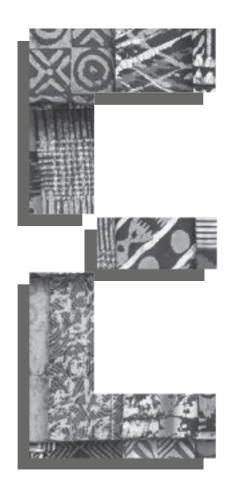
Tutor Professional Development Handbook: B.Ed. in Initial Teacher Education - Mathematics Year 2 Semester 2

HANDBOOK FOR COORDINATORS











The Government of Ghana







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Foreword

t is a great pleasure and privilege to be asked to write the Foreword to this latest set of Professional Development Handbooks for the Bachelor of Education (B.Ed.) in Initial Teacher Education Year 2 Semester 2 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.

Over the last six years there is compelling empirical evidence that there has been a substantial shift in tutors' behaviour and approaches. This has had a tremendous impact on student teachers. An annual external evaluation of beginning teachers' classroom practices is carried out nationwide. In the 2015 evaluation only 2% beginning teachers demonstrated competencies and behaviours in the National Teachers' Standards. By 2019 this had increased to 42%. When one considers that these figures are derived from a national sample of all beginning teachers in the country it demonstrates that there has been a genuine transformation in Ghana's teacher education system.

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, represents the first set of Handbooks developed since the onset of the COVID-19 pandemic. COVID-19 has had a significant impact on all of our lives and Colleges of Education should be commended for the way in which they rapidly responded to institutional closures and made the transition to emergency remote teaching and learning. These Handbooks have been designed to reflect the current realities of the blended learning approach which is being used in Colleges of Education and it is hoped that they will play a role in increasing the effectiveness of these new approaches.

These are also the first Professional Development Handbooks to be developed since Transforming Teaching, Education & Learning (T-TEL) was established as a Ghanaian not-for-profit organisation. I would like to take this opportunity to thank both the Ghana Tertiary Education Commission and Mastercard Foundation for their collaboration and support with the 'new T-TEL' which has made the development of these Handbooks possible.

Robin Todd Executive Director, T-TEL May 2021

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The New approach to the Weekly Professional Development (PD) Sessions for Tutors

Guidance Notes for the CoE Professional Development Coordinators

Overview

- 1. Background to the new approach to PD Sessions
- 2. Features of the B.Ed. PD Sessions
- 3. The Role of the PDC
- 4. The Role of the PDC in coordinating the introductory Session for tutors

1. Background to the new approach to PD

- For four years the CoE have been supported in leading weekly Tutor PD Sessions. The PD Sessions have focused on key themes, such as: the NTS, Action research and classroom enquiry among others. The ten theme-based PD modules have been vital in paving the way for the Reform of Teacher Education in Ghana. They have equipped tutors with important skills and knowledge to support the smooth transition to the New B.Ed.
- The New Four-Year B.Ed. will be implemented in CoEs, now affiliated to the Public Universities, and a new approach to the tutors' weekly PD is required. This new approach involves the Universities supporting their affiliated CoE in implementing the subject specific PD Sessions.
- The weekly PD Sessions are designed to prepare subject tutors to use the B.Ed. Course Manuals to teach the 12 lessons in the Course Manuals to student teachers. This means the PD Sessions will now be subject specific. This means there will be subject specific PD groups running each week in the CoEs and universities.
- The PD Sessions are designed to help operationalize the reform of teacher education at tutor and student teacher level and to support:
 - professionalising teaching by supporting teachers in developing communities of practice and raising the status of the teaching profession
 - o improving the quality of new teachers by ensuring that they undergo a rigorous and practically focused, high-quality degree level programme
 - o improving the learning outcomes and life chances for all children.

2. Features of the B.Ed. PD Sessions

- The universities will prepare the Subject Leads or HoDs from their affiliated CoE to lead the weekly subject tutor Sessions,
- The subject-tutor-groups can work at separate tables in one room. However, in exceptional cases a subject may need to work in another space in order to use specific materials or resources, e.g. video or science equipment,
- The main resources for the weekly tutor Sessions are the Subject Specific Course Manuals and the PD Guidance Notes on each Course Manual,
- Each PD Guidance Note is subject specific and contains two sections. The first section provides guidance for the Introductory Session for tutors. The second section is written to provide information to guide the eight (8) weekly PD Sessions that are linked directly to the twelve lessons in the Course Manual,
- The three-hour Introductory Session is to;
 - o introduce the new approach to PD and organisation of the weekly Sessions
 - o introduce the course manuals.

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 1 IN THE COURSE MANUAL

LESSON TOPIC:

- a. Early Grade The Mathematics Curriculum
- **b. Upper Grade** The Mathematics Curriculum
- c. JHS School Mathematics Curriculum
- **d. JHS** Geometrical Proofs

Focus: the bullets provide the frame for what is to be done. The guidance notes in italics identify the prompt the SL/HoD needs and each one must be addressed	Guidance notes on Leading the session. What the SL/HoDs will have to say during each stage of the session	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each state of the session)	Time in session
Introduction / lesson overview Reflection on previous PD Session (Introduction to the course manual) Introduction and overview of the main	Introduction 1. Ice breaker activity: Begin with an investigational activity on materials used in teaching and learning (e.g. Mention curriculum materials you used in a particular mathematics course.)	Introduction 1. Engage in an investigational activity (e.g. Mentioning curriculum materials used in a particular mathematics course.)	15 mins
purpose of the lesson in the course manual.	2. Let tutors tell how useful the previous PD session was and how it influenced their teaching over the week.	Explain how useful the previous PD session was and how it influenced your teaching and learning	

- Highlight cross cutting themes i.e., gender equality and social inclusion (GESI), ICT
- Identification of important or distinctive aspects of the lesson
- Reading and discussion of the introductory sections up to learning outcomes
- Ask tutors to state the purpose of the lesson and state their expectations of the PD Session.
- 4. Through questioning, lead tutors to outline the important features of the course manual.
- 5. Ask tutors to read the introductory sections (up to Learning Outcomes (LOs). Let tutors in pairs discuss the important or distinctive aspects of the lesson including vocabulary and fundamental concepts in the lesson.

Distinctive aspects include the interactive nature of the activities, emphasis on connecting concepts (The Standard-Based Curriculum, congruent and similar triangles)

- a. Early Grade Lesson 1b. Upper Grade Lesson 1
- c. JHS; Assessment Lesson 1
- d. JHS; Euclidean Lesson 1

- of mathematics over the week.
- State the purpose of the lesson in the course manual and state your expectations of the PD session
- 4. Outline the important features of the course manual
- 5. Read the introductory sections (up to learning outcomes) and in pairs/groups discuss the important or distinctive aspects of the lesson (The Standard-Based Curriculum, congruent and similar triangles) and fundamental concepts in the lesson.

Refer to Lesson 1

2. Concept Development (New learning likely to arise in this lesson):

 Identification and

Activity 2: Concept Development

 Lead tutors to identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and

Activity 2: Concept Development

 Identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant

- discussion of concepts
- Identification
 of possible
 challenging
 areas in
 teaching of
 the concept.
 This may
 include GESI
 and ICT
 related
 concepts
- Identification of needed GESI responsive and ICT resources for the teaching and learning of the concept.

- the use of relevant resources including the basic school curriculum.
- Engage tutors to identify and discuss various strategies for the development of conceptual understanding of the lesson.
 Let tutors refer to lesson 7 of the course manual for additional strategies.
 (PD Theme 1 & 3, CCP-PP ix-xxii).
- 3. Lead tutors to discuss misconceptions and barriers in teaching and learning of the lesson.
- 4. Let tutors discuss the differences and similarities of the objective and the standard-based curricula.
- 5. Engage tutors in discussing the nature and structure of the current standard-based and objective-based curricula
- 6. Ask tutors to outline possible challenging areas in teaching of the mathematics curriculum and geometrical proofs taking into consideration GESI (e. g. identifying areas in the curriculum where

- resources including the basic school curriculum
- In pairs (NTS 3h) identify and discuss familiar and unfamiliar concepts in the lesson. Identify some misconceptions and barriers in teaching and learning of the lesson. (Provide an example here – e.g. curriculum is not the same as syllabus)
- Discuss some potential misconceptions and barriers with respect to the teaching and learning of the lesson.
- 4. In pairs discuss the differences and similarities of the objective-based and the standard-based curricula.
- Discuss in detail the nature and structure of the current standardbased and objective based curricula
- 6. Outline possible challenging areas in the teaching of the mathematics curriculum and/or geometrical proofs taking into consideration GESI. (e.g ensure language is gender neutral where possible

	stereotyp	es are		and examples reinforcing	
	reinforce			stereotypes are avoided)	
3. Teaching and	Teaching and	l learning		aching and learning	40 mins
learning activities	activities		0.00	ivities	
 Reading of teaching and learning activities and identification of areas that require clarification especially GESI related activities. Reading of teaching and learning activities and identification of GESI and ICT issues that 	activities taking int issues an the activi the cours eg. i. Provision m physically cha ii. Both genda leading roles iii. work and distribution of Ref: Writing t	and learning for the lesson to account GESI d refer them to ties outlined in the manual made for allenged ters take in group task the weekly PD to NTS 1a, b, c,	1.	Suggest teaching and learning activities for the lesson taking into account Gender Equality and Social Inclusion (GESI) issues. Ref: Writing the weekly PD session-pp 3., NTS 1a, b, c, d, 2b, e, f, 3b, c	
require clarification.	up with s pedagogi and their compete be inculc students to basic s through S eg. Strategy Group Work Investigation Role Play	m and come ome cal approaches related core ncies likely to ated CoE and extended school learners STS activities. Core Competency Collaborative learning Critical Thinking Communication a ascertain the ich methods	2.	Brainstorm and come up with some pedagogical approaches and their likely related core competencies to be inculcated in CoE students and extended to basic school learners through STS activities. (Students can ascertain the extent to which methods are used during STS activities in schools).	

- Engage tutors in pairs to discuss strategies to strengthen core competences (e.g. mind- reading word puzzle, investigation, etc.).
- 4. Let a tutor model a presentation of an activity using ICT tools and taking into consideration GESI (e.g. making adjustments for physically challenged learners, and getting both male and female participants to play leading roles in group work) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii)
- 3. Discuss strategies to strengthen core competences (e.g. mindreading word puzzle, investigation, etc.)
- 4. Model a presentation of an activity using ICT tools and taking into consideration GESI (e.g. making adjustments for physically challenged learners, and getting both male and female participants to play leading roles in group work) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii)

4. Review of Assessment component Reading of

Reading of assessment opportunities and ensuring they are aligned to the NTEAP and required course assessment: subject project (30%), subject portfolio (30%) and end of semester examination (40%) Working through one or two activities,

Review of Assessment Components

- Ask tutors to review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP
 Early Grado The
- a. Early Grade The Mathematics Curriculum can be reviewed taking into consideration subject project (30%), subject portfolio (30%)
- b. Upper Grade The Mathematics Curriculum can be reviewed taking into consideration subject project (30%), subject portfolio (30%)

Review of Assessment Components

 Review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP. Note the various sections of the lesson that could be reviewed in line with subject project (30%) and subject portfolio (30%)

	c. JHS – School		
	Mathematics Curriculum		
	can be reviewed taking into		
	consideration subject		
	project (30%), subject		
	portfolio (30%)		
	d. JHS – Geometrical Proofs		
	can be reviewed taking into		
	consideration subject		
	project (30%), subject		
	portfolio (30%)		
	2. Ask tutors to identify	2. Identify teaching and	
	teaching and learning	learning resources and	
	resources and the	the concepts they can	
	concepts they can help	help learners use in	
	learners use in proofs in	proofs in JHS).	
	JHS).		
	3. Ask tutors to discuss the	3. Discuss the assessment	
	assessment strategies to	strategies to be used	
	be used during teaching	during teaching of the	
	of the lesson at the	lesson – 'Assessment as'	
	various levels (KG, UP,	(NTS 3k).	
	JHS)– 'Assessment as'		
	(NTS 3k).		
	4. Lead tutors to discuss	4. Discuss the various ways	
	the various ways they	you can support student	
	can support student	teachers to build their	
	teachers to build their	portfolios	
	portfolios	before/during/after	
	before/during/ after	lessons.	
	lessons	16350113.	
Resources	Resources	Resources	10 mins
	Support tutors to	Identify as many GESI	
Guidance notes	identify inclusive	responsive resources as	
for SL/HoD	resources such as	possible that can be used	
should	posters with large prints	in the teaching and	
Identify any	for partially sighted	learning of the concepts	
aspect of the	learners, engaging	to be introduced in the	
lesson that	experts in sign language,	lesson.	
might be	making use of		
challenging	projectors, flip charts,		
for tutors in	sticky notes, tactile,		
terms of new	audio-visuals, visuals,		
learning, and	audio, teachers and		
icarring, and	233.5, 1535.1615 4114		

which needs
to be
considered
prior to taking
tutors
through the
lesson
activities
"walk
through".
Equity and
inclusion
issues as well
as ICT
resources
need
consideration
Th

- The resources needed must be identified: literature page referenced etc, on web, YouTube, physical resources, power point; how they should be used. Consideration needs to be given to local availability
- This section can build on the PD needs identified from the course manuals

- leaners resource packs, textbooks, course manual, pairs of compasses and ruler and addition mat, that can be used in the teaching and learning of the concepts introduced in the lesson NTS 3j
- Discuss with tutors how and where human and material resources including low or no cost materials for the lesson could be obtained in advance. Such material could include
- 3. Ask tutors, in pairs (NTS 3h), select a concept through balloting and design resources that can be used in the teaching and learning of the concepts selected (NTS 3j).
- Participate in discussing how and where human and material resources including low or no cost materials for the lesson could be obtained in advance.
- In pairs (NTS 3h), select a concept through balloting and design resources that can be used in the teaching and learning of the concept selected (NTS 3j).

Evaluation and review of session Guidance notes for SL/HoD should

- Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive, differentiatio n and inclusive approaches and use of appropriate ICT tools.
- Identify how any assessments during the lesson relate to course assessment components
- The selected activities

Reflective Activity

- 1. Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i).
- Take note of all unresolved issues and use any of following strategies
- discuss with SL/SWL
- put on SL/SWL
 WhatsApp platform for discussion
- tutors to research and report findings on shared platforms.

Advance Preparation

Ask tutors to read Lesson 2 of the Course Manual on:

Early Grade - Counting and Number Relationships

Upper Primary - Counting and Number Relationships

JHS; Assessment - Geometric Proofs: Learning, teaching and applying 2

JHS Euclidean Geometry - Standards-based versus objective-based curriculum JHS

N/B

i)

Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).

Reflective Activity

- Show by 5 or 3 or 1
 finger(s) if you "really got
 it", "got some of it" or
 "didn't get it"
 respectively. If you
 showed 5 fingers, share
 your experience with your
 colleagues
- 2. Deal with unresolve ed issues through sharing the issues on the various electronic platforms and/or seeking solutions through research.

Advance Preparation

Read Lesson 2 of the Course Manual on: Early Grade - Counting and

Number Relationships

Upper Primary - Counting
and Number Relationships

JHS; Assessment - Geometric

Proofs: Learning, teaching
and applying 2

JHS Euclidean Geometry -

Standards-based versus objective-based curriculum JHS

N/B

i) Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).

should be done with tutors in real or close to real time ii)

- Anticipate any issues for clarification or questions which might arise as the tutors work through the activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including digital skills, are being developed or applied
- Makes links to the existing **PD Themes** with page reference where they can support teaching, for example: action research, questioning and to other external reference material
- Identify where power point

- Read the course manual, the PD session guide ahead of time to identify any outstanding issues relating to this lesson for clarification.
- clarification.

 iii) Collect all resources
 (such as projector,
 flip chart and sticky
 notes) you need
 ahead of time,
 prepare samples of
 TLMs you may need
 and rehearse how
 these may be used
 to support the
 achievement of your
 goals
- ii) Read the course manual, the PD session guide ahead of time to identify any outstanding issues relating to this lesson for clarification.
 iii) Collect all resources (such as projector, flin
- for clarification.

 iii) Collect all resources
 (such as projector, flip
 chart and sticky
 notes) you need
 ahead of time,
 prepare samples of
 TLMs you may need
 and rehearse how
 these may be used to
 support the
 achievement of your
 goals

presentations		
or other		
resources		
need to be		
developed to		
support		
learning and		
provide		
guidance		
Identify resources		
required for any		
TLMs and provide		
guidance on their		
development		

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 2 IN THE COURSE MANUAL

Lesson Topic: Curriculum, Counting, Number Relationships and Geometric Proofs 2

Focus: the bullets		Guidance notes on Leading Guidance Notes on Tutor	Time in
pro	vide the frame	the session. What the Activity during the PD	session
for	what is to be	SL/HoDs will have to say Session. What PD Session	
dor	ne. The guidance	during each stage of the participants (Tutors) will	
not	es in italics	session do during each state of	
ide	ntify the prompt	the session)	
the	SL/HoD needs		
and	d each one must		
be (addressed		
1.	Introduction /	Introduction Introduction	15 mins
	lesson overview Reflection on	 Ice breaker activity: Engage in an investigational activity 	
	previous PD Session (Introduction to the course	investigational activity (e.g. In what ways do you learn mathematics?) investigational activity (e.g. In what ways do you learn mathematics?)	
	manual) Introduction and overview of the main purpose of the lesson in the course manual. Highlight cross	 Ask a critical friend to give feedback on observation during the enactment of Lesson 1. Share with members feedback on observation during the teaching of Lesson 1. 	
	cutting themes i.e., gender equality and social inclusion (GESI), ICT Identification of important or distinctive	 Ask tutors to tell how useful the previous PD session was (NTS 1b) and how it influenced their teaching over the week. Tell colleagues about how useful the previous PD session was and how it influenced your teaching over the week. 	

• Re di in se	espects of the esson eading and iscussion of the estroductory ections up to earning	4. Lead tutors through questioning to state and explain the purpose of the lesson (NTS 2b) and state their expectations of the PD Session.	4. State and explain the purpose of the lesson NTS 2b) in the course manual and state your expectations of the PD session.	
	utcomes	5. Lead tutors to outline the important features of the lesson in the course manual taking note of cross cutting themes i.e., gender equality and social inclusion (GESI), ICT	5. Identify the important features of the lesson in the course manual taking note of cross cutting themes i.e., gender equality and social inclusion (GESI), ICT.	
		6. Ask tutors to read the introductory sections (up to learning outcomes) silently and discuss the importance or distinctive aspects of the lesson (i.e. the interactive nature of the activities, emphasis on integrated curriculum, counting, number relationships and geometric proofs 2) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson. Refer to course manual, Lesson 2	6. Read the introductory sections (up to learning outcomes) silently and in pairs/groups discuss the importance or distinctive aspects of the lesson (i.e. the interactive nature of the activities, emphasis on integrated curriculum, counting, number relationships and geometric proofs 2 and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson. Refer to course manual, Lesson 2	
2. Co	oncept	Concept Development	Concept Development	25 mins
D	evelopment	1. Lead tutors to identify		
(1)	New learning	familiar and unfamiliar	1. Identify familiar and	

concepts in the lesson

concepts in the lesson

with other lessons and

and discuss relevant

connections among

likely to arise in

this lesson):

Identification

and discussion of concepts

unfamiliar concepts in

the lesson and discuss

relevant connections

among concepts in the

lesson with other lessons

- Identification of possible challenging areas in teaching of the concept. This may include GESI and ICT related concepts
- Identification of needed GESI responsive and ICT resources for the teaching and learning of the concept.

the use of relevant resources including the basic school curriculum.

Example;

i. Standards-based and objective-based curricula (BSC content standard

B4.1.1.1; B5.1.1.1; B6.1.1.1)

ii. Skip counting forwards and backwards(SBC content standard **B4.1.1.1**; **B5.1.1.1**; **B6.1.1.1**)

- iii. Congruence
- iv. Pythagoras theorem
- Engage tutors to identify and discuss various strategies for the development of conceptual understanding of the lesson.

Example: Interactive,
Internet search, Model
lessons, Exploratory (Let
tutors refer to Lesson 2 of
the course manual for
additional strategies.)

- 3. Ask tutors in pairs to investigate some ways of applying skip counting forwards and backwards, congruence of similar triangles, Pythagoras theorem and Standards-based and objective-based curricula.
- Lead tutors to explore potential misconceptions of teaching and learning "skip counting forwards

and the use of relevant resources including the basic school curriculum.

