy.

Tutors act as role models for student teachers. If tutors use the ‘lecture-method’ then this is what student teachers will imitate when they enter basic school classrooms. If tutors use a wide variety of interactive approaches, aligned with the National Teachers’ Standards, then these approaches will become standard behaviour for beginning teachers when they graduate.

This latest set of Professional Development Handbooks, developed by four mentoring universities (Kwame Nkrumah University of Science and Technology, University of Education, Winneba, University for Development Studies and University of Ghana) and tutors from their affiliated Colleges of Education, are the first set of Handbooks which include specific cross cutting sessions in Gender, Equality and Social Inclusion (GESI) and Information and Communications Technology (ICT).

The introduction of GESI in these Handbooks is an important step forward in ensuring that our teacher education system is responsive and genuinely promotes equality and inclusion whilst the inclusion of ICT represents Ghana’s aim of ensuring that all teachers and learners are digitally literate.

As with previous Handbooks I would like to take this opportunity to thank both the Ghana Tertiary Education Commission and Mastercard Foundation for their assistance and support in making this work possible.

Robin Todd  
Executive Director, T-TEL

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## Year Two Semester One

### Writing the weekly PD sessions: Guidance for the Subject Writing Leads (SWL).

- The PD sessions are an important way to ensure effective implementation of the key principles and practices of the B.Ed. *It is critical that what SWL write provides direct subject and B.Ed. specific guidance, so SL/HoD can support and scaffold tutors learning and professional development.*
- The sessions need to provide *the PD* opportunity for tutors fully understand what they need to teach and to planning together to make sure the new B.Ed. courses are taught well
- Developments since the manuals were written require SWL to add additional detail to sessions. Specifically, this means a focus on:
  - Integrating GESI to ensure the needs of females, males and students with special education needs are well catered for
  - Integrating ICT and 21c skills to ensure students learn to use technology effectively to support their own and pupils' learning
  - National Teacher Education Assessment Policy (NTEAP)
    - the three assessment components *for the semester* for **EACH** course: subject project (30%), subject portfolio (30%) and end of semester examination (40%). These need to be introduced in session 1. PD writers will need to provide an example portfolio and project assessment components if these are not written into the course manuals (See Appendix 2: Course Assessment Components at a Glance).
    - integrating the use of continuous assessment designed to support student teacher learning in each session
- The PD session template provides the frame for SWL to write the guidance for the Subject Leads (SL)/HoD on how to lead and support the professional development of tutors in the weekly sessions for student teachers
- Age level specialisms are introduced in Y2S1. To ensure appropriate subject and age level focus for the PD sessions:
  - there will be subject specialists writing for each subject
  - where subjects are grouped direct reference needs to be made to examples of activities in the course manuals for each subject
  - where there are different age levels direct reference needs to be made to the course manuals for activities for each age level
- STS is six days in year 2 Semester 1 and involves observation and working with small groups subjects should include STS activities
- SL/HoD need to have details of the resources needed for the activities

## GENDER, EQUALITY AND SOCIAL INCLUSION (GESI)

### Tutor PD Session for Lesson 001 in the Course Manual

<p><b>Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.</b></p>	<p><b>Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i></b></p>	<p><b>Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.</b></p>	<p><b>Time in session</b></p>
<p><b>1.0 Introduction to GESI</b></p>	<p>1.1 Task tutors to individually read the introduction (to GESI) and learning outcomes below and invite opinions from both male and female tutors and those with special needs where applicable.</p> <p><b>Introduction to GESI:</b>  <b>a. Purpose of GESI in the specialisms</b>            Communities all over the world consist of diverse individuals and social groupings that have different needs, strengths, opportunities, and concerns as a result of differences in culture, gender, abilities, economic and social status. As teacher educators, it is important to understand</p>	<p>1.1 Read and discuss the introduction to (to GESI) and the learning outcomes below and provide your opinion on same.</p> <p><b>Introduction to GESI:</b>  <b>a. Purpose of GESI in the specialisms</b>            Communities all over the world consist of diverse individuals and social groupings that have different needs, strengths, opportunities, and concerns as a result of differences in culture, gender, abilities, economic and social status. As teacher</p>	<p><b>20 mins</b></p>

	<p>the uniqueness of the diverse groups in the classroom and ensure that every individual is supported to attain quality education. Towards promoting equal opportunity for females and males as well as all other disadvantaged groups in the classroom, GESI in schools is being championed. Tutors need to have a clear understanding of GESI issues to be able to integrate these in the teaching and learning process and other aspects of college life and to encourage student teacher to do same during STS.</p> <p><b>b. Overview of GESI and related concepts</b></p> <p>This session seeks to expose tutors in all the specialisms (EG, UP and JHS) to the concept GESI and related issues such as Gender, Equality, Equity etc to enable them appreciate issues of stereotypes and work towards challenging traditional gender roles as well as dealing with their own unconscious biases so they can attend to the diverse needs of all learners in the classroom and in the College.</p>	<p>educator, it is important that you understand the uniqueness of the diverse groups in the classroom and ensure that every individual is supported to attain quality education. Towards promoting equal opportunity for females and males as well as all other disadvantaged groups in the classroom, GESI in schools is being championed. You need to have a clear understanding of GESI issues to be able to integrate these in the teaching and learning process and other aspects of college life and to encourage student teacher to do same during STS.</p> <p><b>b. Overview of GESI and related concepts</b></p> <p>This session seeks to expose you to the concept GESI and related issues such as Gender, Equality, Equity etc to enable you appreciate issues of stereotypes and work towards challenging traditional gender roles as well as dealing with your own unconscious biases so you can attend to the diverse needs of all learners in the classroom and in the College.</p>	
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	<p><b>c. Session learning outcomes</b></p> <p>By the end of this session, tutors will be able to</p> <ol style="list-style-type: none"> <li>i. demonstrate understanding of the concept GESI and related issues.</li> <li>ii. apply these concepts in their teaching and general practices.</li> <li>iii. support student teachers to understand GESI issues and how to apply them during STS.</li> </ol> <p>1.2 Task tutors to identify what the acronym GESI stands for and explain what it means.</p> <p><b>Gender, Equality and Social Inclusion</b> is a concept that addresses unequal power relations experienced by people on the grounds of gender, wealth, ability, location, ethnicity, language and agency or a combination of these dimensions.</p> <p>1.3 Using talk for learning strategies (concept cartoons, storytelling, role play discussion etc), ask tutors in their subject groups to explain any <u>two concepts</u> related to GESI. Allow tutors to use their phones/laptops to search for how each concept is related to education. <a href="http://www.google.com">www.google.com</a></p>	<p><b>c. Session learning outcomes</b></p> <p>By the end of this session, you will be able to</p> <ol style="list-style-type: none"> <li>i. demonstrate understanding of the concept GESI and related issues.</li> <li>ii. apply these concepts in your teaching and general practices.</li> <li>iii. support student teachers to understand GESI issues and how to apply them during STS.</li> </ol> <p>1.2 Identify what the acronym GESI stands for and explain what it means.</p> <p>1.3 In your subject groups, explain any <u>two concepts</u> related to GESI. (you may use your phones/laptops to search for how each concept is related to education from <a href="http://www.google.com">www.google.com</a>) Adapt differentiated approaches to explain concepts (sketches, role play, story etc).</p>	
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	<p>Allow tutors to explain concepts using differentiated approaches (sketches, role play, story etc).</p> <p>Employ a creative approach, such as quizzes to capture attention.</p> <p><b>Gender</b> is the relationship between men and women and the roles and responsibilities they have in the society. Example in Ghana it is socially accepted that cooking is the role of women and providing upkeeping money for the family is the role of men.</p> <p><b>Equality</b> is the similarity of treatment as it is legally and constitutionally given. Example is providing <b>all</b> children (irrespective of ability, gender, socio-economic background etc.) with opportunities to achieve quality learning outcomes.</p> <p><b>Equity</b> is the state of being fair or just in terms of provision of resources, support or opportunities base on individual learners need; the result is equality in achievement.</p> <p><b>Inclusion</b> is the process of valuing all individuals and leveraging their diverse talent, not in spite of their differences, but because of their differences. Example Ensuring that <b>all</b> students (boys, girls and SEN) are given equal opportunities</p>		
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	<p>to participate in the classroom.)</p> <p><b>Gender Equality</b> is a state where males and females have equal rights, life prospects and opportunities to shape their own lives and contribute to society.</p> <p><b>Social Inclusion</b> is the process of improving the terms of participation for people who are disadvantaged, through enhancing opportunities and access to resources.</p> <p>1.2 Ask tutors to reflect on their understanding of GESI and justify the need for GESI in education.</p> <p>For instance, the classroom and school environment have been skewed in ways that condone gender bias and promote exclusion.</p> <p><b>Example 1:</b> Male characters are often represented than females in TLMs and textbooks.</p> <p><b>Eg. 2</b> Persons with SEN are often disadvantaged during some classroom activities: the blind learner loses out when pictures are used. The Deaf lose out when only verbal language is used.</p> <p><b>Refer to Appendix 1.</b></p>	<p>1.2 Reflect on your understanding of GESI and justify its importance in education.</p>	
<p><b>2. Identification and discussion of new learning</b></p>	<p>2.1 Through questioning, ask tutors to identify and discuss how each new GESI concept they have acquired could be</p>	<p>2.1 identify and discuss how the new GESI concepts you have acquired could be useful in your teaching and general school life.</p>	<p><b>15 mins</b></p>

<p><b>Potential barriers to learning for student teachers</b></p>	<p>useful in their teaching and general school life.</p> <p><i>Eg. a) Inclusion: mix ability/gender grouping; involving all categories of learners in every activity.</i></p> <p><i>Eg. b) Equity: provide support and resources in line with the needs of each learner.</i></p> <p><b>N/B:</b> Encourage tutors to support student teachers identify how each concept could be used during STS.</p> <p>2.2 Using think-pair-share ask tutors to identify possible barriers to learning GESI for student teachers and how to address them.</p> <p>Examples may include: <b>Misconceptions:</b> <i>those certain roles are for specific gender; boys are brave and can dissect a rabbit and girls are good cooks than boys. This can be addressed by citing instances where girls demonstrate bravery and boys have been better cooks.</i></p> <p><b>Negative attitudes:</b> <i>the perception that persons with SEN are low achievers. Address this by giving examples of persons with SEN who have excelled in various aspects of life (Hellen Keller, Professor Danaah)</i></p>	<p>2.2 Reflect individually, share with a colleague and then the entire group possible barriers to learning GESI for student teachers and how to address them.</p> <p>Examples may include: <b>Misconceptions:</b> <i>those certain roles are for specific gender; boys are brave and can dissect a rabbit and girls are good cooks than boys. This can be addressed by citing instances where girls demonstrate bravery and boys have been better cooks.</i></p> <p><b>Negative attitudes:</b> <i>the perception that persons with SEN are low achievers. Address this by giving examples of persons with SEN who have excelled in various aspects of life (Hellen Keller, Professor Danaah)</i></p>	
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	(Tutors may share their experience of unfair treatment/unconscious biases that constitute barriers to GESI).	(Tutors may share their experience of unfair treatment/unconscious biases that constitute barriers to GESI).	
<b>3.0 Planning for teaching, learning and assessment activities for the lesson/s</b>	<p>3.1 Using talk for learning (small group discussion, plenary discussion) guide tutors to identify and discuss GESI responsive practices that support in creating GESI friendly school and classroom environments. (reference to college context)</p> <p><i>Eg. a) Involving men and women equally in decision making</i></p> <p><i>b) ensuring that all college facilities are accessible by everyone (abled bodied and persons with disability),</i></p> <p><i>c) Equitable allocation of resources among all college actors (males, females, minority groups) etc</i></p> <p>3.2 Ask tutors to brainstorm aspects of the basic school curriculum that need improvement in the area of GESI.</p> <p><i>E.g. a) Play activities: girls and boys could play soccer and ampe.</i></p> <p><i>Eg. b) decision making school prefects are mostly boys: girls and students with special education needs could equally be appointed school prefects.</i></p>	<p>3.1 Identify and discuss GESI responsive practices that support in creating GESI friendly school and classroom environments. (Reference to college context).</p> <p><i>Eg. a) Involving men and women equally in decision making</i></p> <p>3.2 Brainstorm aspects of the basic school curriculum that need improvement in the area of GESI.</p> <p><i>E.g. a) Play activities: girls and boys could play soccer and ampe.</i></p>	<b>30 mins</b>

<p>Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</p> <p>GESI responsive assessment</p> <p>Resources: links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</p>	<p>3.3 Task tutors to discuss in their subject groups and come out with strategies on how GESI, ICT, and 21<sup>st</sup> Century skills can be integrated in their specific subject areas.</p> <p>3.4 Lead tutors to identify and possible strategies to make subjects projects and subject portfolios GESI responsive.</p> <p><i>Eg. a) Equitable distribution of relevant resources for the subject projects</i></p> <p><i>Eg. b) Ensure projects content do not portray GESI biases and stereotypes. In grouping students for subject projects ensure mix ability/gender groupings</i></p> <p><b>Note</b> Remind tutors to consciously ensure GESI responsiveness in conducting continuous assessment in their various disciplines.</p> <p>Eg a) ensure that leadership roles are assigned equally among females, males and students with special education needs (SEN) when assessments (subject projects) are done in groups.</p> <p>Eg. b) Ensure equitable distribution of resources among males, female and (SEN).</p>	<p>3.3 Identify strategies on how GESI, ICT, and 21<sup>st</sup> Century skills can be integrated in their specific subject areas.</p> <p>3.4 identify and discuss possible strategies to make subjects projects and subject portfolios GESI responsive.</p> <p><i>Eg. a) Equitable distribution of relevant resources for the subject projects</i></p> <p><b>Note:</b> Make conscious efforts to ensure GESI responsiveness in conducting continuous assessment for student teachers (eg subject project)</p>	
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	3.5 Task tutors in their subject groups, to identify and discuss the links to existing GESI resources such as the Gender Handbook for CoEs	3.5 identify and discuss the links to existing GESI resources such as the Gender Handbook for CoEs  Read GESI resources for new ideas to improve your lesson preparation and classroom practice.	
<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>Tutors need to identify critical friends to observe lessons and report at next session.</li> <li>Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1 Invite critical friend (male/female) to observe a lesson using the observation checklist and give feedback on next PD session. <i>Example: equal involvement of both males, females and SEN learners.</i></p> <p>4.2 Write the concepts learned on pieces of paper and call tutors at random to pick one and explain to the whole group. Give further clarification where applicable.</p> <p><b>Advance Preparation for lessons</b></p> <p>4.3 Encourage tutors to read GESI related resources for new ideas to improve their lesson preparation and classroom practices.</p>	<p>4.2 Invite critical friend (male/female) to observe a lesson using the observation checklist and give feedback on next PD session. <i>Example: equal involvement of both males, females and SEN learners</i></p> <p>4.2 Pick and explain GESI concepts learnt giving examples in classroom and out of class situations.</p> <p><b>Advance Preparation for lessons</b></p> <p>4.3 Read GESI related resources for new ideas to improve their lesson preparation and classroom practices.</p>	<b>15 mins</b>

## **GESI Appendix 1 – UNDERSTANDING GENDER - TERMS AND CONCEPTS**

**Sex** is aspect of one's biological makeup that depends on whether one is born with distinct male or female genitals and a genetic programme that releases either male or female hormones to stimulate the development of one's reproductive system. Sex is biologically defined. It is determined by birth. It is universal and unchanging.

**Gender** is simply the relationship between men and women and the roles and responsibilities they have in the society in which they live. It refers to the socially constructed differentiated roles assigned to both sexes, whereby both men and women are expected to conform to and perpetuate the roles and behaviors that have been assigned to them. Gender is socially constructed and differs between and within cultures. It is about the differences in roles, responsibilities, opportunities, needs and constraints of men and women.

### **Some Distinctive Features of Gender:**

- Deals with the relationship between men and women
- Deals with the roles and responsibilities men and women are assigned by their society
- Both men and women are expected to conform to and perpetuate the roles and behaviors that have been assigned them
- It involves the ranking of traits and activities so that those associated with men are normally given greater value
- It is historical
- It is learned, and therefore can be unlearned
- It takes place within different macro and micro spheres such as the state, the labour market, schools, the media, the law, the family, household and interpersonal relations
- It interacts with race/ethnicity, age, disability, status, economic factors, etc. Meaning these factors may present different gender dynamics and expectations.

**Gender Roles** define what is considered appropriate for men and women within a given society. It also means socially assigned roles of men and women and informs the division of labour. It involves the relation to power (how it is used, by whom and how it is shared). It varies greatly from one culture to another and change over time. Gender roles may vary from one social group to another within the same culture.

**Gender Relation** refers to how men and women relate to each other, resulting in manifestations of gender based power. This arises from the roles men and women are expected to play and the impact of their interactions. The family is a good example, as men assume the earner and leader roles, women assume the domestic and care giving roles. These power relations are uneven because the male has more power in making decisions than females. If we do not conform to roles prescribed to us by society, we are seen to be deviant by society. Power relations always result in one party being worse off than the other

and create social imbalances. This means inequality between men and women that is acquired in the process of socialisation.

**Gender Responsiveness** refers to outcomes that reflect an understanding of gender roles and inequalities and which make an effort to encourage equal participation and equal and fair distribution of benefits.

Gender responsiveness is accomplished through gender analysis and gender inclusiveness. It means creating an environment that reflects an understanding of the realities of women and men's lives and address the issues accordingly. Being gender responsive means having the capacity to analyse a specific context from a gender perspective, to develop gender sensitive course outline, lesson notes, teaching learning materials and to allocate budgets in a gender-responsive way.

**Gender Stereotyping** refers to the practice of ascribing to an individual woman or man specific attributes, characteristics, or roles by reason only of her or his membership in the social group of women or men.

**Gender Stereotype** simply means the constant portrayal, such as in the media, conversation, jokes or books, of women and men occupying social roles according to a traditional gender role or division of labour. Gender stereotyping is wrongful when it results in a violation or violations of human rights and fundamental freedoms.

**Equality** refers to the equal rights, responsibilities and opportunities of men, women and persons with special education needs and disabilities. It pertains to equal distribution of resources and benefits and participation of women and men in all areas of society. It also means giving equal weight to the knowledge, experience and values of both women and men in society. Equality between men and women is a human rights issue and a pre-condition for sustainable development. It is based on the principle that, though men and women are not the same biologically, they are equal as human beings.

**Equity** is based on principle of fair share. It is a stage in the process of achieving equality. Equity refers to a fair sharing of resources, opportunities and benefits according to a given framework. It is one of the measures of equality, but not the only one. Equity is measurable and manifested in parity. Experience illustrates that equity is used instead of equality within institutions.

**Equality vs Equity.** Equality refers to similarity of treatment as it is legally, constitutionally and divinely given. It is a fundamental right. And it is often the goal. Equity is often viewed as a favour, whereas equality is a fundamental right.

**Empowerment** is a process through which women, men and persons with disability in disadvantaged positions increase their access to knowledge, resources, and decision-making power, and raise their awareness of participation in their communities, in order to reach a level of control over their own environment.

**Gender Mainstreaming** is the concept of bringing gender issues into the mainstream of society. It was established as a global strategy for promoting gender equality in the Platform

for Action adopted at the United Nations Fourth World Conference on Women held in Beijing in 1995. The conference highlighted the necessity to ensure that gender equality is a primary goal in all areas of societal development. In July 1997, the United Nations Economic and Social Council (ECOSOC) defined the concept of gender mainstreaming as follows: "Mainstreaming a gender perspective is the process of assessing the implications for women and men and persons with special education needs and disability of any planned action, including legislation, policies or programmes, in any area and at all levels. It is a strategy for making the concerns and experiences of women as well as of men an integral part of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres, so that women and men benefit equally, and inequality is not perpetuated. The ultimate goal of mainstreaming is to achieve gender equality".

**Mainstreaming** in education involves placing learners with special education needs and disability in a general education classroom with a special education teacher as a co-teacher giving them the same opportunities as other learners to access instruction, gain knowledge, and to participate in the academic and socializing environments that a school offer.

**Inclusion** is the process of valuing all individuals and leveraging their diverse talent, not despite their differences, but because of their differences. Inclusion requires a conscious effort to involve all human resources in the fabric and mission of the institution or school as a critical value addition.

**Disempowerment** is any action, policy development and/or relief program or process through which women's, men's and persons with disabilities priorities, needs and interests are further ignored, reducing their participation in decision- making and representing an obstacle to their economic, political and social improvement, or to their academic progress and growth attainment.

**Patriarchy** is an ideology and social system that propagates male supremacy or male power and superiority over women as natural. The operating premise is that men are biologically, intellectually and emotionally superior to women. Conversely, women are considered to be weak and dependent on men for protection, guidance, upkeep and general survival. The ideology is institutionalised through active formal and informal systems, backed up by ideas, beliefs, religion, practices and culture – and sometimes by force. A patriarchal ideology is the key factor in the structural gender inequality in most of our societies.

**Gender Neutrality** is the claim some people make when they want to present themselves as not practising gender-based discrimination. What it often masks, however, is the failure to take gender issues into consideration, and this can translate into discrimination against girls as it fails to pay attention to the distinct and special needs of girls and boys.

**Gender blindness** is the failure to recognise the differences between males and females and therefore leading to failure to provide for the differences.

**Other concepts/ terminologies:**

**Marginalisation** - exclusion in processes such as decision-making. This results in women's inability to articulate their needs and interests.

**Discrimination** - differential treatment based on factors over which an individual has no control, e.g. sex, disability, socio-economic status, tribe, nationality, race, etc.

**Objectification** - assignment of less than human status and treatment to women.  
**Infantilisation** - categorising women with children, i.e. having no legal decision making powers, voting rights or capacity to enter into contracts.

**Dispossession** - through patriarchal systems of property inheritance, where in some cultures women are not allowed to inherit wealth.

**Segregation** occurs when students with disabilities are educated in separate environments (classes or schools) designed for students with impairments or with a particular impairment.

**Exclusion** occurs when an individual or group is denied the right to access (facilities, education) or participate in educational or social activity on the bases of ability, gender, health or social status.

**Value Assignment** - determining a woman's value by the sex and number of children she bears.

**Violence** - physical, mental and emotional abuse, which is culturally accepted as correcting a wife or harmful practices such as female genital mutilation to subdue female sexual urge

**Poor** refers to households or persons who consume an average of less than 2,220 calories of food per person per day. (according to Nepal Living Standard Survey, 2010/11)

**Vulnerable Groups** refer to groups that experience a higher risk of poverty and social exclusion than the general population. Ethnic minorities, migrants, person with disabilities, the homeless, those struggling with substance abuse, isolated elderly people and children all often face difficulties that can lead to further social exclusion, such as low levels of education and unemployment or underemployment.

**Gender Impact Analysis/Assessment** examines policies and practices to ensure they have beneficial effects on women and men. It identifies the existence and extent of differences between women and men and the implications of these differences for specific policy areas.

**Social Exclusion** describes the experience of groups that are systematically and historically disadvantaged because of discrimination based on gender, ethnicity or religion.

**Gender Responsive Budget** refers to government planning, programming and budgeting that contributes to the advancement of gender equality and the fulfillment of women's rights. It entails identifying and reflecting interventions to address gender gaps in sector and local government policies, plans and budgets.

**Disaggregated Data** refers to distinguishing men and women, ethnic minorities, people with disability, people with HIV and other excluded people in the data to reveal quantitative differences between them.

### **Why the need for GESI in education?**

The need to deliberately address gender and inclusion in the classroom arises because, over time, the classroom and school environment have been skewed in ways that condone gender bias and promote exclusion. Below are examples of practices in the classroom that reinforce traditional gender roles and stereotypes:

- a. Male characters are often represented than females in TLMs
- b. Textbooks have more males than females in illustrations
- c. Illustrations in TLMs often portray gender stereotypes (male CEO and decision makers, females in domestic roles etc.)
- d. Persons with disability are underrepresented
- e. When persons with disability are featured, they are portrayed with negative stereotypes
- f. (Cursed, beggars or burden on society)
- g. Use of male pronouns to represent everyone (ignoring the existence of females)
- h. Persons with disability are identified by their disability. Often their disability is put before them – for example, deaf man, "handicapped" child, blind girl etc

### **Some misconceptions of GESI in Schools and out of Schools and how to address them**

- a. GESI seeks to favour women
- b. GESI affects the learning outcomes of the “normal” learner
- c. Society thinks education is for men
- d. Concerns only persons with disabilities
- e. Quality inclusion is expensive
- f. Only schools are responsible for the implementation of GESI
- g. Persons with disability cannot cope in mainstream school.
- h. Disability is contagious

### **Ways the misconceptions can be addressed**

These can be addressed through:

- Behavior change communication approaches
- Continued sensitization and advocacy of GESI
- Mainstreaming GESI responsiveness in school and community practices and activities

### **Barriers that hinder GESI and how to address them in and out of schools**

- a. Infrastructural barriers such as inaccessible school facilities
- b. Curriculum barriers such as deficient resources and learning materials for learners
- c. attitudinal barriers such as insensitivity and discrimination by teachers, parents, peers and the society at large
- d. Pedagogical barriers such as teachers not having necessary knowledge and skills on GESI responsive pedagogy.
- e. Public misconception of what GESI seeks to achieve
- f. Large class size especially in the basic schools

- g. Unavailability of relevant teaching and learning resources
- h. Lack of expert support for the regular class teacher

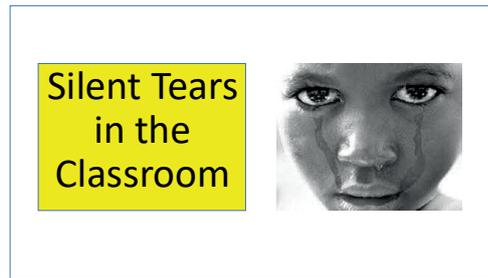
**Ways the barriers can be addressed**

These can be addressed through:

- GESI responsive infrastructure
- GESI responsive teacher education curriculum (include basic braille and sign language)
- Continuous advocacy
- Training teachers on GESI responsive pedagogies
- Train and deploy more special education teachers to the regular schools
- Provide relevant TLR for use in schools

## Appendix 2 – GESI Observation Tool

### A. Silent Tears



- Tears always fill me, but I can't pour them because no one understands me
- My parents can't even understand me because my teachers make them believe I am good for nothing
- I thought my parents will tell them that I repair all the electrical appliances in the house without any training
- Who will hear me now because myself and many who are like me are being destroyed?
- Who will help tell them that even though we might not be able to get the certificate we have great talents?
- Who will help tell teachers that they should not force their dreams on us but guide us nurture our God given talents?
- Who will hear our cry? I am one of the voices of the many silent voices in the class
- I wish I can be bold to tell my teachers that I must be understood and not compared
- My maths teachers say I'm good for nothing because I'm not good in calculations
- My science teachers say am useless because I can't express myself fluently in the white man's language
- They seem to have forgotten that I'm the one who led the school soccer team to win that trophy
- I am the same person who plays the drums to the admiration of all
- Sometimes when I ask why they consider what I do as important, they tell me WAEC doesn't ask those in examinations
- My teachers always say I don't do well even though they teach me well but how can I tell them that the teaching method doesn't favour me even though it favours the majority
- How can I tell my teacher that I just need motivation not condemnation?

