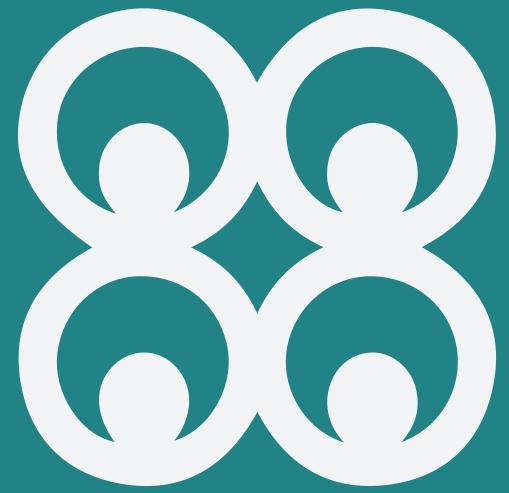
Tutor Professional Development Handbook: B.Ed. in Initial Teacher Education - Mathematics Year 3 Semester 2

HANDBOOK FOR COORDINATORS





Wisdom, Knowledge and Prudence X





The Government of Ghana







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Foreword

In Ghana we have made great strides in transforming our teacher education system over the past few years. With each passing year the changes brought about through these reforms are maturing, embedding, and sustaining. Once the first B.Ed. graduates from Colleges of Education enter basic school classrooms from 2022 onwards, I am sure that as a nation, we will truly start to see the benefits of these reforms.

The success of national reforms depends on individual tutors and individual teachers working in classrooms across the country every day. The progress that we want to see will only be brought about through the consistent and regular application of the professional knowledge, professional practice and professional values and attitudes set out in the National Teachers' Standards (NTS).

This is where the Tutor Professional Development Handbooks, written by tutors and university lecturers, have an important role to play in helping tutors to reflect critically on their methods of teaching and learning.

Critical thinking and reflection is an area of weakness in parts of our current education system. Colleges of Education take secondary school graduates and, over four years of the B.Ed., shape them into professional teachers. A recent '21st Century Skills assessment' of a representative sample of Ghanaian Senior High School students found that 'critical thinking and problem solving' was the area where they performed least well. Lesson observation of these students' teachers in the same Senior High Schools found that 'employs a variety of instructional strategies that encourage student participation and critical thinking' was the area of the NTS where these teachers consistently scored lowest.

Teaching matters. If we want our Colleges of Education to develop teachers who can think critically and solve problems then tutors must model these expected behaviours in their lessons so that they create an environment where our teachers develop these competencies and, ultimately, use these competencies to develop critical thinking in our basic schools.

This latest set of Professional Development Handbooks, developed by four mentoring universities (University for Development Studies, University of Education, Winneba, University of Ghana and Kwame Nkrumah University of Science and Technology) and tutors from their affiliated Colleges of Education, are the third set of Professional Development Handbooks to be developed since Transforming Teaching, Education & Learning (T-TEL) became 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 making all this possible.

Robin Todd Executive Director, T-TEL February 2022

Age Level(s):	Name of Subject(s):
a. Upper Grade	a. Mathematics: Teaching and Assessing
b. JHS (Core)	b. Teaching and Assessing JHS Mathematics
c. JHS (Elective)	c. Mathematics

Tutor PD Session for Lesson 1 in the Course Manual

Lesson Tittle:

- a. Upper Primary: The Four Basic Operations (Teaching and Assessing)
- b. JHS (Core): Measurement, Shape and Space: (Teaching and Assessing)
- c. JHS (Elective): Teaching Investigations with Shapes and Space

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. 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 stage of the session.	Time in session
 1a: Introduction to the semester – in session one Introduction to the purpose of the specialisms: EG, UP and JHS Overview of subject/s age level/s to be covered in the PD sessions and guidance on grouping tutors according to the 	 1a: Introduction Ice breaker activity: Ask each tutor to estimate the number of handspans that could make the height of the Subject Lead and prove by measuring. 1.2 Lead tutors to discuss the overview of the phases to be covered in the course manual in this PD session. 	 1a: Introduction Ice breaker: Estimate Ice breaker: Estimate the number of handspans that can make the height of Subject Lead and prove by measuring. 1.2 Discuss the overview of the phases to be covered in the course this PD session. 	20 mins
subject/s, age levels/s.	Upper Primary: Place value (Teaching and Assessing).	Upper Primary: Place value (Teaching and Assessing)	