 Participate in the identification and discussion of various strategies for the development of conceptual understanding of the lesson

- 3. In pairs discuss some practical ways of applying skip counting forwards and backwards, congruence of similar triangle, Pythagoras theorem and Standards-based and objective-based curricula.
- Explore potential misconceptions of teaching and learning "skip counting forwards and

	and backwards",	backwards",	
	"congruence of similar	"congruence of similar	
	triangle", "Pythagoras	triangle", "Pythagoras	
	theorem" and	theorem" and	
	"Standards-based and	"Standards-based and	
	objective-based	objective-based	
	curricula". (eg. "all	curricula".	
	similar triangles are		
	congruent")		
	Barriers: Inappropriate		
	inclusive resources		
	Limited use of technology		
	Inadequate pre-requisite		
	knowledge		
	N/B: Refer tutors to the		
	lesson 2 of the course		
	manual for other potential		
	misconceptions and		
	barriers.		
	Duilleis.		
	5. Ask tutors to outline	5. Outline possible	
	possible challenging	challenging areas in	
	areas in teaching of the	teaching concepts such	
	concepts such as skip	as skip counting	
	counting forwards and	forwards and	
	backwards, congruence	backwards,	
	of similar triangle and	congruence of similar	
	Pythagoras theorem	triangle and	
	and Standards-based	Pythagoras theorem.	
	and objective-based	, 0	
	curricula Eg misapplying		
	the rule of patterns.		
	·		
	6. Have tutors suggest	6. Suggest creative	
	creative approaches of	approaches of	
	addressing the	addressing the	
	identified challenges.	identified challenges.	
	Eg. Selection model for		
	counting problems,		
	using the principle of		
	multiple embodiment.		
3. Teaching,	Teaching and learning	Teaching and learning	40 mins
learning and	activities for the lesson	activities for the lesson	
assessment		İ	
activities for the	Ask tutors to suggest	Suggest teaching and	
activities for the lesson	Ask tutors to suggest teaching and learning activities for the lesson	Suggest teaching and learning activities that can be used in	

- Reading of teaching and learning activities and identification of areas that require clarification especially GESI related activities.
- Reading of teaching and learning activities and identification of GESI and ICT issues that require clarification.
- taking into account
 Gender Equality and
 Social Inclusion (GESI)
 (eg. both male and
 female participants
 playing the leading
 roles in group work,
 even distribution of
 questions) issues and
 refer them to the
 activities outlined in the
 course manual (writing
 the weekly PD sessionpp 3., NTS 1a, b, c, d,
 2b, e, f, 3b, c;
- 2. Lead tutors to brainstorm to come up with some pedagogical approaches and their related core competencies likely to be inculcated in CoE students and extended to basic school learners through STS activities.

Example:
Group Work - Collaborative learning
Investigation - Critical
Thinking
Role Play - Communication
Students can ascertain the extent to which methods are used during STS activities in schools.

3. Engage tutors in pairs to discuss strategies to strengthen core competencies (e.g. mind- reading word puzzle, investigation, creating variant tasks and solutions, identifying applications

- teaching the lesson taking into account GESI issues (eg. both male and female participants playing the leading roles in group work, even distribution of questions). Read the activities in the course manual lesson 2 and identify those that require clarification (NTS 1a, b, c, d, 2b, e, f, 3b, c; BSC p. iii).
- 2. Brainstorm to come up with some pedagogical approaches and their likely related core competencies to be inculcated in CoE students and extended to basic school learners through STS activities.

(Students can ascertain the extent to which methods are used during STS activities in schools).

3. Discuss the strategies to strengthen core competencies

- of theorems and postulates making connections between topics and concepts, etc.)
- 4. Let a tutor model a presentation of an activity using ICT tools and taking into consideration GESI (eg. both male and female participants playing leading roles in their groups and in the demonstration of the use of ICT tools) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii)

4. Discuss one or two of the activities to ensure understanding and model alternative strategies for the activities using ICT tools and taking into consideration GESI (e.g. both male and female participants playing in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii)

NOTE:

- ✓ Tutors are likely to ask about the relevance of this activity in teaching mathematics lessons. When this comes up, refer them to the PD Theme 1, that is, Creative Approaches
- ▼ The core and transferable skills being developed or used include social skills, communication skills, critical and creative thinking skills
- ✓ Creative Activities,
 Questioning, Talk and
 Learn and Group Work
 can be used to support
 the delivery of this
 session

4. Review of	Review of Assessment	Review of Assessment	15 mins
Assessment	Components	Components	
component	1. Ask tutors to review the	1. Review the	
Reading of	assessment	assessment	
assessment	components of the	components of the	
opportunities and	lesson in the course	lesson in the course	
ensuring they are	manual focusing on	manual focusing on	
aligned to the	assessment of, as and	assessment of, as and	
NTEAP and required	for in line with the	for in line with the	
course assessment:	NTEAP	NTEAP	
subject project	i. Early Grade – Standards-	Look at the various	
(30%), subject	based and objective-based	sections of the lesson	
portfolio (30%) and	curricula could be reviewed	that could be reviewed	
end of semester	in line with subject project	in line with subject	
examination (40%)	(30%) and subject portfolio	project (30%) and	
Working through	(30%)	subject portfolio (30%)	
one or two	ii. Upper Grade – Skip		
activities.	counting forwards and		
	backwards could be		
	reviewed in line with		
	subject project (30%) and		
	subject portfolio (30%)		
	iii. JHS – Congruence could		
	be reviewed in line with		
	subject project (30%) and		
	subject portfolio (30%)		
	iv. JHS – Pythagoras		
	theorem could be reviewed		
	in line with subject project		
	(30%) and subject portfolio		
	(30%)		
	,		
	2. Lead tutors to discuss	2. Discuss the various	
	the various ways they	ways you can support	
	can support student	student teachers to	
	teachers to build their	build their portfolios	
	portfolios	before/during/ after	
	before/during/ after	lessons	
	lessons.		
Resources	Resources	Resources	10 mins
Guidance notes for	Support tutors to	1. Identify as many GESI	
SL/HoD should	identify inclusive	responsive resources	
Identify any	resources such as	as possible that can be	
aspect of the	posters with large	used in the teaching	
lesson that	prints for partially	and learning of the	
might be	sighted learners,	concepts mentioned	
challenging for	engaging experts in sign	above – The BSC	

	tutors in torms		languaga making usa	<u> </u>	ourriculum counting	
	tutors in terms		language, making use		curriculum, counting,	
	of new learning,		of projectors, flip		number relationships	
	and which needs		charts, sticky notes,		and geometric proof.	
	to be considered		tactile materials, audio-		NTS 3j	
	prior to taking		visuals, visuals, audio,			
	tutors through		teachers and leaners			
	the lesson		resource packs,			
	activities "walk		textbooks, course			
			•			
	through". Equity		manual, graph sheets			
	and inclusion		and number charts that			
	issues as well as		can be used in the			
	ICT resources		teaching and learning			
	need		of the concepts			
	consideration		mentioned above –			
•	The resources		curriculum, counting,			
	needed must be		number relationships			
			•			
	identified:		and geometric proofs.			
	literature – page		NTS 3j			
	referenced etc,					
	on web,	2.	Ask tutors, in pairs (NTS	2.	In pairs (NTS 3h),	
	YouTube,		3h), select a concept		select a concept	
	physical		through balloting and		through balloting and	
	resources,		design resources that		design resources that	
	power point;		can be used in the		can be used in the	
	= =		teaching and learning		teaching and learning	
	how they should		-		-	
	be used.		of the concept s		of the concept	
	Consideration		selected (NTS 3j).		selected (NTS 3j).	
	needs to be					
	given to local	3.	Encourage tutors to	3.	Discuss the need for	
	availability		prepare samples of		using local, low or no	
•	This section can		TLMs for teaching of		cost materials to	
	build on the PD		patterns in shapes		design and use	
	needs identified		using no-low-cost		resources for teaching	
	from the course		materials (e.g.		shapes	
			triangles)		Shapes	
-	manuals	D . (_	[]	F*
	aluation and		flective Activity		flective Activity	5 mins
rev	view of session	1.	Engage tutors in the	1.	Show by 5 or 3 or 1	
	_		evaluation of the		finger(s) if you "really	
	idance notes for		session and encourage		got it", "got some of	
SL	/HoD should		them to provide		it" or "didn't get it"	
•	Select activities,		feedback on the PD		respectively. If you	
	linked to CLO		session (NTS 1a, 3i).		showed 5 fingers,	
	and indicators,		, , ,		share your experience	
	from the lesson				with your colleagues	
					with your concagues	
	that are likely to					
	be most					
	different from					

- tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive, differentiation and inclusive approaches and use of appropriate ICT tools.
- Identify how any assessments during the lesson relate to course assessment components
- The selected activities should be done with tutors in real or close to real time
- Anticipate any issues for clarification or questions which might arise as the tutors work through the activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including

- Engage tutors to identify unresolved issues relating to this lesson for clarification
- Lead tutors to take note of all unresolved issues and use any of following strategies
 - i. discuss with SL/SWL
 - ii. put on SL/SWL WhatsApp platform for discussion
 - iii. tutors to research for the next PD session for discussion

- Reflect on the activities in the session and identify unresolved issues relating to the lesson
- Deal with unresolved issues through WhatsApp platform for discussion and/or research

Advance Preparation

- 1. Ask tutors to read Lesson 3 of the Course Manual
- a. Early Grade Countingand Number Relationships2
- b. Upper Grade Placevalue 10 to 1,000c. JHS; Assessment –Number and Numerationsystems
- d. JHS; Euclidean –Lines and Circles: Teaching,Learning and Applying

N.B Remind tutors to:

 i. identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).

Advance Preparation

- 1. Read Lesson 3 of the Course Manual to identify issues of concern.
- a. Early Grade Counting and Number Relationships
- b. Upper Grade Place value 10 to 1,000 c. JHS; Assessment – Number and Numeration systems d. JHS; Euclidean – Lines and Circles:
- Lines and Circles: Teaching, Learning and Applying

N.B

- i. Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson,

- digital skills, are being developed or applied
- Makes links to the existing PD Themes with page reference where they can support teaching, for example: action research, questioning and to other external reference material
- Identify where power point presentations or other resources need to be developed to support learning and provide guidance
- Identify resources required for any TLMs and provide guidance on their development

- ii. read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. collect all resources (such as projector, flip chart and sticky notes) they need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of their goals.
- ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. Collect all resources you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals.

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 3 IN THE COURSE MANUAL

LESSON TOPIC:

- a. Early Grade Counting and Number Relationships,
- **b.** Upper Grade Place value
- c. JHS Number and Numeration systems
- **d.** JHS Lines and Circles

Focus: the bullets provide the frame for what is to be done. The guidance notes in italics identify the prompt the SL/HoD needs and each one must be addressed	Guidance notes on Leading the session. What the SL/HoDs will have to say during each stage of the session	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each state of the session)	Time in session
Introduction / lesson overview Reflection on previous PD Session (Introduction to the course manual) Introduction and overview of the main purpose of the lesson in the course manual. Highlight cross cutting themes i.e., gender equality and social inclusion (GESI), ICT	 Introduction Ice breaker activity: Begin with an investigational activity (e.g. Puzzle and questioning etc.). Let tutors tell how useful the PD session 2 was and how it influenced their teaching in semester two. (NTS 1b) Ask a critical friend to give feedback on his/her observation of the last enacted lesson. 	 Introduction Engage in an investigational activity (e.g. Puzzle and Questioning) Tell how useful the PD session 2 was and how it influenced your teaching in semester two. (NTS 1b) As the critical friend, share with members feedback on your observation of the last enacted lesson. 	15 mins

- Identification of important or distinctive aspects of the lesson
- Reading and discussion of the introductory sections up to learning outcomes
- Introduction and overview of the main purpose of the lesson in the course manual
- Identification of important or distinctive aspects of the lesson
- Reading and discussion of the introductory sections up to learning outcomes

- 4. Lead tutors through questioning to state and explain the purpose of the lesson (NTS 2b) and state their expectations of the PD Session.
- 5. Ask tutors to read the introductory sections (up to learning outcomes) silently. Let tutors in pairs discuss the important or distinctive aspects of the lesson (e.g., the interactive nature of the activities) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson. Counting and Number Relationships - EGE, Place value- Upper Primary Lesson 3, lines and cycles - JHS Lesson 3, Number system - JHS Lesson 3
- 4. State and explain the purpose of the lesson (NTS 2b) and state their expectations of the PD Session.
- 5. Read the introductory sections (up to learning outcomes) silently. Let tutors in pairs discuss the important or distinctive aspects of the lesson (e.g., the interactive nature of the activities) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson. Refer to Course Manual Lesson 3:

2. Concept Development (New learning likely to arise in this lesson):

- Identification and discussion of concepts
- Identification of possible challenging areas in teaching of the concept. This may include GESI and ICT related concepts
- Identification of needed GESI responsive and

Concept Development

- 1. Lead tutors to identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources including the basic school curriculum.
- Engage tutors to identify and discuss various strategies for the development of conceptual

Concept Development

- 1. Identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources including the basic school curriculum.
- Participate in the identification and discussion and discuss various strategies for the

ICT resources for the teaching and learning of the concept. understanding of the lesson. Vocabulary and fundamental concepts related to Counting and Number Relationships in EGE, Place value in UPP Pry, lines and cycles in JHS course, Number system in JHS course. Example: Interactive, Internet search, Model lessons, Exploratory (Let tutors refer to lesson 2 of the course manual for additional strategies.) Refer to Course Manual, lesson 3

development of conceptual understanding of the lesson Refer to Lesson 3.

- 3. Lead tutors to discuss misconceptions and barriers in teaching and learning of the concepts to be introduced in the lesson.
- 3. Discuss some potential misconceptions and barriers with respect to the teaching and learning of the concepts to be introduced in the lesson.
- 4. Engage Tutor on how the concepts in the lesson (eg. Lines) are used both in school mathematics and life outside the mathematics classroom
- 4. Discuss how the concepts in the lesson (e.g. lines) are used both in school mathematics and life outside the mathematics classroom
- 5. Ask tutors to outline possible challenging areas in the teaching and learning of counting and number relationships, lines and circles, place value and number and numeration systems.
- 5. outline possible challenging areas in the teaching and learning of counting and number relationships, place value, number and numeration systems and lines and circles

3. Teaching, learning and assessment activities for the lesson

- Reading of teaching and learning activities and identification of areas that require clarification especially GESI related activities.
- Reading of teaching and learning activities and identification of GESI and ICT issues that require clarification.

Teaching and learning activities for the lesson

- 1. Ask tutors to suggest teaching and learning activities for the lesson taking into account GESI (e.g. both male and female participants playing the leading roles in group work, even distribution of questions) and refer them to the activities outlined in the course manual (writing the weekly PD session-pp 3; NTS 1a, b, c, d, 2b, e, f, 3b, c; BSC pp. iii)
- 2. Lead tutors to brainstorm come up with some pedagogical approaches and their related core competencies likely to be inculcated in CoE students and extended to basic school learners through STS activities.

eg.

cg.	
Strategy	Core
	Competency
Group Work	Collaborative
	learning
Investigation	Critical
	Thinking
Role Play	Communication

Students can ascertain the extent to which methods are used during STS activities in schools.

3. Engage tutors in a discussion of inclusive strategies to clarify the

Teaching and learning activities for the lesson

- 1. Suggest teaching and learning activities that can be used in teaching the lesson taking into account GESI (e.g. both male and female participants playing the leading roles in group work, even distribution of questions). Read the activities in the course manual (pp. 12 &16), and identify those that require clarification (NTS 1a, b, c, d, 2b, e, f, 3b, c; BSC p. iii).
- 2. Brainstorm to come up with some pedagogical approaches and their likely related core competencies to be inculcated in CoE students and extended to basic school learners through STS activities.

(Students can ascertain the extent to which methods are used during STS activities in schools).

3. Discuss the strategies to clear

otherwise dark spots (e.g. using Selection model for counting problems and principle of multiple embodiment etc.)

- potential uncertainties
- 4. Engage tutors in pairs to discuss strategies to strengthen core competencies (e.g. mindreading word puzzle, investigation, creating variant tasks and solutions, identifying applications of concepts and making connections between topics and concepts).
- Discuss the strategies to strengthen core competencies.
 Discuss one or two of the activities to ensure understanding.

- 5. Let a tutor model the presentation of an activity using ICT tools, taking into consideration GESI issues in the B.ED and the Basic School Mathematics Curricula (BSMC), NTS 1a, b, c, d, 2b, e, 3b, c; BSC pp. iii)
- 5. Model alternative strategies for the activities using ICT tools and taking into consideration GESI issues in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii)

N.B

Tutors are likely to ask about the relevance of this activity in teaching mathematics lessons. When this comes up, refer them to PD Manuals

- i. that is, Creative Approaches
- ii. The core and transferable skills being developed or used include social skills, communication

	skills, critical and		
	creative thinking		
	skills		
	iii. Creative Activities,		
	Questioning, Talk		
	and Learn and Group		
	Work can be used to		
	support the delivery		
	of this session		
4. Review of	Review of Assessment	Review of Assessment	15 mins
Assessment	Components	Components	13 111113
component	1. Ask tutors to review the	1. Review the	
-		assessment	
Reading of	assessment components		
assessment	of the lesson in the	components of the	
opportunities and	course manual focusing	lesson in the course	
ensuring they are	on assessment of, as	manual focusing on	
aligned to the NTEAP	and for in line with the	assessment of, as	
and required course	NTEAP	and for in line with	
assessment: subject	Ref. Course Manual,	the NTEAP. The	
project (30%), subject	Lesson 3	various sections of	
portfolio (30%) and	a. Early Grade – The	the lesson should be	
end of semester	Mathematics Curriculum	reviewed in line with	
examination (40%)	can be reviewed taking into	subject project (30%)	
Working through one	consideration subject	and subject portfolio	
or two activities.	project (30%), subject	(30%)	
	portfolio (30%)		
	b. Upper Grade – The		
	Mathematics Curriculum		
	can be reviewed taking into		
	consideration subject		
	project (30%), subject		
	portfolio (30%)		
	c. JHS – School Mathematics		
	Curriculum can be reviewed		
	taking into consideration		
	subject project (30%),		
	subject portfolio (30%)		
	d. JHS – Geometrical Proofs		
	can be reviewed taking into		
	consideration subject		
	project (30%), subject		
	portfolio (30%)		
	2. Lead tutors to discuss	2. Discuss the various	
	the various ways they	ways you can support	
	can support student	student teachers to	
	teachers to build their	build their portfolios	

	portfolios before/during/ after lessons.	before/during/ after lessons	
Resources	Activity 3: Resources	Activity 3: Resources	10 mins
Guidance notes for SL/HoD should Identify any aspect of the lesson that might be challenging for tutors in terms of new learning, and which needs to be considered prior to taking tutors through the lesson activities "walk through". Equity and inclusion issues as well as ICT resources need consideration The resources needed must be	1. Support tutors to identify and design resources that can be used in the teaching and learning of the concepts such as Counting and Number Relationships, Lines and Circles, Place value Number and Numeration systems (NTS 3j) Examples of Resources: Teachers Resource pack, Student's resource pack, Adaptive resources, visual materials, audio visual materials, Posters number charts; ten frames, video clips downloaded from the internet; tape measure.	1. Identify and design resources that can be used in teaching and learning of the concepts such as tessellations, symmetry, congruence and similarity of shapes; triangles and properties of triangles. NTS 3j)	
needed must be identified: literature – page referenced etc, on web, YouTube, physical resources, power point; how they should be used. Consideration needs to be given	2. Discuss with tutors how and where human and material resources for the lesson could be obtain. Such material could include projectors, flip charts and sign language personnel.	2. Participate in discussing how and where human and material resources for the lesson could be obtained in advance.	
to local availability This section can build on the PD needs identified from the course manuals	3. Ask tutors in pairs (NTS 3h) to select a concept through balloting and design resources that can be used in the teaching and learning of the concept (NTS 3j).	3. In pairs (NTS 3h), select a concept through balloting and design resources that can be used in the teaching and learning of the concept selected (NTS 3j). Discuss the need for using local, low or no	

					co	st materials to design	
						nd use resources for	
						aching shapes	
	Guidance notes for SL/HoD should		Activity 5: Reflective Activity			ctivity 5: Reflective	5 mins
•	Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve	1.	evalua sessio them feedb	e tutors in the ation of the n and encourage to provide ack on the PD n (NTS 1a, 3i).	1.	Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues	
	applying new content, e.g. from section 2, or approaches to teaching, learning and assessment,	2.	unres relatir for cla	e tutors to identify olved issues ng to this lesson prification	2.	Reflect on the activities in the session and identify unresolved issues relating to the lesson	
	incl. gender responsive, differentiation and inclusive approaches and use of appropriate ICT tools.	3.	of all u	utors to take note unresolved issues se any of following gies discuss with SL/SWL put on SL/SWL	3.	Deal with unresolved issues through WhatsApp platform for discussion and/or research	
•	Identify how any assessments during the lesson relate to course assessment components The selected		vi.	WhatsApp platform for discussion tutors to research for the next PD session for discussion			
	activities should be done with tutors in real or close to real time	1. EG	Ask tu E: Tead	Preparation utors to read: ching and ent - lesson 4	1. ar	dvance Preparation Read: EGE: Teaching and Assessment EGE sson 4	
•	Anticipate any issues for clarification or questions which might arise as the tutors work through the	wi wi JH Le	thin 99 thin 99 S: Circl arning,	ition of numbers and then numbers 9, UPP lesson 4 e Theorems: teaching and JHS lesson 4	nu th 99 3.	UPP: Addition of umbers within 99 and nen numbers within 99, lesson 4 JHS: Circle Theorems: earning, teaching and oplying, JHS PP34	

- activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including digital skills, are being developed or applied
- Makes links to the existing PD
 Themes with page reference where they can support teaching, for example: action research, questioning and to other external reference material
- Identify where power point presentations or other resources need to be developed to support learning and provide guidance
- Identify resources required for any TLMs and provide guidance on their development

JHS: Classroom Assessment JHS lesson 4

N.B

- i. Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. Collect all resources
 (such as projector,
 flip chart and sticky
 notes) you need
 ahead of time,
 prepare samples of
 TLMs you may need
 and rehearse how
 these may be used
 to support the
 achievement of your
 goals

JHS: Classroom Assessment JHS lesson 4

N.B

- Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. Collect all resources you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 4 IN THE COURSE MANUAL

Lesson Topic:

- a. Early Grade Place Value 10 1000
- **b. Upper Grade** Addition of numbers within 99 and the then numbers within 999
- **c. JHS** Classroom Assessment
- **d. JHS** Circle Theorems: Learning Teaching and Applying

Focus: the bullets provide the frame for what is to be done. The guidance notes in italics identify the prompt the SL/HoD needs and each one must be addressed	Guidance notes on Leading the session. What the SL/HoDs will have to say during each stage of the session	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each state of the session)	Time in session
Introduction / lesson overview Reflection on previous PD Session (Introduction to the course manual) Introduction and	Introduction / lesson overview 1. Ice breaker activity: Begin with an investigational activitiy (e.g. Identify the prime numbers between 4 and 15)	Introduction / lesson overview 1. Engage in an investigational activity (eg. identify the prime numbers between 4 and 15)	15 mins
 overview of the main purpose of the lesson in the course manual. Highlight cross cutting themes i.e., gender equality and 	2. Ask tutors to tell how useful the previous PD session was and how it influenced their teaching over the week.	2. Explain how useful the previous PD session was and how it influenced their teaching over the week.	