### B. Integrating GESI in Teaching and Learning

**Introduction:** The need to deliberately address gender and inclusion in the classroom arises because, overtime, the classroom and school environment have been made to overlook gender biases and continue to promote exclusion. GESI responsive pedagogy involve teaching and learning processes that pay attention to the specific learning needs of girls, boys and members of marginalised groups.

#### **Overview of GESI Responsive Pedagogy:**

Classroom practices often reinforce traditional gender roles, gender and inclusion stereotypes that may disadvantage some learners resulting in poor quality learning outcomes. There is therefore the need to challenge these practices to ensure equal learning

outcomes of all learners. This requires teachers to be GESI responsive in lesson planning, selection and use of teaching and learning materials, methodologies, learning activities, classroom setup and interaction, management of gender stereotypes in the classroom and feedback and assessment.

### **Components of a GESI Responsive Lesson**

#### **1. GESI Responsive Lesson Planning**

- Lesson planning involves a wide range of decisions:
- Content
- Choice of learning materials to use
- Methodologies
- Learning activities
- Language use
- Classroom setup
- Classroom interaction
- Assessment of the learning/ learner
- Fair knowledge of the background of learners to inform all the above
- For a lesson plan to take into account gender and inclusion considerations, the lesson planning process should involve the following:

#### **2. Choice of Learning Materials**

- Review the TLMs and identify if the material contains stereotypes?
- If so, what strategies can be used to address such stereotypes?
- If faced with a history textbook that portrays only heroes, it will be vital to draw up a list of "sheroes" (female heroes).
- If a chemistry textbook portrays only male scientists as inventors or abled bodied scientists, include discussing female scientists and scientists with disability.
- Carefully review the language used in the TLMs for gender responsiveness and inclusion.

#### **3. Teaching Methodologies**

- Select teaching methodologies that will ensure equal participation of girls, boys and students with special needs.
- Ensure that dominant individuals do not sideline less assertive ones. – Employ differentiated teaching approaches suitable for all learners.
- Protect students with disability from abuse or bully by other students.

#### **4. Learning Activities**

The lesson plan should make allowance for all students to participate in the learning activity.

- When doing science experiments, ensure that girls, boys and students with disability have a chance to use the equipment and chemicals.
- There should also be equal participation in such activities as making presentations.
- When assigning projects, ensure that both females and males are given leadership positions and roles.
- Take into account how the learning materials will be distributed equally to both girls and boys, especially in case of shortage or limited supply.

## 5. Classroom Setup and Interaction

**The lesson plan should consider the classroom setup.**

- Consider how to arrange the classroom and interact with the students to promote equal participation of all students.
- Plan in advance to ask substantive questions to all students.
- Where do you stand or sit during the lesson? Ensure that your position or posture does not exclude or intimidate students.

**Management of other gender and inclusive constraints to learning inside the classroom**

- In the planning process, make provision for time to deal with gender-specific problems, if any, such as girls who have missed class due to menstruation, household chores or family responsibilities. Or support to students with learning disabilities.
- Watch for indications of bullying, sexual harassment, adolescent hormonal upheavals, the impact of HIV/ AIDS, Pregnancy, Peer pressure, among others.

### **Feedback and Assessment**

Make time for adequate feedback from girls, boys and students with special needs to ensure that lesson is well understood. Ensure that assessment methods do not disadvantage any marginalised group or individual in the class.

### **GESI Responsive Teaching & Learning Resources (TLRs)**

TLRs are fundamental to the pedagogical process and are critical for shaping young minds. However, TLRs and textbooks often communicate traditional and limited gender roles. They also reinforce stereotypes about disabilities. Usually, the message in some materials is that women and girls are weak and passive and that persons with disabilities are a burden or are cursed. Consequently, male and female students continue to follow the status quo and reinforce negative stereotypes about women. In effect, men are challenged to take up leadership roles, whereas women continue to occupy the backbench. To ensure equality and inclusion, TLRs and other learning resources must empower both female and male students and students with disabilities.

Choose materials that depict persons of minority groups in a positive light. For example, a child with a physical disability playing with other children; an albino student in class with other children, a female statistician etc

GESI Responsive TLRs:

### **GESI Responsive Language Use in the Classroom**

**Language** is a tool of communication. Inappropriate language use can transmit negative messages and inhibit learning. A boy or girl whose teacher constantly tells them "you are stupid" may believe this to be true. A teacher's constant use of harsh, abusive and threatening language may instil fear in the students. Language can also reinforce gender differences and inequalities

- Gender biases are expressed through language that reveals the belief that girls cannot perform as well as boys or that boys should not allow themselves to be outperformed by girls academically – or in any other way.
- Teachers sometimes discourage girls from taking science-based subjects or courses by telling them that such subjects are for boys or are too difficult for girls.
- When a girl is assertive, she is told to stop behaving like a boy, and when a boy cries, he is cautioned to stop acting like a girl.

- Spoken language is only part of the equation. Much offensive communication is not verbal. – An indifferent shrug of the shoulders or rolling of the eyes suggests that the student is too foolish or bothersome to warrant attention.
- Other gestures and body language, such as winking, touching, brushing, grabbing, and other moves, may be overtly sexual.
- It is also difficult for the victim to take steps to stop the abuse because there is often no tangible evidence. Most sexual harassment occurs and escalates in this way.

### **GESI Responsive Classroom Setup**

How the classroom is arranged can contribute positively or negatively to teaching and learning processes. This includes the layout of the furniture in the classroom or laboratory, the quality of chairs and desks, and the overall physical infrastructure of the school. The height of shelves in the classroom can contribute to an interactive classroom setup or exclude student of a certain height.

To ensure GESI responsiveness in the way a classroom is set up, the following needs to be considered:

- A classroom setup that mixes girls and boys and also considers disabilities – Classroom setup that enhances the participation of all students
- Arrangement of the desks that allow students with disabilities to be comfortable – Appropriate shelf heights in the libraries and laboratories.
- Stools in laboratories that are appropriate in size and shape thus enabling effective participation of both girls and boys.
- Fixtures and visual aids on the walls that send gender-responsive messages
- Appropriate size, shape and weight of desks and chairs.

**GESI Responsive Classroom Interaction:** Students are boys and girls with gender-specific needs. Especially as they mature, their gender roles can have an increasing impact on classroom interactions. An existing disability introduces different classroom dynamics. Sexual experimentation, sexual harassment, male domination, female passivity, and bullying come into play in the classroom. The following are essential steps towards building good classroom rapport:

Look for characteristics such as shyness, arrogance, distraction and low confidence.

- Take into account that some students are slow learners, some are gifted, and most are better in some areas than others.
- It is important to go beyond academic ability. Bear in mind that some learners come from disadvantaged situations.
- Orphans, displaced, the very poor or may have hidden disabilities
- Watch out for the gender-specific needs of students: girls who are having problems because they are going through their menstrual cycle.

## Appendix 3 – GESI Observation Tool

Name of Tutor		Sex				
Course Title		Level				
Subject/Topic						
Gender and Inclusion Responsive competency	Some Strategies and Actions to observe:	Not achieved	Partially achieved	Half achieved	Fully achieved	
		0	1	2	3	
<b>1. The Tutor uses Gender and Inclusion responsive pedagogy in class</b>  (aim for a score of 19-21)	<b>The Tutor:</b> 1) gives equal chance to females and males to ask and answer questions in class (and provides extra encouragement to girls who may lack confidence)					
	2) uses participatory methods such as group work, debates and role play; and ensures equal participation of females & males (giving extra encouragement where needed)					
	3) pays attention to the composition of females and males during group work and assigns females leadership roles					
	4) ensures that females have equal access to teaching and learning resources (TLMs, books, desks, etc.), particularly if males are more assertive and take resources first					
	5) is patient with females and males who may be shy or afraid to speak					
	6) checks to see if both females and males understand the lesson					
	7) provides constructive/positive verbal feedback to both females and males in class					
	<b>Total score</b>					
<b>2. The Tutor uses Gender and Inclusion responsive language and interaction</b>	<b>The Tutor:</b> 1) does not use negative expressions or language that demeans, excludes, or gives females the impression that are not as intelligent or do not need to perform as well as males					
	2) does not use harsh/threatening language or actions that instil fear in both females and males					

(aim for a score of 19-21)	3) does not say things that reinforce false assumptions about females and males (e.g., girls are bad at maths/science, girls are always shy, boys are the first to answer)				
	4) does not use body language that excludes girls or shows preferential treatment to boys (such as speaking mostly to boys or turning your back to girls)				
	5) sets ground rules that prohibit teasing or bullying, particularly from males towards females				
	6) builds students' (especially females') skills for self-confidence, speaking out and leadership				
	7) knows the difference between 'being friendly' with girls and being flirtatious. Jokes and conversations <u>should not</u> have sexual undertones, and Tutors should not use terms like 'girlfriend' or 'sweetie'.				
<b>Total score</b>					
<b>3. The Tutor uses Gender and Inclusion responsive TLMs</b>  (aim for a score of 10-12)	<b>The Tutor:</b> 1) reviews all textbooks, pictures, posters, and materials before using them to see if they reinforce traditional Gender and Inclusion roles (e.g., women cooking/cleaning, men in professional roles)				
	2) identifies traditional Gender and Inclusion roles that appear in books/materials and makes a point to alert students to these portrayals when using the materials in class				
	3) discusses with students how portrayals of traditional Gender and Inclusion roles limit what female students think they can do and achieve				
	4) ensures that books, materials, or equipment are equally distributed amongst females/males				
<b>Total score</b>					
<b>4. The Tutor challenges</b>	<b>The Tutor:</b> 1) empowers males to be critical of and challenge traditional views of masculinity				

<b>traditional Gender and Inclusion roles</b>  (aim for a score of 10-12)	(e.g. men should be 'powerful', should not be 'weak', should never cook/clean)				
	2) empowers females to be critical of and challenge traditional views of femininity (e.g., women should be dependent on men, should only be mothers/carers, should not be assertive)				
	3) actively uses examples (e.g., exercises, activities, role play, pictures) that <i>challenge or reverse</i> traditional Gender and Inclusion roles (such as having men cook)				
	4) supports and encourages females to achieve in maths and science and aspire to professions traditionally taken by men (such as engineering, police, medicine)				
<b>Total score</b>					
<b>5. The Tutor uses Gender and Inclusion responsive planning</b>  (aim for a score of 15-18)	<b>The Tutor:</b> 1) plans classroom seating so that males and females are mixed, and so that pupils who need more support sit at the front				
	2) reviews student attendance every 2-3 months (particularly for females) - if there are problems with attendance, the Tutor should follow up with the head Tutor and parents				
	3) reviews student assessments every 2-3 months - if there are large gaps between females and males, the Tutor should develop strategies to close the gaps				
	4) plans to use teaching strategies that ensure equal participation of both females and males				
	5) reviews TLMs for traditional Gender and Inclusion roles and ensures that materials are distributed and used equally between female and males				
	6) plans to use exercises/activities that do not reinforce traditional Gender and Inclusion roles and in some cases, actively <i>challenges or reverses</i> traditional Gender and Inclusion roles				
<b>Total score</b>					
<b>Overall score</b>					

<b>Class size</b>	
<b>Number of Females</b>	
<b>Number of Males</b>	

**Name of Peer Tutor (Observer)**

.....

**Signature**

.....

**Thank you for completing this observation tool.**

# ICT AS CROSS-CUTTING TOOL FOR TEACHING AND LEARNING

## Purpose

### This manual is prepared to

1. help tutors plan and teach learner-centred lessons using ICT
2. provide tutors access to and use of ICT tools for assessment *of, for* and *as* learning
3. introduce tutors to the use ICT for the development of 21<sup>st</sup> century skills
4. guide tutor in their use of ICT software and hardware for teaching and learning.

## Preamble

Teachers in the 21st century are facing new challenges because of the expanding possibilities of ICT integration in every aspect of the school curriculum. Research works have shown the potential of Tutor Professional Development (TPD) that is tailored to local conditions as well as global components and takes advantage of mutual support among tutors, as well as modelling of effective practices.

Welliver's Instructional Transformation Model sets goals and expectations for all teachers at whatever stage they are starting at. The five hierarchical stages start with familiarization, then utilization, integration, reorientation, and finally revolution.

1. **Familiarization:** is when teachers become aware of technology and its potential uses.
2. **Utilization:** teachers use technology, but minor problems will cause them to discontinue its use.
3. **Integration:** technology becomes essential for the educational process and teachers are constantly thinking of new ways to use technology in their classrooms
4. **Reorientation:** teachers begin to rethink the educational goals of the classroom with the use of technology.
5. **Revolution:** is the evolving classroom that becomes completely integrated with technology in all subject areas. Technology becomes an invisible tool that is seamlessly woven into the teaching and learning process.

ICTs have the capabilities to bring several benefits to teachers and students such as shared learning resources, shared learning spaces and promotion of cooperative and collaborative learning they also provide a base for autonomous learning. ICTs have enabled us to communicate one to one, one to many and many to many through communication channels and networking. They provide a means to organize institutions differently and lead to new ways of working together with virtualization. With implementation and integration of ICTs in teacher education, the society has been transformed into a knowledge society. During the International Conference on ICT and Post-2015 Education, the 2015 Qingdao Declaration stated the importance of the professional development of teachers to effectively integrate ICT into their work.

*Successful integration of ICT into teaching and learning requires rethinking the role of teachers and reforming their preparation and professional development. It calls for promoting a culture of quality in all its aspects: staff support, student support, curricula design, course design, course delivery, strategic planning, and development. We will therefore ensure that teacher-training institutions are equipped and prepared to use ICT adequately to expand the benefits of*

*training and professional development programmes to all teachers, and to act as the vanguard for technology-supported innovations in education. We also commit to providing teachers with system-wide support for the pedagogical use of ICT, to incentivize teacher innovation, and to develop networks and platforms that allow teachers to share experiences and approaches that may be of use to peers and other stakeholders. (UNESCO, 2015)*

Mishra and Koehler (2006) expressed the fact that technology has changed the way we teach (pedagogy), what we teach (content), and the context in which teaching/learning happens. Thus, to say that technology gives us new opportunities to connect with the content and use new pedagogical strategies to pass the content to our students.

In the field of teacher education ICT-based applications and their integration with content, method and pedagogy are potential catalysts for meaningful learning of students.

Professionals associated with teacher education institutions should equip them to design their educational system and prepare teachers for the future of the society (Singh, 2014).

With implementation of ICTs and its effective integration with teaching and learning process, the approaches to learning and teaching has changed to reflect global competencies of the 21<sup>st</sup> century teacher. The basic approaches are as follows:

- Learner Centric: Explore the best in every student.
- Learning Centric: Learner learn by designing and preparing meaningful learning experience with the help of a teacher.
- Promoting Inquisitiveness: Develop questioning ability in learner. Teacher encourages learner to ask questions. It leads to critical thinking.
- Innovation Centric: Teacher promotes innovation, creativity, and team spirit in learner.
- Develop cooperative and collaborative learning environment: Learning occurs through discussion, interaction and debate called learning for development.

Teacher is expected to perform the role of a facilitator and moderator with different responsibilities in different situations in a technology-mediated learning environment, called networked society. There is the need for specialized training and orientation of teachers to enable the teacher to develop the classroom, school and society with new skills and competencies. For this reason, the expectation of the National Teacher Curriculum Framework (NTECF) is that student teachers should be equipped a set of competencies and skills so that they can in turn inculcate in their learners the competencies and skills. The set of skills and competencies provided by the NTECF, subsequently captured by the Pre-Tertiary Education Curriculum Framework are:

- critical thinking and problem-solving skills,
- creative and innovative skills,
- life-long learning/personal Life skills,
- collaborative/social skills,
- communication skills,
- literacy and numeracy skills,
- leadership skills,
- entrepreneurial skills,
- digital literacy/information, communication & technology (ICT) skills and,
- civic literacy.

ICT can be used to leverage the development of these skills and competencies if teachers are intentional about the ICTs use for skills and competencies development.

Learning Outcomes	Indicators
1. Demonstrate knowledge and understanding of the basic ICT tools and their impact on 21 <sup>st</sup> century skills	1.1 Mention and describe some basic ICT tools and how to use them, including: Computers, and other hardware, software. 1.2 21 <sup>st</sup> century skills and ICT tools that can be used to integrate them in lessons. 1.3 Analyse and evaluate the changes brought about by the introduction of ICT.
2. Demonstrate use of basic ICT tools for planning lessons	2.1 Perform basic lesson planning tasks using an ICT tool, e.g., using Google calendar. 2.2 Create, edit, format, save and print documents using various productivity tools. 2.3 Use the internet to search for information
3. Demonstrate use of basic ICT tools for teaching, learning and assessment	3.1 Perform basic teaching tasks using an ICT tool, e.g., using PowerPoint, Google classroom, zoom, Google meet. 3.2 Perform basic lesson assessment tasks using an ICT tool, e.g., using Google forms. 3.3 Use the internet to search for activities for teaching, learning and assessment
4. Demonstrate use of basic ICT tools for research	4.1 Perform basic research tasks using an ICT tool, e.g., using survey monkey, Google forms. 4.2 Use the internet for literature search including theoretical and conceptual frameworks

## ICT TOOLS

ICT tools – both software and hardware – can be used for planning, teaching, learning, assessment, data management and for research, with some of them able to perform multiple functions. Some of these tools are stated below with a brief note on their usage.

### ICT TOOLS FOR PLANNING LESSONS

**AnswerGarden** is a tool for online brainstorming and collaboration.

**BrainPOP** Lets you use pre-recorded videos on countless topics to shape your lesson plan, then use quizzes to see what stuck.

**Buncee** Helps students and teachers visualize, communicate, and engage with classroom concepts.

**Class Dojo**: This is a fun tool to gamify the classroom. Students make their own avatars, gain and lose points based on classroom behavior, discussion approaches, and other soft skills agreed upon by the teacher and the class. Teachers can also use Class Dojo to take attendance and create graphs that breakdown the information for teachers. Not only will this tool encourage students to uphold class values, but it will also provide key metrics to help teachers adjust their teaching tactics accordingly.

**Coggle** A mind-mapping tool designed to help you understand student thinking.

**Conceptboard** is a software that facilitates team collaboration in a visual format, similar to mind mapping but using visual and text inputs.

**Dotstorming** A whiteboard app that allows digital sticky notes to be posted and voted on. This tool is best for generating class discussion and brainstorming on different topics and questions.

**Flipgrid:** Flipgrid is the video discussion tool from Microsoft that opens-up the classroom. It is designed to allow students to speak to the group but without the same fear that might constrict responses in a real-world situation. Students can re-record responses, removing the pressure of answering in class, on the spot. Of course, it's also a great tool for use when learning remotely.

**Google Calendar:** With Google Calendar, you can quickly schedule meetings and events and get reminders about upcoming activities, so you always know what's next. Calendar is designed for teams, so it's easy to share your schedule with others — students and colleagues for example — and create multiple calendars that you and your team can use together.

**Google Classroom:** Google Classroom is a free web service, developed by Google for schools, that aims to simplify creating, distributing, and grading assignments in a paperless way. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students. Google Classroom combines *Google Drive* for assignment creation, storage and distribution, Google Docs (equivalent of Microsoft Word), Sheets (equivalent of Microsoft Excel) and Slides (equivalent of Microsoft PowerPoint) for writing/word processing, calculation and graphing, and presentation respectively Gmail for communication, and Google Calendar for scheduling.

**Google Meet:** Google Meet is a google enterprise-grade video conferencing app. Now, anyone with a Google Account can create an online meeting with up to 100 participants and meet for up to 60 minutes per meeting.

**PowerPoint Presentation:** PowerPoint is a presentation programme developed by Microsoft. PowerPoint is often used to create business presentations but can also be used for educational or informal purposes. The presentations are comprised of slides, which may contain text, images, and other media, such as audio clips and movies. A good PowerPoint presentation enables teachers to make their lessons engaging, interactive and real.

**Voov Meeting:** VooV Meeting allows attendees to join meetings quickly on mobile phones, PCs, tablets, and webpages for a seamless conferencing experience across platforms

**Zoom:** Zoom Cloud Meetings is a proprietary video teleconferencing software program developed by Zoom Video Communications. It enables you to virtually interact with your students when in-person meetings are not possible, and it has been hugely successful for teaching and learning.

(Zoom, VooV Meeting and Google Meet are good for collaborative lesson planning with colleagues).

## ICT TOOLS/APPS FOR TEACHING

**AudioNote** A combination of a voice recorder and notepad, it captures both audio and notes for student collaboration.

**Edmodo** is a free learning management platform that merges classroom content, safe communication, and assessment with social media savvy. Students and parents can get quick answers to questions as well as stay current on class assignments and happenings via the student planner and discussion threads. It provides a simple way for teachers to create and manage an online classroom community as well as enables students to connect and work with their classmates and teachers anywhere and anytime. The Ghana Library Authority as subscribed to this platform and available for teachers, students, and their parents to use.

**Edpuzzle** helps you use video (your own, or one from Khan Academy, YouTube, and more) to track student understanding.

**GeoGebra for Teaching and Learning Math.** It is a free digital tool for class activities, graphing, geometry, collaborative whiteboard and more

**Google Classroom:** Google Classroom is a free web service, developed by Google for schools, that aims to simplify creating, distributing, and grading assignments in a paperless way. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students. Google Classroom combines Google Drive for assignment creation and distribution, Google Docs, Sheets and Slides for writing, Gmail for communication, and Google Calendar for scheduling.

**Jamboard** is a digital interactive whiteboard in a collaborative whiteboard space with options to draw, add pictures, shapes, sticky notes, and text boxes. Jamboard is one smart display. Quickly pull in images from a Google search, save work to the cloud automatically, use the easy-to-read handwriting and shape recognition tool, and draw with a stylus but erase with your finger – just like a whiteboard.

**Kasahorow** is a vocabulary-enriching platform that helps to learn the English language and modernize African languages like a child. Kasahorow Keyboards for Android lets you type in Akan, English, Gbe, Ga-Dangme, Hausa and Yoruba conveniently. It is used as a normal keyboard by simply installing and selecting when you want to type an African language on any Android devices you have.

**Kahoot** is an online game-based learning platform. It allows teachers, organizations, and parents to set up fun web-based learning for others. Kahoot can be used as a fun trivia activity to do with students or teachers to have a series of fun questions at the same time learn.

**Math Kids** is a free learning game designed to teach young children numbers and mathematics. It features several mini games that toddlers and pre-K kids will love to play, and

the more they do the better their math skills will become. Adding Quiz will put your child's math and addition skills to the test.

Other mathematics applications are, inMaths, Geomaths

**Moodle:** Moodle stands for Modular Object-Oriented Dynamic Learning Environment. Moodle was designed to provide educators, administrators, and learners with an open, robust, secure, and free platform to create and deliver personalised learning environments. Moodle is a user-friendly Learning Management System (LMS) that supports learning and training needs for a wide range of institutions and organisations across the globe.

**Photomath** is a mobile application that utilizes a smartphone's camera to scan and recognize mathematical equations; the app then displays step-by-step explanations onscreen. It is available for free on both Android and iOS. It uses the camera on a user's smartphone or tablet to scan and recognize a math problem. Once the problem is recognized, the app will display solving steps, sometimes in a variety of methods or multiple approaches, to explain the scanned problem step-by-step and teach users the correct process.

**Piazza** Lets you upload lectures, assignments, and homework; pose and respond to student questions; and poll students about class content. This tool is better suited for older students as it mimics post-secondary class instructional formats.

**QuickVoice Recorder** Allows you to record classes, discussions, or audio for projects. Sync your recordings to your computer easily for use in presentations.