•	Introduction to	JHS (Core) - Measurement,	JHS (Core) - Measurement,	
	the course	Shape and Space:	Shape and Space:	
	manual/s	(Teaching and	(Teaching and	
•	Overview of	Assessing).	Assessing)	
	course learning	JHS (Elective) – Teaching	JHS (Elective) – Teaching	
	outcomes	investigations with shapes	investigations with shapes	
•	Introduction to	and space.	and space	
	the two			
	continuous	NB:	NB:	
	assessment	Remember to put	Please work in your phase group and contribute in the	
	components to be undertaken in	members into groups according to the phases to	whole group.	
	each subject	be taught in the semester.	whole group.	
	during the			
	semester (See	1.3 Guide tutors to scan	1.3 Individually, scan	
	Course	through the course	through the course	
	Assessment	manual and indicate	manual and identify	
	Components at a	the purpose of the	the purpose of the	
	Glance Appendix	specialisms: UP, JHS	specialisms (Upper	
	2) NB: in subjects	(Core) and JHS	Primary, JHS Core and	
	where there are	(Elective)	JHS Elective) and share	
	no assessment		with the whole group.	
	components in the			
	course manuals	i. Upper Primary & JHS		
	examples will	(Core) Both courses consider		
	need to be provided for	how student teachers will:		
	SL/HoD.	be provided with the		
	52/1102.	concepts and pedagogy		
		required to teach in Upper		
		Primary and Junior High		
		School; support the		
		learning of pupils between		
		the ages of 9-11 and 12-		
		14; gain understanding of		
		human development and		
		the developmental milestones associated		
		with Upper Primary and		
		JHS.		
		ii. JHS (Elective):		
1		The course considers how		
		student teachers will:		
		a) identify the learning		
		outcomes of the JHS 1-		
		3 Mathematics		
		curriculum;		

 b) assess the four domains in the curriculum, that is, Number, Algebra, Geometry and Handling Data. c) design and analyse the development of micro lesson plans and concept development, practice, assessment strategies and trialling in micro-teaching sessions. d) translate current Mathematics theory into practice. e) integrate ICT tools in the teaching and learning of Mathematics <i>NB:</i> Draw tutors' attention to all NTS references and salient points necessary for the development of their teaching plan. 	NB: Pay attention to all NTS references and salient points necessary for the development of their teaching plan.	
1.4 Ask tutors to read the introduction of the various course manuals and discuss the Course learning Outcomes (CLOs) in groups as appropriate.	1.4 Read the introduction of your course manual and discuss the Course learning Outcomes (CLOs) in groups as appropriate.	
1.5 Ask tutors to discuss the two continuous assessment (CA) components to be undertaken during the course in line with the NTEAP making reference to the Appendix 2 of this PD Manual to be abreast with:	1.5 With reference to Appendix 2 of this PD manual, discuss the two continuous assessment components to be undertaken during the course in line with the NTEAP to be abreast with:	

 i. the scope of the subject project and subject portfolio ii. the percentage/ weight distributions iii. alternative tools for CA. <i>Example of a subject</i> project activity may include: α. Samples of problem - solving tasks with written explanations of how the problems were solved and how this can be taught. β. Charts and graphs with written explanations of how and why they were created and how this can be taught. γ. Use of computer analyses conducted as well as use of software to teach mathematics and evaluate how effective they are. δ. Use of indigenous mathematics (ethnomathematics) in teaching formal mathematics 	 i. the scope of the subject project and subject portfolio ii. the percentage/ weight distributions iii. alternative tools for CA. <i>Example of a subject</i> project activity may include: α. Samples of problem - solving tasks with written explanations of how the problems were solved and how this can be taught. β. Charts and graphs with written explanations of how and why they were created and how this can be taught. γ. Use of computer analyses conducted as well as use of software to teach mathematics and evaluate how effective they are. δ. Use of indigenous mathematics (ethnomathematics) to teach formal mathematics. 	
An example of a subject portfolio activity is to: design a TLR for teaching calculation or pre- calculation and ask colleague students to use it. Provide a rationale for the design; do an evaluation of its impact on students' learning; and state what would have made the TLR usage effective.	An example of a subject portfolio activity is to: design a TLM for teaching calculation or pre- calculation and ask colleague students to use it. Provide a rationale for the design; do an evaluation of its impact on students' learning; and state what would have made the TLM usage effective.	