- social inclusion (GESI), ICT
- Identification of important or distinctive aspects of the lesson
- Reading and discussion of the introductory sections up to learning outcomes
- 3. Ask the critical friend to give feedback on his/her observation of the last enacted lesson.
- Ask tutors to state the purpose of the lesson and state their expectations of the PD Session (NTS 2b)
- Lead tutors to outline the important features of the lesson in the course manual.
- 6. Ask tutors to read the introductory sections (up to learning outcomes) and discuss the important or distinctive aspects of the lesson (e.g. the interactive nature of the activities with emphasis on connecting concepts such as ,Place Value, Addition of numbers Classroom Assessment and Circle Theorems with other lessons and the use of relevant resources including the basic school curriculum) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

Course Manual for:

- a. Early Grade lesson 4
- b. Upper Grade lesson 4
- c. JHS; Assessment lesson
- d. JHS; Euclidean lesson 4

- 3. As the critical friend, share with members feedback on your observation of the last enacted lesson.
- 4. State the purpose of the lesson and state your expectations of the lesson.
- Outline the important features of the lesson in the course manual.
- 6. Read the introductory sections (up to learning outcomes) and in pairs/groups discuss the important or distinctive aspects of the lesson (e.g. connecting Place Value, Addition of numbers Classroom Assessment and Circle Theorems with other lessons and the use of relevant resources including the basic school curriculum) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson..

Course Manual for:

- a. Early Grade lesson 4
- b. Upper Grade lesson 4
- c. JHS; Assessment lesson 4
- d. JHS; Euclidean lesson
- 4

	DCC Combonst Chain de ada	DCC Comband Chair de ade	
	BSC Content Standards B4.1.1.1 B5.1.1.1 B6.1.1.1	BSC Content Standards B4.1.1.1 B5.1.1.1 B6.1.1.1	
	B4.1.3.1 CCP-B8.3.2.1 (PD	B4.1.3.1 CCP-B8.3.2.1 (PD	
	Theme 1, 3 & 4)	Theme 1, 3 & 4) (PD	
	Theme 1, 3 & 4)	Theme 1, 3 & 4)	
		Theme 1, 3 & 4)	
2. Concept	Concept Development	Concept Development	25 mins
Development (New	1. Lead tutors to identify	1. Identify familiar and	
learning likely to	familiar and unfamiliar	unfamiliar concepts in	
arise in this lesson):	concepts in the lesson	the lesson and discuss	
 Identification 	and discuss relevant	relevant connecting	
and discussion of	connecting concepts in	concepts in the lesson -	
concepts	the lesson – e.g. micro	micro lesson, the use	
 Identification of 	lesson, the use of	of technology across	
possible	technology across the	the Early Grade	
challenging areas	Early Grade	mathematics,	
in teaching of	mathematics,	subtraction of whole	
the concept. This	subtraction of whole	numbers and	
may include GESI	numbers and	trigonometric	
and ICT related	trigonometric equations	equations with other	
concepts	with other concepts and	concepts and the use	
Identification of	the use of relevant	of relevant resources).	
needed GESI	resources).	,	
responsive and	,		
ICT resources for	2. Engage tutors to identify	2. Identify and discuss	
the teaching and	and discuss various	various strategies for	
learning of the	strategies for the	the development of	
concept.	development of	conceptual	
concept.	conceptual	understanding of	
	understanding of	a. Early Grade – Place	
	a. Early Grade – Place	Value	
	Value	b. Upper Grade – Addition	
	b. Upper Grade – Addition	c. JHS; Assessment –	
	of numbers	Classroom Assessment	
	c. JHS; Assessment –	d. JHS; Euclidean – Circle	
	Classroom Assessment	Theorem	
	d. JHS; Eclidean – Circle	Theorem	
	Theorem		
	2 Load tutors to discuss	2 Discuss same national	
	3. Lead tutors to discuss	3. Discuss some potential	
	misconceptions and	misconceptions and	
	barriers in teaching and	barriers with respect	
	learning of	to the teaching and	
	a. Early Grade – Place	learning of	
	Value	a. Early Grade – Place	
	b. Upper Grade – Addition	Value	
	of numbers	b. Upper Grade – Addition	
		of numbers	

	c. JHS; Assessment –	c. JHS; Assessment –	
	Classroom Assessment	Classroom Assessment	
	d. JHS; Euclidean – Circle	d. JHS; Euclidean – Circle	
	Theorem	Theorem	
	(e.g. that a circular object is		
	a circle, any angle		
	subtended on the		
	circumference has the same		
	value)		
3. Teaching,	Teaching and learning	Teaching and learning	40 mins
learning and	activities	activities	10 1111113
assessment	Ask tutors to suggest	Suggest teaching and	
activities for the	teaching and learning	learning activities for	
	activities for the lesson	_	
lesson		the lesson taking into	
Reading of	taking into account GESI	account GESI (e.g.	
teaching and	(e.g. making adjustments	making adjustments	
learning	for physically challenged	for physically	
activities and	learners, and getting	challenged learners,	
identification of	both male and female	and getting both male	
areas that	participants to play	and female	
require	leading roles in group	participants to play	
clarification	work) NTS 1a, b, c, d, 2b,	leading roles in group	
especially GESI	e, f, 3b, c;	work) NTS 1a, b, c, d,	
related activities.		2b, e, f, 3b, c;	
 Reading of 		(Writing the Weekly PD	
teaching and		Session-p 3., NTS 1a, b, c,	
learning		d, 2b, e, f, 3b, c;(NTS 1a, b,	
activities and		c, d, 2b, e, f, 3b, c; BSC p.	
identification of		iii)	
GESI and ICT		,	
issues that	2. Lead tutors to	2. Brainstorm to come up	
		with some pedagogical	
require	brainstorm come up with		
clarification.	some pedagogical	approaches and their	
	approaches and their	likely related core	
	related core	competencies to be	
	competencies likely to be	inculcated in CoE	
	inculcated in CoE	students and extended	
	students and extended	to basic school	
	to basic school learners	learners through STS	
	through STS activities.	activities.	
	Example:	(Students can ascertain	
	Group Work - Collaborative	the extent to which	
	learning	methods are used during	
	Investigation - Critical	STS activities in schools).	
	Thinking		
	Role Play - Communication		
	Note Flay - Collinium Cation		

	Students can ascertain the extent to which methods are used during STS activities in schools.		
	3. Engage tutors in a discussion of strategies to strengthen core competencies. (e.g. difficulty identifying the places of digits and their values beyond hundreds).	3. Discuss the strategies to strengthen core competencies.	
	4. Engage tutors to work through one or two of the activities to ensure understanding.	4. Work through one or two of the suggested activities to ensure understanding.	
	5. Ask a tutor to model alternative strategies for the activities using ICT tools, taking into consideration GESI issues (eg. both male and female participants playing the leading roles in group work, even distribution of questions and in the demonstration of the use of ICT tools by both male and female particpants) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii).	5. Model alternative strategies for the activities using ICT tools, taking into consideration GESI issues (e.g. both male and female participants playing the leading roles in group work, even distribution of questions and in the demonstration of the use of ICT tools by both male and female participants) in B.ED and Basic School Curricula.	
4. Review of Assessment	Review of Assessment Components	Review of Assessment Components	40 mins
component	·		
Reading of assessment	1. Ask tutors to review the assessment components	Ask tutors to review the assessment	
opportunities and	of the lesson in the	components of the	
ensuring they are	course manual focusing	lesson in the course	
aligned to the	on assessment of, as and	manual focusing on	

NTEAP and required for in line with the assessment of, as and **NTEAP** for in line with the course assessment: a. Early Grade – Place Value subject project NTEAP. can be reviewed taking into Look at the various (30%), subject portfolio (30%) and consideration subject sections of the lesson end of semester project (30%), subject that could be reviewed examination (40%) portfolio (30%) in line with subject Working through b. Upper Grade – Addition project (30%) and subject portfolio (30%) one or two of numbers can be activities. reviewed taking into consideration subject project (30%), subject portfolio (30%) c. JHS; Assessment -Classroom Assessment can be reviewed taking into consideration subject project (30%), subject portfolio (30%) d. JHS; Euclidean - Circle Theorem can be reviewed taking into consideration subject project (30%), subject portfolio (30%) 2. Lead tutors to discuss 2. Discuss the various the various ways they ways you can support student teachers to can support student teachers to build their build their portfolios portfolios before/during/ after before/during/ after lessons lessons Resources Resources 10 mins Resources 1. Identify as many GESI 1. Support tutors to **Guidance notes for** identify inclusive responsive resources SL/HoD should resources such as as possible that can be posters with large prints used in the teaching Identify any aspect of the for partially sighted and learning of the lesson that learners, engaging concepts introduced in might be experts in sign the lesson. a. Early Grade – lesson 4 challenging for language, making use of projectors, flip charts, b. Upper Grade – lesson 4 tutors in terms sticky notes, tactile, c. JHS; Assessment of new learning, and which needs audio-visuals, visuals, lesson 4

audio, teachers and

to be considered

	from the lesson				with your colleagues	
	and indicators,		session (NTS 1a, 3i).		showed 5 fingers, share your experience	
•	Select activities, linked to CLO		feedback on the PD		respectively. If you	
	/HoD should		them to provide		or "didn't get it"	
	idance notes for		session and encourage		got it", "got some of it"	
			evaluation of the		finger(s) if you "really	
rev	view of session	4.	Engage tutors in the	4.	Show by 5 or 3 or 1	
Eva	aluation and	Re	flective Activity	Re	eflective Activity	5 mins
			and consepts selected.		selected. NTS 3j	
			the concepts selected.		of the concepts	
	manuals		teaching and learning of		teaching and learning	
	from the course		for designing resources that can be used in the		designing resources that can be used in the	
	needs identified		and develop the rubrics		the rubrics for	
	build on the PD		3h), select a concept		a concept and develop	
•	This section can	3.	Let tutors, in pairs (NTS	3.	In pairs (NTS 3h), select	
	availability					
	given to local		personnel.			
	needs to be		and sign language			
	Consideration		projectors, flip charts			
	be used.		resources can include		obtain in advance.	
	how they should		obtain in advance. Such		the lesson could be	
	power point;		the lesson could be		material resources for	
	resources,		material resources for		where human and	
	physical		and where human and		discussing how and	
	YouTube,	2.	Discuss with tutors how	2.	Participate in	
	on web,		•			
	referenced etc,		O themes 1 & 3)			
	literature – page	d	JHS; Euclidean – lesson 4			
	identified:	4	,			
	needed must be		HS; Assessment – lesson			
•	The resources		Upper Grade – lesson 4			
	consideration	a.	Early Grade – lesson 4			
	need		in the lesson.			
	ICT resources		the concepts introduced			
	issues as well as		teaching and learning of			
	through". Equity and inclusion		and addition mat, that can be used in the			
	activities "walk		compasses and ruler			
	the lesson		manual, pairs of	(P	D themes 1)	
	tutors through		textbooks, course	4		
	prior to taking		leaners resource packs,		JHS; Euclidean – lesson	

- experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive, differentiation and inclusive approaches and use of appropriate ICT tools.
- Identify how any assessments during the lesson relate to course assessment components
- The selected activities should be done with tutors in real or close to real time
- Anticipate any issues for clarification or questions which might arise as the tutors work through the activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including digital skills, are being developed or applied

- discuss with SL/SWL
- put on SL/SWL
 WhatsApp platform for discussion
- tutors to research and report findings on shared platforms.

Advance Preparation

Ask tutors to read Lesson 5 of the Course Manual

- a. Early Grade Addition within 19 and 99:
- b. Upper Grade Classroom assessment:
- c. JHS; Assessment Micro Lessons:
- d. JHS; Eclidean Geometric construction: N.B
- Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. Collect all resources you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals

various electronic platforms and/or seeking solutions through research.

Advance Preparation

Read Lesson 6 of the Course Manual

- a. Early Grade Addition within 19 and 99:
- b. Upper Grade –Classroom assessment:
- c. JHS; Assessment Micro Lessons:
- d. JHS; Eclidean Geometric construction: N.B
- i. Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. Collect all resources you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals.

•	Makes links to	
	the existing PD	
	Themes with	
	page reference	
	where they can	
	support	
	teaching, for	
	example: action	
	research,	
	questioning and	
	to other external	
	reference	
	material	
•	Identify where	
	power point	
	presentations or	
	other resources	
	need to be	
	developed to	
	support learning	
	and provide	
	guidance	
•	Identify	
	resources	
	required for any	
	TLMs and	
	provide guidance	
	on their	
	development	

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 5 IN THE COURSE MANUAL

LESSON TOPIC:

- **a.** Early Grade Addition (within 19 and then 99)
- **b. Upper Grade** Classroom assessment in mathematics in the Upper Primary 1
- c. JHS Micro Lessons and use of technology across junior high school numeracy
- d. JHS Geometrical constructions

Focus: the bullets provide the frame for what is to be done. The guidance notes in italics identify the prompt the SL/HoD needs and each one must be addressed	Guidance notes on Leading the session. What the SL/HoDs will have to say during each stage of the session	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each state of the session)	Time in session
Introduction /	Introduction / lesson	Introduction / lesson	15 mins
lesson overview	overview	overview	
 Reflection on previous PD Session (Introduction to the course manual) Introduction and overview 	1. Ice breaker activity: Begin with an investigational activity (e.g. Tell how to determine the shortest distances between any given two points)	1. Engage in an investigational activity by for example telling how to determine the shortest distances between any given two points)	
of the main purpose of the lesson in the course manual.	2. Ask tutors to tell how useful the previous PD session was and how it influenced their teaching over the week.	2. Tell how useful the previous PD session was and how it influenced your teaching over the week.	

- Highlight cross cutting themes i.e., gender equality and social inclusion (GESI), ICT
- Identification of important or distinctive aspects of the lesson
- Reading and discussion of the introductory sections up to learning outcomes

- 3. Ask the critical friend to give feedback on his/her observation of the last enacted lesson.
- Ask tutors state the purpose of the lesson and state their expectations of the PD Session (NTS 2b)
- Lead tutors to outline the important features of the course manual
- 6. Ask tutors to read the introductory sections (up to learning outcomes) and discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities with emphasis on connecting concepts (creating addition facts, Effective assessment skills, key features of the basic school curriculum, applying geometry to real life) with other lessons and the use of relevant resources including the basic school curriculum) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

Course Manual for:

- a. Early Grade Lesson 5
- b. Upper Grade Lesson 5
- c. JHS; Assessment Lesson

- 3. As the critical friend, share with members feedback on your observation of the last enacted lesson.
- 4. State the purpose of the lesson and state your expectations of the lesson
- 5. Identify the important features of the course manual
- 6. Read the introductory sections (up to learning outcomes) and in pairs/groups discuss the important or distinctive aspects of the lesson (i.e. Initiate discussions on strategies to create addition facts, effectively employ assessment skills, explain key features of the basic school curriculum and apply geometry to real life) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

Course Manual for lesson 5 BSC Content Standards B1.1.2.3, B1.1.2.4, B2.1.2.3, B2.1.2.4, B3.1.2.3, B3.1.2.4, CCP pp. 49-53 (PD Theme 1, 3 & 4)

	d. JHS; Euclidean – Lesson 5 BSC Content Standards B1.1.2.3, B1.1.2.4, B2.1.2.3, B2.1.2.4, B3.1.2.3, B3.1.2.4, CCP pp. 49-53 (PD Theme 1, 3 & 4)		
 2. Concept Development (New learning likely to arise in this lesson): Identification and discussion of concepts Identification of possible challenging areas in teaching of the concept. This may include GESI and ICT related concepts Identification of needed GESI responsive and ICT resources for the teaching and learning of the concept. 	Concept Development 1. Lead tutors to identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources including the basic school curriculum) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson. a. Early Grade – Addition within 19 and 99 b. Upper Grade – Classroom assessment c. JHS; Assessment – Micro Lessons d. JHS; Eclidean – Geometric construction	Concept Development 1. Identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources including the basic school curriculum) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.	25 mins
	2. Engage tutors to identify and discuss various strategies for the development of conceptual understanding of the lesson. Example: Interactivity, Internet search, Model lessons, Exploratory (Let tutors refer to lesson 2 of the course manual for additional strategies.)	2. Identify and discuss various strategies for the development of conceptual understanding of	

3. Lead tutors to discuss 3. Discuss some potential misconceptions and misconceptions and barriers with respect to barriers with respect to the teaching and the teaching and learning of learning of a. Early Grade – Addition a. Early Grade – Addition within 19 and 99 within 19 and 99 b. Upper Grade – Classroom b. Upper Grade – Classroom assessment assessment c. JHS; Assessment – Micro c. JHS; Assessment – Micro Lessons Lessons d. JHS: Eclidean d. JHS: Eclidean -Geometric construction Geometric construction (e.g. one must add ones before the tens) 4. Ask tutors to outline 4. Outline possible possible challenging challenging areas in areas in teaching of the teaching concepts such concepts such as skip as skip counting counting forwards and forwards and backwards, congruence backwards, congruence of similar triangle and of similar triangle and Pythagoras theorem and Pythagoras theorem. Standards-based and objective-based curricula (e.g. misapplying the rules of patterns). 40 mins 3. Teaching, Teaching and learning **Teaching and learning** learning and activities activities assessment 1. Suggest teaching and 1. Ask tutors to suggest activities for the teaching and learning learning activities that lesson activities for the lesson can be used in teaching taking into account GESI the lesson taking into Reading of account GESI issues (e.g. teaching and (e.g. making adjustments for making adjustments for learning physically challenged physically challenged activities and learners, and getting learners, and getting identification of areas that both male and female both male and female require participants to play participants to play clarification leading roles in group leading roles in group especially GESI work) NTS 1a, b, c, d, 2b, work). (Writing the Weekly PD related e, f, 3b, c; (Writing the Weekly PD Session-p 3., NTS 1a, b, activities.

c, d, 2b, e, f, 3b, c;(NTS

Session-p 3., NTS 1a, b, c, d,

2b, e, f, 3b, c;

Reading of

teaching and

learning
activities and
identification
of GESI and ICT
issues that
require
clarification.

Lead tutors to suggest creative approaches of addressing the identified challenges.

Eg. Selection model for addition problems, using the principle of multiple embodiment.
Students can ascertain the extent to which methods are used during STS

activities in schools.

- 3. Engage tutors in a discussion of strategies to strengthen core competencies. (e.g. using concrete materials to proof that the sum of two 2-digit numbers does not depend on which place values are summed first)
- Engage tutors to work through one or two of the activities to ensure understanding.
- 5. Ask a tutor to model alternative strategies for the activities using ICT tools, taking into consideration GESI issues (e.g. both male and female participants playing the leading roles in their groups and in the demonstration of the use of ICT tools) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii).

- 1a, b, c, d, 2b, e, f, 3b, c; BSC p. iii)
- Suggest creative approaches of addressing the identified challenges.

Students can ascertain the extent to which methods are used during STS activities in schools.

3. Discuss of the strategies to strengthen core competencies.

- Work through one or two of the suggested activities to ensure understanding.
- 5. Model alternative strategies for the activities using ICT tools, taking into consideration GESI issues in B.ED and Basic School Curricula.