**StudyGe:** This is a geography for children. This learning game will help you to remember location of countries, their capitals and flags. You can train your memory and memorize information about countries. This offline platform will allow students to improve your knowledge of geography. Other geography platforms are LearnGeography, AP Human Geography

**Telegram** is a mobile application that allows users to communicate with them using mobile gadget and computer. Telegram can be used for teaching and learning for the following reasons:

Multiple platforms: smartphones (Operating system, Android), PC, Laptop, iPad, Tab, and Web., Compatible file format, large files transfer, Grouping facilities, better storage capacity and management, better memory system and management, better security with the encryption. Telegram can be used for teaching and learning in the following ways: announcement, forum i.e., whole class discussion, Quizzes, open ended question, group project report, listening practice, pronunciation practice, speaking practice, writing practice, problem solving, Content/materials sharing, PowerPoint presentation.

**Vocaroo** Is a quick and easy way to record and share voice messages over the interwebs. Vocaroo creates audio recordings without the need for additional software. The recordings are easy to be embedded into PowerPoint presentations and websites.

**Whiteboard** is an instant formative assessment tool for your classroom, providing you with live feedback and immediate overview over your students. Engage your whole class, include every student and let everybody answer - including the shy students or students who normally wouldn't bother to answer.

## DIGITAL ASSESSMENT TOOLS FOR TEACHERS

**Classmarker:** Classmarker is an online testing software that offers a free version that is very complete providing teachers with interesting possibilities for formative and summative evaluations. A professional web-based Quiz maker is an easy-to-use, customizable online testing solution for business, training & educational assessments with Tests & Quizzes graded instantly, saving hours of paperwork

**Edulastic** Allows you to make standards-aligned assessments and get instant feedback.

**Gimkit** Lets you write real-time quizzes.

**Google Forms:** Google Forms is a tool that allows collecting information from users through a personalized survey or exam. Google Forms is a free tool from Google that allows you to do the following: Create forms, surveys, quizzes, and such. Share the forms with others. Allow others to complete the forms online.

**Kahoot** - game-based assessment tool.

**Mentimeter** - pre-built education templates.

**Naiku** Lets you write quizzes students can answer using their mobile devices.

**Poll Everywhere** - used by 300,000 teachers.

**Quiz Bot** - Create a quiz with several multiple-choice questions and test on telegram

**Socrative** - quizzes and questions with real-time grading.

**World Geography** – Quiz Games for Geography

**World Map Quiz** – quizzes and questions for Geography

## ICT TOOLS/APPS FOR RESEARCH

**Academia.edu:** is a platform for academics to share research papers. The company's mission is to accelerate the world's research.

**ai.google:** Google periodically releases data of interest to researchers in a wide range of computer science disciplines.

**Biohunter:** A Portal with literature search, data statistics, reading, sorting, storing, field expert identification and journal finder.

**Code Ocean** is a Cloud-based computational platform which provides a way to share, discover and run published code.

**DataBank:** Is an analysis and visualization tool that contains collections of time series data on a variety of topics.

**Datacatalogs.org** offers open government data from US, EU, Canada, CKAN, and more.

**Data.gov:** The USA government's official data portal offers access to tens of thousands of data sets

**Data.gov.in:** An Open Government Data (OGD) Platform India - is a platform for supporting Open Data initiative of Government of India. The portal is intended to be used by Government of India Ministries/ Departments their organizations to publish datasets, documents, services, tools and applications collected by them for public use. It intends to increase transparency in the functioning of Government and also open avenues for many more innovative uses of Government Data to give different perspective.

**Data.gov.uk:** The British government's official data portal offers access to tens of thousands of data sets on topics such as crime, education, transportation, and health

**DeepDyve:** provides simple and affordable access to millions of articles across thousands of peer-reviewed journals. Content from the world's leading publishers including Reed Elsevier, Springer, Wiley-Blackwell, and more.

**GitHub:** An Online software project hosting using the Git revision control system.  
**Open Science Framework:** This gathers a network of research documents, a version control system, and a collaboration software.

**Google Finance:** it provides stock market data and give updates in real time.

**Google Scholar** is a freely accessible web search engine that indexes the full text or metadata of scholarly literature across an array of publishing formats and disciplines.

**Microsoft Academic Search:** Find information about academic papers, authors, conferences, journals, and organizations from multiple sources.

**Peer Evaluation:** is an Open repository for data, papers, media coupled with an open review and discussion platform.

**QuillBot** is a paraphrasing and summarizing tool that helps millions of students and professionals cut their writing time by more than half using state-of-the-art AI to rewrite any sentence, paragraph, or article.

**ResearchGate** is the professional network for scientists and researchers. Over 15 million members from all over the world use it to share, discover, and discuss research.

**Sciencescape:** An Innovation in the exploration of papers and authors.

**SlideShare:** Community for sharing presentations and other professional content

**SSRN:** Is Multi-disciplinary online repository of scholarly research and related materials in social sciences.

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## Tutor PD Session on ICT Integration & 21<sup>st</sup> Century Skills

Age Levels/s: EG,UP,JHS

Name of Subject/s: ICT Integration

<p><b>Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.</b></p>	<p><b>Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i></b></p>	<p><b>Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.</b></p>	<p><b>Time in session</b></p>
<p><b>Introduction to the session</b></p>	<p>1.1 Self-introduction: Ask tutors to introduce themselves.</p> <p>1.2 Ask tutors to share any successes and issues they had when using ICT tools in a previous semester <i>employing talk for learning strategies.</i></p> <p>1.3 Asks tutors who are conversant with and have utilized ICT tool(s) in Lessons in the previous semester(s) to share their practices and how these ICT tools and its integration has impacted on their teaching in any of the semester(s). It is important to identify the topic as well as the ICT tool(s) used in the discussion.</p>	<p>1.1 Kindly introduce yourself to the group.</p> <p>1.2 Tutors share any successes and issues they had when using ICT tools in a previous semester <i>employing talk for learning strategies.</i></p> <p>1.3 Tutors who are conversant with and have utilized ICT tool(s) in Lessons in the previous semester(s) to share their practices and how these ICT tools and its integration has impacted on their teaching in any of the semester(s). It is important to identify the topic as well as the ICT tool(s) used in the discussion.</p>	<p><b>20 mins</b></p>

	<p>1.4. Ask tutors to read the purpose, the learning outcomes and learning indicators of the manual and use the think-pair-share approach to share their views about how the manual can help them to integrate ICT into their lessons.</p> <p><b>Distinctive aspects</b> Lead tutors to discuss ICT tool(s) they are familiar with and any unique qualities of these ICT tool(s) as learning tools that they can identify.</p> <p>Note: The following are the distinctive aspects that this manual has considered: Reading literacy, writing literacy, numeracy, information literacy, ICT [information and communications technologies] digital literacy, communication and can be described broadly as learning domains.</p> <p>1.5 Ask tutors to pair with a colleague and share their views about the ICT tools that they have used in their everyday life and how the unique qualities of these tool(s) can be incorporated into their classroom teaching.</p>	<p>1.4. Read the purpose, the learning outcomes and learning indicators of the manual and use the think-pair-share approach to share your views about how the manual can help you to integrate ICT into their lessons.</p> <p><b>Distinctive aspects</b> Tutors to discuss ICT tool(s) they are familiar with and any unique qualities of these ICT tool(s) as learning tools that they can identify.</p> <p>Note: The following are the distinctive aspects that this manual has considered: Reading literacy, writing literacy, numeracy, information literacy, ICT [information and communications technologies] digital literacy, communication and can be described broadly as learning domains.</p> <p>1.5 Pair with a colleague and share your views about the ICT tools that you have used in your everyday life and how the unique qualities of these tool(s) can be incorporated into your classroom teaching.</p>	
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	<p>1.6 In groups ask tutors to write on a flip chart using Concept Cartoons:</p> <p>a. ICT tool (s) tutors are familiar with. e.g., email, mobile phones, computers, slides, animation, zoom, telegram, etc.</p> <p>b. ICT tool(s) tutors use and integrate in their teaching at the College of Education</p> <p>1.7 Let tutors present their findings via <i>radio reporting</i>.</p>	<p>1.6 In groups, write on a flip chart using Concept Cartoons:</p> <p>a. The distinctive features of ICT tool(s) you are familiar with</p> <p>b. CT tools you use and integrate in your teaching at the College of Education.</p> <p>1.7 Present your findings via <i>radio reporting</i>.</p>	
<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p><b>Concept Development</b></p> <p>2.1. Using the think, pair, share approach, assign tutors sub-topics of integrating ICT into teaching and learning (<i>equity, health and safety issues relating to the use of ICT tools</i>) to tutors to discuss and write points on a flip chart for presentation. Allow time for each presentation and whole group discussion.</p> <p>2.2 Ask tutors to work in pairs and examine the misconceptions in teaching and learning with ICT tool(s) and share ideas on how to address them.</p> <p>E.g. computers can do everything a teacher can do</p>	<p><b>Concept Development</b></p> <p>2.1. Discuss the sub-topic, assigned to you with your partner and share your views with the larger group</p> <p>2.2 In pairs, discuss misconceptions in teaching and learning with ICT tool (s) and share possible ways of addressing them.</p> <p>E.g. computers can do everything a teacher can do</p>	<b>25 mins</b>

	2.3 Ask tutors to outline possible challenging areas in teaching with ICT tool(s) taking into consideration GESI (e. g. identifying areas in the curriculum where stereotypes are reinforced and addressing these).	2.3 Outline possible challenging areas in teaching with ICT tool(s) taking into consideration GESI (e. g. identifying areas in the curriculum where stereotypes are reinforced and addressing these).	
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous</li> </ul>	<p><b>Teaching and learning activities:</b></p> <p>3.1. Discuss with tutors, general ICT tools for teaching and learning</p> <p>Desktop and laptops computers, Projector, Digital cameras, Printer, Photocopier, tablets, Popplet, Pen Drive, Ipods, Ipads, Webboards, Scanners, Microphones, interactive white board, DVDs and CDs Flash discs, video Games</p> <p><b>E.g.,</b>  <b>Geomaths</b>  <b>Maths kits</b>  <b>Microsoft maths solver</b>  <b>Photomaths</b>  <b>Scratch</b>  <b>kasahorow</b></p> <ul style="list-style-type: none"> <li>• <b>Software</b></li> <li>• <b><u>Office Professional</u></b> – E.g. XP.</li> <li>• <b>Good photo software</b> e.g. <u>Microsoft Digital Photo Suite</u></li> <li>• <b>"Photostory 2</b> -- comes with service pack 2.</li> </ul>	<p><b>Teaching and learning activities:</b></p> <p>3.1 Discuss general ICT tools for teaching and learning</p> <p>Desktop and laptops computers, Projector, Digital cameras, Printer, Photocopier, tablets, Popplet, Pen Drive, Ipods, Ipads, Webboards, Scanners, Microphones, interactive white board, DVDs and CDs Flash discs, video Games</p> <p><b>E.g.,</b>  <b>Geomaths</b>  <b>Maths kits</b>  <b>Microsoft maths solver</b>  <b>Photomaths</b>  <b>Scratch</b>  <b>kasahorow</b></p> <ul style="list-style-type: none"> <li>• <b>Software</b></li> <li>• <b><u>Office Professional</u></b> – E.g. XP.</li> <li>• <b>Good photo software</b> e.g. <u>Microsoft Digital Photo Suite</u></li> <li>• <b>"Photostory 2</b> -- comes with service pack 2.</li> </ul>	<b>40 mins</b>

<p>assessment to support student teacher learning</p> <ul style="list-style-type: none"> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, YouTube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</li> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> </ul> </li> <li>• Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Inspiration</b></li> <li>• <b><u>Smart Notebook</u></b> <ul style="list-style-type: none"> <li>○ <b><u>United Streaming</u></b> subscription</li> </ul> </li> <li>• <b>Hardware</b></li> <li>• <b>Flat Screen monitor</b> Good quality printer preferably a laser black and color photo. E.g. HP</li> <li>• <b>CD/DVD RW drive(s)</b></li> <li>• <b><u>USB ports</u></b></li> <li>• <b>Scanner</b> – e.g. Epson brand</li> <li>• <b>Digital camera</b> – e.g. of Canon</li> <li>• <b>External storage</b> - an <u>external hard drive</u> to back up data</li> <li>• <b>Portable storage</b> - USB flash drive, 2 GB minimum.</li> <li>• <b><u>Palm</u></b> or other <b>handheld device</b> to keep schedules, dates, reminders, and store pictures and music. E.g. Tungsten Palm</li> <li>• <b><u>Smart board</u></b> or <b><u>Smart Airliner</u></b>, with projection unit for classroom use.</li> <li>• <b>CPS (<u>classroom performance system</u>)</b> also for classroom use.</li> </ul> <p><b>Teaching 21st Century Skills with ICT</b></p> <p><b>Collaborative Problem Solving</b></p>	<ul style="list-style-type: none"> <li>• <b>Inspiration</b></li> <li>• <b><u>Smart Notebook</u></b> <ul style="list-style-type: none"> <li>○ <b><u>United Streaming</u></b> subscription -</li> </ul> </li> <li>• <b>Hardware</b></li> <li>• <b>Flat Screen monitor</b> Good quality printer preferably a laser black and color photo. E.g. HP</li> <li>• <b>CD/DVD RW drive(s)</b></li> <li>• <b><u>USB ports</u></b></li> <li>• <b>Scanner</b> – e.g. Epson brand</li> <li>• <b>Digital camera</b> – e.g. of Canon</li> <li>• <b>External storage</b> - an <u>external hard drive</u> to back up data</li> <li>• <b>Portable storage</b> - USB flash drive, 2 GB minimum.</li> <li>• <b><u>Palm</u></b> or other <b>handheld device</b> to keep schedules, dates, reminders, and store pictures and music. E.g. Tungsten Palm</li> <li>• <b><u>Smart board</u></b> or <b><u>Smart Airliner</u></b>, with projection unit for classroom use.</li> <li>• <b>CPS (<u>classroom performance system</u>)</b> also for classroom use.</li> </ul> <p><b>Teaching 21st Century Skills with ICT</b></p> <p><b>Collaborative Problem Solving</b></p>	
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	<p><a href="https://youtu.be/cnkKHL_dyGE">https://youtu.be/cnkKHL_dyGE</a></p> <p><b>Creativity</b>  <a href="https://www.youtube.com/watch?v=qV7DiTFdtvw">https://www.youtube.com/watch?v=qV7DiTFdtvw</a></p> <p><b>Hands-On Learning</b>  <a href="https://youtu.be/vYUNfJ9IKzs">https://youtu.be/vYUNfJ9IKzs</a></p> <p><b>Effective Written and Oral Communication</b>  <a href="https://www.youtube.com/watch?v=D5hMN_XkPQA">https://www.youtube.com/watch?v=D5hMN_XkPQA</a></p> <p><b>Ethical Decision Making</b>  <a href="https://youtu.be/lwk8dGFn1tY">https://youtu.be/lwk8dGFn1tY</a></p> <p><b>Information and Media Literacy</b>  <a href="https://youtu.be/bjYhmTC3lrc">https://youtu.be/bjYhmTC3lrc</a></p> <p><b>Critical Thinking</b>  <a href="https://youtu.be/y7iMEH7jGfK">https://youtu.be/y7iMEH7jGfK</a>  <a href="https://youtu.be/88DoGrqEuJk">https://youtu.be/88DoGrqEuJk</a></p> <p><b>Leadership</b>  <a href="https://youtu.be/NF10F6bX_g">https://youtu.be/NF10F6bX_g</a></p> <p><b>Personal Responsibility and Initiative</b>  <a href="https://youtu.be/nRE131ErclM">https://youtu.be/nRE131ErclM</a></p> <p>3.2 Lead tutors to discuss Special Education Needs (SEN) ICT tools for teaching, learning and assessment.</p> <p><b>E.g.,</b> Teachers dealing with the SEN will require special ICT tools like; text magnifier, head wands,</p>	<p><a href="https://youtu.be/cnkKHL_dyGE">https://youtu.be/cnkKHL_dyGE</a></p> <p><b>Creativity</b>  <a href="https://www.youtube.com/watch?v=qV7DiTFdtvw">https://www.youtube.com/watch?v=qV7DiTFdtvw</a></p> <p><b>Hands-On Learning</b>  <a href="https://youtu.be/vYUNfJ9IKzs">https://youtu.be/vYUNfJ9IKzs</a></p> <p><b>Effective Written and Oral Communication</b>  <a href="https://www.youtube.com/watch?v=D5hMN_XkPQA">https://www.youtube.com/watch?v=D5hMN_XkPQA</a></p> <p><b>Ethical Decision Making</b>  <a href="https://youtu.be/lwk8dGFn1tY">https://youtu.be/lwk8dGFn1tY</a></p> <p><b>Information and Media Literacy</b>  <a href="https://youtu.be/bjYhmTC3lrc">https://youtu.be/bjYhmTC3lrc</a></p> <p><b>Critical Thinking</b>  <a href="https://youtu.be/y7iMEH7jGfK">https://youtu.be/y7iMEH7jGfK</a>  <a href="https://youtu.be/88DoGrqEuJk">https://youtu.be/88DoGrqEuJk</a></p> <p><b>Leadership</b>  <a href="https://youtu.be/NF10F6bX_g">https://youtu.be/NF10F6bX_g</a></p> <p><b>Personal Responsibility and Initiative</b>  <a href="https://youtu.be/nRE131ErclM">https://youtu.be/nRE131ErclM</a></p> <p>3.2 Discuss Special Education Needs (SEN) ICT tools for teaching, learning and assessment.</p> <p><b>E.g.,</b> Teachers dealing with the SEN will require special ICT tools like; text magnifier, head wands,</p>
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	<p>keyboard for cerebral Palsy, braille, typing aids, large prints, audio books.</p> <p>3.3 Lead tutors to discuss some useful Education Technology Resources for teaching, learning and assessment.  <b>E.g., <u>Office 365 vs G-Suite for Education</u></b>  <u>Google Meet for Online Teaching</u>  <u>Google Classroom for Online</u>  <u>Assignment submissions</u>  <u>Plagiarism checking</u>  <u>Softwares</u>  <u>Tools for Checking Grammar errors Online</u>  Assessment tools include: grading rubrics, Canvas Assignments, plagiarism detection, self-assessment, and peer assessment, surveys, and classroom polling. Quiz bot  Digital Assessment Tools for Teachers:  Socrative - quizzes and questions with real-time grading.  Classmarker- quizzes and questions with real-time grading  Google Forms - easy to use.  Mentimeter - pre-built education templates.  Poll Everywhere - used by 300,000 teachers.  Kahoot - game-based assessment tool.</p> <ul style="list-style-type: none"> <li>• Further links to videos for further application of ICT tools in the teaching and learning process</li> </ul>	<p>keyboard for cerebral Palsy, braille, typing aids, large prints, audio books.</p> <p>3.3 Discuss some useful Education Technology Resources for teaching, learning and assessment.  <b>E.g. <u>Office 365 vs G-Suite for Education</u></b>  <u>Google Meet for Online Teaching</u>  <u>Google Classroom for Online</u>  <u>Assignment submissions</u>  <u>Plagiarism checking</u>  <u>Softwares. Tools for Checking Grammar errors Online</u>  Assessment tools include: grading rubrics, Canvas Assignments, plagiarism detection, self-assessment, and peer assessment, surveys, and classroom polling. Quiz bot  Digital Assessment Tools for Teachers:  Socrative - quizzes and questions with real-time grading.  Classmarker- quizzes and questions with real-time grading  Google Forms - easy to use.  Mentimeter - pre-built education templates.  Poll Everywhere - used by 300,000 teachers.  Kahoot - game-based assessment tool.</p> <ul style="list-style-type: none"> <li>• Further links to videos for further application of ICT tools in the teaching and learning process</li> </ul>	
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	<p><a href="https://www.youtube.com/watch?v=k8nMh71ky4Y">https://www.youtube.com/watch?v=k8nMh71ky4Y</a></p> <p>3.4 Ask tutors to suggest ICT-mediated teaching, learning and assessment activities in their respective subjects taking into account GESI. E.g., Making reasonable adjustments using ICT for physically challenged learners. E.g. Both male and female learners playing leading roles in ICT-based group tasks.</p> <p>3.5 Let tutors present their findings to the larger group</p>	<p><a href="https://www.youtube.com/watch?v=k8nMh71ky4Y">https://www.youtube.com/watch?v=k8nMh71ky4Y</a></p> <p>3.4 Suggest ICT-mediated teaching, learning and assessment activities in your respective subjects. Taking into account GESI. E.g., Making reasonable adjustments for physically challenged learners.</p> <p>Both male and female learners playing leading roles in a group task.</p> <p>3.5 Present your findings to the larger group</p>	
<ul style="list-style-type: none"> <li>• <b>Evaluation and review of session:</b></li> <li>• Tutors need to identify critical friends to observe lessons and report at next session</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1 Ask tutors to identify any outstanding issues relating to the lesson/s for clarification</p> <p>4.2 Ask tutors to identify a critical friend who will observe their first lesson and give them feedback on how they integrated ICT in the lesson.</p>	<p>4.1 Identifying any outstanding issues relating to the lesson/s for clarification.</p> <p>4.2 Identify a critical friend who will observe your first lesson and give you feedback on how you integrated ICT in the lesson.</p>	<b>5 mins</b>

# SCIENCE

**AGE LEVELS:** JHS (BIOLOGY), JHS (CHEMISTRY), UPPER PRIMARY, EARLY GRADE

**Name of courses/Subject/s:**

1. Early Grade – Early science.
2. Upper Primary – Integrated Science I.
3. JHS --- Particulate nature of chemistry.
4. JHS --- Environmental biology.

**Lesson Tittles:**

Early Grade: Review of Year 1 Integrated Science and Teaching Living and Non Living things

Upper Primary: Group of Plants

JHS Biology: Teaching Classification of Plants and Animals

JHS Chemistry: Teaching Periodicity- Electron configuration

### Tutor PD Session for Lesson 1 in the Course Manual

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i>	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.	Time in session
<p><b>1(a) Introduction to the semester – in session one</b></p> <ul style="list-style-type: none"> <li>• Introduction to the purpose of the specialisms: EG, UP and JHS</li> <li>• Overview of subject/s age level/s to be covered in the PD sessions and guidance on</li> </ul>	<p><b><u>INTRODUCTION 1 (a)</u></b></p> <p>1.1. Discuss with tutors the purpose/goals related to the various specialisms. E.g. The science programme is designed to transform the Early grade, Upper primary and JHS teachers into one</p>	<p>1.1. Discuss the purpose/goals related to the various specialisms.</p>	<b>20 mins</b>