1b Introduction to	1b Introduction to the	1b Introduction to the	
the session	Lesson	Lesson	
Review prior			
learning	1.6 Ask tutors to tell how	1.6 Tell how useful the	
 Reading and 	useful the previous	previous semester's	
discussion of the	semester's PD session	PD session was and	
introductory	was and how it	how it influenced your	
sections of the	influenced their	teaching in year 3	
lesson up to and	teaching in year 3	semester 1. Provide	
including learning	semester 1. Lead them	examples of how	
outcomes and	to provide examples of	students employed	
indicators	how students were	the various strategies	
Overview of	prepared to employ	and skills during the	
content and	the various strategies	basic school classroom	
identification of	and skills during the	work including STS	
any distinctive	basic school classroom	Field Experience in	
aspects of the	work including STS	year 3 semester 1 and	
lesson/s,	Field Experience in	how student teachers	
NB: The guidance for	year 3 semester 1 and	will be prepared to	
SL/HoD should	how student teachers	employ the various	
identify and address	will be prepared to	strategies and skills	
any areas where	employ the various	during the basic	
tutors might require	strategies and skills	school classroom work	
	during the basic school	in STS Field Experience	
clarification on any	classroom work in STS	in year 4 semester 1.	
aspect of the lesson.	Field Experience in	in year 4 semester 1.	
NB: SL/HoD should	year 4 semester 1.		
ask tutors to plan for	year 4 semester 1.		
their teaching as they	1.7 Ask tutors to read and	1.7 Read and discuss the	
go through the PD	discuss the	introductory section	
session	introductory section of	of lesson 1 in the	
	lesson 1 in the course	course manual	
	manual including the	including the Learning	
	Learning Outcomes	Outcomes (LOs) in	
	(LOs) in phase groups.	your phase groups.	
	(LOS) in phase groups.	your phase groups.	
	1.8 Ask tutors in phase	1.8 In your phase group,	
	groups to discuss the	discuss the important	
	important or	or distinctive aspects	
	distinctive aspects of	of lesson 1 including	
	lesson 1 including	vocabulary and	
	vocabulary and	fundamental	
	-		
	fundamental concepts.	concepts.	
	Distinctive aspects	Distinctive aspects	
	Example:	Example:	
	a. Upper Primary:	a. Upper Primary:	

	Place value in numeration systems; counting and representing numbers in multiple of ways and indifferent bases. b. JHS (Core): – Spatial sense; concept of measurement; types of angles; finding perimeter and area of 2-D shapes; volumes of prisms and pyramids. c. JHS (Elective) – Assessment strategies; Investigating perimeters and areas of polygons; Investigating the relationship between the volumes of prisms and pyramids.	Place value in numeration systems; counting and representing numbers in multiple of ways and indifferent bases.	
	NB:	NB:	
	Encourage tutors to see	Consider leaners as	
	leaners as knowledge	knowledge constructors	
	constructors but not as	but not as passive listeners	
	passive listeners in the	in the learning	
	learning environment.	environment.	
2. Concept	Concept Development	Concept Development	15 mins
Development			
(New learning	2.1 Ask tutors to identify	2.1 Identify familiar and	
likely to arise in	familiar and unfamiliar	unfamiliar concepts in	
lesson/s):	concepts in their	your lesson and discuss	
Identification and discussion of now	lessons and discuss	with the larger group.	
discussion of new learning, potential	with the larger group.		
barriers to learning	Familiar Concepts Unfamiliar concepts		
for student	Place value of Place value of Whole Numbers decimals		
teachers or	Measurement of Measurement of length and area volume		
students, concepts			
or pedagogy being	Counting to Estimation of establish quantities		
introduced in the	quantities Addition, Division of		
lesson, which need	subtraction and numbers		
to be explored	multiplication of numbers		
with the SL/HoD			
<i>NB:</i> The guidance for			
SL/HoD should set out			

what they need to do to introduce and explain the issues/s	2.2 Lead tutors to draw connections among concepts in the various	2.2 In your phase groups, draw connections among concepts in the	
with tutors	lessons in line with the basic school curriculum. <i>Example.</i>	lesson and in line with the basic school curriculum.	
	JHS: The connection is that solids have shape and occupy space (BSC: B 5.3.1.1; 5.3.2.1). UPPER PRIMARY: Repeated addition is a fundamental concept of multiplication; repeated subtraction is a fundamental concept of division; addition as the inverse of subtraction and		
	vice versa; Multiplication as the inverse of division and vice versa irrespective of the phase of study (BSC B 3.1.2.6; 2.2.1.2; B 4.1.2.5; B 4.1.2.2).		
	2.3 Guide tutors to use Think-Pair-Share to outline possible challenging areas in teaching their lessons.	2.3 Individually, outline the challenging areas in teaching your lesson, share with a member of the same phase group and then with the whole group.	
	Example: Upper Primary (Teaching place value): non- availability of place value resource materials for		
	teaching decimals. JHS Core/Elective (Shape, Space and Measurement) Inadequate pedagogical content		
	knowledge for teaching volume of prisms and pyramids.		