4. Review of	Review of Assessment	Review of Assessment	15 mins
Assessment	Components	Components	
Assessment component Reading of assessment opportunities and ensuring they are aligned to the NTEAP and required course assessment: subject project (30%), subject portfolio (30%) and end of semester examination (40%) Working through one or two activities.	Components 1. Ask tutors to review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP a. Early Grade – lesson 5 b. Upper Grade – lesson 5 c. JHS Euclidean – lesson 5 d. JHS Assessment – lesson 5 2. Let tutors discuss the assessment strategies to be used during enactment of the lesson referring to the NTEAP at the various levels (KG, UP, JHS) – 'Assessment as' (NTS 3k).	Components 1. Identify the assessment components of the lesson in the new course manual focusing on assessment of, as and for in line with the NTEAP Look at the various sections of the lesson that could be reviewed in line with subject project (30%) and subject portfolio (30%) 2. Discuss the assessment strategies to be used during enactment of the lesson making reference to the NTEAP	
Pagaurage	3. Lead tutors to discuss the various ways they can support student teachers to build their portfolios before/during/ after lessons	3. Discuss the various ways you can support student teachers to build their portfolios before/during/ after lessons	10 mins
Resources	Resources	Resources	10 mins
Guidance notes for SL/HoD should Identify any aspect of the lesson that might be challenging for tutors in terms of new learning, and which needs to be considered prior to taking	1. Support tutors to identify inclusive resources such as tactile materials, audiovisuals, visuals, audioteachers and leaners resource packs, textbooks, course manual, pairs of compasses and ruler and addition mat, that can be used in the	1. Identify inclusive resources such as tactile, audio-visuals, visuals, audio, teachers and leaners resource packs, textbooks, course manual, pairs of compasses and ruler and addition mat, that can be used in the teaching and learning of the concepts introduced in the lesson.	

tutors through	teaching and learning of		
the lesson	the concepts		
activities "walk	(PD themes 1 & 5)		
through".			
Equity and	2. Discuss with tutors how	2. Participate in discussing	
inclusion issues	and where human and	how and where human	
as well as ICT	material resources for	and material resources	
resources need	the lesson could be	for the lesson could be	
consideration	obtain in advance. Such	obtain in advance.	
 The resources 	resources can include		
needed must	projectors, flip charts		
be identified:	and sign language		
literature –	personnel.		
page	-		
referenced etc,	3. Let tutors, in pairs (NTS	3. In pairs (NTS 3h), select a	
on web,	3h), select a concept	concept and develop the	
•	''	rubrics for designing	
YouTube,	and develop the rubrics		
physical	for designing resources	resources that can be	
resources,	that can be used in the	used in the teaching and	
power point;	teaching and learning of	learning of the concepts	
how they	the concepts selected.	selected. NTS 3j	
should be used.			
Consideration			
needs to be			
given to local			
availability			
This section can			
build on the PD			
needs			
identified from			
the course			
manuals			
Evaluation and	Reflective Activity	Reflective Activity	5 mins
review of session	1. Engage tutors in the	1. Show by 5 or 3 or 1	
Guidance notes for	evaluation of the session	finger(s) if you "really	
SL/HoD should	and encourage them to	got it", "got some of it"	
• Select	provide feedback on the	or "didn't get it"	
activities,	PD session (NTS 1a, 3i).	respectively. If you	
linked to CLO		showed 5 fingers, share	
and indicators,		your experience with	
from the lesson		your colleagues.	
		your concagues.	
that are likely	2 Take note of all	2 Dool with correctly of	
to be most	2. Take note of all	2. Deal with unresolved	
different from	unresolved issues and	issues through sharing	
tutors' previous	use any of following	the issues on the	
experience.	strategies	various electronic	
These could	discuss with SL/SWL	platforms and/or	

involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive, differentiation and inclusive approaches and use of appropriate ICT tools.

- Identify how any assessments during the lesson relate to course assessment components
- The selected activities should be done with tutors in real or close to real time
- Anticipate any issues for clarification or questions which might arise as the tutors work through the activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including

- put on SL/SWL
 WhatsApp platform for discussion
- tutors to research and report findings on shared platforms.

Advance Preparation

 Ask tutors to read Lesson 6 of the Course Manual (e.g. Trigonometric ratios (sine, cosine and tangent) ahead of time to identify issues of concern for clarification) p. 32

N.B

- Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. Collect all resources
 (such as projector, flip
 chart and sticky notes)
 you need ahead of
 time, prepare samples
 of TLMs you may need
 and rehearse how
 these may be used to
 support the
 achievement of your
 goals

seeking solutions through research.

Advance Preparation

1. Read Lesson 6 of the Course Manual (e.g. Trigonometric ratios (sine, cosine and tangent) ahead of time to identify issues of concern for clarification) p. 32

N.B

- i. Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. Collect all resources you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals.

	digital skills,	
	are being	
	developed or	
	applied	
•	Makes links to	
	the existing PD	
	Themes with	
	page reference	
	where they can	
	support	
	teaching, for	
	example:	
	action	
	research,	
	questioning	
	and to other	
	external	
	reference	
	material	
•	Identify where	
	power point	
	presentations	
	or other	
	resources need	
	to be	
	developed to	
	support	
	learning and	
	provide	
	guidance	
•	Identify	
	resources	
	required for	
	any TLMs and	
	provide	
	guidance on	
	their	
	development	

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 6 IN THE COURSE MANUAL

LESSON TOPIC:

- **a.** Early Grade Classroom Assessment
- **b. Upper Grade** Classroom Assessment
- c. JHS Micro Lesson and Use of Technology Across Junior High School Numeracy
- d. JHS Trigonometry: Learning and Applying

Focus: the bullets provide the frame for what is to be done. The guidance notes in italics identify the prompt the SL/HoD needs and each one must be addressed	Guidance notes on Leading the session. What the SL/HoDs will have to say during each stage of the session	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each state of the session)	Time in session
Introduction / lesson overview Reflection on previous PD Session (Introduction to the course manual) Introduction and overview of the main purpose of the lesson in the course manual.	 Introduction / lesson overview Ice breaker activity: Begin with an investigational activity a (e.g. mention in turns the set of triangular numbers from 1 and not more than 50) Ask tutors to tell how useful the previous PD session was and how it influenced their teaching over the week. 	 Introduction / lesson overview Engage in an investigational activity (eg. mention in turns the set of triangular numbers from 1 and not more than 50) Explain how useful the previous PD session was and how it influenced your teaching over the week. 	15 mins

- Highlight cross cutting themes i.e., gender equality and social inclusion (GESI), ICT
- Identification of important or distinctive aspects of the lesson
- Reading and discussion of the introductory sections up to learning outcomes

- Ask the critical friend to give feedback on his/her observation of the last enacted lesson.
- Ask tutors to state the purpose of the lesson and state their expectations of the PD Session (NTS 2b)
- Lead tutors to outline the important features of the lesson in the course manual.
- 6. Ask tutors to read the introductory sections (up to learning outcomes) and discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities with emphasis on connecting concepts -Classroom Assessment, Micro Lesson, the Use of Technology Across Junior **High School Numeracy** and Trigonometry with other lessons and the use of relevant resources including the basic school curriculum) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

Course Manual for: a. Early Grade – Lesson 6. b. Upper Grade – Lesson 6 c. JHS; Assessment – Lesson 6

- 3. As the critical friend, share with members feedback on your observation of the last enacted lesson.
- 4. State the purpose of the lesson and state your expectations of the lesson.
- 5. Outline the important features of the lesson in the course manual.
- 6. Read the introductory sections (up to learning outcomes) and in pairs/groups discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities with emphasis on connecting concepts (Classroom Assessment, Micro Lesson, the Use of Technology Across Junior High School Numeracy and Trigonometry with other lessons and the use of relevant resources including the basic school curriculum) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

Course Manual for:

- a. Early Grade Lesson 6.
- b. Upper Grade Lesson 6

				I - IIIC A I I
	1	uclidean – I		c. JHS; Assessment – Lesson
	BSC Cont	ent Standa	ırds	6
	B4.1.1.1	B5.1.1.1 B	6.1.1.1	d. JHS; Euclidean – Lesson 6
	B4.1.3.1	CCP-B8.3.2	2.1 (PD	BSC Content Standards
	Theme 1	, 3 & 4)		B4.1.1.1 B5.1.1.1 B6.1.1.1
				B4.1.3.1 CCP-B8.3.2.1 (PD
				Theme 1, 3 & 4) (PD Theme
				1, 3 & 4)
	1			
2. Concept	_	Developm		Concept Development
Development		tutors to ic	•	1. Identify familiar and
(New learning	_	familiar and unfamiliar		unfamiliar concepts in
likely to arise in		epts in the		the lesson and discuss
this lesson):	and d	liscuss rele	vant	relevant connections
 Identification 	conn	ections am	ong	among concepts in the
and		epts in the	_	lesson with other
discussion of		other lesso		lessons and the use of
concepts		se of releva		relevant resources.
Identification	resou			
of possible	10300	003.		
•	2. Engag	ao tutore te	idontify	2. Identify and discuss
challenging		ge tutors to	•	
areas in		liscuss vario		various strategies for
teaching of		egies for th		the development of
the concept.		opment of		conceptual
This may		eptual unde	erstanding	understanding of
include GESI	of the	e lesson.		a. Early Grade – Classroom
and ICT		1		Assessment
related	Level	Concept	Strategy	b. Upper Grade – Classroom
concepts	Early Child	Assessment Assessment	Interactive	Assessment
 Identification 	Upp Grade	Assessment	Internet search	
of needed	JHS	Micro lesson	Model	c. JHS; Assessment – Micro
	(Assesst)		lessons	
GESI	(Assessi)		10330113	Lesson and Use of
GESI	JHS	Trigonometry	Exploratory	Lesson and Use of Technology
GESI responsive		Trigonometry		Technology
GESI responsive and ICT	JHS	Trigonometry		Technology d. JHS; Euclidean –
GESI responsive and ICT resources for	JHS	Trigonometry		Technology
GESI responsive and ICT resources for the teaching	JHS (Euclidean)		Exploratory	Technology d. JHS; Euclidean – Trigonometry
GESI responsive and ICT resources for the teaching and learning	JHS (Euclidean) 3. Let tu	utors refer	Exploratory to Lesson	Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the
GESI responsive and ICT resources for the teaching and learning of the	JHS (Euclidean) 3. Let tu 6 of t	utors refer the course i	Exploratory to Lesson manual	Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the course manual for
GESI responsive and ICT resources for the teaching and learning	JHS (Euclidean) 3. Let tu 6 of t	utors refer	Exploratory to Lesson manual	Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the
GESI responsive and ICT resources for the teaching and learning of the	JHS (Euclidean) 3. Let tu 6 of t for ac	utors refer the course of dditional st	to Lesson manual rategies.	Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the course manual for additional strategies
GESI responsive and ICT resources for the teaching and learning of the	3. Let tu 6 of t for act	utors refer the course i dditional st	to Lesson manual rategies.	Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the course manual for additional strategies 4. Discuss some potential
GESI responsive and ICT resources for the teaching and learning of the	3. Let tu 6 of t for ac	utors refer the course of dditional st tutors to di enceptions	to Lesson manual rategies.	Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the course manual for additional strategies 4. Discuss some potential misconceptions and
GESI responsive and ICT resources for the teaching and learning of the	3. Let tu 6 of t for act	utors refer the course in dditional st tutors to di enceptions a	to Lesson manual rategies. scuss and ing and	 Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the course manual for additional strategies 4. Discuss some potential misconceptions and barriers with respect to
GESI responsive and ICT resources for the teaching and learning of the	3. Let tu 6 of t for act 4. Lead to misco barries learni	utors refered the course of th	to Lesson manual rategies. scuss and ing and arious	 Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the course manual for additional strategies 4. Discuss some potential misconceptions and barriers with respect to the teaching and
GESI responsive and ICT resources for the teaching and learning of the	3. Let tu 6 of t for act. 4. Lead to miscon barrier learning concerns.	utors refer the course of dditional st tutors to di enceptions ers in teach ng of the v	to Lesson manual rategies. scuss and ing and arious	 Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the course manual for additional strategies 4. Discuss some potential misconceptions and barriers with respect to the teaching and learning of the various
GESI responsive and ICT resources for the teaching and learning of the	3. Let tu 6 of t for act. 4. Lead to miscon barrier learning concerns.	utors refered the course of th	to Lesson manual rategies. scuss and ing and arious	 Technology d. JHS; Euclidean – Trigonometry 3. Refer to Lesson 6 of the course manual for additional strategies 4. Discuss some potential misconceptions and barriers with respect to the teaching and

	Eg.	introduced in the	
	a. Early Grade – Classroom	lesson.	
	Assessment:		
	That assessment is done only		
	after teaching		
	b. Upper Grade – Classroom		
	Assessment:		
	That assessment is done only		
	after teaching		
	c. JHS; Assessment – Micro		
	Lesson and Use of		
	Technology: That JHS		
	students should not use		
	calculators		
	d. JHS; Euclidean –		
	Trigonometry:		
	That trigonometry cannot be		
	apply in everyday life activity.		
	Barriers: Inappropriate		
	inclusive resources		
	Limited use of technology		
	Inadequate pre-requisite		
	knowledge N/B: Refer tutors		
	to the Lesson 6 of the course		
	manual for other potential		
	misconceptions and barriers.		
	misconceptions and barriers.		
3. Teaching,	Teaching and learning	Teaching and learning	40 mins
learning and	activities	activities	
assessment	Ask tutors to suggest	Suggest teaching and	
activities for the	teaching and learning	learning activities that	
lesson	activities for the lesson	can be used in teaching	
Reading of	taking into account GESI	the lesson taking into	
teaching and	(e.g. making adjustments	account GESI (e.g.	
learning	for physically challenged	making adjustments for	
activities and	learners, and getting both	physically challenged	
identification	male and female	learners, and getting	
of areas that	participants to play	both male and female	
require	leading roles in group	participants to play	
clarification	work)	leading roles in group	
especially	,	work) (writing the	
GESI related	NTS 1a, b, c, d, 2b, e, f, 3b, c;	weekly PD session-p 3.,	
activities.	Ref: writing the weekly PD	NTS 1a, b, c, d, 2b, e, f,	
Reading of	session-p 3., NTS 1a, b, c, d,	3b, c (NTS 1a, b, c, d, 2b,	
teaching and	2b, e, f, 3b, c; BSC p. iii)	e, f, 3b, c; BSC p. iii)	
_	25, c, 1, 55, c, 55c p. III)	c, i, 55, c, 55c p. III)	
learning			

activities and identification of GESI and ICT issues that require clarification.

2. Guide tutors to come up with some creative approaches and their related core competencies likely to be inculcated in CoE students and extended to basic school learners through STS activities..

eg.

<u>~6.</u>	
Strategy	Core Competency
Group Work	Collaborative
	learning
Investigation	Critical Thinking
Role Play	Communication

(Students can ascertain the extent to which methods are used during STS activities in schools)

- 3. Engage tutors in a discussion of strategies to strengthen core competencies. (e.g. Using activity-based/demonstration to solve problem with differentiated assessment of, as and for)
- 4. Ask a tutor to model alternative strategies for the activities using ICT tools, taking into consideration GESI issues (e.g. both male and female participants playing the leading roles in their groups and in the demonstration of the use of ICT tools) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii).

2. Come up with some pedagogical approaches and their likely related core competencies to be inculcated in CoE students and extended to basic school learners through STS activities.

(Students can ascertain the extent to which methods are used during STS activities in schools).

3. Discuss the strategies to strengthen core competencies.

4. Model alternative strategies for the activities using ICT tools, taking into consideration GESI issues (e.g. both male and female participants playing the leading roles in their groups and in the demonstration of the use of ICT tools) in B.ED and Basic School Curricula.

4. Review of	Review of Assessment	Review of Assessment	15 mins
Assessment	Components	Components	
component	-		
Reading of	1. Ask tutors to review the	1. Ask Ask tutors to review	
assessment	assessment components	the assessment	
opportunities and	of the lesson in the	components of the	
ensuring they are	course manual focusing	lesson in the course	
aligned to the	on assessment of, as and	manual focusing on	
NTEAP and	for in line with the NTEAP	assessment of, as and	
required course	a. Early Grade – Lesson 6.	for in line with the NTEA	
assessment:	b. Upper Grade – Lesson 6	a. Early Grade – Lesson 6.	
subject project	c. JHS; Assessment – Lesson 6	b. Upper Grade – Lesson 6	
(30%), subject	d. JHS; Euclidean – Lesson 6	c. JHS; Assessment – Lesson	
portfolio (30%)	,	6	
and end of		d. JHS; Euclidean – Lesson 6	
semester		,	
examination	2. Let tutors discuss the	2. Discuss the assessment	
(40%) Working	assessment strategies to	strategies to be used	
through one or	be used during	during enactment of the	
two activities.	enactment of the lesson	lesson making reference	
	referring to the NTEAP at	to the NTEAP at the	
	the various levels (KG,	various levels (KG, UP,	
	UP, JHS)– 'Assessment as'	JHS) – 'Assessment as'	
	(NTS 3k).	(NTS 3k).	
	3. Lead tutors to discuss the	3. Discuss the various ways	
	various ways they can	you can support student	
	support student teachers	teachers to build their	
	to build their portfolios	portfolios	
	before/during/ after	before/during/ after	
	lessons	lessons	
Resources	Resources	Resources	10 mins
Guidance notes	Support tutors to identify	Identify as many GESI	
for SL/HoD	GESI responsive	responsive resources as	
should	resources such as tactile	possible that can be	
Identify any	materials, audio-visuals,	used in the teaching	
aspect of the	visuals, audio, teachers	and learning of the	
lesson that	and leaners resource	concepts mentioned	
might be	packs, textbooks, course	above.	
challenging	manual, pairs of	a. Early Grade – Lesson 6.	
for tutors in	compasses and ruler and	b. Upper Grade – Lesson 6	
terms of new	addition mat, that can be	c. JHS; Assessment – Lesson	
learning, and	used in the teaching and	6	
which needs	learning of the concepts	d. JHS; Euclidean – Lesson 6	
	mentioned above.	(PD themes 1)	

considered	a. Early Grade – Lesson 6.			
prior to taking	b. Upper Grade – Lesson 6			
tutors	c. JHS; Assessment – Lesson 6			
through the	d. JHS; Euclidean – Lesson 6			
lesson	(PD themes 1 & 3)			
activities				
"walk	2. Let tutors, in pairs (NTS	2. In pa	airs (NTS 3h), select	
through".	3h), select a concept and	a cor	ncept and develop	
Equity and	develop the rubrics for		rubrics for designing	
inclusion	designing resources that	reso	urces that can be	
issues as well	can be used in the	used	l in the teaching	
as ICT	teaching and learning of	and l	learning of the	
resources	the concepts selected.		cepts selected. NTS	
need		3j		
consideration				
• The resources				
needed must				
be identified:				
literature –				
page				
referenced				
etc, on web,				
YouTube,				
physical				
resources,				
power point;				
how they				
should be				
used.				
Consideration				
needs to be				
given to local				
availability				
This section				
can build on				
the PD needs				
identified				
from the				
course				
manuals				

Evaluation and review of session Guidance notes for SL/HoD should

- Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. From section 2, or approaches to teaching, learning and assessment, incl. gender responsive, differentiatio n and inclusive approaches and use of appropriate ICT tools.
- Identify how any assessments during the lesson relate to course assessment components
- The selected activities

Reflective Activity

- Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i).
- Take note of all unresolved issues and use any of following strategies
- discuss with SL/SWL
- put on SL/SWL WhatsApp platform for discussion
- tutors to research and report findings on shared platforms.

Advance Preparation

Ask tutors to read Lesson 7 of the Course Manual

- a. Early Grade Classroom assessment
- assessment
 b. Upper Grade Micro
 Lesson and Use of
 Technology Across Upper
 Primary Numeracy 1 c. JHS;
 Assessment Teaching
 Integers in the Basic Schools
 d. JHS; Euclidean –
 Trigonometry 2

N.B

- Remind tutors to
 identify a critical friend
 from the same or
 related discipline to
 observe during teaching
 and provide feedback
 (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues

Reflective Activity

- Rate the PD session with the given checklist.
- 2. Reflect on the activities in the session and outline outstanding issues relating to the lesson
- Deal with unresolved issues through WhatsApp platform for discussion and/or research

Advance Preparation

Read Lesson 7 of the Course Manual

- a. Early Grade Classroom assessment
- b. Upper Grade Micro Lesson and Use of Technology Across Junior High School Numeracy 1 c. JHS; Assessment – Teaching Integers in the Basic Schools d. JHS; Euclidean – Trigonometry 2

N.B

- Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.