<p>grouping tutors according to the subject/s, age levels/s.</p> <ul style="list-style-type: none"> <li>• Introduction to the course manual/s</li> <li>• Overview of course learning outcomes</li> <li>• Introduction to the two continuous assessment components to be undertaken in each subject during the semester (See Course Assessment Components at a Glance Appendix 2) NB in subjects where there are no assessment components in the course manuals examples will need to be provided for SL/HoD.</li> </ul>	<p>imbued with the right knowledge, technology, pedagogy, innovation, content and the core values and attitudes to promote inclusivity and inspire active learning at the early grade level.</p> <p>1.2. Grouping for this semester’s PD sessions will be done according to various grade levels or specialisms. Thus, Early grade, Upper primary and JHS, hence ask tutors to sit according to their grade levels.</p> <p>NOTE: Courses to be covered during this semester’s PD sessions are:</p> <ol style="list-style-type: none"> <li>1. Early Grade – Early science.</li> <li>2. Upper Primary – Integrated Science I.</li> <li>3. JHS --- Particulate nature of chemistry and Environmental biology.</li> </ol> <p>1.3. Ask tutors to be in their distinctive groups to read course descriptions, course learning outcomes and their corresponding learning indicators.</p>	<p>1.2. Sit in groups according to your grade levels or specialisms.</p> <p>1.3. Read the course descriptions, course learning outcomes and their corresponding learning indicators in your various groups.</p>	
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	<p>1.3.1. Ask tutors to discuss the relationship between the course learning outcomes and their corresponding learning indicators.</p> <p>1.4. Deliberate with tutors on the two assessment components (Subject project and subject portfolio) for the semester.</p> <p><b>(Subject Portfolio: Overall weighting of project = 30%</b> Weighting of individual parts of portfolio out of 100. <b>Three (3) items of work produced during the semester selected by student teachers with tutor support</b> during the semester as best examples of their progress and 200-word reflection on the items i.e. i. (a) Each of the three (3) items selected by the student teacher is 30 % (90%). i. (b) Presentation and organization of portfolio 10%.</p> <p style="text-align: center;"><b>OR</b></p> <p>ii. (a). Each of the two (2) items selected by the student teacher is 30 % (60%). ii(b)Mid semester assessment 30% ii. (c) Presentation and organization of portfolio 10%.</p>	<p>1.3.1. Discuss the relationship between the course learning outcomes and their corresponding learning indicators.</p> <p>1.4. Deliberate on the two assessment components (Subject project and subject portfolio) for the semester.</p> <p><b>(Subject Portfolio: Overall weighting of project = 30%</b> Weighting of individual parts of portfolio out of 100. <b>Three (3) items of work produced during the semester selected by student teachers with tutor support</b> during the semester as best examples of their progress and 200-word reflection on the items i.e. i. (a) Each of the three (3) items selected by the student teacher is 30 % (90%). i. (b) Presentation and organization of portfolio 10%.</p> <p style="text-align: center;"><b>OR</b></p> <p>ii. (a). Each of the two (2) items selected by the student teacher is 30 % (60%). ii(b)Mid semester assessment 30% ii. (c) Presentation and organization of portfolio 10%.</p>	
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<p><b>1(b) Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• Reading and discussion of the introductory sections of the lesson up to and including learning outcomes and indicators</li> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where</p>	<p>Subject Project: <b>Overall weighting of project = 30%</b></p> <p><b>Weighting of individual parts of project out of 100%</b></p> <ul style="list-style-type: none"> <li>• Introduction – 10%</li> <li>• Methodology – 20%</li> <li>• Substantive section – 40%</li> <li>Conclusion – 30%)</li> </ul> <p><i>NOTE: Refer to appendix 2: (Course Assessment Components briefly) for further details.</i></p> <p><b>NOTE: Start the review of the prior learning with an ice breaker. (E.g. Ask a male tutor to describe how to prepare Kokonte and Palm-nut soup).</b></p> <p><b><u>INTRODUCTION 1 (b)</u></b></p> <p>1.5. Ask tutors in their respective groups to write one thing they learnt in Year 1 semester 2 PD sessions and how they applied it in their teaching at their various grade levels on a post in card.</p> <p>1.5.1. Ask tutors to post the cards on the wall for gallery walk.</p> <p>1.6. Ask tutors to read and discuss the introductory sections of the lesson up to and including learning</p>	<p>Subject Project: <b>Overall weighting of project = 30%</b></p> <p><b>Weighting of individual parts of project out of 100%</b></p> <ul style="list-style-type: none"> <li>• Introduction – 10%</li> <li>• Methodology – 20%</li> <li>• Substantive section – 40%</li> <li>Conclusion – 30%)</li> </ul> <p><i>NOTE: Refer to appendix 2: (Course Assessment Components briefly) for further details.</i></p> <p>1.5. Write one thing you learnt in Year 2 semester 1 PD sessions and how you applied it in your teaching at the various grade levels on a post in card.</p> <p>1.5.1. Post the cards on the wall for gallery walk.</p> <p>1.6. Read and discuss the introductory sections of the lesson up to and including learning outcomes and</p>	
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<p>tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><b>Note:</b> Lesson 1 topics and lesson descriptions for the various levels are:  <b>JHS- Biology:</b> Topic - Teaching classification of plants and animals</p> <p><i>Lesson Description - The lesson provides the student teacher the opportunity to deepen pedagogic knowledge of classification of plants and animals.</i></p> <p><b>JHS - Chemistry:</b> Topic - Teaching periodicity- Electronic configuration.</p> <p><i>Lesson Description- In this lesson, a discussion of Periodicity (Electron configuration/arrangement and properties of elements) would be treated with Student teachers.</i></p> <p><b>UPPER PRIMARY:</b> Topic- Group of plants</p> <p><i>Lesson Description -This lesson will deepen the understanding of the basic concepts of group of plants and animals and classification of plants using common their characteristics.</i></p>	<p>indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p>	
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	<p><b>EARLY GRADE:</b> <i>Topic - Review of Year 1 Integrated Science and Teaching Living and Non Living things</i></p> <p><i>Lesson Description – This lesson introduces student teachers to the concept of living and non-living things with the view to identifying appropriate pedagogies that can be used to teach the main characteristics and differences of living and non-living things to early grade learners.</i></p> <p>1.7. Ask tutors to identify and discuss the distinctive features of lesson 1 for the various levels.</p> <p><b>JHS Biology:</b></p> <ul style="list-style-type: none"> <li>• <i>Classification</i></li> <li>• <i>Taxonomy/Levels of classification</i></li> </ul> <p><b>JHS Chemistry:</b></p> <ul style="list-style-type: none"> <li>• <i>Periodic table</i></li> <li>• <i>Electronic configuration</i></li> <li>• <i>Groups and periods</i></li> </ul> <p><b>UPPER PRIMARY:</b></p> <ul style="list-style-type: none"> <li>• <i>Classification of plants</i></li> <li>• <i>Nature of leaves</i></li> <li>• <i>Root system</i></li> </ul> <p><b>EARLY GRADE:</b></p> <ul style="list-style-type: none"> <li>• <i>Living and non-living things</i></li> </ul>	<p>1.7. Identify and discuss the distinctive features of lesson 1 for the various levels.</p> <p><b>JHS Biology:</b></p> <ul style="list-style-type: none"> <li>• <i>Classification</i></li> <li>• <i>Taxonomy/Levels of classification</i></li> </ul> <p><b>JHS Chemistry:</b></p> <ul style="list-style-type: none"> <li>• <i>Periodic table</i></li> <li>• <i>Electronic configuration</i></li> <li>• <i>Groups and periods</i></li> </ul> <p><b>UPPER PRIMARY:</b></p> <ul style="list-style-type: none"> <li>• <i>Classification of plants</i></li> <li>• <i>Nature of leaves</i></li> <li>• <i>Root system</i></li> </ul> <p><b>EARLY GRADE:</b></p> <ul style="list-style-type: none"> <li>• <i>Living and non-living things</i></li> </ul>	
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	<ul style="list-style-type: none"> <li>• <i>Characteristics of living and non-living things.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Characteristics of living and non-living things.</i></li> </ul>	
<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Ask tutors to be in pairs, list the major concepts in the lesson and share with the whole group.</p> <p><b>E.g.</b></p> <ul style="list-style-type: none"> <li>• <i>Classification systems and associated misconception. (JHS – biology)</i></li> <li>• <i>Properties of elements. (JHS- chemistry)</i></li> <li>• <i>Erect, creeping and climbing plants (UP)</i></li> <li>• <i>Concepts of living and non-living things (Early Grade)</i></li> </ul> <p>2.2 Ask tutors to discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions related to the concepts are:</i>  <b>JHS.....Plants</b> are non-living things because they cannot locomote.  <i>Solution: Even though plants do not locomote but they move, because movement involves change of position of part or the whole body of an organism from one place to another which is one of the characteristics of living things.</i></p> <p><b>JHS...Elements</b> are put in the periodic table in an alphabetical order.</p>	<p>2.1. In pairs, list the major concepts in the lesson and share with the whole group.</p> <p>2.2. Discuss the potential misconceptions and barriers with respect to the concepts listed.</p>	<b>15 mins</b>

	<p><i>Solution: Elements are arranged based on their atomic numbers and the number of electrons in their outermost shell.</i></p> <p><b>UP....Classification</b>  <i>Students hold the view that classification simply refer to as grouping of living things.</i>  <i>Solution: classification is not exclusively limited to just grouping but grouping based on common characteristics.</i></p> <p>2.3. Ask tutors in their respective group levels to identify the most appropriate teaching strategies that can be employed to best explain the new concepts.  E.g. (1) Nature’s walk and analogical representations to be employed in teaching classification and levels of classification.  <u>Example of an Analogical Representation</u>  Kingdom .....  Continent  Phyla/Division ....  Countries  Class .....  Region  Order .....  District  Family ..... Town  Genus .....  Community  Species ..... Clan</p>	<p>2.3. In your respective group, the most appropriate teaching strategies that can be employed to best explain the new concepts.</p>	
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	<p>(2). The use of mnemonics and periodic tables to teach the elements and their atomic numbers.</p> <p>1. <b>H</b>ello ..... Hydrogen</p> <p>2. <b>H</b>ello ..... Helium</p> <p>3. <b>L</b>isten ..... Lithium</p> <p>4. <b>B</b> ..... Beryllium</p> <p>5. <b>B</b> ..... Boron</p> <p>6. <b>C</b> ..... Carbon etc.</p>		
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each</li> </ul>	<p>3.1. Guide tutors to read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p><i>Note: Tutors should go through the activities one after the other taking into consideration the time available, resources and nature of learners, coherency and methodology.</i></p> <p>3.1.1. Assist tutors to identify areas that need clarification.</p> <p>3.2. Lead tutors to discuss in their various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 1.</p>	<p>3.1. Read and discuss the teaching and learning activities in the course manuals for your group.</p> <p>3.1.1. Identify areas that need clarification.</p> <p>3.2. Discuss in your group how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 1.</p>	

<p>lesson should include at least two opportunities to use continuous assessment to support student teacher learning</p> <ul style="list-style-type: none"> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</li> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> </ul> </li> <li>• Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<p><b>Note:</b> <i>Ensure that the language used in instructing to carry out the varied activities are gender responsive. E, g. Do not use harsh, threatening language or actions that instil fear in both females and males.</i></p> <p>3.3. Ask tutors to discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p>E g.</p> <ol style="list-style-type: none"> <li>1. <i>Equal representation of males and females and mix ability grouping as appropriate.</i></li> <li>2. <i>Assign leadership roles to females.</i></li> </ol> <p>3.4. Ask tutors to identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities. <i>e.g. (1) The use of ICT to prepare and present lessons. (2) Development of collaborative and communicative skills through group works and presentations.</i></p> <p>3.5. Ask tutors to read the assessment activities in the various</p>	<p>3.3. Discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p>3.4. Identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p> <p>3.5. Read the assessment activities in your various manuals and</p>	
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	<p>manuals and identify areas that require clarification.</p> <p><i>Note:</i>  <i>(1) Inform tutors to ask student teachers to develop specific mnemonics and analogical representations, which are gender friendly, to teach the concepts of periodicity and levels of classification respectively. <b>These could be added to their subject portfolio.</b></i></p> <p><i>(2) Encourage tutors to instruct student -teachers to work in groups (in mixed ability, &amp; and pay attention to the composition of females and males during the group work) to use either concept maps, simulations or multimedia presentations to design games and/or rhymes that can make early grade/Upper primary/JHS learners learn:</i></p> <ul style="list-style-type: none"> <li><i>i. Characteristics of living and non-living things</i></li> <li><i>ii. The differences between living and non-living things.</i></li> <li><i>iii. Names of elements, atomic numbers and their chemical symbols.</i></li> </ul> <p><b><i>This could be one of their subject projects for the semester.</i></b></p> <p>3.6. Lead tutors in identifying the needed inclusive resources for</p>	<p>identify areas that require clarification.</p> <p>3.6. Identify the needed inclusive resources for teaching and learning of the</p>	
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	<p>teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p>E.g. Games, Audio-visuals from YouTube, samples of individual tutor learning plans.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. <i>Equal representation of males and females in pictures.</i></li> <li>2. <i>Make sure the resources are enough and appropriate to all learners (males, females and physically challenge)</i></li> </ol> <p>3.7. Ensure that everybody has a concrete plan for teaching the given topics, thus, the activities agreed on by the group to be followed.</p> <p><i>Remind tutors in the case of unresolved issues consult the subject writing leads.</i></p>	<p>concepts in both CoE and basic school classrooms.</p> <p>3.7. Have a concrete plan for teaching the given topics, thus, the activities agreed on by the group to be followed.</p> <p><i>In the case of unresolved issues consult the subject writing leads.</i></p>	
<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors need to identify critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1. Ask tutors to identify a critical friend who took part in the PD session to sit in their class during lesson and report on observations made during next PD session.</p> <p>4.2. Ask tutors to discuss and clarify anything relating to Lesson 1.</p>	<p>4.1. Identify a critical friend who took part in the PD session to sit in your class during lesson and report on observations made during next PD session.</p> <p>4.2. Discuss and clarify anything relating to Lesson 1 that needs to be discussed and clarified.</p>	<p><b>15 mins</b></p>

	4.3. Ask tutors to read lesson 2 from the PD manual and find relevant materials for the next session.	4.3. Read lesson 2 from the PD manual and find relevant materials for the next session.	
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**AGE LEVELS:** JHS (BIOLOGY), JHS (CHEMISTRY), UPPER PRIMARY, EARLY GRADE

**Name of courses/Subject/s:**

1. Early Grade – Early science.
2. Upper Primary – Integrated Science I.
3. JHS --- Particulate nature of chemistry.
4. JHS ---Environmental biology.

**Lesson Tittles:**

Early Grade: How to teach Living and Non Living things I  
 Upper Primary: Group of Plants and Animals II  
 JHS Biology: Teaching Flowering Plants  
 JHS Chemistry: Teaching Chemical bond and compound formation

**Tutor PD Session for Lesson 2**

<p><b>Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.</b></p>	<p><b>Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i></b></p>	<p><b>Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.</b></p>	<p><b>Time in session</b></p>
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the lesson up to and including learning</li> </ul>	<p><b>Start the review of the prior learning with an ice breaker.</b></p> <p>1.1. Ask tutors in their respective groups to write one thing they learnt in lesson 1 of the previous PD session on a post in card and tell how it was applied in their teaching at their various grade levels.</p>	<p>1.1. Write one thing you have learnt in lesson 1 of the previous PD session on a post in card and tell how you applied it in your teaching at your various grade levels.</p>	<p><b>20 mins</b></p>

<p>outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>1.2. Ask tutors to invite their critical friends to share their observations for a short discussion.</p> <p>1.3. Ask tutors to read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><b>Note:</b> <i>Lesson 2 topics and lesson descriptions for the various levels are:</i>  <b>JHS- Biology:</b> <i>Topic - Teaching flowering plants.</i></p> <p><i>Lesson Description</i>  <i>This lesson provides the student teacher the opportunity to embed the teaching of the structure and functions of the flower and the phases of photosynthesis and to identify and correct misconceptions/incorrect ideas about photosynthesis.</i></p> <p><i>(Refer to the course manual for JHS- Chemistry, Upper primary and early grade lesson introductions/descriptions.</i></p> <p><i>N.B. Inform tutors that the grouping for this PD session will be done based on the following levels:</i></p>	<p>1.2. Invite your critical friends to share their observations for a short discussion.</p> <p>1.3. Read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p>	
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	<p><i>Early grade, upper primary and JHS.</i></p> <p>1.3.1. Ask tutors to discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 2 so that they become familiar with them.</p> <p>1.4. Ask tutors to read the content to be covered for lesson 2 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1. Lead tutors to identify the distinctive aspects of the content of the lessons.</p> <p><i>E.g. Distinctive aspects of the lessons</i>  <b>JHS BIOLOGY</b> .....  <i>Structure and functions of flowers.</i>  <i>Photosynthesis</i>  <b>JHS CHEMISTRY</b>.....  <i>Covalent and Ionic bond formation, Periodic trends</i>  <b>UP</b> .....</p> <p><i>Groups of animals</i>  <i>Body coverings of animals.</i>  <i>Use of some animals</i>  <b>EARLY GRADE</b> .....  <i>Characteristics of plants and animals.</i>  <i>Differences between plants and animals.</i>  <i>Use of plants and animals.</i></p>	<p>1.3.1. Discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 2.</p> <p>1.4. Read the content to be covered for lesson 2 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1. Identify the distinctive aspects of the content of the lessons.</p>	
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<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Ask tutors to be in pairs and list the major concepts in the lesson and share with the whole group.</p> <p><b>E.g.</b></p> <ul style="list-style-type: none"> <li>• <i>Individual Parts of a flower and whorl names (JHS – BIOLOGY)</i></li> <li>• <i>Ion formation (cations and anions), Atomic size, Electronegativity effect (JHS-CHEMISTRY)</i></li> </ul> <p><i>(Refer to the course manual for Upper primary and early grade lesson for their respective new learnings).</i></p> <p>2.2. Ask tutors to discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and barriers related to the concepts are:</i></p> <p><b>Misconceptions: JHS BIOLOGY.....</b>  <i>Students held onto the misconception that the individual names of a flower are the same as the whorl name.</i></p> <p><i>Solution: the individual names of a flower are sepal petal, stamen and carpel/pistil, however, the corresponding whorl names are Calyx, Corolla, Androecium and Gynoecium</i></p>	<p>2.1. In pairs, list the major concepts in the lesson and share with the whole group.</p> <p>2.2. Discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and BARRIERS related to the concepts are:</i></p> <p><b>Misconceptions: JHS BIOLOGY.....</b>  <i>Students held onto the misconception that the individual names of a flower is the whorl name.</i></p> <p><i>Solution: the individual names of a flower are sepal petal, stamen and carpel/pistil, however, the corresponding whorl names are Calyx, Corolla, Androecium and Gynoecium</i></p>	<p><b>15 mins</b></p>
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	<p><b>JHS...CHEMISTRY...</b> <i>All covalent compounds and molecules do not conduct electricity.</i></p> <p><b>Solution:</b> <i>Graphite is a covalent molecule and yet it is a good conductor of electricity because it contains delocalized electrons (free elections).</i></p> <p><b>UP... INTEGRATED SCIENCE.</b>  <i>Learners may hold view that all animals have four legs. E.g. Birds and some reptiles like snakes are not animals.</i></p> <p><b>Solution:</b> <i>Legs alone are not enough to determine whether an organism is an animal or not. E.g. A Bird has two legs but it an animal. Some reptiles like snake have no legs but they are regarded as animals.</i></p> <p><b>Early Grade.....EARLY SCIENCE</b>  <i>Learners may hold the view that plants do not respire but only photosynthesize.</i></p> <p><b>Solution:</b> <i>All living things respire. Plants are living things. Therefore, they respire.</i></p> <p><b>Barriers</b></p> <ol style="list-style-type: none"> <li><i>1. Frequent light outages when doing power point presentations and poor internet connectivity.</i></li> <li><i>2. Insufficient teaching and learning resources.</i></li> </ol>		
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	<p>3. <i>Inability to effectively use ICT tools.</i></p> <p>4. <i>Changes in seasons affect the availability of some teaching and learning resources.</i></p> <p>2.3. Ask tutors to suggest alternative teaching strategies that can be employed to best explain the new concepts. <i>E.g. The use of radio reporter strategy to teach uses of plants and animals and characteristics of covalent and ionic bonds.</i></p>	<p>2.3. Suggest alternative teaching strategies that can be employed to best explain the new concepts.</p>	
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and</li> </ul>	<p>3.1. Lead tutors to read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p><i>Note: Tutors should go through the activities one after the other taking into consideration the time available, resources and nature of learners, coherency and methodology.</i></p> <p>3.1.1. Ask tutors to identify areas that need clarification.</p> <p>3.2. Lead tutors to discuss in their various groups/levels how the different activities would be carried out in both CoE and basic</p>	<p>3.1. Read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p>3.1.1. Identify areas that need clarification.</p> <p>3.2. Discuss in your various groups/levels how the different activities would be carried out in both CoE and basic school</p>	<b>40 mins</b>

<p>identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to support student teacher learning</p> <ul style="list-style-type: none"> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</li> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> </ul> </li> <li>• Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<p>school classroom to achieve the LOs and the LIs of the course manual for lesson 2.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Ask tutors to discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E.g.</i></p> <ol style="list-style-type: none"> <li>1. Give equal chances to females and males to ask and also answer questions in class.</li> <li>2. Assign leadership roles to females.</li> </ol> <p>3.4. Ask tutors to identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p> <p><i>E.g.</i></p> <p>(1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as</p>	<p>classroom to achieve the LOs and the LIs of the course manual for lesson 2.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E.g.</i></p> <ol style="list-style-type: none"> <li>1. Give equal chances to females and males to ask and also answer questions in class.</li> <li>2. Assign leadership roles to females.</li> </ol> <p>3.4. Identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p> <p><i>E.g.</i></p> <p>(1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as</p>	
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	<p><i>teaching and learning resources.</i></p> <p><i>2. Development of problem-solving skills and critical thinking through the use of leading and probing questions.</i></p> <p>3.5. Ask tutors to read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><i>Note:</i>  <i>(1) Inform tutors to ask student teachers to draw a fully labelled diagram of a named flower which clearly depicts the four whorls (e.g. flamboyant/Pride of Barbados). <b>These could be added to their subject portfolio.</b></i>  <i>(2) Encourage tutors to instruct student -teachers to work in groups (in mixed ability, &amp; and pay attention to the composition of females and males during the group work) to use either concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i>  <b><i>This could be one of their subject projects for the semester.</i></b></p>	<p><i>teaching and learning resources.</i></p> <p><i>2. Development of problem-solving skills and critical thinking through the use of leading and probing questions.</i></p> <p>3.5. Read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><i>Note:</i>  <i>(1) Ask student teachers to draw a fully labelled diagram of a named flower which clearly depicts the four whorls (e.g. flamboyant/Pride of Barbados). <b>These could be added to their subject portfolio.</b></i>  <i>(2) Encourage tutors to instruct student -teachers to work in groups (in mixed ability, &amp; and pay attention to the composition of females and males during the group work) to use either concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i>  <b><i>This could be one of their subject projects for the semester.</i></b></p>	
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	<p>3.6. Lead tutors to identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p>E.g. Periodic Tables, Audio-visuals from YouTube, Games, samples of individual tutor learning plans.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. <i>The periodic table should be GESI responsive by being bold, clear, colourful and big enough to be easily noticeable by all learners.</i></li> <li>2. <i>Equal representation of males and females in group formation.</i></li> <li>3. <i>Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></li> <li>4. <i>Refer to theme 1 for different types of games to be used to teach the concepts.</i></li> </ol> <p>3.7. Ensure that every member of the various groups prepares a concrete plan for what they have agreed on to be done to achieving the LOs and LIs of the course manuals.</p> <p><i>NB: In the case of unresolved issues consult the subject leads.</i></p>	<p>3.6. Identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p>E.g. Periodic Tables, Audio-visuals from YouTube, Games, samples of individual tutor learning plans.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. <i>The periodic table should be GESI responsive by being bold, clear, colourful and big enough to be easily noticeable by all learners.</i></li> <li>2. <i>Equal representation of males and females in group formation.</i></li> <li>3. <i>Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></li> <li>4. <i>Refer to theme 1 for different types of games to be used to teach the concepts.</i></li> </ol> <p>3.7. Have concrete plans for what you have agreed on to be done to achieving the LOs and LIs of the course manuals.</p>	
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<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors should identify critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1. Ask tutors to identify a critical friend who took part in the PD session to sit in their class and report on observations made during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 2 needs to be discussed and clarified.</i></p> <p>4.2. Encourage tutors to read lesson 3 from the PD manual and find relevant materials for the next session.</p>	<p>4.1. Identify a critical friend who took part in the PD session to sit in your class during lesson and report on observations made during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 2 needs to be discussed and clarified.</i></p> <p>4.2. Read lesson 3 from the PD manual and find relevant materials for the next session.</p>	<p><b>15 mins</b></p>
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**Age Levels/s:** JHS, Upper Grade and Early Grade

**Name of courses/Subject/s:**

1. Early Grade – Early science.
2. Upper Primary – Integrated Science I.
3. JHS --- Particulate nature of chemistry.
4. JHS ---Environmental biology.