Ta salati d		
 Teaching a lesson 		
without the relevant		
resources including ICT		
tools.		
Each of the above can be		
addressed through further		
reading and advance		
preparation – e.g.		
searching the internet for		
solutions to the identified		
challenging areas.		
2.4 Lead tutors to discuss	2.4 In whole group, discuss	
misconceptions and	misconceptions and	
barriers to learning in	barriers to learning in	
the lesson.	the lesson.	
Example:	Example:	
a. UPPER PRIMARY: –	a. UPPER PRIMARY: – In	
In place-value students do	place-value, students do not	
not consider the place of	consider the place of a	
number as showing the	number as showing the	
value of the number. They	value of the number;	
read numbers as individual	numbers are read as	
digit. i.e 143 as one-four-	individual digit. i.e 143 as	
three instead of one	one-four-three instead of	
hundred and forty-three	one hundred and forty-three	
b. JHS (Core/Elective)-	b. JHS (Core/Elective) –	
misconception of space	misconception of space	
shape and measurement	shape and measurement is	
is that a square is not a	that a square is not a	
rectangle; a square is not	rectangle; a square is not a	
a rhombus; slant height of	rhombus; slant height of a	
a pyramid is considered as	pyramid is considered as	
the actual height of the	the actual height of the	
pyramids.	pyramids.	
Barriers to learning may	Barriers to learning may	
include: weak prior	include: weak prior	
•	knowledge, students	
knowledge, students	_	
engaging in non-academic	engaging in non-academic	
activities to the detriment	activities to the detriment	
of academic engagement,	of academic engagement,	
lack of appropriate	lack of appropriate	
resources, lack of	resources, lack of	
opportunity to use ICT	opportunity to use ICT tools	
tools due to power	due to power outages,	
outages, interrupted	interrupted internet	
internet connectivity,	connectivity, unavailability	
meenier connectivity,		

		ungugilghility of internet	of internet hundle for	
		unavailability of internet	of internet bundle for	
		bundle for accessing the	students, inadequate	
		internet, inadequate	contact time due to staff	
		contact time due to staff	meetings.	
		meetings.		
3.	Planning for	Planning for Teaching and	Planning for Teaching and	40 mins
	teaching, learning	learning Activities for the	learning activities for the	
	and assessment	Lesson	Lesson	
	activities for the	Lesson	Lesson	
		2.1. Aple to the reasing the sing	2.1 Suggest too shing and	
	lesson/s	3.1 Ask tutors in their	3.1 Suggest teaching and	
•	Reading and	phase groups, to	learning activities for	
	discussion of the	suggest teaching and	the lesson by ensuring;	
	teaching and	learning activities for		
	learning activities	the lesson by ensuring;		
•	Noting and	i. Provision is made for	i. Provision is made for SEN	
	addressing areas	SEN.	ii. Both genders take	
	where tutors may	ii. Both genders take	leading roles in group task,	
	, require	leading roles in group	etc making reference to	
	clarification	task.	NTS 1a, b, c, d, 2b, e, f, 3b,	
•	Noting	iii. Even distribution of	C.	
	opportunities for	questions to different		
	making links to the	categories of learners		
	Basic School	based on gender, ability,		
		previous experience, etc.		
	Curriculum	referring to NTS 1a, b, c, d,		
•	Noting	2b, e, f, 3b, c.		
	opportunities for	20, e, 1, 30, c.		
	integrating: GESI			
	responsiveness	3.2 Ask tutors to read the	3.2 Read the activities	
	and ICT and 21 st	activities outlined in	outlined in your course	
	Century skills	their course manuals	manual and identify	
•	Reading,	and identify areas that	areas that require	
	discussion, and	require clarification.	clarification.	
	identification of			
	continuous	NB: Refer to the Basic	NB: Refer to the Basic	
	assessment	School Curriculum (BSC	School Curriculum (BSC	
	opportunities in	4.1.1.1; 4.1.3.2; 5.1.1.1;	4.1.1.1; 4.1.3.2; 5.1.1.1;	
	the lesson. Each	5.3.3.1-2;) and search	5.3.3.1-2;) and search	
	lesson should	through "IXL Math" and	through "IXL Math" and	
	include at least	GeoGebra to clarify the	GeoGebra to clarify the	
		otherwise dark spots in	otherwise dark spots in	
	two opportunities	"Geometry and Algebra".	"Geometry and Algebra".	
	to use continuous			
	assessment to	3.3 Lead tutors to	2 2 Brainstorm to come un	
	support student		3.3 Brainstorm to come up	
	teacher learning	brainstorm to come up	with some pedagogical	
•	Resources:	with some GESI	approaches that can be	
		responsive pedagogical	employed during the	