5 mins

- should be done with tutors in real or close to real time
- Anticipate any issues for clarification or questions which might arise as the tutors work through the activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including digital skills, are being developed or applied
- Makes links to the existing PD Themes with page reference where they can support teaching, for example: action research, questioning and to other external reference material
- Identify where power point

- relating to this lesson for clarification.

 iii. Collect all resources (such as projector, flip chart and sticky notes) you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals
- iii. Collect all resources you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals

presentations		
or other		
resources		
need to be		
developed to		
support		
learning and		
provide		
guidance		
 Identify 		
resources		
required for		
any TLMs and		
provide		
guidance on		
their		
development		

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Course Title: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 7 IN THE COURSE MANUAL

LESSON TOPIC:

Early Grade; Classroom Assessment of Mathematics in the Early Grade (2)
Upper Primary; Micro Lessons and use of technology across upper primary numeracy 1
JHS; Teaching Integers in the Basic School
JHS; Trigonometry 2: Learning and Applying

Fo	cus: the bullet	Gui	dance notes on Leading	Guidance Notes on Tutor		Time in
points provide the		the	the session. What the		tivity during the PD	session
fro	frame for what is to		SL/HoDs will have to say		ssion. What PD Session	
be	done. The	dur	ing each stage of the	ра	rticipants (Tutors) will	
gu	idance notes in	sess	sion	do	during each state of the	
ita	ilics identify the			ses	ssion) Guidance Notes	
pr	ompt the SL/HoD			on	Tutor Activity during	
ne	eds and each one			the	e PD Session. What PD	
m	ust be addressed			Se.	ssion participants	
				(Tu	utors) will do during	
				еа	ch state of the session)	
1.	Introduction /	Int	roduction	In	troduction	15 mins
	lesson overview	1.	Ice breaker activity:	1.	Engage in an	
•	Reflection on		Begin with an		investigational activity	
	previous PD		investigational activity		(e.g. How can you	
	Session		(e.g. How can you		know the amount of	
	(Introduction to		know the amount of		mathematical	
	the course		mathematical		knowledge gained by a	
	manual)		knowledge gained by a		learner?)	
•	Introduction and		learner?)			
	overview of the	2.	Ask a critical friend to	2.	As a critical friend,	
	main purpose of		give feedback on		share with members	
	the lesson in the		observation during the		feedback on	
	course manual.		enactment of lesson 1		observation during the	
•	Highlight cross				teaching of Lesson 6.	
	cutting themes					

- i.e., gender equality and social inclusion (GESI), ICT
- Identification of important or distinctive aspects of the lesson
- Reading and discussion of the introductory sections up to learning outcomes
- Ask tutors to tell how useful the previous PD session (NTS 1b) influenced their teaching over the week.
- 4. Lead tutors through questioning to state the purpose of the lesson (NTS 2b) and state their expectations of the PD Session.
- 5. Lead tutors to outline the important features of the lesson in the course manual taking note of cross cutting themes i.e., gender equality and social inclusion (GESI), ICT, etc.
- 6. Have tutors read the introductory sections of the lesson and work in pairs/groups and reflect on previous PD Session outlining the key features of Early Grade; Classroom Assessment of Mathematics in the Early Grade (2); Upper Primary; Micro Lessons and use of technology across upper primary numeracy 1; JHS; Teaching Integers in the Basic School JHS; Trigonometry 2: Learning and Applying) and suggest the relevant students' previous knowledge that can support the

- Explain how the previous PD session influenced your teaching over the week.
- State and explain the purpose of the lesson (NTS 2b) in the course manual and state your expectations of the PD session.
- 5. Identify the important features of the lesson in the course manual taking note of cross cutting themes i.e., gender equality and social inclusion (GESI), ICT, etc.
- 6. Read the introductory sections (up to learning outcomes) silently and in pairs/groups discuss the important or distinctive aspects of the lesson (i.e. Week 7 Lesson 7: Classroom Assessment of Mathematics in the Early Grade (2); Upper Primary; Micro Lessons and use of technology across upper primary numeracy 1; JHS; Teaching Integers in the Basic School JHS; Trigonometry 2: Learning and Applying) and suggest the relevant students'

	I		1
	teaching and learning of the lesson.	previous knowledge that can support the	
	or the leadin.	teaching and learning	
		of the lesson.	
		or the lesson.	
2. Concept	Concept Development	Concept Development	25 mins
Development (New			
learning likely to	1. Engage tutors in the	1. In pairs/groups	
arise in this lesson):	identification and	identify and	
 Identification 	discussion of familiar	discuss familiar	
and discussion of	and unfamiliar	and unfamiliar	
concepts	concepts in the	concepts in the	
 Identification of 	lesson including	lesson	
possible	operation of integers,		
challenging areas	especially, addition of		
in teaching of	integers, subtraction of		
the concept. This	Integers, micro lesson		
may include GESI	(PD Themes 1 & 3)		
and ICT related	(i.e. WEEK 7 Lesson 7		
concepts	concepts: Classroom		
Identification of	Assessment of		
needed GESI	Mathematics in the Early Grade 2; Upper Primary;		
responsive and ICT resources for	Micro Lessons and use of		
	technology across upper		
the teaching and learning of the	primary numeracy 1;		
concept.	JHS; Teaching Integers in		
concept.	the Basic School;		
	JHS; Trigonometry 2:		
	Learning and Applying)		
	2. Lead tutors to search on	2. Search on the	
	the internet for	internet for detailed	
	detailed information	information on the	
	on the strategies for	strategies for	
	developing	developing	
	assessment tools for	assessment tools for	
	children in the early	children in the early	
	grade	grade;	
	3. Engage tutors in a	3. Participate in a	
	collaborative	collaborative	
	practical activities	practical activities	
	involving planning,	involving planning,	
	designing, and	designing, and	
	preparation of	preparation of	
	manipulatives and	manipulatives and	

- other models for teaching selected concepts in upper primary mathematics
- Tutors in groups to outline properties of integers
- ii. Engage tutors to explore on the internet for definition and applications of radian measure and circular functions conceptual understanding of the ideas to be developed in the lesson
- other models for teaching selected concepts in upper primary mathematics

- 4. Have tutors discuss possible misconceptions and barriers in teaching and learning of Early Grade: Classroom Assessment of Mathematics in the Early Grade (2); Upper Primary; Micro Lessons and use of technology across upper primary numeracy 1; JHS; Teaching Integers in the Basic School; JHS; Trigonometry 2: Learning and Applying)
- Discuss potential misconceptions and barriers in teaching and learning of the concepts in Lesson

- 5. Have tutors outline possible challenging areas in teaching number and numerals including mental mathematics.
- 5. Outline possible challenging areas in the teaching of the identified concepts.

- 6. Ask tutors to identify resources that can be used in the teaching and learning of the concepts mentioned above (e.g. mental maths games, Number chart puzzles, etc.
- 7. Let tutors in pairs select a concept through balloting and design resources that can be used in the teaching and learning of the concept.

NOTE:

Knowledge and understanding of number concepts including counting and identification of number bases in Ghanaian number words may be challenging and needs to be addressed'

- Analyse number words in different Ghanaian languages to establish knowledge of number bases and operations that are embedded in these languages
- In pairs or groups tutors discuss the need for using local low or no cost materials to design and

- 6. Identify resources that can be used in teaching and learning of the concepts mentioned above (e.g. mental maths games, number games, Number chart puzzles, etc.
- 7. In pairs select a concept through balloting and design resources that can be used in the teaching and learning of the concept selected.

			T
	use resources for		
	teaching number		
	concepts.		
3. Teaching,	Teaching and learning	Teaching and learning	40 mins
learning and	activities for the lesson	activities for the lesson	
assessment	1. Ask tutors to suggest	1. Suggest teaching and	
activities for the	teaching and learning	learning activities that	
lesson	activities for the lesson	can be used in	
 Reading of 	taking into account	teaching the lesson	
teaching and	Gender Equality and	taking into account	
learning	Social Inclusion (GESI)	GESI (e.g. both male	
activities and	(e.g. both male and	and female	
identification of	female participants	participants playing	
areas that	playing the leading roles	the leading roles in	
require	in group work, even	group work, even	
clarification	distribution of	distribution of	
especially GESI	questions) and refer	questions). Read the	
related activities.	them to the activities	activities in the course	
 Reading of 	outlined in the course	manual (pp. 12 &16),	
teaching and	manual (writing the	and identify those that	
learning	weekly PD session-pp 3.,	require clarification (
activities and	NTS 1a, b,c, d, 2b, e, f,	NTS 1a, b, c, d, 2b, e, f,	
identification of	3b, c; UPP-pp. 20; JHS;	3b, c; BSC p. iii).	
GESI and ICT	Euclidean- pp. 26; JHS;		
issues that	Assessment-25, EGE- p.		
require	16		
clarification.			
 Reading of 	2. Lead tutors to	2. Brainstorm and come	
assessment	brainstorm and come up	up with some	
opportunities	with some pedagogical	pedagogical	
and ensuring	approaches and their	approaches and their	
they are aligned	related core	likely related core	
to the NTEAP	competencies likely to	competencies to be	
and required	be inculcated in CoE	inculcated in CoE	
course	students and extended	students and extended	
assessment:	to basic school learners	to basic school	
subject project	through STS activities.	learners through STS	
(30%), subject	Example:	activities.	
portfolio (30%)	Group Work -	a. (Students can ascertain	
and end of	Collaborative learning	the extent to which	
semester	Investigation - Critical	methods are used	
examination	Thinking	during STS activities in	
(40%) Working	Role Play -	schools).	
through one or	Communication		
two activities,	(Students can ascertain		
	the extent to which		

- methods are used during STS activities in schools).
- 3. Engage tutors in pairs to discuss strategies to strengthen core competencies (e.g. mind- reading word puzzle, investigation, etc.).
- 3. Discuss the strategies to strengthen core competencies.
- 4. Let a tutor model a presentation of an activity using ICT tools and taking into consideration GESI (e.g. both male and female participants playing leading roles in their groups and in the demonstration of the use of ICT tools) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii)
- 4. Discuss one or two of the activities to ensure understanding and model alternative strategies for the activities using ICT tools and taking into consideration GESI (e.g. both male and female participants playing leading roles in their groups and in the demonstration of the use of ICT tools) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii)

NOTE:

- i. Tutors are likely to ask about the relevance of this activity in teaching mathematics lessons.
 When this comes up, refer them to the PD Theme 1, that is, Creative Approaches
- ii. The core and transferable skills being developed or used include social skills, communication skills, critical and creative thinking skills
- iii. Creative Activities, Questioning, Talk and Learn and Group Work

			can be used to support			
			the delivery of this			
			session			
1	Evaluation and		vity 4: Review of	Ro	view of Assessment	15 mins
	riew of session:		essment Components	_	mponents	13 1111113
161	Review learning	A33	essinent components	-	inponents	
•	and identification of any outstanding issues relating to this lesson for clarification Course assignment O Advance preparation	b. U	Ask tutors to review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP. Early Grade – Lesson 7 pper Grade – Lesson 7	a. b.	Review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP. Early Grade – Lesson 7 Upper Grade – Lesson 7	
	In the case of unresolved issues	d. JI 7	HS Euclidean – Lesson 7 HS Assessment – Lesson	d. Le:	JHS Euclidean – Lesson 7 JHS Assessment – sson 7	
		2.	Let tutors discuss the assessment strategies to be used during enactment of the lesson referring to the NTEAP at the various levels (KG, UP, JHS) (NTS 3k).	2.	Discuss the assessment strategies to be used during enactment of the lesson making reference to the NTEAP at the various levels (KG, UP, JHS) (NTS 3k).	
		3.	Lead tutors to discuss the various ways they can support student teachers to build their portfolios before/during/ after lessons.	3.	Discuss the various ways you can support student teachers to build their portfolios before/during/ after lessons.	
Re	sources	Res	ources	Re	sources	10 mins
	idance notes for	1.	Support tutors to	1.	Identify and design	
SL/	HoD should		identify inclusive		inclusive resources	
•	Identify any		resources such as		such as tactile, audio-	
	aspect of the lesson that might be		tactile materials, audio-visuals, visuals, audio, teachers and		visuals, visuals, audio, teachers and leaners resource packs,	
	challenging for		leaners resource		textbooks, course	
	tutors in terms		packs, textbooks,		manual, graph sheets	

	of new learning, and which needs to be considered prior to taking tutors through the lesson activities "walk through". Equity and inclusion issues as well as ICT resources		course manual, graph sheets and number charts that can be used in the teaching and learning of the concepts to be introduced in the lesson.		and number charts that can be used in the teaching and learning of the concepts to be introduced in the lesson, – the BSC curriculum, counting, number relationships and geometric proof. NTS 3j	
•	need consideration The resources needed must be identified: literature – page referenced etc, on web, YouTube,	2.	Ask tutors, in pairs (NTS 3h), select a concept through balloting and design resources that can be used in the teaching and learning of the concept (NTS 3j).	2.	In pairs (NTS 3h), select a concept through balloting and design resources that can be used in the teaching and learning of the concept selected (NTS 3j).	
•	physical resources, power point; how they should be used. Consideration needs to be given to local availability This section can build on the PD needs identified from the course manuals	3.	Encourage tutors to prepare samples of TLMs for teaching of a. Teaching and Assessing Numeracy b. Teaching and Assessing mathematics for Upper Primary c. Teaching and Assessing JHS Mathematics d. Euclidean Geometry	3.	Discuss the need for using local, low or no cost materials to design and use resources for teaching of the lesson.	
	Course	Refl	ective Activity	Re	flective Activity	5 mins
	assessment in accordance with the NTEAP: SWL need to review assessment in the course manual to ensure it complies with	1. E	Engage tutors in the evaluation of the session and encourage shem to provide seedback on the PD session (NTS 1a, 3i).	1.	Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues.	
	NTEAP implementation		Engage tutors to identify unresolved issues	2.	Reflect on the activities in the session	

and the 60% continuous assessment and 40 % End of semester examination. This means ensuring subject project, subject portfolio preparation and development are explicitly addressed in the PD sessions.

- relating to this lesson for clarification.
- Lead tutors to take note of all unresolved issues and use any of following strategies
- i. discuss with SL/SWL
- ii. put on SL/SWL WhatsApp platform for discussion.
- iii. tutors to research for the next PD session for discussion

- and identify unresolved issues relating to the lesson.
- Deal with unresolved issues through WhatsApp platform for discussion and/or research

Advance Preparation

Ask tutors to read Lesson 8 of the Course Manual (Micro Lessons and use of technology across upper primary numeracy 2) to identify issues of concern for clarification.

N.B

Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).

Collect all resources you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals

Advance Preparation

Read Lesson 8 of the Course Manual (Micro Lessons and use of technology across upper primary numeracy 2) to identify issues of concern.

N.B

Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a). Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 8 IN THE COURSE MANUAL

LESSON TOPIC:

- a. Early Grade Classroom Assessment of Mathematics in the Early Grade (3)
- b. Upper Grade Micro Lessons and use of technology across upper primary numeracy 2
- **c. JHS** Teaching Integers in the Basic School 2
- **d. JHS** Trigonometry 3: Learning and Applying

Focus: the bullets provide the frame for what is to be done. The guidance notes in italics identify the prompt the SL/HoD needs and each one must be addressed	Guidance notes on Leading the session. What the SL/HoDs will have to say during each stage of the session	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each state of the session)	Time in session
1. Introduction / lesson overviewReflection on	Introduction / lesson overview	Introduction / lesson overview	15 mins
previous PD Session (Introduction to the course manual) Introduction and overview of the main purpose of the lesson in the course manual. Highlight cross	Ice breaker activity: Begin with an investigational activities (e.g. mention in turns the set of triangular numbers from 1 and not more than 50)	1. Engage in an investigational activity (eg. mention in turns the set of triangular numbers from 1 and not more than 50)	
cutting themes i.e., gender equality and social inclusion (GESI), ICT Identification of important or	2. Ask tutors to tell how useful the previous PD session was and how it influenced their teaching over the week.	2. Explain how useful the previous PD session was and how it influenced their teaching over the week.	

distinctive aspects of the lesson Reading and discussion of the introductory sections up to learning outcomes

- Ask the critical friend to give feedback on his/her observation of the last enacted lesson.
- Ask tutors to state the purpose of the lesson and state their expectations of the PD Session (NTS 2b)
- 5. Lead tutors to outline the important features of the lesson in the course manual
- 6. Ask tutors to read the introductory sections (up to learning outcomes) and discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities with emphasis on connecting concepts -(Classroom Assessment of mathematics in early Grade 3; Micro Lessons and use of technology across upper primary numeracy 2; ,Teaching Integers in the Basic School 2; Trigonometry 3: Learning and Applying with other lessons and the use of relevant resources) and suggest the relevant students' previous knowledge that can support the teaching

- 3. As the critical friend, share with members feedback on your observation of the last enacted lesson.
- 4. State the purpose of the lesson and state your expectations of the lesson
- 5. Identify the important features of the lesson in the course manual.
- 6. Read the introductory sections (up to learning outcomes) and in pairs/groups discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities with emphasis on connecting concepts (Classroom Assessment of mathematics in early Grade 3, Micro Lesson and the Use of Technology across upper primary Numeracy 2 and Trigonometry 3,Learning and Applying with other lessons and the use of relevant resources) and suggest the relevant students' previous knowledge that can support the teaching

and learning of the and learning of the lesson. lesson. See Course Manual for: See Course Manual for: a. Early Grade - Lesson 8. a. Early Grade – Lesson b. Upper Grade - Lesson 8 8. c. JHS; Assessment b. Upper Grade – Lesson Lesson 8 d. JHS; Euclidean – Lesson c. JHS; Assessment -Lesson 8 **BSC Content Standards** d. JHS; Euclidean -B4.1.1.1 B5.1.1.1 B6.1.1.1 Lesson 8 **B4.1.3.1 CCP-B8.3.2.1** (PD **BSC Content Standards** Theme 1, 3 & 4) B4.1.1.1 B5.1.1.1 B6.1.1.1 B4.1.3.1 CCP-**B8.3.2.1** (PD Theme 1, 3 & 4) (PD Theme 1, 3 & 4) 2. Concept **Concept Development Concept Development** 25 mins **Development (New** 1. Lead tutors to identify 1. Identify familiar and familiar and unfamiliar unfamiliar concepts learning likely to arise in this lesson): concepts in the lesson in the lesson and and discuss relevant discuss relevant Identification and connections among connections among discussion of concepts in the lesson concepts in the concepts with other lessons and lesson with other Identification of the use of relevant lessons and the use possible challenging resources including of relevant resources areas in teaching of the basic school including the basic the concept. This curriculum. school curriculum. may include GESI and ICT related 2. Engage tutors to 2. Identify and discuss concepts identify and discuss various strategies for Identification of various strategies for the development of needed GESI the development of conceptual responsive and ICT conceptual understanding of resources for the understanding of the a. Early Grade teaching and Classroom Assessment lesson. learning of the Level Concept Strategy b. Upper Grade – concept. Early Assessment Interactive Classroom Assessment Child Micro Model Upp c. JHS; Assessment -Grade Lessons lessons/ Internet Micro Lesson and Use of search Technology IHS Teaching Model d. JHS; Euclidean -(Assesst) Integers lessons Trigonometry Exploratory Trigonometry

	Let tutors refer to Lesson 8 of the course manual for additional strategies. Engage tutors to identify and discuss unfamiliar concepts in the lesson 3. Lead tutors to discuss misconceptions and barriers in teaching and learning of the concepts to be developed in the lesson. Eg. a. Early Grade — Classroom Assessment of Mathematics in the Early Grade (3) b. Upper Grade — Micro Lessons and use of technology across upper primary numeracy 2 c. JHS — Teaching Integers in the Basic School 2 d. JHS — Trigonometry 3: Learning and Applying That trigonometry cannot be apply in everyday life activity. Barriers: Inappropriate inclusive resources Limited use of technology Inadequate pre-requisite knowledge N/B: Refer tutors to the Lesson 8 of the course manual for	3. Discuss some potential misconceptions and barriers with respect to the teaching and learning of concepts to be developed in the lesson; a. Early Grade – Classroom Assessment of Mathematics in the Early Grade (3) b. Upper Grade – Micro Lessons and use of technology across upper primary numeracy 2 c. JHS – Teaching Integers in the Basic School 2 d. JHS – Trigonometry 3: Learning and Applying	
	_		
	other potential misconceptions and		
	barriers.		
3. Teaching, learning	Teaching and learning	Teaching and learning	40 mins
and assessment	activities	activities	
activities for the lesson	1. Ask tutors to suggest	Suggest teaching and	
Reading of teaching	teaching and learning	learning activities	
and learning	activities for the	that can be used in	
activities and	lesson taking into	teaching the lesson	

- identification of areas that require clarification especially GESI related activities.
- Reading of teaching and learning activities and identification of GESI and ICT issues that require clarification.
- account GESI (e.g. both male and female participants playing the leading roles in group work, even distribution of questions) Writing the Weekly PD Session-p 3., NTS 1a, b, c, d, 2b, e, f, 3b, c
- 2. Lead tutors to brainstorm and come up with some pedagogical approaches and their related core competencies likely to be inculcated in CoE students and extended to basic school learners through STS activities.
- (Students can ascertain the extent to which methods are used during STS activities in schools).
- 4. Engage tutors in a discussion of strategies strengthen core competencies. (e.g. using activity-based/demonstration to solve problem with differented assessment of, as and for; engaging tutors in exploratory activities to solve the problem of inability to state the correct trig ratio).