**Lesson Titles:**

**Early Grade:** *How to teach Living and Non-Living things II*

**Upper Primary:** Metals and Non-Metals

**JHS Biology:** Teaching Fruit Formation and Dispersal

**JHS Chemistry:** Teaching Chemical Equations

### Tutor PD Session for Lesson 3

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i>	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.	Time in session
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the</li> </ul>	<p><b>Start the review with an ice breaker.</b></p> <p>1.1. Ask tutors in their respective groups to write one thing they learnt in lesson 2 of the previous PD session on a post in card and tell how it was applied in their teaching at their various grade levels.</p>	<p>1.1. Write one thing you have learnt in lesson 2 of the previous PD session on a post in card and tell how you applied it in your teaching at your various grade levels.</p>	<b>20 mins</b>

<p>lesson up to and including learning outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>1.2. Ask tutors to invite their critical friends to share their observations for a short discussion.</p> <p>1.3. Ask tutors to read and discuss the introductory sections of the lesson including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><b>Note:</b> <i>Lesson topics and lesson descriptions for the various levels are:</i>  <b>JHS- Chemistry: Teaching Chemical Equation.</b>  <b>Lesson Description:</b>  <i>The lesson is designed to provide chemistry student-teachers with the relevant learning experiences and technological skills that will enable them to teach chemical equations creatively through hands-on exploratory learning activities.</i>  <i>(Refer to the course manual for JHS- Biology, Upper primary and early grade lesson introductions/descriptions</i></p> <p>1.3.1. Ask tutors to discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 3 so that</p>	<p>1.2. Invite your critical friends to share their observations for a short discussion.</p> <p>1.3. Read and discuss the introductory sections of the lesson including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p>1.3.1. Discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 3.</p>	
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	<p>they become familiar with them.</p> <p>1.4 Ask tutors to read the content to be covered for lesson 3 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1. Lead tutors to identify the distinctive aspects of the content of the lessons.</p> <p><i>E.g. Distinctive aspects of the lessons</i>  <b>JHS BIOLOGY</b> .....  <i>Dispersal of fruits and seeds</i></p> <p><b>JHS CHEMISTRY</b>.....  <i>Chemical equations in word form</i>  <b>UP</b> .....  <i>Characteristics of metals and non-metals</i>  <b>EARLY GRADE</b> .....  <i>characteristics of living and non-living things, plants and animals</i></p>	<p>1.4. Read the content to be covered for lesson 3 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1. Identify the distinctive aspects of the content of the lessons.</p>	
<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the</li> </ul>	<p>2.1. Ask tutors to be in pairs and list the major concepts in the lesson</p> <p>2.1.2. Ask tutors to share with the whole group.</p> <p>(Refer to the course manual for Upper primary, Early grade and JHS lesson for their respective new learnings).</p>	<p>2.1. In pairs, list the major concepts in the lesson</p> <p>2.1.2. Share with the whole group.</p>	<b>15 mins</b>

<p>lesson, which need to be explored with the SL/HoD</p> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.2. Ask tutors to discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and barriers related to the concepts are:</i></p> <p><b>Misconceptions:</b> <b>JHS BIOLOGY.....</b> <i>Students may have the misconception on dispersal of fruit and seeds</i></p> <p><b>JHS...CHEMISTRY...</b> <i>Inability to comprehend the microscopic behaviour of particles during chemical bonding for symbolic representation may be students misconception</i></p> <p><b>UP....INTEGRATED SCIENCE.</b> <i>Learners may have a misconception on the difference of iron and steel, and prevention of rust</i></p> <p><b>Solution:</b> <i>the use of real materials made of steel and iron in the teaching can help.</i></p> <p><b>Early Grade.....EARLY SCIENCE</b> <i>Student-teachers might stick to the exact activities and methods used in teaching them and therefore may not be creative enough to add other activities.</i></p>	<p>2.2. Discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and barriers related to the concepts are:</i></p> <p><b>Misconceptions:</b> <b>JHS BIOLOGY.....</b> <i>Students may have the misconception on dispersal of fruit and seeds</i></p> <p><b>JHS...CHEMISTRY...</b> <i>Inability to comprehend the microscopic behaviour of particles during chemical bonding for symbolic representation may be students misconception</i></p> <p><b>UP....INTEGRATED SCIENCE.</b> <i>Learners may have a misconception on the difference of iron and steel, and prevention of rust</i></p> <p><b>Solution:</b> <i>the use of real materials made of steel and iron in the teaching can help.</i></p> <p><b>Early Grade.....EARLY SCIENCE</b> <i>Student-teachers might stick to the exact activities and methods used in teaching them and therefore may not be creative enough to add other activities.</i></p>	
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	<p><i>Solution:</i> Allow students to suggest ways in which they would use in the same concept.</p> <p>2.3. Ask tutors to suggest alternative teaching strategies that can be employed to best explain the new concepts.</p> <p><i>E.g. The use of radio reporter strategy to teach uses and characteristics of plants and animals.</i></p>	<p><i>Solution:</i> Allow students to suggest ways in which they would use in the same concept.</p> <p>2.3. Discuss the potential misconceptions and barriers with respect to the concepts listed. Suggest alternative teaching strategies that can be employed to best explain the new concepts.</p>	
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous</li> </ul>	<p>3.1. Lead tutors to read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p><i>Note: Tutors should go through the activities one after the other taking into consideration the time available, resources and nature of learners, coherency and methodology.</i></p> <p>3.1.1 Ask tutors to identify areas that need clarification.</p> <p>3.2. Lead tutors to discuss in their various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 3.</p>	<p>3.1. Read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p>3.1.1. Identify areas that need clarification.</p> <p>3.2. Discuss in your various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 3.</p>	<b>40 mins</b>

<p>assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to support student teacher learning</p> <ul style="list-style-type: none"> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</li> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> </ul> </li> </ul> <p>Tutors should be expected to have a plan for the next</p>	<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Ask tutors to discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E.g.</i></p> <ol style="list-style-type: none"> <li>1. Give equal chances to females and males to ask and also answer questions in class.</li> <li>2. Assign leadership roles to females.</li> </ol> <p>3.4. Ask tutors to identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p> <p><i>E.g.</i></p> <ol style="list-style-type: none"> <li>(1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</li> <li>2. Development of problem and critical thinking through the use</li> </ol>	<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p>3.4. Identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p>	
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<p>lesson for student teachers</p>	<p><i>of leading and probing questions.</i></p> <p>3.5. Ask tutors to read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><b>Note:</b> <i>Encourage tutors to instruct student -teachers to work in groups (in mixed ability, &amp; and pay attention to the composition of females and males during the group work) to use either concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i></p> <p><b>This could be one of their subject projects for the semester.</b></p> <p>3.6. Lead tutors to identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>Eg. 1. Equal representation of males and females in group formation.</i></p> <p><i>2. Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></p>	<p>3.5. Read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><i>Note: Encourage tutors to instruct student -teachers to work in groups (in mixed ability, &amp; and pay attention to the composition of females and males during the group work) to use either concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i></p> <p><b>This could be one of their subject projects for the semester.</b></p> <p>3.6. Identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>Eg. 1. Equal representation of males and females in group formation.</i></p> <p><i>2. Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></p>	
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	<p>3. Refer to theme 1 for different types of games to be used to teach the concepts.</p> <p>3.7. Ensure that every member of the various groups have concrete plans for what they have agreed on to be done to achieving the LOs and LIs of the course manuals.</p> <p><i>NB: In the case of unresolved issues consult the subject leads.</i></p>	<p>3. Refer to theme 1 for different types of games to be used to teach the concepts.</p> <p>3.7. Have concrete plans for what you have agreed on to be done to achieving the LOs and LIs of the course manuals.</p>	
<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors should Identifying critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1. Ask tutors to identify a critical friend who took part in the PD session to sit in their class and report on observations made during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 3 needs to be discussed and clarified.</i></p> <p>4.2. Encourage tutors to read lesson 4 from the PD manual and find relevant materials for the next session.</p>	<p>4.1. Identify a critical friend who took part in the PD session to sit in your class during lesson and report on observations made during next PD session.</p> <p>4.2. Read lesson 4 from the PD manual and find relevant materials for the next session.</p>	<b>15 mins</b>

**Age Levels/s:** Early Grade, Upper Primary, JHS.

**Name of Course/Subject/s:**

1. Early Grade – Early science.
2. Upper Primary – Integrated Science I.
3. JHS --- Particulate nature of chemistry.
4. JHS ---Environmental biology.
- 5.

**Lesson titles:**

**EarlyGrade:** Measurement in Science

**Upper Primary:** Rusting

**JHS. Biology:** Carbon and NitrogenCycle

**JHS. Chemistry:** Teaching Chemical Reactions

### Tutor PD Session for Lesson 4

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i>	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.	Time in session
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the lesson up to and including learning</li> </ul>	<p>Begin the PD session with an ice-breaker</p> <p>1.1. Ask tutors in their respective groups to write one thing they learnt in lesson 3 of the previous PD session on a post in card and tell how it was applied in their teaching at their various grade levels.</p>	<p>1.1. Write one thing you have learnt in lesson 3 of the previous PD session on a post in card and tell how you applied it in your teaching at your various grade levels.</p>	<b>20 mins</b>

<p>outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>1.2. Ask tutors to invite their critical friends to share their observations for a short discussion.</p> <p>1.3. Ask tutors to read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><b>Note:</b> <i>Examples of Lesson 4 topics and lesson descriptions for the various levels are:</i>  <b>JHS Chemistry:</b> <i>Teaching Chemical Reactions.</i></p> <p>Lesson description  <i>Chemical reaction, a process in which one or more substances, the reactants, are converted to one or more different substances, the products. It is a process that leads to the chemical transformation of one set of chemical substances to another.</i></p> <p><b>Early Grade:</b>  <i>Measurement in Science.</i></p> <p><b>Lesson description</b>  <i>In science, a measurement is a collection of quantitative or numerical data that describes a property of an object or event. A measurement is</i></p>	<p>1.2. Invite your critical friends to share their observations for a short discussion.</p> <p>1.3. Read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p>	
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	<p><i>made by comparing a quantity with a standard unit. (Emphasis on SI units).</i></p> <p>1.3.1. Ask tutors to discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 4 so that they become familiar with them.</p> <p>1.4. Ask tutors to read the content to be covered for lesson 4 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1 Lead tutors to identify the distinctive aspects of the content of the lessons. <i>E.g. Distinctive aspects of the lessons:</i></p> <p><b>JHS Biology:</b></p> <ul style="list-style-type: none"> <li>• <i>Concepts (Phases of the cycles of Carbon and Nitrogen)</i></li> <li>• <i>Green House effect</i></li> <li>• <i>How to teach the Nitrogen and Carbon Cycles</i></li> </ul> <p><b>JHS Chemistry:</b> <i>Balancing Chemical equations</i></p> <p><b>Upper Primary:</b></p> <ul style="list-style-type: none"> <li>• <i>Meaning of Rust</i></li> <li>• <i>Causes and effects of rust of metals</i></li> <li>• <i>Methods of preventing rust</i></li> </ul>	<p>1.3.1. Discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 4.</p> <p>1.4. Read the content to be covered for lesson 2 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1. Identify the distinctive aspects of the content of the lessons.</p>	
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	<p><b>Early Grade:</b></p> <ul style="list-style-type: none"> <li>• <i>Measuring mass and Length</i></li> <li>• <i>Measuring Volume and time</i></li> </ul>		
<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Ask tutors to be in pairs and list the major concepts in the lesson and share with the whole group.</p> <p><b>E.g.</b> <i>JHS Chemistry: Cause of rusting.</i> <i>(Refer to the course manual)</i></p> <p>2.2. Ask tutors to discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Refer to the course manuals for some of the barriers that relate to the concepts.</i></p> <p>2.3. Ask tutors to suggest alternative teaching strategies that can be employed to best explain the new concepts.</p> <p><i>Note:</i> <i>Refer to Theme 3 (Talk for learning) for more examples.</i></p>	<p>2.1. In pairs, list the major concepts in the lesson and share with the whole group.</p> <p>2.2. Discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and barriers related to the concepts are:</i></p> <p>2.3. Suggest alternative teaching strategies that can be employed to best explain the new concepts.</p> <p><i>Note:</i> <i>Refer to Theme 3 (Talk for learning) for more examples</i></p>	<b>15 mins</b>
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> </ul>	<p>3.1. Lead tutors to read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p><i>Note: Tutors should go through the activities one after the other taking into</i></p>	<p>3.1. Read and discuss the teaching and learning activities in the course manuals for the various group levels.</p>	<b>40 mins</b>

<ul style="list-style-type: none"> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to support student teacher learning</li> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, Utube, physical resources, power point; how they should be used.</li> </ul> </li> </ul>	<p><i>consideration the time available, resources and nature of learners, coherency and methodology.</i></p> <p>3.1.1. Ask tutors to identify areas that need clarification.</p> <p>3.2. Lead tutors to discuss in their various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 4.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Ask tutors to discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E g.</i></p> <ol style="list-style-type: none"> <li>1. Give equal chances to females and males to ask and also answer questions in class.</li> <li>2. Assign leadership roles to females.</li> </ol> <p><i>Refer to session zero for more examples</i></p>	<p>3.1.1. Identify areas that need clarification.</p> <p>3.2. Discuss in your various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 4.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E g.</i></p> <ol style="list-style-type: none"> <li>1. Give equal chances to females and males to ask and also answer questions in class.</li> <li>2. Assign leadership roles to females.</li> </ol> <p><i>Refer to session zero for more examples</i></p>	
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<p>Consideration needs to be given to local availability</p> <ul style="list-style-type: none"> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> </ul> <p>Tutors should be expected to have a plan for the next lesson for student teachers</p>	<p>3.4. Ask tutors to identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p> <p><i>e.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem and critical thinking through the use of leading and probing questions.</i></p> <p>3.5. Ask tutors to read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><i>Eg. Encourage tutors to instruct student -teachers to work in groups (in mixed ability, &amp; and pay attention to the composition of females and males during the group work) to use either concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i></p>	<p>3.4. Identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p> <p><i>e.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem and critical thinking through the use of leading and probing questions.</i></p> <p>3.5. Read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><i>Eg. Instruct student -teachers to work in groups (in mixed ability, &amp; and pay attention to the composition of females and males during the group work) to use concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i></p>	
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	<p><b><i>This could be one of their subject projects for the semester.</i></b></p> <p>3.6. Lead tutors to identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li><i>1. The resource materials should be GESI responsive by being bold, clear, colorful and big enough to be easily noticeable by all learners.</i></li> <li><i>2. Equal representation of males and females in group formation.</i></li> <li><i>3. Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></li> <li><i>4. Refer to theme 1 for different types of games to be used to teach the concepts.</i></li> </ol> <p>3.7. Ensure that every member of the various groups have concrete plans for what they have agreed on to be done to achieving the LOs and LIs of the course manuals.</p> <p><i>NB: In the case of unresolved issues consult the subject leads.</i></p>	<p><b><i>This could be one of their subject projects for the semester.</i></b></p> <p>3.6. Identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li><i>1. The resource materials should be GESI responsive by being bold, clear, colorful and big enough to be easily noticeable by all learners.</i></li> <li><i>2. Equal representation of males and females in group formation.</i></li> <li><i>3. Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></li> <li><i>4. Refer to theme 1 for different types of games to be used to teach the concepts.</i></li> </ol> <p>3.7. Have concrete plans for what you have agreed on to be done to achieving the LOs and LIs of the course manuals.</p>	
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<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors should Identifying critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1. Ask tutors to identify a critical friend who took part in the PD session to sit in their class and report on observations made during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 4 needs to be discussed and clarified.</i></p> <p>4.2. Encourage tutors to read lesson 5 from the PD manual and find relevant materials for the next session.</p>	<p>4.1. Identify a critical friend who took part in the PD session to sit in your class during lesson and report on observations made during next PD session.</p> <p>4.2. Read lesson 5 from the PD manual and find relevant materials for the next session.</p>	<p><b>15 mins</b></p>
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**Age Levels/s:** Early Grade, Upper Primary, JHS.

**Name of Course/Subject/s:**

1. Early Grade – Early science.
2. Upper Primary – Integrated Science I.
2. JHS --- Particulate nature of chemistry.
3. JHS ---Environmental biology

**Lesson Tittles:**

**Early Grade:** Teaching Measurement in Science

**Upper Primary:** Measurement in Science

**JHS. Biology:** Teaching Farming Systems

**JHS. Chemistry:** Teaching Nature of Solution

### Tutor PD Session for Lesson 5

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i>	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.	Time in session
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the lesson up to and including learning</li> </ul>	<p>Begin the PD session with an ice-breaker</p> <p>1.1. Ask tutors in their respective groups to write one thing they learnt in lesson 4 of the previous PD session on a post in card and tell how it was applied in their teaching at their various grade levels.</p>	<p>1.1. Write one thing you have learnt in lesson 4 of the previous PD session on a post in card and tell how you applied it in your teaching at your various grade levels.</p>	<b>20 mins</b>

<p>outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>1.2. Ask tutors to invite their critical friends to share their observations for a short discussion.</p> <p>1.3. Ask tutors to read and discuss the introductory sections of the lesson including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><b>Note:</b> Lesson 5 topics and lesson descriptions for the various levels are:</p> <p><b>JHS Chemistry:</b> Teaching Nature of solutions</p> <p>Lesson description <i>This lesson will help student teachers to recognize the composition of many solutions and most common way to express concentration</i></p> <p><b>JHS Biology:</b> Teaching Farming systems</p> <p>Lesson description. <i>The lesson examines the process that makes up the cycle and how these processes can be made simple and meaningful to the learners at the Junior High Schools.</i></p> <p><b>Upper Primary:</b> Measurement in Science</p>	<p>1.2. Invite your critical friends to share their observations for a short discussion.</p> <p>1.3. Read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p>	
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	<p><i>Lesson description</i>  <i>Student teachers will engage in measurement activities which will enable them to better understand processes involved in measuring temperature.</i></p> <p><b>Early Grade: Teaching Measurement in Science</b></p> <p><i>Lesson description</i>  <i>This lesson will help the student-teacher to understand how they need to use the everyday materials around children and with what they play with and are used to, in learning measurement in science</i></p> <p>1.3.1. Ask tutors to discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 5 so that they become familiar with them.</p> <p>1.4. Ask tutors to read the content to be covered for lesson 5 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1. Lead tutors to identify the distinctive aspects of the content of the lessons.  E.g. Distinctive aspects of the lessons</p>	<p>1.3.1. Discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 5.</p> <p>1.4. Read the content to be covered for lesson 5 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1. Identify the distinctive aspects of the content of the lessons.</p>	
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	<p><b>JHS Biology:</b></p> <ul style="list-style-type: none"> <li>• Types of Farming systems</li> <li>• Agricultural uses of farming systems</li> </ul> <p><b>JHS Chemistry:</b></p> <ul style="list-style-type: none"> <li>• Types of solutions</li> <li>• Express concentration of a solution (percent by weight, mole fraction, molarity, parts per million, parts per billion)</li> </ul> <p><b>Upper Primary:</b></p> <ul style="list-style-type: none"> <li>• Estimation of temperatures</li> <li>• Meaning of temperature and units of temperature, reading temperature on analogue and digital thermometers, handling and using thermometers</li> </ul> <p><b>Early Grade:</b></p> <ul style="list-style-type: none"> <li>• Developing early grade science activities for teaching Measurement in Science</li> </ul>		
<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need</li> </ul>	<p>2.1. Ask tutors to be in pairs and list the major concepts in the lesson and share with the whole group.</p> <p><b>E.g.</b> Early Grade: Concept measurement in science and misconception (Refer to the course manual for JHS Biology, Upper primary and JHS Chemistry lesson for their respective new learnings).</p>	<p>2.1. In pairs, list the major concepts in the lesson and share with the whole group.</p>	<p><b>15 mins</b></p>

<p>to be explored with the SL/HoD NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.2. Ask tutors to discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and barriers related to the concepts are:</i></p> <p><b>Misconceptions/ Barriers: JHS BIOLOGY.....</b> <i>Student-teachers may not be actively involved in farming at home and therefore may be ignorant about some farming practices</i></p> <p><b>JHS...CHEMISTRY...</b> <i>Student teachers may not have the skills/knowledge in teaching Nature of Solutions I (Types of solutions- unsaturated, saturated, and supersaturated, and how to form/measure different concentrations of solutions) to the Basic School learner</i></p> <p><b>UP....INTEGRATED SCIENCE.</b> <i>Student teachers may have misconceptions of measurements of body temperature that may not be scientific</i></p> <p><b>Early Grade.....EARLY SCIENCE</b> <i>Conversion of units, especially from imperial system to the SI units. Solution: There should be series of activities in the classroom.</i></p>	<p>2.2. Discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and barriers related to the concepts are:</i></p> <p><b>Misconceptions/ Barriers : JHS BIOLOGY.....</b> <i>Student-teachers may not be actively involved in farming at home and therefore may be ignorant about some farming practices</i></p> <p><b>JHS...CHEMISTRY...</b> <i>Student teachers may not have the skills in teaching Nature of Solutions I (Types of solutions- unsaturated, saturated, and supersaturated, and how to form/measure different concentrations of solutions) to the Basic School learner</i></p> <p><b>UP....INTEGRATED SCIENCE.</b> <i>Student teachers may have misconceptions of measurements of body temperature that may not be scientific</i></p> <p><b>Early Grade.....EARLY SCIENCE</b> <i>Conversion of units, especially from imperial system to the SI units. Solution: There should be series of activities in the classroom.</i></p>	
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	<p>2.3. Ask tutors to suggest alternative teaching strategies that can be employed to best explain the new concepts.</p> <p><i>Refer to theme one (creative approaches) for more examples.</i></p>	<p>2.3. Suggest alternative teaching strategies that can be employed to best explain the new concepts.</p>	
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to</li> </ul>	<p>3.1. Ask tutors to read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p><i>Note: Tutors should go through the activities one after the other taking into consideration the time available, resources and nature of learners, coherency and methodology.</i></p> <p>3.1.1. Ask tutors to identify areas that need clarification.</p> <p>3.2. Lead tutors to discuss in their various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 5.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or</li> </ol>	<p>3.1. Read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p>3.1.1. Identify areas that need clarification.</p> <p>3.2. Discuss in your various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 5.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or</li> </ol>	<b>40 mins</b>

<p>support student teacher learning</p> <ul style="list-style-type: none"> <li>● Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</li> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> </ul> </li> <li>● Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<p><i>actions that instil fear in both females and males.</i></p> <p>3.3. Ask tutors to discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E g. 1. Give equal chances to females and males to ask and also answer questions in class.</i></p> <p><i>2. Assign leadership roles to females.</i></p> <p><i>Refer to session zero for more examples</i></p> <p>3.4. Ask tutors to identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p> <p><i>e.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem and critical thinking through the use of leading and probing questions.</i></p> <p>3.5. Ask tutors to read the assessment activities in the various manuals</p>	<p><i>actions that instil fear in both females and males.</i></p> <p>3.3. Discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p>3.4 Identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p> <p><i>e.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem and critical thinking through the use of leading and probing questions.</i></p> <p>3.5. Read the assessment activities in the various manuals and</p>	
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	<p>and identify areas that require clarification.</p> <p><i>Eg. Encourage tutors to instruct student -teachers to work in groups (in mixed ability, &amp; and pay attention to the composition of females and males during the group work) to use concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i></p> <p><b><i>This could be one of their subject projects for the semester.</i></b></p> <p>3.5. Lead tutors to identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li><i>1. The resource materials should be GESI responsive by being bold, clear, colorful and big enough to be easily noticeable by all learners.</i></li> <li><i>2. Equal representation of males and females in group formation.</i></li> <li><i>3. Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></li> <li><i>4. Refer to theme 1 for different types of games</i></li> </ol>	<p>identify areas that require clarification.</p> <p><i>Eg. Instruct student -teachers to work in groups (in mixed ability, &amp; and pay attention to the composition of females and males during the group work) to use concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i></p> <p><b><i>This could be one of their subject projects for the semester.</i></b></p> <p>3.5. Identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li><i>1. The resource materials should be GESI responsive by being bold, clear, colorful and big enough to be easily noticeable by all learners.</i></li> <li><i>2. Equal representation of males and females in group formation.</i></li> <li><i>3. Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></li> <li><i>4. Refer to theme 1 for different types of games</i></li> </ol>	
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	<p><i>to be used to teach the concepts.</i></p> <p>3.6. Ensure that every member of the various groups have concrete plans for what they have agreed on to be done to achieving the LOs and LIs of the course manuals.</p> <p><i>NB: In the case of unresolved issues consult the subject leads.</i></p>	<p><i>to be used to teach the concepts.</i></p> <p>3.6. Have concrete plans for what you have agreed on to be done to achieving the LOs and LIs of the course manuals.</p>	
<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors should Identifying critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1. Ask tutors to identify a critical friend who took part in the PD session to sit in their class and report on observations made during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 5 needs to be discussed and clarified.</i></p> <p>4.2. Encourage tutors to read lesson 6 from the PD manual and find relevant materials for the next session.</p>	<p>4.1. Identify a critical friend who took part in the PD session to sit in your class during lesson and report on observations made during next PD session.</p> <p>4.2. Read lesson 6 from the PD manual and find relevant materials for the next session.</p>	<b>15 mins</b>

**AGE LEVELS:** JHS (BIOLOGY), JHS (CHEMISTRY), UPPER PRIMARY **AND** EARLY GRADE

**NAME OF SUBJECT(S)/COURSE**

Environmental biology  
 Particulate nature of chemistry  
 Integrated Science I.  
 Early Science

**Lesson tittle**

Course Review 1 and STS Seminar  
 Course Review 1 and STS Seminar  
 Course Review 1 and STS Seminar  
 Course Review 1 and STS Seminar

**Tutor PD Session for Lesson 6**

<p><b>Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.</b></p>	<p><b>Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i></b></p>	<p><b>Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.</b></p>	<p><b>Time in session</b></p>
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the lesson up to and</li> </ul>	<p><b>Introduce the session with an ice-breaker.</b></p> <p>1.1. Give post-it cards to your colleagues and ask them to write their reflections of PD sessions 1, 2, 3, 4 and 5 on it based on the following: positives, challenges and suggestion to improve on the next PD sessions.</p>	<p>1.1. Write down your reflections of PD sessions 1,2,3,4 and 5 on the post-it card given you based on the following: positives, challenges and suggestions to improve on the next PD sessions.</p>	<p><b>20 mins</b></p>

<p>including learning outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>1.1.1. Ask tutors use Think-pair-share to present their reflections.</p> <p>1.2. Ask tutors who served as critical friends in lessons 1,2,3,4 and 5 to give a summary of their observations on the enactment of lessons 1,2,3,4 and 5.</p> <p><i>Note: Tutors should be reminded of areas of their previous lessons that need improvement.</i></p> <p>1.3. Encourage tutors in their phase groups to discuss the important or distinctive features of lessons 1, 2, 3, 4 and 5 and share them with the whole group.</p> <p>1.4. Guide tutors to brainstorm on how GESI issues were promoted in the CoE and basic school classrooms during the enactment of lessons 1, 2, 3, 4 and 5 beginning with lesson planning, selection of teaching learning resources (TLRs), classroom setup and gender responsive language and interactions.</p> <p><i>E.g. Gender Responsive Language Interactions.</i> <i>The Teacher:</i></p>	<p>1.1.1. Share your reflections with a colleague and then with the larger group.</p> <p>1.2. Critical friends give summary of their observations on the enactment of lessons 1,2,3,4 and 5.</p> <p>1.3. Discuss the important or distinctive features of lessons 1, 2, 3, 4 and 5 and share them with the whole group.</p> <p>1.4. Brainstorm on how GESI issues were promote in the CoE and basic classrooms during the enactment of lessons 1, 2, 3, 4 and 5 beginning with lesson planning, selection of teaching learning resources (TLRs), classroom setup and gender responsive language and interactions.</p> <p><i>E.g. Gender Responsive Language Interactions.</i> <i>The Teacher:</i></p>
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	<i>Does not use negative expressions or language that demeans, excludes, or gives females the impression that they are not as intelligent or do not need to perform as well as males (e.g. Engineering is for men, girls don't play football)</i>	<i>Does not use negative expressions or language that demeans, excludes, or gives females the impression that they are not as intelligent or do not need to perform as well as males (e.g. Engineering is for men, girls don't play football)</i>	
<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Ask tutors in their distinctive groups to list new learning areas in lessons 1, 2, 3, 4 and 5 that they were unable to explain properly to the student teachers in the enactment of those lessons.</p> <p>2.1.1. Ask one tutor in each distinct group to model the selected concept(s) and appropriate activities to be employed in teaching them.</p> <p><i>For example, modeling the teaching of the concept of gaseous exchange/breathing and cellular/tissue respiration.</i></p> <p>2.2. Lead tutors to discuss unresolved misconceptions and potential barriers in teaching and learning of lessons 1, 2, 3, 4 and 5 from the various phases.</p>	<p>2.1. In your distinctive groups, list new learning areas in lessons 1, 2, 3, 4 and 5 that you were unable to explain properly to the student teachers in the enactment of those lessons.</p> <p>2.1.1. Model the selected concept(s) and appropriate activities to be employed in teaching them.</p> <p><i>For example, modeling the teaching of the concept of gaseous exchange/breathing and cellular/tissue respiration.</i></p> <p>2.2. Discuss unresolved misconceptions and potential barriers in teaching and learning of lessons 1, 2, 3, 4 and 5 from the various phases.</p>	<b>15 mins</b>
<b>3. Planning for teaching, learning and assessment</b>	3.1. In their phase groups, ask tutors to recount the teaching	3.1. Ask tutors to recount the teaching and learning activities	<b>40 mins</b>