 links to the approaches and their lesson and their impact 	
existing PD impact on the learning on learning of the	
Themes, for of the concepts under concepts under	
example, action consideration. consideration.	
research, Example: Example:	
questioning and <i>i</i>) The use of inquiry to <i>i</i>) The use of inquiry to	
to other explore successfully how explore successfully how	
external Geometry relate to all Geometry relate to all	
reference members of the society. members of the society.	
material: (ii) The use of (ii) The use of	
literature, on <i>differentiation and differentiation and</i>	
web, Utube, scaffolding to ensure that scaffolding to ensure that	
physical no learner is left behind no learner is left behind	
resources, (BSC pp. xv) (BSC pp. xv)	
power point; <i>iii) Being patient with iii) Being patient with</i>	
, 5 , 5	
Consideration for persons with SEN, for persons with SEN,	
needs to be providing peer support for providing peer support for	
given to local those who might need those who might need	
availability support, while you pay support, while you pay	
o guidance on any <i>attention to all Phases. attention to all Phases.</i>	
power point	
presentations, 3.4 Ask tutors to explain 3.4 Suggest teaching	
TLM or other some suggested strategies that can help	
resources which teaching strategies inculcate core	
need to be that can help inculcate competencies in	
developed to core competencies in student teachers and	
support student teachers and for that matter Basic	
learning for that matter Basic School learners (i.e.	
Tutors should be School learners (i.e. during STS).	
expected to have a during STS).	
plan for the next Example: Using Example: Using Group	
lesson for student a) Group Work to discuss Work to discuss how	
teachers how Geometry relate to Geometry relate to the	
the society: Social and society: Social and	
Leadership Skills, Leadership Skills,	
Collaborative Learning, Collaborative Learning, etc.	
b) Using Investigation to	
identify generalizations on	
properties to consider	
when studying	
geometrical shape and	
space to inculcate Critical	
Thinking; Problem Solving	
Skills, Justification of	
Ideas; Digital Literacy, etc.	

1	[1
3.5 Ask tutors to mention some GESI responsive and culturally relevant resources that can be used with the suggested approaches and strategies to achieve the LOs.	3.5 Mention some GESI responsive and culturally relevant resources that can be used with the suggested approaches and strategies to achieve the LOs.	
Example: Resources may include supporting staff with experts in sign language as well as resources such as teacher and learner resource packs, dienes block, abacus, cartons, empty- can, textbooks, course manual, projectors, flip charts, sticky notes, braille, tactile materials, audio and audio-visuals that can be used in the teaching and learning of the concepts mentioned above (NTS 3j) NB: Encourage tutors to give other examples that is not captured in the above.	Example: Resources may include supporting staff with experts in sign language as well as resources such teacher and learner resource packs, textbooks, etc	
3.6 Lead tutors to discuss assessment strategies ('as' and 'for') to be used during teaching of the lesson.	3.6 Discuss assessment strategies ('as' and 'for') to be used during teaching of the lesson.	
NB: Continuous assessment activities (assignments, quizzes, group presentations, etc. should be used to create subject projects and build subject portfolios).	NB: Continuous assessment activities (assignments, quizzes, group presentations, etc. should be used to create subject projects and build subject portfolios).	
Example: A project on how to develop and use a	Example: A project on how to develop and use a known	