- taking into account GESI (e.g. both male and female participants playing the leading roles in group work, even distribution of questions).
 (Writing the Weekly PD Session-p 3., NTS 1a, b, c, d, 2b, e, f, 3b, c; BSC pp. iii).
- 2. Brainstorm and come up with some pedagogical approaches and their likely related core competencies to be inculcated in CoE students and extended to basic school learners through STS activities.
- (Students can ascertain the extent to which methods are used during STS activities in schools).
- 4. Discuss the strategies to strengthen core competencies.

5. Ask a tutor to model 5. Model alternative alternative strategies strategies for the for the activities using activities using ICT ICT tools, taking into tools, taking into consideration GESI consideration GESI issues (e.g. both male (e.g. both male and and female female participants participants playing playing leading roles leading roles in their in their groups and in groups and in the the demonstration of the use of ICT tools in demonstration of the use of ICT tools in the B.ED and Basic B.ED and the Basic School Curricula. School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii). **Review of Assessment Review of Assessment** Components Components 1. Ask tutors to review 1. Ask tutors to review the assessment the assessment components of the components of the lesson in the course lesson in the course manual focusing on manual focusing on assessment of, as and assessment of, as for in line with the and for in line with NTEAP. the NTEAP. a. Early Grade – Lesson 8. a. Early Grade – Lesson b. Upper Grade – Lesson 8 c. JHS; Assessment b. Upper Grade – Lesson Lesson 8

4. Review of

Assessment

component

of semester

Reading of assessment

opportunities and

ensuring they are

aligned to the NTEAP

and required course

assessment: subject

examination (40%)

or two activities.

Working through one

project (30%), subject

portfolio (30%) and end

2. Let tutors discuss the assessment strategies to be used during enactment of the lesson referring to the NTEAP at the various levels (KG, UP, JHS)—'Assessment as' (NTS 3k).

d. JHS; Euclidean - Lesson

8

2. Discuss the assessment strategies to be used during enactment of the lesson making reference to the NTEAP at the various levels (KG, UP, JHS)—'Assessment as' (NTS 3k)

c. JHS; Assessment -

d. JHS; Euclidean -

Lesson 8

Lesson 8

15 mins

3. Lead tutors to discuss 3. Discuss the various the various ways they ways you can support can support student student teachers to teachers to build their build their portfolios portfolios before/during/ after before/during/ after lessons lessons 10 mins Resources Resources Resources **Guidance notes for** 1. Support tutors to 1. Identify as many GESI SL/HoD should identify GESI responsive resources Identify any aspect responsive resources as possible that can be used in the of the lesson that such as supporting staff teaching and learning might be for sign language, of the concepts in the challenging for projectors, flip charts, sticky notes, tactile tutors in terms of lesson. materials, audioa. Early Grade – Lesson new learning, and which needs to be visuals, visuals, audio, considered prior to teachers and leaners b. Upper Grade – Lesson taking tutors resource packs, through the lesson textbooks, course c. JHS; Assessment -Lesson 8 activities "walk manual, pairs of compasses and ruler d. JHS; Euclidean through". Equity and addition mat, that Lesson 8 and inclusion issues (PD themes 1) can be used in the as well as ICT teaching and learning resources need of the concepts in the consideration lesson. The resources a. Early Grade – Lesson 8. needed must be b. Upper Grade – Lesson 8 identified: c. JHS; Assessment literature – page Lesson 8 referenced etc, on d. JHS; Euclidean – Lesson web, YouTube, physical resources, (PD themes 1 & 3) power point; how they should be 2. Discuss with tutors how 2. Participate in used. Consideration and where human and discussing how and needs to be given material resources for where human and to local availability the lesson could be material resources for This section can obtain in advance. Such the lesson could be build on the PD resources can include obtain in advance. needs identified from the course projectors, flip charts and sign language manuals personnel.

3. In pairs (NTS 3h),

select a concept and

3. Let tutors, in pairs (NTS

3h), select a concept

	and develop the rubrics for designing resources that can be used in the teaching and learning of the concepts selected.	develop the rubrics for designing resources that can be used in the teaching and learning of the concepts selected. NTS 3j	
Evaluation and review	Reflective Activity	Reflective Activity	5 mins
of session	Engage tutors in the	1. Show by 5 or 3 or 1	
		•	
Guidance notes for	evaluation of the	finger(s) if you "really	
SL/HoD should	session and encourage	got it", "got some of	
 Select activities, 	them to provide	it" or "didn't get it"	
linked to CLO and	feedback on the PD	respectively. If you	
indicators, from the	session (NTS 1a, 3i).	showed 5 fingers,	
lesson that are		share your	
likely to be most		experience with your	
different from		colleagues.	
tutors' previous			
experience. These	2. Engage tutors to	2. Identify unresolved	
could involve	identify unresolved	issues relating to the	
	issues relating to this	lesson.	
applying new	lesson for clarification.	1633011.	
content, e.g. from	lesson for clarification.		
section 2, or			
approaches to	3. Lead tutors to take	3. Deal with unresolved	
teaching, learning	note of all unresolved	issues through	
and assessment,	issues and use any of	WhatsApp platform	
incl. gender	following strategies	for discussion and/or	
responsive,	i. discuss with SL/SWL	research	
differentiation and	ii. put on SL/SWL		
inclusive	WhatsApp platform for		
approaches and use	discussion.		
of appropriate ICT	iii. tutors to research for		
tools.	the next PD session for		
 Identify how any 	discussion		
assessments during			
the lesson relate to	Advance Preparation	Advance Preparation	
course assessment	Ask tutors to read Lesson	Read Lesson 9 of the	
components	9 of the Course Manual	Course Manual	
The selected	a. Early Grade –	a. Early Grade –	
activities should be	Classroom assessment	Classroom assessment	
	b. Upper Grade – Micro	b. Upper Grade – Micro	
done with tutors in	Lesson and Use of	Lesson and Use of	
real or close to real			
time	Technology Across Junior	Technology Across Junior	
Anticipate any	High School Numeracy 1	High School Numeracy 1	
issues for	c. JHS; Assessment –	c. JHS; Assessment –	
clarification or	Teaching Integers in the	Teaching Integers in the	
questions which	Basic Schools	Basic Schools	

- might arise as the tutors work through the activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including digital skills, are being developed or applied
- Makes links to the existing PD Themes with page reference where they can support teaching, for example: action research, questioning and to other external reference material
- presentations or other resources need to be developed to support learning and provide guidance Identify resources required for any TLMs and provide guidance

on their development

Identify where

power point

d. JHS; Euclidean – Trigonometry

N.B

- i. Remind tutors to
 identify a critical friend
 from the same or
 related discipline to
 observe during
 teaching and provide
 feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. Collect all resources you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals

d. JHS; Euclidean – Trigonometry 2

N.B

- i. Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).
- ii. Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- iii. Collect all resources
 you need ahead of
 time, prepare samples
 of TLMs you may need
 and rehearse how
 these may be used to
 support the
 achievement of your
 goals

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 9 IN THE COURSE MANUAL

LESSON TOPIC:

- a. Early Grade Micro Lesson and Use of Technology Across Early Grade Mathematics (1)
- **b. Upper Grade** Subtraction of whole numbers within 19 and then numbers within 99
- **c. JHS** Rational and Irrational numbers
- **d. JHS** Trigonometric Equations: *Learning, teaching and applying*

Focus: the bullets provide the frame for what is to be done. The guidance notes in italics identify the prompt the SL/HoD needs and each one must be addressed		frame the session. What the SL/HoDs will have to say during each stage of the session session to be session session the session. What the Session. What PD Session participants (Tutors) will do during each state of the session) ds and		Time in session		
1.	Introduction /		roduction / lesson		roduction / lesson	15 mins
	lesson	ove	erview	ov	erview	
•	overview Reflection on previous PD Session (Introduction to the course manual)	1.	Ice breaker activity: Begin with an investigational activity (e.g. Create your own acronym for the basic trigonometric ratios)	1.	Engage in an investigational activity (e.g. create personal acronyms for the basic trigonometric ratios)	
•	Introduction and overview of the main purpose of the lesson in the course manual.	2.	Ask tutors to tell how useful the previous PD session was and how it influenced their teaching over the week. Ask a critical friend to		Explain how useful the previous PD session was and how it influenced your teaching over the week. As the critical friend,	
•	Highlight cross cutting themes	٥.	give feedback on	٥.	share with members	

- i.e., gender equality and social inclusion (GESI), ICT
- Identification of important or distinctive aspects of the lesson
- Reading and discussion of the introductory sections up to learning outcomes

- his/her observation of the last enacted lesson.
- 4. Ask tutors to suggest the purpose of the lesson and state their expectations of the PD Session (NTS 2b)
- 5. Lead tutors to outline the important features of the lesson in the course manual taking note of cross cutting themes i.e., gender equality and social inclusion (GESI), ICT, etc.
- 6. Ask tutors to read the introductory sections (up to learning outcomes) and discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

See Course Manual for: a. Early Grade – Lesson 9

- b. Upper Grade Lesson 9
- c. JHS; Assessment Lesson
- d. JHS; Euclidean Lesson 9 BSC- B4.1.3.1 B5.1.3.1, CCP-B8.3.2.1 (PD Theme 1 &3)

- feedback on your observation of the last enacted lesson.
- 4. Suggest the purpose of the lesson and state your expectations of the lesson.
- 5. Identify the important features of the lesson in the course manual taking note o cross cutting themes i.e., gender equality and social inclusion (GESI), ICT, etc.
- 6. Read the introductory sections (up to learning outcomes) and in pairs/groups discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

See Course Manual for: Lesson 9 BSC- B4.1.3.1 B5.1.3.1, CCP-B8.3.2.1 (PD Theme 1 &3)

2. Concept Development (New learning likely to arise in this lesson):

- Identification and discussion of concepts
- Identification of possible challenging areas in teaching of the concept. This may include **GESI** and ICT related concepts
- Identification of needed GESI responsive and ICT resources for the teaching and learning of the concept.

Concept Development

- 1. Lead tutors to identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources including the basic school curriculum.
- 2. Engage tutors to identify and discuss various strategies for the development of conceptual understanding of the lesson. Example:

Level	Concept	Strategy
Early Child	Micro lesson	Interactive
Upper Grade	Subtraction of Whole Nos.	Internet search
JHS (Assessment)	Rational and Irrational Nos.	Model lessons
JHS (Eucl)	Trigonometri c equations	Exploratory

Let tutors refer to Lesson 9 of the course manual for additional strategies.

3. Lead tutors to discuss misconceptions and barriers in teaching and learning of the concepts to be developed in the lesson.

Eg.

a. Early Grade - Micro Lesson and Use of Technology: That the use of ICT tools does not encourage logically reason.

b. Upper Grade -Subtraction of whole numbers: *That smaller*

Concept Development

25 mins

- 1. Identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the and the use of relevant resources including the basic school curriculum.
- 2. Identify and discuss various strategies for the development of conceptual understanding of the lesson.

3. Discuss some potential misconceptions and barriers with respect to the teaching and learning of the concepts to be developed in the lesson.

lesson with other lessons

numbers are subtracted	
from the bigger numbers	
during subtraction.	
c. JHS; Assessment –	
Rational and Irrational	
numbers: That a fraction is	
made up two different	
numbers.	
d. JHS; Euclidean Geometry	
– Trigonometry:	
That trigonometry cannot	
be apply in everyday life	
activity.	
Barriers: Inappropriate	
inclusive resources	
Limited use of technology	
Inadequate pre-requisite	
knowledge	
N/B: Refer tutors to the	
lesson 9 of the course	
manual for other potential	
misconceptions and	
barriers.	

3. Teaching, learning and assessment activities for the lesson

- Reading of teaching and learning activities and identification of areas that require clarification especially GESI related activities.
- Reading of teaching and learning activities and identification of GESI and ICT issues that require clarification.

Teaching and learning activities

- 1. Ask tutors to suggest teaching and learning activities for the lesson taking into account Gender Equality and Social Inclusion (GESI) (e.g. both male and female participants playing the leading roles in group work, even distribution of questions) and refer them to the activities outlined in the course manual (Writing the Weekly PD Session-p 3., NTS 1a, b, c, d, 2b, e, f, 3b, c; UPPp. 20; JHS; Euclidean- p. 26; JHS; Assessment-25, EGE-p. 16)
- 2. Lead tutors to brainstorm and come up with some pedagogical approaches and their related core competencies likely to be inculcated in CoE students and extended to basic school learners through STS activities.

eg.

<u> </u>	
Strategy	Core
	Competency
Group Work	Collaborative
	learning
Investigation	Critical Thinking
Role Play	Communication

(Students can ascertain the extent to which methods are used during STS activities in schools.)

Teaching and learning activities

- 1. Ask tutors to suggest teaching and learning activities for the lesson taking into account Gender Equality and Social Inclusion (GESI) (e.g. both male and female participants playing the leading roles in group work, even distribution of questions) and refer them to the activities outlined in the course manual (Writing the Weekly PD Session-p 3., NTS 1a, b, c, d, 2b, e, f, 3b, c; UPPp. 20; JHS; Euclidean- p. 26; JHS; Assessment-25, EGE-p. 16)
- 2. Brainstorm and come up with some pedagogical approaches and their likely related core competencies to be inculcated in CoE students and extended to basic school learners through STS activities. (Students can ascertain the extent to which methods are used during STS activities in schools.)

40 mins

- 3. Engage tutors in a discussion of strategies strengthen core competencies. (e.g. Using the principle of multiple embodiment to solve problems related to subtraction and engaging tutors in exploratory activities to solve the problem of inability to use of ICT tools).
- 3. Discuss some strategies strengthen core competencies.

4. Ask a tutor to model alternative strategies for the activities using ICT tools, taking into consideration GESI (e.g. both male and female participants playing leading roles in their groups and in the demonstration of the use of ICT tools) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii).

4. Model alternative strategies for the activities using ICT tools, taking into consideration GESI (e.g. both male and female participants playing leading roles in their groups and in the demonstration of the use of ICT tools) in B.ED and Basic School Curricula. NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii).

NOTE:

- 1. Tutors are likely to ask about the relevance of this activity in teaching mathematics lessons.
 When this comes up, refer them to the PD Theme 1, that is, Creative Approaches
- 2. The core and transferable skills being developed or used include social skills, communication skills, critical and creative thinking skills

4. Review of Assessment component • Reading of assessment opportunities and ensuring they are aligned to the NTEAP and required course assessment: subject project (30%), subject portfolio (30%) and end of semester examination (40%) Working through one or two activities.	Creative Activities, Questioning, Talk and Learn and Group Work can be used to support the delivery of this session Review of Assessment Components 1. Ask tutors to review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP. a. Early Grade – Lesson 9 b. Upper Grade – Lesson 9 c. JHS; Assessment – Lesson 9 d. JHS; Euclidean – Lesson 9 2. Let tutors discuss the assessment strategies to be used during enactment of the lesson referring to the NTEAP at the various levels (KG, UP, JHS) – 'Assessment as' (NTS 3k). 3. Lead tutors to discuss the various ways they can support student	Review of Assessment Components 1. Review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP See Course manual - Lesson 9 2. Discuss the assessment strategies to be used during enactment of the lesson making reference to the NTEAP at the various levels (KG, UP, JHS) (NTS 3k). 3. Discuss the various ways you can support student teachers to build their	15 mins
	· · ·	1	
Resources	Resources	Resources	10 mins
 Guidance notes for SL/HoD should Identify any aspect of the lesson that might be challenging for 	1. Support tutors to identify GESI responsive resources such as supporting staff for sign language, projectors, flip charts, sticky notes, tactile materials, audio-	 Identify as many GESI responsive resources as possible that can be used in the teaching and learning of the concepts in the lesson. (PD themes 1 & 3) 	

		1		1		
	tutors in terms		visuals, visuals, audio,			
	of new		teachers and leaners			
	learning, and		resource packs,			
	which needs to		textbooks, course			
	be considered		manual, pairs of			
	prior to taking		compasses and ruler and			
	tutors through		addition mat, that can			
	the lesson		be used in the teaching			
	activities "walk		and learning of the			
	through".		concepts in the lesson.			
	Equity and	Dof	er for more suggested			
	inclusion issues					
			ources:			
	as well as ICT	I	Early Grade – Lesson 9			
	resources need		Upper Grade – Lesson 9			
	consideration		JHS; Assessment – Lesson			
•	The resources	9				
	needed must	d.	JHS; Euclidean – Lesson 9			
	be identified:	(PI	D themes 1 & 3)			
	literature –					
	page	2.	Discuss with tutors how	2.	Participate in discussing	
	referenced etc,		and where human and		how and where human	
	on web,		material resources for		and material resources	
	YouTube,		the lesson could be		for the lesson could be	
	physical		obtain in advance. Such		obtain in advance.	
	resources,		resources can include			
	power point;		projectors, flip charts			
	how they		and sign language			
	should be used.		personnel.			
	Consideration		personnen			
	needs to be	3.	Let tutors, in pairs (NTS	3.	In pairs (NTS 3h), select a	
		٥.		٥.		
	given to local		3h), select a concept and		concept and develop the	
	availability		develop the rubrics for		rubrics for designing	
•	This section can		designing resources that		resources that can be	
	build on the PD		can be used in the		used in the teaching and	
	needs		teaching and learning of		learning of the concepts	
	identified from		the concepts selected.		selected. NTS 3j	
	the course					
	manuals					
Gu	idance notes for	Re	flective Activity	Re	eflective Activity	5 mins
SL	/HoD should	1.	Engage tutors in the	1.	Show by 5 or 3 or 1	
•	Select		evaluation of the session		finger(s) if you "really got	
	activities,		and encourage them to		it", "got some of it" or	
	linked to CLO		provide feedback on the		"didn't get it"	
	and indicators,		PD session (NTS 1a, 3i).		respectively. If you	
	from the lesson		, , ,		showed 5 fingers, share	
	that are likely				your experience with	
	to be most				your colleagues.	
	to be most	<u> </u>		<u> </u>	1001 concapacs.	

- different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive, differentiation and inclusive approaches and use of appropriate ICT tools.
- Identify how any assessments during the lesson relate to course assessment components
- The selected activities should be done with tutors in real or close to real time
- Anticipate any issues for clarification or questions which might arise as the tutors work through the activities and provide guidance on these.

- 2. Engage tutors to identify unresolved issues relating to this lesson for clarification.
- Lead tutors to take note of all unresolved issues and use any of following strategies
- i. discuss with SL/SWL
- ii. put on SL/SWL WhatsApp platform for discussion.
- iii. tutors to research for the next PD session for discussion

Advance Preparation

Ask tutors to read Lesson 10 of the Course Manual a. Early Grade – Micro Lessons and use of technology across early grade mathematics (2) b. Upper Grade – Shape, space and Measurement 1 c. JHS; Assessment – Rational and Irrational numbers 2 d. JHS; Euclidean – Sine and

cosine rules: Learning and

N.B

Applying 1

- ✓ Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).
- ✓ Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues

- 2. Reflect on the activities in the session and identify unresolved issues relating to the lesson.
- Deal with unresolved issues through WhatsApp platform for discussion and/or research

Advance Preparation

Read Lesson 10 of the Course Manual
a. Early Grade – Micro
Lessons and use of
technology across early
grade mathematics (2)
b. Upper Grade – Shape,
space and Measurement 1
c. JHS; Assessment –
Rational and Irrational
numbers 2
d. JHS; Euclidean – Sine and
cosine rules: Learning and
Applying 1

N.B

- ✓ Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).
- ✓ Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- ✓ Collect all resources you need ahead of time,

- Identify where, and which, core and transferable skills, including digital skills, are being developed or applied
- Makes links to the existing PD Themes with page reference where they can support teaching, for example: action research, questioning and to other external reference material
- Identify where power point presentations or other resources need to be developed to support learning and provide guidance
- Identify resources required for any TLMs and provide guidance on their development

- relating to this lesson for clarification.
- ✓ Collect all resources
 (such as projector, flip
 chart and sticky notes)
 you need ahead of time,
 prepare samples of
 TLMs you may need and
 rehearse how these
 may be used to support
 the achievement of your
 goals.

prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals.