<p><b>activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to support student teacher learning</li> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material:</li> </ul> </li> </ul>	<p>and learning activities employed to teach lessons 1, 2, 3, 4, and 5.</p> <p>3.2. Encourage tutors to tell how they implemented the following:</p> <ol style="list-style-type: none"> <li>i. Provision for physically challenged persons and persons with other forms of disability.</li> <li>ii. Taking gender leading roles in group task.</li> <li>iii. Distribution of questions to different categories of learners based on gender, ability, previous experience, etc. referring to NTS 1a, b, c, d, 2b, e, f, 3b, c</li> </ol> <p>3.3. Ask tutors to discuss the appropriateness of all the activities outlined in their respective course manuals and identify those that require clarification in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 1,2,3,4,5and 5.</p> <p>3.4. Ask tutors to think-pair-share how they integrated GESI issues related to the teaching and learning activities of lessons 1,2,3,4 and 5.</p> <p><i>E.g. i. The lesson plan/proforma should make allowance for</i></p>	<p>employed to teach lessons 1, 2, 3, 4, and 5.</p> <p>3.2. Tell how you implemented the following:</p> <ol style="list-style-type: none"> <li>i. Provision for physically challenged persons and persons with other forms of disability.</li> <li>ii. Taking gender leading roles in group task.</li> <li>iii. Distribution of questions to different categories of learners based on gender, ability, previous experience, etc. referring to NTS 1a, b, c, d, 2b, e, f, 3b, c</li> </ol> <p>3.3. Discuss the appropriateness of all the activities outlined in your respective course manuals and identify those that require clarification in both CoE and basic school classrooms to achieve the LOs and the LIs of the course manual for lessons 1,2,3,4, and 5.</p> <p>3.4. Individually think about how you integrated GESI issues related to the teaching and learning activities of lessons 1,2,3,4 and 5.</p> <p><i>E.g. I. The lesson plan/proforma should make allowance for all</i></p>	
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<p>literature, on web, Youtube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</p> <ul style="list-style-type: none"> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> <li>● Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<p><i>all students to participate in the learning activity.</i></p> <p><i>ii. When doing science experiments, ensure that girls, boys and students with disability have a chance to use the equipment and chemicals.</i></p> <p><i>iii. There should also be equal participation in such activities as making presentations.</i></p> <p><i>iv. When assigning projects, ensure that both females and males are given leadership positions and roles.</i></p> <p><i>v. Take into account how the learning materials will be distributed equally to both girls and boys, especially in case of shortage.</i></p> <p>3.5. Ask tutors to list the 21<sup>st</sup> century skills that were developed or applied in lessons 1, 2, 3, 4 and 5 on post-it card.</p> <p><i>E.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem-solving skills and critical thinking through the use of leading and probing questions.</i></p>	<p><i>students to participate in the learning activity.</i></p> <p><i>ii. When doing science experiments, ensure that girls, boys and students with disability have a chance to use the equipment and chemicals.</i></p> <p><i>iii. There should also be equal participation in such activities as making presentations.</i></p> <p><i>iv. When assigning projects, ensure that both females and males are given leadership positions and roles.</i></p> <p><i>v. Take into account how the learning materials will be distributed equally to both girls and boys, especially in case of shortage.</i></p> <p>3.5. List the 21<sup>st</sup> century skills that were applied in lessons 1, 2, 3, 4 and 5 on post-it card.</p> <p><i>E.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem-solving skills and critical thinking through the use of leading and probing questions.</i></p>	
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	<p>3.5.1. Encourage tutors to share with the whole group how they helped student teachers to apply 21<sup>st</sup> century skills through STS activities.</p> <p>3.6. In their phases, ask tutors to tell the whole group the assessment activities in the various manuals and explain areas that require clarification.</p> <p><i>Examples:</i>  <i>(1) Ask student teachers to draw a fully labelled diagram of the human digestive system and the vertical section of the human tooth.</i>  <b>(2)</b> Design a simple experiment with boiling water (a straw can be used to colour the bottom of the water) to demonstrate convection currents.  <b><i>This exercise should be added to the student teacher's subject portfolio.</i></b></p> <p>3.7. Lead tutors to recount the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>E.g. Overhead projector, Laptop, Audio-visuals from YouTube, Games, samples of individual tutor</i></p>	<p>3.5.1. Share with the whole group how you helped student teachers to apply 21<sup>st</sup> century skills through STS activities.</p> <p>3.6. Tell the whole group the assessment activities in the various manuals and explain areas that require clarification.</p> <p>3.7. Recount the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>E.g. Overhead projector, Laptop, Audio-visuals from YouTube, Games, samples of individual tutor learning</i></p>	
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	<p><i>learning plans, Models/Drawings of the human digestive system and human dentition, Computer animations.</i></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li><i>1. The drawings of the human digestive system and teeth should be GESI responsive by being bold, clear, colourful and big enough to be easily noticeable by all learners.</i></li> <li><i>2. Equal representation of males and females in group formation.</i></li> <li><i>3. Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></li> <li><i>4. Refer to theme 1 for different types of games to be used to teach the concepts.</i></li> </ol>	<p><i>plans, Models/Drawings of the human digestive system and human dentition, Computer animations.</i></p>	
<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors should Identifying critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1. Engage tutors to provide feedback of the PD sessions 1,2,3,4 and 5 taking into consideration – Clarity of concepts and various contents delivered, pedagogical approaches employed, ICT integration, GESI issues, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 7.</p> <p>4.2. Engage tutors to identify unresolved</p>	<p>4.1. Provide feedback on this PD sessions 1,2,3,4 and 5 taking into consideration – Clarity of concepts and various contents delivered, pedagogical approaches employed, ICT integration, GESI issues, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi)? and make notes that will help you to teach Lesson 7.</p> <p>4.2. Identify unresolved issues relating to</p>	<b>15 mins</b>

	<p>issues relating to lessons 1,2,3,4, and 5 for clarification.</p> <p><b>N/B:</b> <i>Take note of all other unresolved issues that may need further research or consultation and use any of following strategies to address them.</i></p> <p><i>i. put on SL/SWL WhatsApp or Telegram platform for discussion</i></p> <p><i>ii. tutors to research on those unresolved issues that persist for the next PD session for discussion.</i></p> <p>4.3. Ask tutors who were identified as critical friends of lessons 1,2,3,4 and 5 to also observe the enactment of lesson 7 and provide feedback during the next PD Session (NTS 1a).</p>	<p>lessons 1,2,3,4, and 5 for clarification.</p> <p><b>N/B:</b> <i>Take note of all other unresolved issues that may need further research or consultation and use any of following strategies to address them.</i></p> <p><i>i. put on SL/SWL WhatsApp or Telegram platform for discussion</i></p> <p><i>ii. tutors to research on those unresolved issues that persist for the next PD session for discussion.</i></p> <p>4.3. Identify critical friends for lessons 1,2,3,4, and 5 to also observe the enactment of lesson 7 and provide feedback during the next PD Session (NTS 1a).</p>	
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**NAME OF SUBJECT(S)/COURSE**

JHS (Biology) -Environmental biology  
 JHS (Chemistry) -Particulate nature of chemistry  
 Upper Primary -Integrated Science I.  
 Early Grade- Early Science

**LESSON TITLES**

JHS (Biology) -Teaching Respiratory System  
 JHS (Chemistry)- Teaching Solubility  
 Upper Primary -Misconceptions about Measurement in Science  
 Early Grade- Sun and Earth

**Tutor PD Session for Lesson 7**

<b>Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.</b>	<b>Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i></b>	<b>Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.</b>	<b>Time in session</b>
<b>1. Introduction to the session</b> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the lesson up to and</li> </ul>	<b>Start the review of the prior learning with an ice breaker.</b> <p>1.1. Ask tutors in their distinctive groups to write two things that didn't go on well in the reviewed lesson of the previous PD session on a post in card and tell, at their various grade levels, how it affected the session.</p>	<p>1.1. Write two things that didn't go on well in the reviewed lesson of the previous PD session on a post in card and tell, in your various grade levels, how it affected the session.</p>	<b>20 mins</b>

<p>including learning outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>1.2. Ask tutors to invite their critical friends to share their observations and have a short discussion on what needs to be improved</p> <p>1.3. Ask tutors to read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><b>Note:</b> Lesson 7 topics and lesson descriptions for the various levels are: <b>JHS- Biology:</b> Topic - Teaching Respiratory System.</p> <p><i>Lesson Description</i> <i>This lesson describes the respiratory processes and emphasizes on the teaching skills obtained for teaching specific science lesson.</i></p> <p><i>(Refer to the course manual for JHS- Chemistry, Upper primary and early grade lesson introductions/descriptions.</i></p> <p><i>N.B. Inform tutors that the grouping for this PD session will be done based on the following levels: Early grade, upper primary and JHS.</i></p>	<p>1.2. Invite your critical friends to share their observations for a short discussion on what needs to be improved.</p> <p>1.3. Read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><b>Note:</b> Lesson 7 topics and lesson descriptions for the various levels are: <b>JHS- Biology:</b> Topic - Teaching Respiratory System.</p> <p><i>Lesson Description</i> <i>This lesson describes the respiratory processes and emphasizes on the teaching skills obtained for teaching specific science lesson.</i></p> <p><i>(Refer to the course manual for JHS- Chemistry, Upper primary and early grade lesson introductions/descriptions.</i></p>	
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	<p>1.3.1. Ask tutors to discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 7 so that they become familiar with them.</p> <p>1.4. Ask tutors to read the content to be covered for lesson 7 in their respective groups in order to acquaint themselves with the areas and their appropriateness.</p> <p>1.4.1. Lead tutors to identify the distinctive aspects of the content of the lessons. <i>E.g. Distinctive aspects of the lesson 7 are:</i></p> <p><b>JHS BIOLOGY .....</b> <i>Respiratory system, Pharynx, Larynx, Trachea, Bronchi, Bronchioles, Alveoli, Diaphragm.</i></p> <p><b>JHS Chemistry...Solubility, Solute, Solvent, Stable solution, Factors/Conditions that affect solubility</b></p> <p><b>UP Grade .....</b> <i>Temperature, Physical measure (Area/volume of plane figures, Mass/weight)</i></p> <p><b>Early Grade .....</b> <i>Objects in the sky: sun, moon, and stars.</i> <i>The Sun</i> <i>The Earth</i></p>	<p>1.3.1. Discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 7.</p> <p>1.4. Read the content to be covered for lesson 7 in your respective groups in order to acquaint yourselves with the areas and their appropriateness.</p> <p>1.4.1. Identify the distinctive aspects of the content of the lessons. <i>E.g. Distinctive aspects of the lesson 7 are:</i></p> <p><b>JHS BIOLOGY .....</b> <i>Respiratory system, Pharynx, Larynx, Trachea, Bronchi, Bronchioles, Alveoli, Diaphragm.</i></p> <p><b>JHS Chemistry...Solubility, Solute, Solvent, Stable solution, Factors/Conditions that affect solubility</b></p> <p><b>UP Grade .....</b> <i>Temperature, Physical measure (Area/volume of plane figures, Mass/weight)</i></p> <p><b>Early Grade .....</b> <i>Objects in the sky: sun, moon, and stars.</i> <i>The Sun</i> <i>The Earth</i></p>	
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<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Ask tutors to be in pairs and list the major concepts in the lesson and share with the whole group.</p> <p><i>E.g.</i></p> <ul style="list-style-type: none"> <li>• <i>Breathing/gaseous exchange and tissue/cellular respiration. Pronunciation of terms such as pharynx, larynx, bronchia and bronchioles. (JHS – BIOLOGY)</i></li> <li>• <i>Solubility, Factors that affect Solubility (temperature, pressure stirring and particle size). (JHS-CHEMISTRY)</i></li> <li>• <i>Meaning of temperature, Physical measure (Area/volume of plane figures, Differences Mass and weight. (UP)</i></li> <li>• <i>Distinction among heavenly bodies such as sun, moon, and stars.</i></li> <li>• <i>The Sun</i></li> <li>• <i>The Earth (Early Grade)</i></li> </ul> <p>2.2. Ask tutors to discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and</i></p>	<p>2.1. In pairs, list the major concepts in the lesson and share with the whole group.</p> <p>2.2. Discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and</i></p>	<p><b>15 mins</b></p>
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	<p><i>barriers related to the concepts are:</i></p> <p><b>Misconceptions:</b> <b>JHS BIOLOGY.....</b> <i>Students hold the misconception that gaseous exchange or breathing is the same as tissue/cellular respiration.</i></p> <p><b>Solution:</b> <i>Gaseous exchange or breathing which is also referred to as external respiration simply refers to intake of oxygen and giving out of carbon dioxide. It is a physical process, occurs out the cell and does not produce any amount of energy. However, tissue/cellular respiration refers to the sum total of chemical reactions that occur in food within the cells with or without the participation of molecular oxygen.</i></p> <p><b>JHS...CHEMISTRY...</b> <i>Students held the view that all salts are soluble.</i></p> <p><b>Solution:</b> <i>It is not all salts that are soluble. E.g. Calcium sulfate and Barium sulfate, Silver chloride. However, soluble salts include: All common sodium, potassium and ammonium salts.</i></p> <p><b>UP.... INTEGRATED SCIENCE.</b> <i>Learners may hold view that when they touch an</i></p>	<p><i>barriers related to the concepts are:</i></p> <p><b>Misconceptions:</b> <b>JHS BIOLOGY.....</b> <i>Students hold the misconception that gaseous exchange or breathing is the same as tissue/cellular respiration.</i></p> <p><b>Solution:</b> <i>Gaseous exchange or breathing which is also referred to as external respiration simply refers to intake of oxygen and giving out of carbon dioxide. It is a physical process, occurs out the cell and does not produce any amount of energy. However, tissue/cellular respiration refers to the sum total of chemical reactions that occur in food within the cells with or without the participation of molecular oxygen.</i></p> <p><b>JHS...CHEMISTRY...</b> <i>Students held the view that all salts are soluble.</i></p> <p><b>Solution:</b> <i>It is not all salts that are soluble. E.g. Calcium sulfate and Barium sulfate, Silver chloride. However, soluble salts include: All common sodium, potassium and ammonium salts.</i></p> <p><b>UP.... INTEGRATED SCIENCE.</b> <i>Learners may hold view that when they touch an</i></p>	
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	<p><i>object, they feel the temperature.</i></p> <p><b>Solution:</b> <i>We do not feel temperature, rather we feel the rate at which heat is conducted towards or away from our hands. Two objects can be at the same temperature, yet if one has a higher conductivity, it will feel colder.</i></p> <p><b>Early Grade.....EARLY SCIENCE</b>  <i>Learners may hold the view that the moon produces its own light.</i></p> <p><i>Solution: The moon does not produce its own light. Moonlight is actually sunlight that shines on the moon and bounces off, the light reflects off old volcanoes, craters, and lava flows on the moon's surface</i></p> <p><b>Barriers</b>  <i>The following may be barriers for this lesson:</i></p> <ol style="list-style-type: none"> <li><i>1. Frequent light outages and poor internet connectivity.</i></li> <li><i>2. Insufficient teaching and learning resources.</i></li> <li><i>3. Inability to effectively use ICT tools.</i></li> <li><i>4. Changes in seasons affect the availability of some teaching and learning resources.</i></li> </ol> <p>2.3. Ask tutors in their respective group levels to identify the most appropriate</p>	<p><i>object, they feel the temperature.</i></p> <p><b>Solution:</b> <i>We do not feel temperature, rather we feel the rate at which heat is conducted towards or away from our hands. Two objects can be at the same temperature, yet if one has a higher conductivity, it will feel colder.</i></p> <p><b>Early Grade.....EARLY SCIENCE</b>  <i>Learners may hold the view that the moon produces its own light.</i></p> <p><i>Solution: The moon does not produce its own light. Moonlight is actually sunlight that shines on the moon and bounces off, the light reflects off old volcanoes, craters, and lava flows on the moon's surface</i></p> <p><b>Barriers</b>  <i>The following may be barriers for this lesson:</i></p> <ol style="list-style-type: none"> <li><i>1. Frequent light outages and poor internet connectivity.</i></li> <li><i>2. Insufficient teaching and learning resources.</i></li> <li><i>3. Inability to effectively use ICT tools.</i></li> <li><i>4. Changes in seasons affect the availability of some teaching and learning resources.</i></li> </ol> <p>2.3. In your respective group levels, identify the most appropriate teaching strategies</p>	
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	<p>teaching strategies that can be employed to best explain the new concepts.</p> <p><i>E.g. The use of talk for learning strategy (group presentations) to teach the concept of human respiratory system and concepts of the sun, stars and the moon.</i></p>	<p>that can be employed to best explain the new concepts.</p> <p><i>E.g. The use of talk for learning strategy (group presentations) to teach the concept of human respiratory system and concepts of the sun, stars and the moon.</i></p>	
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities</li> </ul>	<p>3.1. Guide tutors to read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p><i>Note: Tutors should go through the activities one after the other taking into consideration the time available, resources and nature of learners, coherency and methodology.</i></p> <p>3.1.1. Assist tutors to identify areas that need clarification.</p> <p>3.2. Lead tutors to discuss in their various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 7.</p>	<p>3.1. Read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p><i>Note: Tutors should go through the activities one after the other taking into consideration the time available, resources and nature of learners, coherency and methodology.</i></p> <p>3.1.1. Identify areas that need clarification.</p> <p>3.2. Discuss in your various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 7.</p>	<b>40 mins</b>

<p>to use continuous assessment to support student teacher learning</p> <ul style="list-style-type: none"> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, You-tube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</li> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> </ul> </li> <li>• Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into accounts that some students are physically challenged or slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Ask tutors to discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p>E.g.</p> <ol style="list-style-type: none"> <li>1. Make sure mix ability groups are formed and females and males are equally represented.</li> <li>2. Assign leadership roles to females.</li> </ol> <p>3.4. Ask tutors to identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school leaners to develop these skills through STS activities.</p> <p><i>E.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem-solving skills and critical thinking through</i></p>	<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into accounts that some students are physically challenged or slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p>E.g.</p> <ol style="list-style-type: none"> <li>1. Make sure mix ability groups are formed and females and males are equally represented.</li> <li>2. Assign leadership roles to females.</li> </ol> <p>3.4. Identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school leaners to develop these skills through STS activities.</p> <p><i>E.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem-solving skills and critical thinking through</i></p>	
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	<p><i>the use of probing and leading questions.</i></p> <p>3.5. Ask tutors to read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><i>Note:</i>  <i>(1) Inform tutors to ask student teachers to draw a fully labelled diagram of the human respiratory system. The student teachers should also provide one function each of the following respiratory structures: Nostril, Pharynx, Larynx, Trachea, Bronchi, Bronchioles, Alveoli and Diaphragm. <b>These could be added to their subject portfolio.</b></i>  <i>(2) Encourage tutors to instruct student -teachers to work in groups. Groups should be inclusive, multi-age, and developmentally appropriate. Besides, they should also pay attention to the composition of females and males during the group work) to use either concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i>  <b><i>This could be one of their subject projects for the semester.</i></b></p>	<p><i>the use of probing and leading questions.</i></p> <p>3.5. Read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><i>Note:</i>  <i>(1) Inform tutors to ask student teachers to draw a fully labelled diagram of the human respiratory system. The student teachers should also provide one function each of the following respiratory structures: Nostril, Pharynx, Larynx, Trachea, Bronchi, Bronchioles, Alveoli and Diaphragm. <b>These could be added to their subject portfolio.</b></i>  <i>(2) Encourage tutors to instruct student -teachers to work in groups. Groups should be inclusive, multi-age, and developmentally appropriate. Besides, they should also pay attention to the composition of females and males during the group work) to use either concept maps, simulations or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i>  <b><i>This could be one of their subject projects for the semester.</i></b></p>	
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	<p>3.6. Guide tutors to brainstorm the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>E.g. Computer animations, Games, Audio-visuals from YouTube, samples of individual tutor learning plans.</i></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Equal representation of males and females in pictures.</li> <li>2. Make sure the resources are enough and appropriate to all learners (males, females and physically challenge)</li> </ol> <p>3.7. Make sure that every tutor in the distinct groups prepares a concrete plan for teaching the given topics, thus, the activities agreed on by the group to be followed in order to achieve the LOs and LIs for the varied lesson 7.</p> <p><i>NOTE: In the case of unresolved issues consult the subject leads.</i></p>	<p>3.6. Brainstorm the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>E.g. Computer animations, Games, Audio-visuals from YouTube, samples of individual tutor learning plans.</i></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Equal representation of males and females in pictures.</li> <li>2. Make sure the resources are enough and appropriate to all learners (males, females and physically challenge)</li> </ol> <p>3.7. Prepare a concrete plan for teaching the given topics, thus, the activities agreed on by the group to be followed by every tutor in their distinct groups.</p> <p><i>NOTE: In the case of unresolved issues consult the subject leads.</i></p>	
<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors should Identifying critical friends to observe lessons and report at next session.</li> </ul>	<p>4.1. Ask tutors to identify a critical friend who took part in the 7th PD session to sit in their class during lesson and report on observations made</p>	<p>4.1. Identify a critical friend who took part in the 7th PD session to sit in their class during lesson and report on observations made</p>	<p><b>15 mins</b></p>

<ul style="list-style-type: none"> <li>Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 2 needs to be discussed and clarified.</i></p> <p>4.2. Encourage tutors to read lesson 8 from both the PD and course manuals and find other relevant materials for the next session PD session.</p>	<p>during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 2 needs to be discussed and clarified.</i></p> <p>4.2. Read lesson 8 from both the PD and course manuals and find other relevant materials for the next PD session.</p>	
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**NAME OF SUBJECT(S)/COURSE**

JHS (Biology) -Environmental biology  
 JHS (Chemistry) -Particulate nature of chemistry  
 Upper Primary -Integrated Science I.  
 Early Grade- Early Science

**LESSON TITLES**

JHS (Biology) - Teaching the Digestive System  
 JHS (Chemistry)- Teaching Colloids I  
 Upper Primary - Teaching Ventilation I  
 Early Grade- Night and Day I

**Tutor PD Session for Lesson 8**

<p><b>Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.</b></p>	<p><b>Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i></b></p>	<p><b>Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.</b></p>	<p><b>Time in session</b></p>
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the lesson up to and including learning outcomes and indicators</li> </ul>	<p><b>Start the review of the prior learning with an ice breaker.</b></p> <p>1.1 Ask tutors in their distinct groups to write two things that went on well and one thing that didn't go on well in lesson 7 on a post in card and share with the whole group.</p> <p>1.2. Ask tutors to invite their critical friends to share their observations.</p>	<p>1.1. Write two things that went on well and one thing that didn't go on well in lesson 7 on a post in card and share with the whole group.</p> <p>1.2. Invite your critical friends to share their observations.</p>	<p><b>20 mins</b></p>

<ul style="list-style-type: none"> <li>Overview of content and identification of any distinctive aspects of the lesson/s, NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</li> </ul>	<p><i>NOTE: Subject lead compares what the individual tutors had written with the observations made by the critical friends to make sure that diligent observation went on.</i></p> <p>1.3. Ask tutors to read and discuss the introductory sections of the lessons up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><b>Note:</b> Lesson 8 topics and lesson descriptions for the various levels are: <b>UP:</b> Topic – <i>Teaching Ventilation I.</i></p> <p><i>Lesson Description</i> This lesson exposes student-teachers to the concept of Convection as heat transfer due to the bulk movement of molecules within fluids such as gases and liquids. (Refer to the course manual for JHS-Chemistry, JHS-Biology and Early grade lesson introductions/descriptions</p> <p><i>N.B. Inform tutors that the grouping for this PD session will be done based on the following levels: Early grade, upper primary, JHS-Biology and JHS-Chemistry.</i></p>	<p>1.3. Read and discuss the introductory sections of the lessons up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p>	
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	<p>1.3.1. Ask tutors to discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 8 so that they become familiar with them.</p> <p>1.4. Ask tutors to read the content to be covered for lesson 8 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1 Using probing questions, lead tutors to identify the distinctive aspects of the contents of the lessons.</p> <p><i>E.g. Distinctive aspects of the lessons</i></p> <p><b>JHS BIOLOGY</b> .....</p> <p><i>Enzymes and Digestion</i> <i>Dentition</i> <i>Teaching how to teach the digestive system</i></p> <p><b>JHS CHEMISTRY</b>.....</p> <p><i>Concepts on colloid formation</i> <i>Types of colloids</i></p> <p><b>UP</b> .....</p> <p><i>Meaning of convection</i> <i>Convection currents</i></p> <p><b>EARLY GRADE</b> .....</p> <p><i>Position of the sun</i> <i>Causes of day and night</i></p>	<p>1.3.1. Discuss the CLOs and LIs of the learning areas to be covered in the PD sessions for lesson 8.</p> <p>1.4. Read the content to be covered for lesson 8 in their respective groups in order to acquaint themselves with the areas.</p> <p>1.4.1 Identify the distinctive aspects of the contents of the lessons.</p> <p><i>E.g. Distinctive aspects of the lessons</i></p> <p><b>JHS BIOLOGY</b> .....</p> <p><i>Enzymes and Digestion</i> <i>Dentition</i> <i>Teaching how to teach the digestive system</i></p> <p><b>JHS CHEMISTRY</b>.....</p> <p><i>Concepts on colloid formation</i> <i>Types of colloids</i></p> <p><b>UP</b> .....</p> <p><i>Meaning of convection</i> <i>Convection currents</i></p> <p><b>EARLY GRADE</b> .....</p> <p><i>Position of the sun</i> <i>Causes of day and night</i></p>	
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<p><b>2 Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Ask tutors to be in pairs and list the new learning areas in the lesson and share with the whole group.</p> <p><b>E.g.</b></p> <ul style="list-style-type: none"> <li>• <i>Enzymes and digestion. Does carbohydrate and protein digestion go on in the mouth? (JHS – BIOLOGY)</i></li> <li>• <i>Position of the sun Causes of day and night. (EARLY GRADE)</i></li> </ul> <p><i>(Refer to the course manual for JHS-Chemistry and Upper Primary lessons for their respective new learning areas).</i></p> <p>2.2. Ask tutors to discuss the potential misconceptions and barriers with respect to the new learning areas listed.</p> <p><i>NB: Some of the misconceptions and barriers related to the concepts are:</i></p> <p><b>Misconceptions: JHS BIOLOGY.....</b>  <i>Students held onto the misconception that chemical digestion of proteins starts in the mouth and ends in the small intestine.</i></p>	<p>2.1. In pairs, list the major concepts in the lesson and share with the whole group.</p> <p><b>E.g.</b></p> <ul style="list-style-type: none"> <li>• <i>Enzymes and digestion. Does carbohydrate and protein digestion go on in the mouth? (JHS – BIOLOGY)</i></li> <li>• <i>Position of the sun Causes of day and night. (EARLY GRADE)</i></li> </ul> <p><i>(Refer to the course manual for JHS-Chemistry and Upper Primary lessons for their respective new learning areas).</i></p> <p>2.2. Discuss the potential misconceptions and barriers with respect to the concepts listed.</p> <p><i>NB: Some of the misconceptions and BARRIERS related to the concepts are:</i></p> <p><b>Misconceptions: JHS BIOLOGY.....</b>  <i>Students held onto the misconception that the individual names of a flower is the whorl name.</i></p> <p><i>Solution: Misconceptions: JHS BIOLOGY.....</i>  <i>Students held onto the misconception that chemical digestion of proteins starts in the mouth and ends in the small intestine.</i></p>	<p><b>15 mins</b></p>
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	<p><i>Solution: The chemical digestion of proteins does not start in the month because mucous secreted by the salivary gland helps lubricate and hold masticated foods together in a clump called a bolus. The enzyme amylase or ptyalin presents in the saliva/masticated food from the mouth continue its breakdown of only carbohydrate in the month. Protein digestion starts in the stomach.</i></p> <p><b>JHS...CHEMISTRY...</b>  <i>Learners held the view that colloid is a homogenous mixture or a heterogenous solution.</i></p> <p><b>Solution:</b> <i>A colloid is a <b>homogeneous</b> solution with intermediate particle size between a solution and a suspension. Colloid particles may be seen in a beam of light such as dust in air in a "shaft" of sunlight. Milk, fog, and jello are examples of colloids. In contrast a suspension is a heterogeneous mixture of larger particles. OR A colloid is a heterogeneous mixture in which the dispersed particles are intermediate in size between those of a solution and a suspension. In contrast a suspension is a heterogeneous mixture of larger particles.</i></p>	<p><i>Solution: The chemical digestion of proteins does not start in the month because mucous secreted by the salivary gland helps lubricate and hold masticated foods together in a clump called a bolus. The enzyme amylase or ptyalin presents in the saliva/masticated food from the mouth continue its breakdown of only carbohydrate in the month. Protein digestion starts in the stomach.</i></p> <p><b>JHS...CHEMISTRY...</b>  <i>Learners held the view that colloid is a homogenous mixture or a heterogenous solution.</i></p> <p><b>Solution:</b> <i>A colloid is a <b>homogeneous</b> solution with intermediate particle size between a solution and a suspension. Colloid particles may be seen in a beam of light such as dust in air in a "shaft" of sunlight. Milk, fog, and jello are examples of colloids. In contrast a suspension is a heterogeneous mixture of larger particles. OR A colloid is a heterogeneous mixture in which the dispersed particles are intermediate in size between those of a solution and a suspension. In contrast a suspension is a heterogeneous mixture of larger particles.</i></p>	
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	<p><b>UP.... INTEGRATED SCIENCE.</b>  <i>Learners may hold view that the temperatures of a boiling system are the same everywhere within the boiling system.</i></p> <p><b>Solution:</b> <i>The temperatures within a boiling system are not the same. The temperature at the surface is lower than the temperature at the bottom of the system and this phenomenon induces convection current.</i></p> <p><b>Early Grade.....EARLY SCIENCE</b>  <i>Learners may hold the view that day and night occur when:</i></p> <ul style="list-style-type: none"> <li>• <i>The Sun goes behind hills.</i></li> <li>• <i>Clouds cover the Sun.</i></li> <li>• <i>The Moon covers the Sun.</i></li> <li>• <i>The Sun goes behind the Earth once a day.</i></li> <li>• <i>The Earth goes around the Sun once a day.</i></li> <li>• <i>The Earth spins on its axis once a day.</i></li> </ul> <p><b>Solution:</b> <i>Day and night are caused by the rotation of the earth on its axis. The duration of the day and night is not equal at all places on the earth because of the inclined axis.</i>  <i>One side of the Earth faces the Sun, while the other side faces away into</i></p>	<p><b>UP.... INTEGRATED SCIENCE.</b>  <i>Learners may hold view that the temperatures of a boiling system are the same everywhere within the boiling system.</i></p> <p><b>Solution:</b> <i>The temperatures within a boiling system are not the same. The temperature at the surface is lower than the temperature at the bottom of the system and this phenomenon induces convection current.</i></p> <p><b>Early Grade.....EARLY SCIENCE</b>  <i>Learners may hold the view that day and night occur when:</i></p> <ul style="list-style-type: none"> <li>• <i>The Sun goes behind hills.</i></li> <li>• <i>Clouds cover the Sun.</i></li> <li>• <i>The Moon covers the Sun.</i></li> <li>• <i>The Sun goes behind the Earth once a day.</i></li> <li>• <i>The Earth goes around the Sun once a day.</i></li> <li>• <i>The Earth spins on its axis once a day.</i></li> </ul> <p><b>Solution:</b> <i>Day and night are caused by the rotation of the earth on its axis. The duration of the day and night is not equal at all places on the earth because of the inclined axis.</i>  <i>One side of the Earth faces the Sun, while the other side faces away into</i></p>	
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	<p><i>space. The side facing the Sun is bathed in light and heat – we call this daytime. The side facing away is cooler and darker, and experiences night.</i></p> <p>The sun, the moon, the stars seem to move from east to west because the earth spins from east to west.</p> <p><b>Barriers</b></p> <ol style="list-style-type: none"> <li>1. <i>Week prior knowledge and poor internet connectivity.</i></li> <li>2. <i>Insufficient teaching and learning resources.</i></li> <li>3. <i>Inability to effectively use ICT tools.</i></li> <li>4. <i>Misconceptions.</i></li> </ol> <p>2.3. Ask tutors to suggest alternative teaching strategies that can be employed to best explain the new concepts.</p>	<p><i>space. The side facing the Sun is bathed in light and heat – we call this daytime. The side facing away is cooler and darker, and experiences night.</i></p> <p>The sun, the moon, the stars seem to move from east to west because the earth spins from east to west.</p> <p><b>Barriers</b></p> <ol style="list-style-type: none"> <li>1. <i>Week prior knowledge and poor internet connectivity.</i></li> <li>2. <i>Insufficient teaching and learning resources.</i></li> <li>3. <i>Inability to effectively use ICT tools.</i></li> <li>4. <i>Misconceptions</i></li> </ol> <p>2.3. Suggest alternative teaching strategies that can be employed to best explain the new concepts.</p>	
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> </ul>	<p>3.1. Lead tutors to read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p><i>Note: Tutors should go through the activities one after the other taking into consideration the time available, resources and nature of learners and coherency.</i></p> <p>3.1.1. Ask tutors to identify areas that need clarification.</p>	<p>3.1. Read and discuss the teaching and learning activities in the course manuals for the various group levels.</p> <p>3.1.1. Identify areas that need clarification.</p>	<b>40 mins</b>

<ul style="list-style-type: none"> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to support student teacher learning</li> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, Youtube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</li> <li>○ guidance on any power point</li> </ul> </li> </ul>	<p>3.2. Lead tutors to discuss in their various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 8.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Ask tutors to discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E g.</i></p> <ol style="list-style-type: none"> <li>1. Give equal chances to females and males to ask and also answer questions in class.</li> <li>2. Assign leadership roles to females.</li> </ol> <p>3.4. Ask tutors to identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p>	<p>3.2. Discuss in your various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 8.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Take into account that some students are slow learners and others are gifted.</li> <li>2. Do not use harsh, threatening language or actions that instil fear in both females and males.</li> </ol> <p>3.3. Discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E g.</i></p> <ol style="list-style-type: none"> <li>1. Give equal chances to females and males to ask and also answer questions in class.</li> <li>2. Assign leadership roles to females.</li> </ol> <p>3.4. Identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities.</p>	
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<p>presentations, TLM or other resources which need to be developed to support learning</p> <ul style="list-style-type: none"> <li>• Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<p><i>E.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem-solving skills and critical thinking through the use of leading and probing questions.</i></p> <p>3.5. Ask tutors to read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><i>Note:</i>  <i>(1) Inform tutors to ask student teachers to draw a fully labelled diagram of the human digestive system and the vertical section of the human tooth.</i>  <i>(2) Ask student-teachers to design a simple experiment with boiling water (a straw can be used to colour the bottom of the water) to demonstrate convection currents. <b>This exercise should be added to the student teacher's subject portfolio.</b></i>  <i>(3) Encourage tutors to instruct student -teachers to work in groups (in mixed ability, multi- age &amp; and pay attention to the composition of females and males during the group work) to use either concept maps, simulations</i></p>	<p><i>E.g. (1) The use of power point/excel to do presentations. Use Microsoft word to do assignments as well as teaching and learning resources.</i></p> <p><i>2. Development of problem-solving skills and critical thinking through the use of leading and probing questions.</i></p> <p>3.5. Read the assessment activities in the various manuals and identify areas that require clarification.</p> <p><i>Note:</i>  <i>(1) Inform tutors to ask student teachers to draw a fully labelled diagram of the human digestive system and the vertical section of the human tooth.</i>  <i>(2) Ask student-teachers to design a simple experiment with boiling water (a straw can be used to colour the bottom of the water) to demonstrate convection currents. <b>This exercise should be added to the student teacher's subject portfolio.</b></i>  <i>(3) Encourage tutors to instruct student -teachers to work in groups (in mixed ability, multi-age &amp; and pay attention to the composition of females and males during the group work) to use either concept maps, simulations</i></p>	
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	<p><i>or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i></p> <p><b><i>This could be one of their subject projects for the semester.</i></b></p> <p>3.6. Lead tutors to identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>E.g. Overhead projector, Laptop, Audio-visuals from YouTube, Games, samples of individual tutor learning plans, Models/Drawings of the human digestive system and human dentition, Computer animations.</i></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li><i>1. The drawings of the human digestive system and teeth should be GESI responsive by being bold, clear, colourful and big enough to be easily noticeable by all learners.</i></li> <li><i>2. Equal representation of males and females in group formation.</i></li> <li><i>3. Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></li> <li><i>4. Refer to theme 1 for different types of games to be used to teach the concepts.</i></li> </ol>	<p><i>or multimedia presentations to design games and/or rhymes that can teach the various concepts at early grade/Upper primary/JHS levels.</i></p> <p><b><i>This could be one of their subject projects for the semester.</i></b></p> <p>3.6. Identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>E.g. Overhead projector, Laptop, Audio-visuals from YouTube, Games, samples of individual tutor learning plans, Models of the human digestive system and human dentition, Computer animations.</i></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li><i>1. The drawings of the human digestive system and teeth should be GESI responsive by being bold, clear, colourful and big enough to be easily noticeable by all learners.</i></li> <li><i>2. Equal representation of males and females in group formation.</i></li> <li><i>3. Make sure the resources are appropriate and enough to all learners (males, females and physically challenge)</i></li> <li><i>4. Refer to theme 1 for different types of games to be used to teach the concepts.</i></li> </ol>	
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	<p>3.7. Ensure that every member of the various groups prepares a concrete plan for what they have agreed on to be done so as to be able to achieve the LOs and LIs in the course manuals.</p> <p><i>NB: In the case of unresolved issues consult the subject leads.</i></p>	<p>3.7. Have concrete plans for what you have agreed on to be done so as to be able to achieve the LOs and LIs in the course manuals.</p> <p><i>NB: In the case of unresolved issues consult the subject leads.</i></p>	
<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors should Identifying critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.3. Ask tutors to identify a critical friend who took part in the PD session to sit in their class and report on observations made during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 8 needs to be discussed and clarified.</i></p> <p>4.4. Encourage tutors to read lesson 9 from the PD manual and find relevant materials for the next PD session.</p>	<p>4.3. Identify a critical friend who took part in the PD session to sit in your class during lesson enactment and report on observations made during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 8 needs to be discussed and clarified.</i></p> <p>4.4. Read lesson 9 from the PD manual and find relevant materials for the next PD session.</p>	<b>15 mins</b>

**Age Levels/s:** JHS, Upper Grade and Early Grade

**Name of courses/Subject/s:**

1. Early Grade – Early science.
2. Upper Primary – Integrated Science I.
3. JHS --- Particulate nature of chemistry.
3. JHS ---Environmental biology.
- 4.

**Lesson Tittles:**

Early Grade – Day and Night II

Upper Prim. – Ventilation II

JHS (Biology)- Teaching the Ecosystem

JHS (Chemistry)- Teaching Colloids II

### Tutor PD Session for Lesson 9

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i>	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.	Time in session
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the lesson up to and including learning</li> </ul>	<p>Start with an ice breaker.</p> <p>1.1. Ask tutors in their respective groups to write one thing they learnt in Year 1 semester 2 PD sessions and how they applied it in their teaching at their various grade levels on a post in card.</p>	<p>1.1. Write one thing they learnt in Year 1 semester 2 PD sessions and how they applied it in their teaching at their various grade levels on a post in card.</p>	<b>20 mins</b>

<p>outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>1.1.1. Ask tutors to post the cards on the wall for gallery walk.</p> <p>1.2. Invite the critical friends for the various grade levels to share their findings for a short discussion.</p> <p>1.3. Ask tutors to read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><i>N.B.: Refer to the course manual for detailed information.</i></p> <p>1.4. Ask tutors to read the lesson overview, lesson descriptions and the content of lesson 9 in their respective groups.</p> <p>1.4.1. Ask tutors to note the distinctive features of lesson 9 as they read and discuss them after reading.</p> <p><i>E.g. Early Grade: Cycle of day and night.</i></p> <p><i>NB: Refer to the course manual for the rest.</i></p>	<p>1.1.1. Ask tutors to post the cards on the wall for gallery walk.</p> <p>1.2. Critical friends for the various grade levels share their findings for a short discussion.</p> <p>1.3. Read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p><i>N.B.: Refer to the course manual for detailed information.</i></p> <p>1.4. Read the lesson overview, lesson descriptions and the content of lesson 9 in your respective groups.</p> <p>1.4.1. Identify the distinctive features of lesson 9 as you read and discuss them after reading.</p> <p><i>NB: Refer to the course manual.</i></p>	
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<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Ask tutors to identify and discuss the new areas to be covered in lesson 9 of their respective course manuals.</p> <p><i>Eg. Early Grade: 1. Cycle of day and night. 2. Human activities that are influenced by the cycle of day and night.</i></p> <p>2.2. Use questions and answers to assist tutors to identify and discuss the potential barriers to lesson 9 and suggest interventions to them.</p> <p><i>E.g. A potential Barrier: Student-teacher might still have some unscientific ideas about the cycle of day and night on human activities.</i></p> <p>2.3. Ask tutors to familiarize themselves with the teaching strategies suggested in the course manuals to teach lesson 9 and suggest alternative ones.</p> <p><i>Eg. The use of radio reporter to teach definitions and examples and the use of spider graph to teach difference and similarities.</i></p>	<p>2.1. Identify and discuss the new areas to be covered in lesson 9 from your respective course manuals.</p> <p><i>Early Grade: 1. Cycle of day and night. 2. Human activities that are influenced by the cycle of day and night.</i></p> <p>2.2. Identify and discuss the potential barriers to lesson 9 and suggest interventions to them.</p> <p>2.3. Familiarize yourselves with the teaching strategies suggested in the course manuals to teach lesson 9 and suggest alternative ones.</p> <p><i>Eg. The use of radio reporter to teach definitions and examples and the use of spider graph to teach difference and similarities.</i></p>	<p>15 mins</p>
<p><b>3. Planning for teaching, learning and assessment</b></p>	<p>3.1. Support tutors to read and discuss the activities of lesson 9 in order to agree on</p>	<p>3.1. Read and discuss the activities of lesson 9 in order to agree on how to deliver them</p>	<p><b>40 mins</b></p>

<p><b>activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to support student teacher learning</li> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material:</li> </ul> </li> </ul>	<p>how to deliver them in the various classrooms.</p> <p><i>NB: Prompt tutors to identify areas that need clarification and let them solve them in their respective groups or discuss them with the larger group.</i></p> <p>3.2. Lead tutors to discuss in their various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 9.</p> <p><i>NB: Actively uses examples (e.g., exercises, activities, role play, pictures) that challenge or reverse traditional gender roles (such as having men cook).</i></p> <p>3.3. Ask tutors to discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p>E.g.  (1) Classroom setup that enhances the participation of all students  (2). <i>It is important to go beyond academic ability. Bear in mind that some learners come from disadvantaged situations – orphans, displaced, the very poor or may have hidden disabilities.</i></p>	<p>in the various classrooms.</p> <p>3.2. Discuss in your various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 9.</p> <p><i>NB: Actively uses examples (e.g., exercises, activities, role play, pictures) that challenge or reverse traditional gender roles (such as having men cook).</i></p> <p>3.3. Discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p>E.g  (1) Classroom setup that enhances the participation of all students  (2). <i>It is important to go beyond academic ability. Bear in mind that some learners come from disadvantaged situations – orphans, displaced, the very poor or may have hidden disabilities.</i></p>	
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<p>literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</p> <ul style="list-style-type: none"> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> <li>● Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<p>3.4. Ask tutors to identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills through STS activities. <i>E.g. Development of digital literacy skills through power point presentations.</i></p> <p>3.5. Ask tutors to suggest two (2) alternative assessment strategies (<i>for or as</i>) to be used during the lesson. <i>Eg. Pre-test, short quizzes &amp; group presentations. These could be added to students' subject portfolios.</i></p> <p>3.6. Lead tutors to identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms. <i>NB: Ensures that books, materials, or equipment are equally distributed amongst females/males.</i></p> <p>3.7. Ensure that every member of the various groups have concrete plans for what they have agreed on to be done to achieve the LOs and LIs of the course manuals.</p>	<p>3.4. Identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how you can help student teachers to support basic school learners to develop these skills through STS activities. <i>E.g. Development of digital literacy skills through power point presentations.</i></p> <p>3.5. Suggest two (2) alternative assessment strategies (<i>for or as</i>) to be used during the lesson. <i>Eg. Pre-test, short quizzes &amp; group presentations. These could be added to students' subject portfolios.</i></p> <p>3.6. Identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms. <i>NB: Ensures that books, materials, or equipment are equally distributed amongst females/males.</i></p> <p>3.7. Have concrete plans for what you have agreed on to be done to achieving the LOs and LIs of the course manuals.</p>	
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<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors should identify critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1. Ask tutors to identify a critical friend who took part in the PD session to sit in their class and report on observations made during next PD session.</p> <p><i>Note: Find out if anything relating to Lesson 9 needs to be discussed and clarified.</i></p> <p>4.2. Encourage tutors to read lesson 10 from the PD manual and find relevant materials for the next session.</p>	<p>4.1. Identify a critical friend who took part in the PD session to sit in your class during lesson and report on observations made during next PD session.</p> <p>4.2. Read lesson 10 from the PD manual and find relevant materials for the next session.</p>	<p><b>15 mins</b></p>
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**Age Levels/s:** JHS, Upper Grade and Early Grade

**Name of courses/Subject/s:**

1. Early Grade – Early Grade Science Curriculum Studies I
  2. Upper Primary – Integrated Science I.
  5. JHS --- Particulate nature of chemistry.
- JHS ---Environmental biology.