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 10 IN THE COURSE MANUAL

LESSON TOPIC:

- a. Early Grade Micro Lessons and use of technology across early grade mathematics (2)
- **b. Upper Grade** Shape, space and Measurement 1
- c. JHS Rational and Irrational numbers 2
- d. JHS Sine and cosine rules: Learning and Applying 1

Focus: the bullets provide the frame for what is to be done. The guidance notes in italics identify the prompt the SL/HoD needs and each one must be addressed		Guidance notes on Leading the session. What the SL/HoDs will have to say during each stage of the session	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each state of the session)	Time in session
1.	Introduction / lesson overview	Introduction / lesson overview	Introduction / lesson overview	15 mins
•	Reflection on previous PD Session (Introduction to the course manual) Introduction and overview of	1. Ice breaker activity: Begin with an investigational activity (e.g. mention types of fraction and give an example each).	 Engage in an investigational activity (e.g. mention types of fraction and give an example each). 	
•	the main purpose of the lesson in the course manual. Highlight cross	2. Ask tutors to tell how useful the previous PD session was and how it influenced their teaching over the week.	 Explain how useful the previous PD session was and how it influenced their teaching over the week. 	
	cutting themes i.e., gender equality and	3. Ask the critical friend to give feedback on his/her	3. As the critical friend, share with members	

social inclusion (GESI), ICT

Identification of

- important or distinctive aspects of the lesson Reading and discussion of the introductory sections up to learning outcomes
- observation of the last enacted lesson.
- 4. Ask tutors to state the purpose of the lesson and state their expectations of the PD Session (NTS 2b)
- 5. Lead tutors to outline the |5. Outline the important important features of the lesson in the course manual.
- 6. Ask tutors to read the introductory sections (up to learning outcomes) and discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities with emphasis on connecting concepts - Micro Lessons and use of technology across early grade mathematics, Shape, space and Measurement, Rational and Irrational numbers and Sine and cosine rules with other lessons and the use of relevant resources) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

See Course Manual for: a. Early Grade - Lesson 10. b. Upper Grade – Lesson 10 c. JHS; Assessment – Lesson 10

d. JHS; Euclidean – Lesson 10

- feedback on your observation of the last enacted lesson.
- 4. State the purpose of the lesson and state your expectations of the lesson
- features of the lesson in the course manual.
- 6. Read the introductory sections (up to learning outcomes) and discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities with emphasis on connecting concepts -Micro Lessons and use of technology across early grade mathematics, Shape, space and Measurement, Rational and Irrational numbers and Sine and cosine rules with other lessons and the use of relevant resources) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

See Course Manual for: a. Early Grade – Lesson 10. b. Upper Grade – Lesson 10

		c. JHS; Assessment – Lesson 10 d. JHS; Euclidean – Lesson 10	
2. Concept Development (New learning likely to arise in this lesson): Identification and discussion of concepts Identification of possible challenging areas in teaching of the concept. This may include GESI and ICT related concepts Identification of needed GESI responsive and ICT resources for the teaching and learning of the concept.	Concept Development 1. Lead tutors to identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources including the basic school curriculum. 2. Engage tutors to identify and discuss various strategies for the development of conceptual understanding of the lesson. Early Grade: Micro Lessons and use of technology. Strategies: Internet search and Exploratory. Upper Grade: Shape, space and Measurement. Strategies: Inclusive Activity-Based and Demonstration JHS Assessment: Rational and Irrational Strategies: Number Games, internet search and Model lesson JHS Euclidean: Sine and cosine rules Strategies: Exploratory and collaborative group activity 3. Engage tutors to identify and discuss unfamiliar concepts in the lesson.	Concept Development 1. Identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources including the basic school curriculum. 2. Identify and discuss various strategies for the development of conceptual understanding of Early Grade: Micro Lessons and use of technology. Upper Grade: Shape, space and Measurement. JHS Assessment: Rational and Irrational numbers JHS Euclidean: Sine and cosine rules	25 mins

	4. Lead tutors to discuss	4. Discuss some potential	
	misconceptions and	misconceptions and	
	barriers in teaching and	barriers with respect	
	_	•	
	learning of the concepts	to the teaching and	
	in the lesson.	learning of concepts in	
	Eg.	the lesson.	
	Early Grade: Micro Lessons		
	and use of technology.		
	Misconception: Girls fear		
	maths and use of		
	technological devices		
	Upper Grade: Shape, space		
	and Measurement.		
	Misconception: Maths for		
	boys but not Girls		
	JHS Assessment: Rational		
	and Irrational numbers		
	Misconception: some		
	numbers cannot be		
	represented with objects.		
	E.g1		
	JHS Euclidean: Sine and		
	cosine rules		
	Misconception: not useful to		
	real life situation		
	Barriers: Inappropriate		
	inclusive resources		
	Limited use of technology		
	Inadequate pre-requisite		
	knowledge		
	N/B: Refer tutors to the		
	lesson 10 of the course		
	manual for other potential		
	misconceptions and barriers.		
3. Teaching,	Teaching and learning	Teaching and learning	40 mins
learning and	activities	activities	
assessment	1. Ask tutors to suggest	1. Ask tutors to suggest	
activities for the	teaching and learning	teaching and learning	
lesson	activities for the lesson	activities for the lesson	
 Reading of 	taking into account	taking into account	
teaching and	Gender Equality and	Gender Equality and	
learning	Social Inclusion (GESI)	Social Inclusion (GESI)	
activities and	(e.g. both male and	(e.g. both male and	
identification of	female participants	female participants	
areas that	playing the leading roles	playing the leading	
a. 545 that	F10 1 10.00111 B 10.000	L 0 0 0	

- require clarification especially GESI related activities.
- Reading of teaching and learning activities and identification of GESI and ICT issues that require clarification.
- in group work, even distribution of questions) and refer them to the activities outlined in the course manual (Writing the Weekly PD Session-p 3., NTS 1a, b, c, d, 2b, e, f, 3b, c; UPP-p. 20; JHS; Euclidean- p. 26; JHS; Assessment-25, EGE- p. 16)
- 2. Lead tutors to brainstorm and come up with some creative approaches and their related core competencies likely to be inculcated in CoE students and extended to basic school learners through STS activities.

Example:
Group Work - Collaborative learning
Investigation - Critical
Thinking
Role Play - Communication
(Students can ascertain the extent to which methods are used during STS activities in

schools.)

3. Engage tutors in a discussion of strategies strengthen core competencies. (e.g. Using activity-based/demonstration to solve problem with differentiated assessment of, as and for; engaging tutors in exploratory activities to solve the problems)

- roles in group work,
 even distribution of
 questions) and refer
 them to the activities
 outlined in the course
 manual
 (Writing the Weekly PD
 Session-p 3., NTS 1a, b, c,
 d, 2b, e, f, 3b, c; BSC p.iii,
 BSC p.iii, UPP-p. 20; JHS;
- d, 2b, e, f, 3b, c; BSC p.iii, BSC p.iii, UPP-p. 20; JHS; Euclidean- p. 26; JHS; Assessment-25, EGE- p. 16)
- 2. Brainstorm and come up with some pedagogical approaches and their likely related core competencies to be inculcated in CoE students and extended to basic school learners through STS activities.

(Students can ascertain the extent to which methods are used during STS activities in schools.)

3. Discuss the strategies to strengthen core competencies.

	4. Ask a tutor to model alternative strategies for the activities using ICT tools, taking into consideration GESI issues (e.g. both male and female participants playing leading roles in their groups and in the demonstration of the use of ICT tools) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii).	4. Model alternative strategies for the activities using ICT tools, taking into consideration GESI (e.g. both male and female participants playing leading roles in their groups and in the demonstration of the use of ICT tools) in B.ED and Basic School Curricula.	
4. Review of	Review of Assessment	Review of Assessment	15 mins
Assessment	Components	Components	
component Reading of assessment opportunities and ensuring they are aligned to the NTEAP and required course assessment: subject project (30%), subject portfolio (30%) and end of semester examination (40%) Working through one or two activities.	1. Ask tutors to review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP a. Early Grade – Lesson 10. b. Upper Grade – Lesson 10 c. JHS; Assessment – Lesson 10 d. JHS; Euclidean – Lesson 10	1. Ask tutors to review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP a. Early Grade – Lesson 10 b. Upper Grade – Lesson 10 c. JHS; Assessment – Lesson 10 d. JHS; Euclidean – Lesson 10	
detivities.	2. Lead tutors to discuss the various ways they can support student teachers to build their portfolios before/during/ after lessons	2. Discuss the various ways you can support student teachers to build their portfolios before/during/ after lessons	
	3. Let tutors discuss the assessment strategies to be used during enactment of the lesson	3. Discuss the assessment strategies to be used during enactment of the	

referring to the NTEAP at

lesson making

		the various levels (KG,	reference to the	
		UP, JHS) (NTS 3k).	NTEAP	
	ources	Resources	Resources	10 mins
	dance notes for		Identify inclusive	
-	loD should	inclusive resources such	resources such as	
	dentify any	as tactile materials,	tactile, audio-visuals,	
	aspect of the	audio-visuals, visuals,	visuals, audio, teachers	
	esson that	audio, teachers and	and leaners resource	
	might be	leaners resource packs,	packs, textbooks,	
	challenging for	textbooks, course	course manual, pairs of	
	tutors in terms	manual, pairs of	compasses and ruler	
	of new learning,	compasses and ruler and	and addition mat, that	
	and which	addition mat, that can be	can be used in the	
	needs to be	used in the teaching and	teaching and learning	
	considered prior	learning of the concepts	of the concepts in the	
	to taking tutors	in the lesson,graph	lesson:	
	through the	sheets, GeoGebra app,	a. Early Grade – Lesson 10.	
	esson activities	set of mathematical	b. Upper Grade – Lesson	
	'walk through".	instrument,	10	
	Equity and	manipulatives,	c. JHS; Assessment –	
	nclusion issues	permanent markers,	Lesson 10	
a	as well as ICT	circular models).	d. JHS; Euclidean – Lesson	
	resources need	a. Early Grade – Lesson 10.	10	
	consideration	b. Upper Grade – Lesson 10	(PD themes 1)	
	The resources	c. JHS; Assessment – Lesson		
	needed must be	10		
	dentified:	d. JHS; Euclidean – Lesson 10		
	iterature –	(PD themes 1 & 3)		
	page referenced			
	etc, on web,	2. Let tutors, in pairs (NTS	2. In pairs (NTS 3h), select	
	YouTube,	3h), select a concept and	a concept and develop	
	ohysical	develop the rubrics for	the rubrics for	
	resources,	designing resources that	designing resources	
	power point;	can be used in the	that can be used in the	
	now they	teaching and learning of	teaching and learning	
	should be used.	the concept selected.	of the concept	
	Consideration		selected. NTS 3j	
	needs to be			
_	given to local			
	availability			
	This section can			
	ouild on the PD			
r	needs identified			
f	from the course			
r	manuals			

Evaluation and review of session Guidance notes for SL/HoD should

- Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive, differentiation and inclusive approaches and use of appropriate ICT tools.
- Identify how any assessments during the lesson relate to course assessment components
- The selected activities should be done with tutors in real or close to real time
- Anticipate any issues for clarification or

Reflective Activity

- Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i).
- 2. Take note of all unresolved issues and use any of following strategies.
- discuss with SL/SWL
- put on SL/SWL
 WhatsApp platform for discussion.
- tutors to research and report findings on shared platforms.

Advance Preparation

Ask tutors to read Lesson 11 of the Course Manual a. Early Grade – Subtraction of whole numbers up to 99 b. Upper Grade – Shape, space and Measurement 2 c. JHS; Assessment – Fractions 1 d. JHS; Euclidean – Applications of Euclidean Geometry and Trigonometry

N.B

(Lesson 10)

- ✓ Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).
- ✓ Read the course manual for the next PD lesson, ahead of time to identify

Reflective Activity

- Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues
- Deal with unresolved issues through sharing the issues on the various electronic platforms and/or seeking solutions through research.

Advance Preparation

Read Lesson 11 of the
Course Manual
a. Early Grade —
Subtraction of whole
numbers up to 99
b. Upper Grade — Shape,
space and Measurement 2
c. JHS; Assessment —
Fractions 1
d. JHS; Euclidean —
Applications of Euclidean
Geometry and
Trigonometry (Lesson 10).

N.B

- ✓ Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).
- ✓ Read the course manual for the next PD

5 mins

- questions which might arise as the tutors work through the activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including digital skills, are being developed or applied
- Makes links to the existing PD Themes with page reference where they can support teaching, for example: action research,

- any outstanding issues relating to this lesson for clarification.
- ✓ Collect all resources (such as projector, flip chart and sticky notes) you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals
- lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- ✓ Collect all resources you need ahead of time, prepare samples of TLMs you may need and rehearse how these may be used to support the achievement of your goals

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 11 IN THE COURSE MANUAL

LESSON TOPIC:

a. Early Grade – Subtraction of whole numbers up to 99

b. Upper Grade – Shape, space and Measurement 2

c. JHS – Fractions 2

d. JHS – Sine and cosine rules: Learning and Applying 2

Fo	cus: the bullets	Guidance notes on	Guidance Notes on Tutor	Time in
pro	ovide the frame for	Leading the session. What	Activity during the PD	session
wh	nat is to be done.	the SL/HoDs will have to	Session. What PD Session	
Th	e guidance notes in	say during each stage of	participants (Tutors) will	
ita	lics identify the	the session	do during each state of the	
pro	ompt the SL/HoD		session)	
ne	eds and each one			
mı	ıst be addressed			
1.	Introduction /	Introduction / lesson	Introduction / lesson	15 mins
	lesson overview	overview	overview	
•	Reflection on previous PD Session (Introduction to the course manual) Introduction and	1. Ice breaker activity: Begin with an investigational activity (e.g. Identify the prime numbers between 4 and 15)	 Engage in an investigational activity (e.g. identify the prime numbers between 4 and 15) 	
•	overview of the main purpose of the lesson in the course manual. Highlight cross cutting themes i.e., gender equality and social	2. Ask tutors to tell how useful the previous PD session was and how it influenced their teaching over the week.	2. Explain how useful the previous PD session was and how it influenced their teaching over the week.	

- inclusion (GESI),
 ICT
- Identification of important or distinctive aspects of the lesson Reading and discussion of the introductory sections up to learning outcomes
- Ask the critical friend to give feedback on his/her observation of the last enacted lesson.
- Ask tutors to state the purpose of the lesson and state their expectations of the PD Session (NTS 2b)
- Lead tutors to outline the important features of the lesson in the course manual
- 6. Ask tutors to read the introductory sections (up to learning outcomes) and discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities with emphasis on connecting concepts:
- a. Early Grade -Subtraction of whole numbers up to 99 **b.** Upper Grade – Shape, space and Measurement 2 c. JHS – Fractions 2 **d. JHS** – Sine and cosine rules: Learning and Applying 2, with other lessons and the use of relevant resources including the basic education curriculum) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

- 3. As the critical friend, share with members feedback on your observation of the last enacted lesson.
- 4. State the purpose of the lesson and state your expectations of the lesson.
- 5. Outline the important features of the lesson in the course manual.
- 6. Read the introductory sections (up to learning outcomes) and in pairs/groups discuss the important or distinctive aspects of the lesson
- a. Early Grade –Subtraction of whole numbers up to 99
- **b. Upper Grade** Shape, space and Measurement 2
- c. JHS Fractions 2
- d. JHS Sine and cosine rules: Learning and Applying 2, with other lessons and the use of relevant resources including the basic school curriculum) and suggest the relevant students' previous knowledge that can support the teaching and learning of the lesson.

		1		1
		See Course Manual for: a. Early Grade – lesson 11 b. Upper Grade – lesson 11 c. JHS; Assessment – lesson 11 d. JHS; Euclidean – lesson 11 BSC Content Standards B4.1.1.1 B5.1.1.1 B6.1.1.1 B4.1.3.1 CCP-B8.3.2.1 (PD Theme 1, 3 & 4)	See Course Manual for: a. Early Grade – lesson 11 b. Upper Grade – lesson 11 c. JHS; Assessment – lesson 11 d. JHS; Euclidean – lesson 11 BSC Content Standards B4.1.1.1 B5.1.1.1 B6.1.1.1 B4.1.3.1 CCP-B8.3.2.1 (PD Theme 1, 3 & 4) (PD Theme 1, 3 & 4)	
•	Concept Development (New learning likely to arise in this lesson): Identification and discussion of concepts Identification of possible challenging areas	Concept Development 1. Lead tutors to identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources.	Concept Development 1. Identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources.	25 mins
•	challenging areas in teaching of the concept. This may include GESI and ICT related concepts Identification of needed GESI responsive and ICT resources for the teaching and learning of the concept.	 Engage tutors to identify and discuss various strategies for the development of conceptual understanding of Early Grade – Subtraction of whole numbers up to 99 Upper Grade – Shape, space and Measurement 2 JHS – Fractions 2 JHS – Sine and cosine rules: Learning and Applying 2 	 Identify and discuss various strategies for the development of conceptual understanding of Early Grade – Shape, Space, and Measurement Upper Grade – Problems solving and logical reasoning JHS; Assessment – Fraction 2 JHS; Euclidean – Applications of Euclidean Geometry and Trigonometry 	
		3. Engage tutors to identify and discuss familiar and unfamiliar concepts in the lesson	3. tutors identify and discuss familiar and unfamiliar concepts in the lesson	

3. Teaching, learning	Refer to Course Manual, Lesson 11 4. Lead tutors to discuss misconceptions and barriers in teaching and learning of the concepts in the lesson. a. Early Grade – Subtraction of whole numbers up to 99 b. Upper Grade – Shape, space and Measurement 2 c. JHS – Fractions 2 d. JHS – Sine and cosine rules: Learning and Applying 2 Teaching and learning	4. Discuss some potential misconceptions and barriers with respect to the teaching and learning of concepts in the lesson. Teaching and learning	40 mins
and assessment activities for the lesson Reading of teaching and learning activities and identification of areas that require clarification especially GESI related activities. Reading of teaching and learning activities and identification of GESI and ICT issues that require clarification.	activities 1. Ask tutors to suggest teaching and learning activities for the lesson taking into account GESI issues (e.g. making adjustments for physically challenged learners, and getting both male and female participants to play leading roles in group work and even distribution of questions) (Writing the Weekly PD Session-p 3., NTS 1a, b, c, d, 2b, e, f, 3b, c;	activities 1. Suggest teaching and learning activities that can be used in teaching the lesson taking into account GESI issues (e.g. making adjustments for physically challenged learners, and getting both male and female participants to play leading roles in group work and even distribution of questions). (Writing the Weekly PD Session-p 3., NTS 1a, b, c, d, 2b, e, f, 3b, c; (NTS 1a, b, c, d, 2b, e, f, 3b, c; BSC p. iii)	
	2. Lead tutors to brainstorm and come up with some pedagogical approaches and their related core competencies likely to be inculcated in CoE	2. Brainstorm and come up with some pedagogical approaches and their likely related core competencies to be inculcated in CoE	

	students and extended to basic school learners through STS activities. (Students can ascertain the extent to which methods are used during STS activities in schools.)	students and extended to basic school learners through STS activities. (Students can ascertain the extent to which methods are used during STS activities in schools.)	
	3. Engage tutors in a discussion of strengthen core competencies (e.g. difficulty identifying the places of digits and their values beyond hundreds).	3. Discuss the strategies to strengthen core competencies.	
	4. Engage tutors to work through one or two of the activities to ensure understanding.	4. Work through one or two of the suggested activities to ensure understanding.	
	5. Ask a tutor to model alternative strategies for the activities using ICT tools, taking into consideration GESI (eg. both male and female participants playing the leading roles in group work, even distribution of questions and in the demonstration of the use of ICT tools by both male and female particpants) in the B.ED and the Basic School Curricula (BSC). NTS 1a, b, c, d, 2b, e, 3b, c, J; BSC pp. iii).	5. Model alternative strategies for the activities using ICT tools, taking into consideration GESI (eg. both male and female participants playing the leading roles in group work, even distribution of questions and in the demonstration of the use of ICT tools by both male and female participants) in B.ED and Basic School Curricula.	
Review of	Review of Assessment	Review of Assessment	15 mins
Assessment	Component 1 Ask tutors to review	Components	
component Reading of	Ask tutors to review the assessment	Ask tutors to review the assessment	
assessment	components of the	components of the	
opportunities and	lesson in the course	lesson in the course	
	ı		1

ensuring they are
aligned to the NTEAP
and required course
assessment: subject
project (30%), subject
portfolio (30%) and
end of semester
examination (40%)
Working through one
or two activities.

- manual focusing on assessment of, as and for in line with the NTEAP:
- a. Early Grade lesson 11b. Upper Grade lesson11
- c. JHS; Assessment lesson 11
- d. JHS; Euclidean lesson 11
- Let tutors discuss the assessment strategies to be used during enactment of the lesson referring to the NTEAP at the various levels (KG, UP, JHS) (NTS 3k).\
- Lead tutors to discuss the various ways they can support student teachers to build their portfolios before/during/ after lessons.

- manual focusing on assessment of, as and for in line with the NTEAP:
- a. Early Grade lesson 11
 b. Upper Grade lesson 11
 c. JHS; Assessment –
- lesson 11 d. JHS; Euclidean – lesson 11
- 2. Discuss the assessment strategies to be used during enactment of the lesson making reference to the NTEAP at the various levels (KG, UP, JHS) (NTS 3k).
- 3. Discuss the various ways you can support student teachers to build their portfolios before/during/ after lessons.

Resources

Guidance notes for SL/HoD should

 Identify any aspect of the lesson that might be challenging for tutors in terms of new learning, and which needs to be considered prior to taking tutors through the lesson activities "walk through".

Resources

1. Support tutors to identify inclusive resources such as tactile materials, audio-visuals, visuals, audio, teachers and leaners resource packs, textbooks, course manual, pairs of compasses and ruler and addition mat, that can be used in the teaching and learning

Resources

1. Identify inclusive resources such as tactile, audio-visuals, visuals, audio, teachers and leaners resource packs, textbooks, course manual, pairs of compasses and ruler and addition mat, that can be used in the teaching and learning of the concepts in the lesson:

10 mins

			,	
•	Equity and inclusion issues as well as ICT resources need consideration The resources needed must be identified: literature – page referenced etc, on web, YouTube, physical resources, power point; how they should be used.	of the concepts in the lesson: a. Early Grade – Lesson 11 b. Upper Grade – Lesson 11 c. JHS; Assessment – Lesson 11 d. JHS; Euclidean – Lesson 11 (PD themes 1 & 3) 2. Let tutors, in pairs (NTS 3h), select a concept and develop the	 a. Early Grade – Lesson 11 b. Upper Grade – Lesson 11 c. JHS; Assessment – Lesson 11 d. JHS; Euclidean – Lesson 11 (PD themes 1) 2. In pairs (NTS 3h), select a concept and develop the rubrics for designing resources 	
•	Consideration needs to be given to local availability This section can build on the PD needs identified from the course manuals	rubrics for designing resources that can be used in the teaching and learning of the concepts selected.	that can be used in the teaching and learning of the concepts selected. NTS 3j	Fasina
⊢ Eva	aluation and	Reflective Activity	Dotloctive Activity	5 mins
	araation ana	Reflective Activity	Reflective Activity	3 1111113
	view of session	Engage tutors in the	1. Show by 5 or 3 or 1	3
rev	view of session	1. Engage tutors in the	1. Show by 5 or 3 or 1	3
rev Gu	view of session idance notes for	Engage tutors in the evaluation of the	1. Show by 5 or 3 or 1 finger(s) if you "really	3
rev Gu	riew of session idance notes for /HoD should	Engage tutors in the evaluation of the session and encourage	1. Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of	33
rev Gu SL,	view of session idance notes for	Engage tutors in the evaluation of the	1. Show by 5 or 3 or 1 finger(s) if you "really	3
rev Gu SL,	view of session idance notes for /HoD should Select activities,	Engage tutors in the evaluation of the session and encourage them to provide	1. Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it"	33
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and	Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD	1. Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you	3
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from	Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD	1. Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers,	3
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are	Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD	1. Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience	<i>33</i>
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most	Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD	1. Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience	<i>33</i>
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from	1. Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i).	1. Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues.	<i>33</i>
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies discuss with SL/SWL 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or seeking solutions 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies discuss with SL/SWL 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies discuss with SL/SWL put on SL/SWL 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or seeking solutions 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment,	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies discuss with SL/SWL put on SL/SWL WhatsApp platform 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or seeking solutions 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies discuss with SL/SWL put on SL/SWL WhatsApp platform for discussion 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or seeking solutions 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive,	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies discuss with SL/SWL put on SL/SWL WhatsApp platform for discussion tutors to research and 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or seeking solutions 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive, differentiation	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies discuss with SL/SWL put on SL/SWL WhatsApp platform for discussion tutors to research and report findings on 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or seeking solutions 	
rev Gu SL,	view of session idance notes for /HoD should Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive,	 Engage tutors in the evaluation of the session and encourage them to provide feedback on the PD session (NTS 1a, 3i). Take note of all unresolved issues and use any of following strategies discuss with SL/SWL put on SL/SWL WhatsApp platform for discussion tutors to research and report findings on 	 Show by 5 or 3 or 1 finger(s) if you "really got it", "got some of it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or seeking solutions 	

- use of appropriate ICT tools.
- Identify how any assessments during the lesson relate to course assessment components
- The selected activities should be done with tutors in real or close to real time
- Anticipate any issues for clarification or questions which might arise as the tutors work through the activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including digital skills, are being developed or applied
- Makes links to the existing PD
 Themes with page reference where they can support teaching, for example: action research, questioning and to other external reference material
- Identify where power point presentations or other resources need to be developed to

Advance Preparation

Ask tutors to read Lesson 12 of the Course Manual a. Early Grade – Shape, Space, and Measurement b. Upper Grade – Problems solving and logical reasoning: c. JHS; Assessment – Fractions 2: d. JHS; Euclidean – Applications of Euclidean Geometry and Trigonometry

N.B

- ✓ Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).
- ✓ Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.
- ✓ Collect all resources
 (such as projector, flip
 chart and sticky notes)
 you need ahead of
 time, prepare samples
 of TLMs you may need
 and rehearse how
 these may be used to
 support the
 achievement of your
 goals

Advance Preparation

Read Lesson 12 of the Course Manual

Course Manual
a. Early Grade – Shape,
Space, and Measurement
b. Upper Grade –
Problems solving and
logical reasoning:
c. JHS; Assessment –
Fractions 2:
d. JHS; Euclidean –
Applications of Euclidean

N.B

Geometry and

Trigonometry

- ✓ Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).
- ✓ Read the course manual for the next PD lesson, ahead of time to identify any outstanding issues relating to this lesson for clarification.

	support learning	
	and provide	
	guidance	
•	Identify resources	
	required for any	
	TLMs and provide	
	guidance on their	
	development	

Age Phase: a. Early Grade

b. Upper Grade

c. JHS d. JHS

Name of Courses: a. Teaching and Assessing Numeracy

b. Teaching and Assessing mathematics for Upper Primary

c. Teaching and Assessing JHS Mathematics

d. Euclidean Geometry

Year 2 Semester 2

TUTOR PD SESSION FOR LESSON 12 IN THE COURSE MANUAL

LESSON TOPIC:

- **a.** Early Grade Shape, Space, and Measurement
- **b. Upper Grade** Problems solving and logical reasoning
- c. JHS Fractions 2
- d. JHS Applications of Euclidean Geometry and Trigonometry

Focus: the bullets provide the frame for what is to be done. The guidance notes in italics identify the prompt the SL/HoD needs and each one must be addressed	Guidance notes on Leading the session. What the SL/HoDs will have to say during each stage of the session	Guidance Notes on Tutor Activity during the PD Session. What PD Session participants (Tutors) will do during each state of the session)	Time in session
1. Introduction /	Introduction / lesson	Introduction / lesson	15 mins
lesson overview	overview	overview	
 Reflection on previous PD Session (Introduction to the course manual) Introduction and 	1. Ice breaker activity: Begin with an investigational activity (e.g. EG: Pick a regular shape and obtain its corresponding net)	Engage in an investigational activity (eg. Identify the nets of given shapes)	
overview of the main purpose of the lesson in the course manual. Highlight cross cutting themes i.e., gender	2. Ask tutors to tell how useful the previous PD session was and how it influenced their teaching over the week.	2. Tell colleagues how useful the previous PD session was and how it influenced your teaching over the week.	
equality and social inclusion (GESI), ICT	3. Ask a critical friend to give feedback on	3. As the critical friend, share with members feedback on your	

- Identification of important or distinctive aspects of the lesson
- Reading and discussion of the introductory sections up to learning outcomes
- his/her observation of the last enacted lesson.
- Ask tutors to state the purpose of the lesson and state their expectations of the PD Session (NTS 2b)
- 5. Lead tutors to outline the important features of the lesson in the course manual
- 6. Ask tutors to read the introductory sections (up to learning outcomes) and discuss the important or distinctive aspects of the lesson (i.e. the interactive nature of the activities with emphasis on connecting concepts ((i) Shape, Space, and Measurement, (ii)Problems solving and logical reasoning, (iii) Fraction 2 and (iv)Applications of **Euclidean Geometry** and Trigonometry) with other lessons and the use of relevant resources including the basic school curriculum.

Course Manual for:

- a. Early Grade lesson 12
- b. Upper Grade –
- lesson 12
- c. JHS; Assessment -
- lesson 12
- d. JHS; Euclidean –
- lesson 12

- observation of the last enacted lesson.
- 4. State the purpose of the lesson and state your expectations of the lesson
- 5. Outline the important features of the lesson in the course manual.
- 6. Read the introductory sections (up to learning outcomes) and in pairs/groups discuss the important or distinctive aspects of the lesson ((i) Shape, Space, and Measurement, (ii)Problems solving and logical reasoning, (iii) Fraction 2 and (iv)Applications of **Euclidean Geometry** and Trigonometry) with other lessons and the use of relevant resources including the basic school curriculum.

Course Manual for:

- a. Early Grade –
- lesson 12
- b. Upper Grade -
- lesson 12
- c. JHS; Assessment -
- lesson 12
- d. JHS; Euclidean –
- lesson 12

	BSC Content Standards B4.1.1.1 B5.1.1.1 B6.1.1.1 B4.1.3.1 CCP-B8.3.2.1 (PD Theme 1, 3 & 4)	BSC Content Standards B4.1.1.1 B5.1.1.1 B6.1.1.1 B4.1.3.1 CCP- B8.3.2.1 (PD Theme 1, 3 & 4) (PD Theme 1, 3 & 4)	
 2. Concept Development (New learning likely to arise in this lesson): Identification and discussion of concepts Identification of possible challenging areas in teaching of the concept. This may include GESI and ICT related concepts Identification of needed GESI responsive and ICT resources for the teaching and learning of the concept. 	Concept Development 1. Lead tutors to identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources. a. Early Grade – Shape, Space, and Measurement b. Upper Grade – Problems solving and logical reasoning c. JHS; Assessment – Fraction 2 d. JHS; Euclidean – Applications of Euclidean Geometry and Trigonometry 2. Engage tutors to identify and discuss various strategies for the development of conceptual understanding of the lesson.	 Concept Development Identify familiar and unfamiliar concepts in the lesson and discuss relevant connections among concepts in the lesson with other lessons and the use of relevant resources. Identify and discuss various strategies for the development of conceptual understanding of Early Grade – Shape, Space, and Measurement Upper Grade – Problems solving and logical reasoning JHS; Assessment – Fraction 2 	25 mins
		d. JHS; Euclidean – Applications of Euclidean Geometry and Trigonometry	

- Engage tutors to identify and discuss familiar and unfamiliar concepts in the lesson
- Lead tutors to discuss misconceptions and barriers in teaching and learning
- a. Early Grade Shape,
 Space, and
 Measurement
 b. Upper Grade Problems
 solving and logical
 reasoning
 c. JHS; Assessment –
 Fraction 2
 d. JHS; Euclidean –

Applications of Euclidean

Geometry and

Trigonometry

(e.g.: Misclassifying a shape due to its orientation. A leaner most often sees a square sitting on a side and they will classify a square tipped on its corner as a rhombus.)

- Groups/pairs identify and discuss familiar and unfamiliar concepts in the lesson
- Discuss some potential misconceptions and barriers with respect to the teaching and learning of
- a. Early Grade Shape,
 Space, and Measurement
 b. Upper Grade –
 Problems solving and
 logical reasoning
 c. JHS; Assessment –
 Fraction 2
 d. JHS; Euclidean –
 Applications of Euclidean
 Geometry and
 Trigonometry

3. Teaching, learning and assessment activities for the lesson

- Reading of teaching and learning activities and identification of areas that require clarification especially GESI related activities.
- Reading of teaching and learning activities and identification of GESI and ICT

Teaching and learning activities

1. Ask tutors to suggest teaching and learning activities for the lesson taking into account GESI (e.g. making adjustments for physically challenged learners, and getting both male and female participants to play leading roles in group work) NTS 1a, b, c, d, 2b, e, f, 3b, c;

Teaching and learning activities

1. Suggest teaching and learning activities that can be used in teaching the lesson taking into account GESI (e.g. making adjustments for physically challenged learners, and getting both male and female participants to play leading roles in group work, even distribution of questions).

40 mins

issues that require NTS 1a, b, c, d, 2b, e, f, clarification. 3b, c; (NTS 1a, b, c, d, 2b, e, f, 3b, c; BSC p. iii) 2. Lead tutors to 2. Brainstorm to come brainstorm come up up with some with some pedagogical pedagogical approaches and their approaches and their related core likely related core competencies likely to competencies to be be inculcated in CoE inculcated in CoE students and extended students and to basic school learners extended to basic through STS activities. school learners Example: through STS activities. Group Work -Collaborative learning Investigation - Critical **Thinking** Role Play -Communication Students can ascertain the extent to which methods are used during STS activities in schools. 3. Engage tutors in a 3. Discuss the strategies discussion of strategies to strengthen core to strengthen core competencies. competencies. (e.g. (a) creating variant tasks and solutions, identifying applications of theorems and postulates making connections between topics and concepts) 4. Ask a tutor to model 4. Model alternative alternative strategies strategies for the for the activities using activities using ICT

tools, taking into

consideration GESI

ICT tools, taking into

issues (eg. Both male

consideration GESI

		T .	1
	and female participants playing the leading roles in their groups and in the demonstration of the use of ICT tools) in the B.ED and the Basic School Curricula (BSC).	issues in B.ED and Basic School Curricula.	
	NTS 1a, b, c, d, 2b, e,		
	3b, c, J; BSC pp. iii).		_
4. Review of	Review of Assessment	Review of Assessment	15 mins
Assessment	Components	Components	
Components Reading of assessment opportunities and ensuring they are aligned to the NTEAP and required course assessment: subject project (30%), subject portfolio (30%) and end of semester examination (40%) Working through one or two activities.	 Ask tutors to review the assessment components of the lesson in the course manual focusing on assessment of, as and for in line with the NTEAP Early Grade – lesson 12 Upper Grade – lesson 12 JHS; Assessment – lesson 12 JHS; Euclidean – lesson 12 	1. Identify the assessment components of the lesson in the new course manual focusing on assessment of, as and for in line with the NTEAP a. Early Grade — lesson 12 b. Upper Grade — lesson 12 c. JHS; Assessment — lesson 12 d. JHS; Euclidean — lesson 12	
	 Let tutors discuss the assessment strategies to be used during enactment of the lesson referring to the NTEAP (at the various levels (KG, UP, JHS)—'Assessment as' (NTS 3k). Lead tutors to discuss the various ways they can support student teachers to build their portfolios before/during/ after lessons 	 Discuss the assessment strategies to be used during enactment of the lesson making reference to the NTEAP at the various levels (KG, UP, JHS)—'Assessment as' (NTS 3k). Discuss the various ways you can support student teachers to build their portfolios before/during/ after lessons 	

Resources	Resources	Resources	10 mins
Guidance notes for	1. Support tutors to	1. Identify as many GESI	
SL/HoD should	identify inclusive	responsive resources as	
Identify any	resources such as	possible that can be used	
aspect of the	posters with large	in the teaching and	
lesson that might	prints for partially	learning of the concepts	
be challenging for	sighted learners,	introduced in the lesson.	
tutors in terms of	engaging experts in		
new learning, and	sign language, making		
which needs to be	use of projectors, flip		
considered prior	charts, sticky notes,		
to taking tutors	tactile, audio-visuals,		
through the	visuals, audio, teachers		
lesson activities	and leaners resource		
"walk through".	packs, textbooks,		
Equity and	course manual, pairs		
inclusion issues as	of compasses and ruler		
well as ICT	and addition mat, that		
resources need	can be used in the		
consideration	teaching and learning		
The resources	of the concepts		
needed must be	introduced in the		
identified:	lesson.		
literature – page	a. Early Grade – lesson		
referenced etc, on	12		
web, YouTube,	b. Upper Grade – lesson		
physical	12		
resources, power	c. JHS; Assessment – lesson		
point; how they	12		
should be used.	d. JHS; Euclidean –		
Consideration	lesson 12		
needs to be given	(PD themes 1 & 3)		
to local availability			
This section can	2. Let tutors, in pairs	2. In pairs (NTS 3h), select	
build on the PD	(NTS 3h), select a	a concept and develop	
needs identified	concept and develop	the rubrics for designing	
from the course	the rubrics for	resources that can be	
manuals	designing resources	used in the teaching and	
	that can be used in the	learning of the concepts	
	teaching and learning	selected. NTS 3j	
	of the concepts		
	selected.		
Evaluation and	Reflective Activity	Reflective Activity	5 mins
review of session	1. Engage tutors in the	1. Show by 5 or 3 or 1	
Guidance notes for	evaluation of the	finger(s) if you "really	
SL/HoD should	session and encourage	got it", "got some of	

- Select activities, linked to CLO and indicators, from the lesson that are likely to be most different from tutors' previous experience. These could involve applying new content, e.g. from section 2, or approaches to teaching, learning and assessment, incl. gender responsive, differentiation and inclusive approaches and use of appropriate ICT tools.
- Identify how any assessments during the lesson relate to course assessment components
- The selected activities should be done with tutors in real or close to real time
- Anticipate any issues for clarification or questions which might arise as the tutors work through the activities and provide guidance on these.
- Identify where, and which, core and transferable skills, including

- them to provide feedback on the PD session (NTS 1a, 3i).
- Take note of all unresolved issues and use any of following strategies
- discuss with SL/SWL
- put on SL/SWL
 WhatsApp platform for discussion
- tutors to research and report findings on shared platforms.

Advance Preparation

- Ask tutors to identify Lesson(s) leaners were having challenges with in the Course Manual
- a. Early Grade Shape,Space, andMeasurement
- b. Upper Grade –Problems solving and logical reasoning
- c. JHS; Assessment Fraction 2
- d. JHS; Euclidean –
 Applications of
 Euclidean Geometry
 and Trigonometry
 Geometric
 construction:
- Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a).

- it" or "didn't get it" respectively. If you showed 5 fingers, share your experience with your colleagues
- 4. Reflect on outstanding issues relating to the lesson. Deal with unresolved issues through sharing the issues on the various electronic platforms and/or seeking solutions through research.

Advance Preparation

- Identify Lesson(s)
 leaners were having
 challenges with in the
 Course Manual
- a. Early Grade Shape,Space, andMeasurement
- b. Upper Grade –Problems solving and logical reasoning
- c. JHS; Assessment Fraction 2
- d. JHS; Euclidean –
 Applications of
 Euclidean Geometry
 and Trigonometry
- Get a critical friend from the same or related discipline to observe your lesson during teaching and provide feedback (NTS 1a).

digital skills, are being developed or applied • Makes links to the existing PD Themes with page reference where they can support teaching, for example: action research, questioning and to other external reference material • Identify where power point presentations or other resources need to be developed to	3. Engage tutors in evaluation of the PD sessions and encourage them to provide feedback on the sessions, indicating how the sessions have supported teaching and learning in the subject	3. Evaluate and provide feedback on the PD sessions and indicate how the sessions have supported teaching and learning in the subject
power point presentations or		
 guidance Identify resources required for any TLMs and provide guidance on their 		

development

College of Education Tutor Professional Development (TPD) Survey – Coordinators Survey Introduction

This survey should be completed by the TPD Coordinators for each College of Education. This survey will be completed on the College of Education Management Information System (CEMIS). The survey should be completed each week after TPD sessions.

1. Name of College of Education	
2. Please enter the date of the session	

3. Did today's scheduled TPD session take place?		
Yes	1	Go to Q5
No and we did not reschedule.	2	Go to Q4
No but we rescheduled for later this week or for an additional slot next week	3	Go to Q4

4. If the TPD session did not take place, p	lease explain why	,
Conflict with other activities	1	End data submission.
No one showed up for the session.	2	
•		
Other (please specify)	3	

5. How many male tutors attended?	Answer must be a number
6. How many female tutors attended?	Answer must be a number
7. Which session was it?	Answer must be a text

8. What was the level of tutor participation during today's session?		
75-100% of the tutors were engaged 1		
50-75% of the tutors were engaged	2	
25-50% of the tutors were engaged	3	
0-25% of the tutors were engaged	4	

9. Please rate yourself on how well you facilitated the session		
I was not prepared 1		
I could have been better prepared. 2		
I felt adequately prepared.	3	
I was very prepared and knew the content	4	
well		

10. Did anyone from your mentoring University visit your college to observe and participate in the PD session?		
Yes	1	Go to Q11
No	2	Skip to Q13

11. What kind of support was provided during the visit?	
The University team worked with me to prepare for the session.	1
The University team participated in the PD session.	2
The University team observed the session.	3
After the session, the University team gave feedback on how the session went	4

12. How valuable was the support to you?	
Not Valuable	1
Somewhat Valuable	2
Very Valuable	3

13. Do you think the tutors found the session valuable?	
Not Valuable	1
Somewhat Valuable	2
Very Valuable	3

14. How adequately do you think Gender Equality and Social Inclusion (GESI) issues were addressed throughout the session?	
Not Adequate	1
Somewhat Adequate	2
Very Adequate	3

15. How much impact do you think the session will have on the learning of students?	
Very Good	1

Good	2
Minimal	3

16. Based on the reflection on the session today, what percentage of tutors do you think	
are applying interactive teaching strategies learnt from the sessions in their classes?	
75-100% of tutors are applying interactive	1
teaching strategies in their classes	
50-75% of tutors are applying interactive	2
teaching strategies in their classes	
25-50% of tutors are applying interactive	3
teaching strategies in their classes	
0-25% of tutors are applying interactive	4
teaching strategies in their classes	

17. What percentage of tutors do you think are using ICT in their classes as teaching aids	
e.g., integration of videos, PowerPoint presentations and as a research tool?	
75-100% of tutors are using ICT as teaching 1	
aids in their classes	
50-75% of tutors are using ICT as teaching	2
aids in their classes	
25-50% of tutors are using ICT as teaching	3
aids in their classes	
0-25% of tutors are using ICT as teaching	4
aids in their classes	

18. Did the Principal and/or Vice Principal attend, visit or monitor the PD session? (Choose	
one or more answer from the list)?	
The Principal	1
·	
The Vice Principal	2
Neither the Principal nor Vice Principal	3
attended	