**Lesson Tittles:**

Early Grade - Day and Night II

Upper Prim. - Psychology of Early Adolescent Learner and Science Teaching and Learning I

JHS (Biology)- Teaching types of Ecosystems

JHS (Chemistry)- Teaching Energy changes

### Tutor PD Session for Lesson 10

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i>	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.	Time in session
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the lesson up to and</li> </ul>	<p>Start with an ice breaker.</p> <p>1.1. Ask tutors in their respective groups to write one thing they learnt in Year 1 semester 2 PD sessions and how they applied it in their teaching at their various grade levels on a post in card.</p>	<p>1.1. Write one thing they learnt in Year 1 semester 2 PD sessions and how they applied it in their teaching at their various grade levels on a post in card.</p>	<b>20 mins</b>

<p>including learning outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>1.1.1 Ask tutors to post the cards on the wall for gallery walk.</p> <p>1.2. Invite the critical friends for the various grade levels to share their findings for a short discussion.</p> <p>1.3. Ask tutors to read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p>1.4. Ask tutors to read the lesson overview, lesson descriptions and the content of lesson 10 in their respective groups.</p> <p><b>Note:</b> <i>Lesson 10 lesson descriptions for the various levels are:</i>  <b>JHS- Biology:</b>  <i>Lesson Description - The lesson provides the student teacher the opportunity to deepen pedagogical knowledge. The Types of Ecosystems chapter of this course is designed to help you plan and teach about the factors that affect ecosystems and how ecosystems change over time in your classroom.</i></p>	<p>1.1.1 Ask tutors to post the cards on the wall for gallery walk.</p> <p>1.2. Critical friends for the various grade levels share their findings for a short discussion.</p> <p>1.3. Read and discuss the introductory sections of the lesson up to and including learning outcomes and indicators in the course manual and indicate how they are related to student teachers' relevant previous knowledge.</p> <p>1.4. Read the lesson overview, lesson descriptions and the content of lesson 10 in their respective groups.</p>	
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	<p><b>JHS - Chemistry:</b>  <i>Lesson Description- In this lesson further explanation and examples are dealt with: The energy change in a chemical reaction is due to the difference in the amounts of stored chemical energy between the products and the reactants.</i></p> <p><b>UPPER PRIMARY:</b>  <i>Lesson Description - Upon completion of this course the student teacher will be able to describe mechanical ventilation as related to spontaneous and artificial.</i></p> <p><b>EARLY GRADE: Refer to the course manual.</b></p> <p>1.4.1. Guide tutors to identify and discuss the distinctive features of lesson 10 as they read.</p> <p><i>E.g. JHS Biology:</i></p> <ul style="list-style-type: none"> <li>• <i>Types of ecosystems</i></li> <li>• <i>Types of ecosystems</i></li> <li>• <i>Misconceptions of Ecosystem</i></li> <li>• <i>Teaching about the ecosystem</i></li> </ul> <p><b>JHS Chemistry:</b></p> <ul style="list-style-type: none"> <li>• <i>Energy changes and chemical reactions</i></li> </ul> <p><b>UPPER PRIMARY:</b></p> <ul style="list-style-type: none"> <li>• <i>The Adolescent Learner adapting to Science learning</i></li> </ul>	<p>1.4.1. As you read, identify and discuss the distinctive features of the lesson.</p>	
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	<p><b>EARLY GRADE:</b></p> <ul style="list-style-type: none"> <li>• <i>The nature of the Early Grade curriculum and science learning</i></li> </ul>		
<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Ask tutors to identify and discuss the new areas to be covered in lesson 10 of their respective course manuals.</p> <p>2.2. Assist tutors to identify and discuss the potential barriers to related lesson 10 and suggest interventions to them. <i>E.g. Insufficient chemicals to demonstrate the chemical reactions. However, you could suggest YouTube videos as alternatives.</i></p> <p>2.3. Ask tutors to read through the teaching strategies specified in the course manuals to teach lesson 10 and suggest alternative ones. <i>Eg. The use of radio reporter to teach definitions and examples and the use of spider graph to teach difference and similarities.</i></p>	<p>2.1. Identify and discuss the new areas to be covered in lesson 10 from your respective course manuals.</p> <p>2.2. Identify and discuss any potential barriers related to lesson 10 and suggest interventions to them.</p> <p>2.3. Read through the teaching strategies s specified in the course manuals to teach lesson 10 and suggest alternative ones. <i>Eg. The use of radio reporter to teach definitions and examples and the use of spider graph to teach difference and similarities.</i></p>	<b>15 mins</b>
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p>	<p>3.1. Support tutors to read and discuss the activities of lesson 10 in order to agree on how to deliver them</p>	<p>3.1. Read and discuss the activities of lesson 10 in order to agree on how to deliver them in the various classrooms.</p>	<b>40 mins</b>

<ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to support student teacher learning</li> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, Utube,</li> </ul> </li> </ul>	<p>in the various classrooms.</p> <p><i>NB: Prompt tutors to identify areas that need clarification and let them solve them in their respective groups or discuss them with the larger group.</i></p> <p>3.2. Lead tutors to discuss in their various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 10.</p> <p>3.3. Ask tutors to discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E g. Plan to use exercises/activities that do not reinforce traditional gender roles and in some cases, actively challenges or reverses traditional gender roles.</i></p> <p>3.4. Ask tutors to identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how they can help student teachers to support basic school learners to develop these skills</p>	<p>3.2. Discuss in your various groups/levels how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 10.</p> <p>3.3. Discuss how GESI issues related to the teaching and learning activities of the lesson would be addressed.</p> <p><i>E g E g. Plan to use exercises/activities that do not reinforce traditional gender roles and in some cases, actively challenges or reverses traditional gender roles.</i></p> <p>3.4. Identify where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson and how you can help student teachers to support basic school learners to develop these skills through STS activities.</p>	
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<p>physical resources, power point; how they should be used. Consideration needs to be given to local availability</p> <ul style="list-style-type: none"> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> <li>● Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<p>through STS activities.</p> <p><i>E.g.</i></p> <p>1. <i>Development of self-regulation skills through independently working on a task.</i></p> <p>2. <i>Development of real life problem solving skills through identification of problems around them and using the concepts gained in class to solve/suggest solutions to the identified problems.</i></p> <p>3.5. Ask tutors to suggest two (2) alternative assessment strategies (<i>for or as</i>) to be used during the lesson.</p> <p><i>Eg. Pre-test, short quizzes &amp; group presentations. These could be added to students' subject portfolios.</i></p> <p>3.6. Lead tutors to identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>E.g. Find out if there are any incidents of gender stereotyping or discrimination? If there are, material should be replaced or used as a basis for engendering a discussion.</i></p> <p>3.7. Ensure that every member of the various groups have</p>	<p><i>E.g.</i></p> <p><i>Development of leadership skills and collaborative and communicative skills through group works and presentations</i></p> <p>3.5. Suggest two (2) alternative assessment strategies (<i>for or as</i>) to be used during the lesson.</p> <p><i>Eg. Pre-test, short quizzes &amp; group presentations. These could be added to students' subject portfolios.</i></p> <p>3.6. Identify the needed inclusive resources for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><i>E.g. Find out if there are any incidents of gender stereotyping or discrimination? If there are, material should be replaced or used as a basis for engendering a discussion.</i></p> <p>3.7. Have concrete plans for what you have agreed on to be done</p>	
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	concrete plans for what they have agreed on to be done to achieve the LOs and LIs of the course manuals.	to achieving the LOs and LIs of the course manuals.	
<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>• Tutors should Identify critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1. Ask tutors to identify a critical friend who took part in the PD session to sit in their class and report on observations made during next PD session.</p> <p><i>NOTE: Find out if anything relating to Lesson 10 needs to be discussed and clarified.</i></p> <p>4.2. Encourage tutors to read lesson 11 from the PD manual and find relevant materials for the next session.</p>	<p>4.1. Identify a critical friend who took part in the PD session to sit in your class during lesson and report on observations made during next PD session.</p> <p>4.2. Read lesson 11 from the PD manual and find relevant materials for the next session.</p>	<b>15 mins</b>

**Age Levels/s:** Early Grade, Upper Grade, JHS (Biology)  
JHS (Chemistry)

**Name of courses/Subject/s:**

1. Early Grade – Early Grade Science Curriculum Studies I
2. Upper Primary – Integrated Science I.
3. JHS --- Particulate nature of chemistry.
4. JHS ---Environmental biology.

**Lesson Tittles:**

Early Grade - Early Grade Science Curriculum Studies II  
Upper Prim. - Psychology of Early Adolescent Learner and Science Teaching and Learning II  
JHS (Chemistry)- Teaching Separation of mixtures

### Tutor PD Session for Lesson 11

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i>	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.	Time in session
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the</li> </ul>	<p><i>Ice breaker activity: Begin with an investigational activity according to the grade level.</i></p> <p>1.1 Use leading and probing questions to recap the main issues raised in the previous PD session in the various grade level.</p> <p><i>NB: Remind tutors on how the grade level of this</i></p>	<p>1.1 Discuss the main issues raised in the previous PD session in the various grade level.</p>	<b>20 mins</b>

<p>lesson up to and including learning outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p><i>lesson is organised and how they will be covered. E.g. Early Grade – Early Grade Science Curriculum Studies II Upper Primary – Psychology of Early Adolescent Learner and Science Teaching and Learning II</i></p> <p><i>JHS --- Teaching separation of mixtures and Science Pedagogy and Curriculum.</i></p> <p>1.2 Encourage tutor who were critical friends to other tutors in the class to share their observations and lesson learnt for a short discussion.</p> <p>1.3 Ask tutors to refer to the activities in their individual course manuals. Read and discuss the introductory sections of the lesson up to learning outcomes and indicators.</p> <p>1.3.1. Ask tutors to suggest relevant students' previous knowledge that can support the teaching and learning of the lesson.</p> <p><i>Refer to the course manual for the various grade level lesson for introductions/descriptions</i></p> <p>1.3.2 Lead tutors to discuss the expectations from each of the course manuals.</p>	<p>1.2 Critical friends share their observations and lesson learnt for a short discussion.</p> <p>1.3 Read and discuss the introductory sections of the lesson up to learning outcomes and indicators.</p> <p>1.3.1. Suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.</p> <p>1.3.2 Discuss the expectations from each of the course manual.</p>	
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	<p>1.4. Ask tutors in the various levels to brainstorm and discuss the distinctive aspects of the 11<sup>th</sup> lesson including vocabulary and fundamental concepts related to the components/ topic in the various grade level.</p> <p><i>E.g. Distinctive aspects of the lessons</i>  <i>JHS- Chemistry: identify links between energy changes and separation of mixtures</i>  <i>UP: features of early grade science.</i>  <i>Note: Discuss any point that needs clarification</i></p>	<p>1.4. Brainstorm and discuss the important or distinctive aspects of the 11th lesson including vocabulary and fundamental concepts.</p>	
<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Using think-pair-share strategy, ask tutors to come out with the main content to be covered in lesson 11.</p> <p><i>Refer to the course manual for Upper primary and early grade lesson for their respective new learning.</i></p> <p>2.1.1 Ask tutors to identify and discuss familiar and unfamiliar concepts in Lesson 11 and discuss with their respective larger group.</p> <p>2.2. Ask tutors to outline potential challenging areas including misconceptions and GESI issues in the teaching of the concept.</p>	<p>2.1. With think-pair-share strategy, come out with the main content to be covered in lesson 11.</p> <p>2.1.1 Identify familiar and unfamiliar concepts in their lessons and discuss with the larger group.</p> <p>2.2. Outline possible challenging areas including misconceptions related to the concepts. Taking into consideration GESI related issues.</p>	<p><b>15 mins</b></p>

	<p><i>NB: Some of the misconceptions and barriers related to the concepts are:</i></p> <p><i>Misconceptions:</i></p> <p><i>JHS...CHEMISTRY...</i></p> <p><i>Students may also incorrectly believe that when a substance dissolves, it disappears</i></p> <p><i>Solution: When a solid (solute) dissolves in a liquid (solvent), the solid particles fill the spaces between the liquid particles. The small particles of matter that makes up the solid are still present, however they are so small they are not visible.</i></p> <p><b>Barriers</b></p> <ol style="list-style-type: none"> <li><i>1. lack knowledge about the features of early grade science</i></li> <li><i>2. Student teachers might have forgotten about the basic features of a science curriculum and revision would be required</i></li> <li><i>3. Student-teachers may; have difficulty using online resources and not have the skills in designing experiments for JHS learners.</i></li> </ol> <p><i>eg. Avoid making discriminatory statements such as : “even the girls are doing better”.</i></p> <p>2.3. In pairs ask tutors to identify the needed</p>	<p>2.3. Identify the needed pedagogies to be</p>	
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	pedagogies to be used in the lessons from the course manual and suggest alternative ones.	used in the lessons from the course manual and suggest alternative ones.	
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to support student teacher learning</li> <li>• Resources: <ul style="list-style-type: none"> <li>○ links to the existing PD</li> </ul> </li> </ul>	<p>3.1 Lead tutors to read through the activities of Lesson 11 from the course manual and suggest other teaching and learning activities for teaching the various grade level.</p> <p><i>NB: Make sure the teaching and learning activities for teaching the various grade levels are suitable for all learners (males, females and physically challenged).</i></p> <p>3.2. Lead tutors to discuss areas identified after the reading that needs clarification.</p> <p><i>E.g. Using internet search, Audio-Visual equipment, concept mapping and Video clips to explain concepts.</i></p> <p>3.3. Ask tutors in their various groups/levels to discuss how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 11.</p> <p><i>Note: Tutors should go through the activities one after the other taking into consideration the time available, resources and nature of learners,</i></p>	<p>3.1. Read through the activities of Lesson 11 from the course manual and suggest other teaching and learning activities for teaching the various grade level</p> <p>3.2. Discuss areas identified after the reading that needs clarification.</p> <p>3.3. In your various groups, discuss how the different activities would be carried out in both CoE and basic school classroom to achieve the LOs and the LIs of the course manual for lesson 11.</p>	<b>40 mins</b>

<p>Themes, for example, action research, questioning and to other external reference material: literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</p> <ul style="list-style-type: none"> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> <li>● Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>	<p><i>coherency and methodology.</i></p> <p>3.4 Using think- pair– share ask tutors to discuss how GESI issues related to the teaching and learning activities of lesson 11 will be addressed.</p> <p><i>E.g. 1.Both genders taking the leading roles in their groups and in the demonstration of the use of ICT tools</i></p> <p><i>2. the use of phones to surf for information on the internet, social skills, communication skills, critical thinking and creative skills</i></p> <p>3.4.1. Ask tutors to identify how, where, and which, 21<sup>st</sup> century skills that can be developed or applied in the lesson 11and model how they can help student teachers to support basic school leaners to develop these skills through STS activities.</p> <p><i>E.g. 1. The use of power point/excel to do presentations.</i></p> <p>3.5. Ask tutors to read the assessment activities in the various manuals and identify areas that require clarification.</p>	<p>3.4 Discuss, how GESI issues that relate to the teaching and learning activities of the lesson 11 will be addressed.</p> <p>3.4.1. Identify how, where, and which, 21st century skills that can be developed or applied in the lesson 11and model how they can help student teachers to support basic school leaners to develop these skills through STS activities.</p> <p>3.5. Read the assessment activities in the various manuals and identify areas that require clarification.</p>	
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	<p>3.5.1. Lead tutors to discuss the various ways they can support student teachers to build their project and subject portfolio for the semester.</p> <p><i>Note: 1. Inform tutors to ask student teachers to create a concept map for teaching the a topics in their various grade levels clearly depicts the concept. <b>These could be added to their subject portfolio.</b></i></p> <p><b>NB:</b> <i>Pay attention to the composition of females and males during any of the group work.</i></p> <p>3.6. Ask a tutor to model a presentation of an inclusive resource for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><b>NOTE:</b> <i>1. Make sure the resources include ICT tools and taking into consideration GESI issues. and enough to all learners</i> <i>2. Refer to theme 1 for different types of games to be used to teach the concepts.</i></p> <p>3.7. In summary, ask tutors to recap the main issues in their various grade levels in the PD session.</p> <p><b>NB. Alert tutors to read lesson 12 and identify</b></p>	<p>3.5.1. Discuss the various ways student teachers can be supported to build their project and subject portfolio for the semester.</p> <p>3.6. Model a presentation of an inclusive resource for teaching and learning of the concepts in both CoE and basic school classrooms.</p> <p><b>NOTE:</b> <i>1. Make sure the resources include ICT tools and taking into consideration GESI issues. and enough to all learners</i> <i>2. Refer to theme 1 for different types of games to be used to teach the concepts.</i></p> <p>3.7. Recap the main issues in your various grade levels in the PD session.</p> <p><b>NB: Collect all resources you need ahead of time,</b></p>	
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	<i>issues or clarification at the next PD session. Collect all resources you need ahead of time, prepare samples of TLRs you may need and rehearse how these may be used to support the achievement of your goal.</i>	<i>prepare samples of TLRs you may need and rehearse how these may be used to support the achievement of your goal.</i>	
<b>4. Evaluation and review of session:</b> <ul style="list-style-type: none"> <li>• Tutors should identify critical friends to observe lessons and report at next session.</li> <li>• Identifying and addressing any outstanding issues relating to the lesson/s for clarification</li> </ul>	<p>4.1. Remind tutors to identify a critical friend from the same or related discipline to observe them during teaching and provide feedback to you and at the next PD session.</p> <p>4.2. Individually, ask tutors to identify any outstanding issues relating to the lesson for clarification.</p>	<p>4.1. A critical friend from the same or related discipline do observation during teaching and provide feedback to you and at the next PD session.</p> <p>4.2. Individually, identify any outstanding issues relating to the lesson for clarification.</p>	<b>15 mins</b>

**Age Levels/s:** JHS, Upper Grade and Early Grade

**Name of courses/Subject/s:**

1. Early Grade – Early Grade Science Curriculum Studies I
2. Upper Primary – Integrated Science I.
3. JHS --- Particulate nature of chemistry.
4. JHS ---Environmental biology.

**Lesson Titles:**

- Early Grade – Course Review II with STS seminar  
 Upper Prim. Course Review II with STS seminar  
 JHS (Biology)- Course Review II with STS seminar  
 JHS (Chemistry)- Course Review II with STS seminar

### Tutor PD Session for Lesson 12

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. <i>What the SL/HoDs will have to say during each stage of the session</i>	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each stage of the session.	Time in session
<p><b>1. Introduction to the session</b></p> <ul style="list-style-type: none"> <li>• Review prior learning</li> <li>• A critical friend to share findings for a short discussion and lessons learned</li> <li>• Reading and discussion of the introductory sections of the lesson up to and</li> </ul>	<p>Ask tutors to begin the session with an ice breaker.eg. Riddle, riddle, ‘What are the three R's that keep our planet clean? Who am I? (Reuse, recycle, reduce.)</p> <p>1.1. Provide post-it cards for tutors and ask them to write down their reflections of PD session from lesson 7-11 on it base on the</p>	<p>1.1. Write down your reflections of PD session from lesson 7-11 on it base on the following: positives challenges and</p>	<b>20 mins</b>

<p>including learning outcomes and indicators</p> <ul style="list-style-type: none"> <li>• Overview of content and identification of any distinctive aspects of the lesson/s,</li> </ul> <p>NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go through the PD session</p>	<p>following: positives challenges and suggestion to improve on the next PD sessions.</p> <p>1.2. Ask tutors to reflect on the lesson observed by a colleague.</p> <p>1.3. In pairs ask tutors to read and discuss the introduction sections of the lesson to identify, the lesson descriptions, the purpose, RPK, LOs and LIs, etc. of the lessons for the various grades.</p>	<p>suggestion to improve on the next PD sessions.</p> <p>1.2. Reflect on the lesson observed by a colleague.</p> <p>1.3. Read and discuss the introduction sections of the lesson to learning outcomes and indicators.</p>	
<p><b>2. Concept Development (New learning likely to arise in lesson/s):</b></p> <ul style="list-style-type: none"> <li>• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD</li> </ul> <p>NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors</p>	<p>2.1. Using semantic mapping, ask tutors to come out with the main content covered in lesson 7-11 for the various grade in the respective course manuals.</p> <p>2.2. Ask tutors to outline potential barriers to learning for student teachers or students in relation to lessons 7-11 in the various grade levels which still need clarification.</p> <p>2.2.1. Ask tutors to suggest ways to improve upon the teaching of those concepts.</p>	<p>2.1. Come out with the main content covered in lesson 7-11 for the various grades in the respective course manuals.</p> <p>2.2. Outline potential barriers of learning for student teachers or students in relation to lessons 7-11 in the various grade levels which still need clarification</p> <p>2.2.1. Suggest ways to improve upon the teaching of those concepts.</p>	<p><b>15 mins</b></p>

	<p><i>E.g.</i></p> <ol style="list-style-type: none"> <li>1. <i>Misconception to some concepts not adequately dealt with.</i></li> <li>2. <i>Lessons not appropriately understood by student - teachers.</i></li> </ol>		
<p><b>3. Planning for teaching, learning and assessment activities for the lesson/s</b></p> <ul style="list-style-type: none"> <li>• Reading and discussion of the teaching and learning activities</li> <li>• Noting and addressing areas where tutors may require clarification</li> <li>• Noting opportunities for making links to the Basic School Curriculum</li> <li>• Noting opportunities for integrating: GESI responsiveness and ICT and 21<sup>st</sup> C skills</li> <li>• Reading, discussion, and identification of continuous assessment opportunities in the lesson. Each lesson should include at least two opportunities to use continuous assessment to support student teacher learning</li> <li>• Resources:</li> </ul>	<ol style="list-style-type: none"> <li>3.1. Discuss with tutors the various suggested teaching and learning activities in the course manual that were used in the delivery of the lessons which need clarification.</li> <li>3.2 Ask tutors discuss how they were able to ensure that all the teaching and learning activities from lessons 7- 11 are GESI responsive.</li> <li>3.3. Ask tutors to read the assessment activities in the manual(s) and identify areas that require clarification especially on NTEAP related activities. (E.g. Assessment arrangements are reviewed in line with NTEAP).</li> </ol> <p><i>Note:</i>  <i>continuous assessment - subject project (class assignment, in-class presentation), subject portfolio including those gathered from School Visit (STS) and summative assessment - end of semester examination.</i></p>	<ol style="list-style-type: none"> <li>3.1. Discuss the various suggested teaching and learning activities in the course manual that were used in the delivery of the lessons which need clarification.</li> <li>3.2. Discuss how they were able to ensure that all the teaching and learning activities from lessons 7- 11 are GESI responsive.</li> <li>3.3. Read the assessment activities in the manual(s) and identify areas that require clarification especially on NTEAP related activities. (E.g. Assessment arrangements are reviewed in line with NTEAP).</li> </ol>	<b>40 mins</b>

<ul style="list-style-type: none"> <li>○ links to the existing PD Themes, for example, action research, questioning and to other external reference material: literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be given to local availability</li> <li>○ guidance on any power point presentations, TLM or other resources which need to be developed to support learning</li> <li>● Tutors should be expected to have a plan for the next lesson for student teachers</li> </ul>			
<p><b>4. Evaluation and review of session:</b></p> <ul style="list-style-type: none"> <li>● Tutors should Identifying critical friends to observe lessons and report at next session.</li> <li>● Identifying and addressing any outstanding issues relating to the</li> </ul>	<p>4.1. Individually, ask tutors to identify any outstanding issues relating to the lesson for clarification.</p> <p>4.2. Ask tutors to evaluate the PD sessions indicating what lessons have been learnt and how the sessions have</p>	<p>4.1. Identify any outstanding issues relating to the lesson for clarification.</p> <p>4.2. Evaluate the PD sessions indicating what lessons have been learnt and how the sessions have impacted teaching</p>	<p><b>15 mins</b></p>

lesson/s for clarification	impacted teaching and learning of the course.	and learning of the course.	
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## Appendix 1

The PD session check list: supporting B.Ed. implementation.

*In some cases, to support implementation and address recent developments the PD session writers may need to add detail to what is covered in the course manuals*

What to Include in PD sessions	Checked and In Place.
<p><b>Course introductions and conclusions</b></p> <ul style="list-style-type: none"> <li>The first PD session of each semester introduces the course manual/s, course expectations and course assessment components</li> <li>The final PD session provides the opportunity to review student teachers' learning from the course</li> </ul>	
<p><b>Prior knowledge:</b> Points for tutors on activating student teachers' prior knowledge.</p>	
<p><b>Basic School Curriculum:</b> when topics for student teachers are from the Basic School Curriculum the PD session makes explicit links.</p>	
<p><b>LO:</b> relevance to each session are introduced</p>	
<p><b>Interactive teaching</b> PD sessions provide opportunities for SL/HOD to model interactive approaches to teaching and learning that tutors will use to support student teachers</p>	
<p><b>Lesson Learning outcomes and indicators</b> are introduced</p>	
<p><b>Integration of subject specific content and subject specific pedagogy</b> is modelled in PD sessions through activities for tutors. Any potentially new concepts introduced in the lesson are explored with tutors</p>	
<p><b>Subject Specific Training:</b> where subjects have been grouped together for the PD sessions, tutors are guided to engage with activities in the subject course manuals to ensure the PD is subject specific. Where appropriate there is direct page or point references to activities in each of the relevant subject course manuals.</p>	
<p><b>Integrating GESI:</b> each PD session explicitly includes at least two (2) teaching and learning activities from the course manual/s which should be used to promote student teachers' understanding of GESI responsiveness and support the inclusion of all pupils.</p>	
<p><b>Assessment, integrating and embedding NTEAP practices:</b> PD sessions include at least two (2) continuous assessment opportunities which will support tutors in developing student teacher's understanding of, and ability to apply, assessment for or as learning.</p>	
<p><b>Age Specific Training:</b> where relevant tutors are guided to specific activities in the course manuals for EG, UP and JHS. Tutors are advised to group student teachers according to the age they are training for.</p>	
<p><b>Building in STS:</b> STS tasks are integrated into the PD sessions. Preparing for work in school and opportunities for tutors to draw on what student teachers are learning in school by, for example, targeting observations linked directly to the themes in the course manuals.</p>	
<p><b>Building in activities which support the development of 21c skills in particular the use of ICT.</b> The development of these is integrated into the PD sessions</p>	

including the use of ICT to support learning. Each PD session should include at least two (2) examples of students being required to use ICT to extend their learning.	
<b>Resources /TLM.</b> Where specific resources are required, it is clear where tutors can access them e.g., videos, online resources or readings.	

## Appendix 2. Course Assessment Components briefly

COMPONENT	SUBJECT PROJECT 1 per course per semester, individual or collaborative student teacher work.	SUBJECT PORTFOLIO 1 per course per semester, individual or collaborative student teacher work.
WHAT IS IT?	<p><b>The Subject project</b> is an assignment designed to enable student teachers to demonstrate achieving one or more of the CLOs, progress towards achieving identified NTS, development of knowledge and understanding of: the Basic School Curriculum, GESI responsiveness, using ICT mand 21stC skills</p>	<p><b>The Subject Portfolio</b> is the deliberate collection of student teachers' work that has been selected and organized for a particular subject to show student teacher's learning and progress to achieving the CLOs through examples of his or her best work.</p>
CONSTITUENTS	<p><b>Introduction:</b> a clear statement of aim and purpose  <b>Methodology:</b> what the student teacher has done and why to achieve the aim and purpose of the project  <b>Substantive or main section:</b> Presentation of any artifacts, experiments, TLMs created for the project; presentation, analysis, and interpretation of what has been done, learned, or found out in relation to focus of the project.  <b>Conclusion:</b> Statement of the key outcomes of the project; reflection on what the student teacher has learnt</p>	<p><b>3 items of work produced during the semester selected by student teachers with tutor support</b> during the semester as best examples of their progress and 200-word reflection on the items*  <b>Or 2 items of work and A mid semester assessment:</b> case study, reflective note, quiz.  * For each item they select, Student teacher's need to reflect on progress against identified NTS; achieving CLOs; increased knowledge and understanding of the Basic School Curriculum, GESI responsiveness, integration of ICT and how they could have approached developing the item differently to achieve a better outcome</p>
WEIGHT	<p><b>Overall weighting of project = 30%</b>  <b>Weighting of individual parts of project out of 100</b></p> <ul style="list-style-type: none"> <li>• Introduction – 10</li> <li>• Methodology – 20</li> <li>• Substantive section – 40</li> <li>• Conclusion – 30</li> </ul>	<p><b>Overall weighting of project = 30%</b>  <b>Weighting of individual parts of portfolio out of 100</b>  i(a). Each of the three (3) items selected by the student teacher is 30 % (90%).  i(b) Presentation and organisation of portfolio 10%.  <b>OR</b>  ii(a). Each of the two (2) items selected by the student teacher is 30 % (60%).  ii(b)Mid semester assessment 30%  ii(c)Presentation and organisation of portfolio 10%</p>

<b>EXAM</b>	<b>End of semester Exam, weight 40%. To assess:</b> achievement of one or more of the CLOs, progress towards achieving identified NTS, development of knowledge and understanding of the Basic School Curriculum, ability to use GESI responsive approaches and to integrate ICT and 21 <sup>st</sup> C skills in teaching and learning
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