known place value	place value material in
material in teaching place	teaching place value -
value - UPPER PRIMARY	UPPER PRIMARY
A project on investigation	A project on investigation
of space and shape	of space and shape
between prism and	between prism and
pyramid (JHS).	pyramid (JHS).
A project on investigating	A project on investigating
measurement in leaner's	measurement in leaner's
community using non-	community using non-
standard unit (JHS).	standard unit (JHS).
Make reference to	Make reference to
assessment in the course	assessment in the course
manual and NTEAP	manual and NTEAP
3.7 Ask each tutor to	3.7 Develop a sample of
develop a sample of	assessment items based
assessment item based	on the LOs and share
on the LOs and share	
	with the whole group.
with the whole group.	
Example:	Example:
Example:	Example:
Upper and JHS Grades –	Upper and JHS Grades –
Interview 10 basic school	Interview 10 basic school
teachers during the STS	teachers during the STS
activity on place value and	activity on place value and
geometry that basic	geometry that basic school
school learners are	learners are exposed to:
exposed to:	a) at home
a) at home	b) during play
b) during play	
3.8 Lead tutors to discuss	3.8 Discuss the various
the various ways they	ways you can support
can support student	student teachers to
teachers to build their	build their subject
subject portfolio.	portfolio.
Example:	Example:
<i>i)</i> Encouraging student	i) Encouraging student
teachers to file all their	teachers to file all their
assignments,	assignments, presentation,
presentation, quizzes,	
	quizzes, reports, pictures of
reports, pictures of	activities/events, etc with
activities/events, etc with	feedback in their folders.
feedback in their folders.	

	::) European einen studenste to	ii) Englanding at danta ta	
	ii) Encouraging students to	ii) Encouraging students to	
	take notes in class and	take notes in class and	
	filing them	filing them.	
	3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration both genders take leading roles in their groups and equity provided for all (NTS 1a, b, 2b,	 3.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration both genders take leading roles in their groups and equity provided for all (NTS 1a, b, 2b, e, 3b, 	
	e, 3b, c, J; BSC pp. iii).	c, J; BSC pp. iii).	
	c, 30, c, 3, 53c pp. mj.	c, s, bsc pp. mj.	
4. Evaluation and review of session:	Evaluation and review of session:	Evaluation and review of session:	15 mins
Tutors need to	4.1 Engage tutors in	4.1 Reflect and provide	
identify critical	providing feedback of	feedback on this PD	
friends to observe	the PD session taking	session taking into	
lessons and report	into consideration –	consideration – Clarity	
at next session	Clarity of content, ICT	of content, pedagogical	
 Identifying and addressing any 	integration, GESI,	approaches employed,	
addressing any outstanding issues	Twenty First Century	ICT integration, GESI,	
relating to the	Skills (NTS 1a, 3i, BSC	Twenty First Century	
lesson/s for	pp. x-xvi) and make	Skills (NTS 1a, 3i, BSC	
clarification	notes that will help	pp. x-xvi)? and make	
Clarincation	them to teach Lesson	notes that will help you	
	1	to teach Lesson 1	
	4.2 Engage tutors to	4.2 Identify unresolved	
	identify unresolved	issues relating to this	
	issues relating to this	lesson for clarification.	
	lesson for clarification.		
	NB: Take note of all	NB: Put your unresolved	
	unresolved issues that	<i>issues unto</i> the	
	may need further research	department's WhatsApp/	
	or consultation and use	Telegram platform and	
	any of following strategies	research into the issues	
	to address them.	raised.	
	i. put on SL/SWL		
	WhatsApp/ Telegram		
	platform for discussion		
	ii. tutors to research for		
	the next PD session for		
	discussion		

4.3 Ask tutors to identify a critical friend from the same or related discipline to observe the enactment of their lesson and provide feedback during the next PD Session (NTS 1a).	4.3 Identify a critical friend from the same or related discipline to observe the enactment of your lesson and to provide feedback during the next PD Session (NTS 1a).	
Advance Preparation	Advance Preparation	
 4.4 Ask tutors to remember to prepare a teaching plan for Lesson 1 taking note of important or distinctive aspects of the lesson and crosscutting issues and read Lesson 2 of the Course Manual on: Upper Primary - The four Basic Operations: (Teaching and Assessing) JHS(Core) - Construction, Angles and Polygons: (Teaching and Assessing 2) JHS (Elective) – Operations and Properties of Integers (number sense): Learning, teaching and applying 	 4.4 Remember to prepare a teaching plan for the Lesson 1 taking note of important or distinctive aspects of the lesson and crosscutting issues and read Lesson 2 of the Course Manual on: Upper Primary - The four Basic Operations: (Teaching and Assessing) JHS(Core) - Construction, Angles and Polygons: (Teaching and Assessing 2) JHS (Elective) – Operations and Properties of Integers (number sense): Learning, teaching and applying 	
NB: <i>i.</i> Read the course manual the PD session guide, the NTEAP, and the NTS ahead of time to identify any outstanding issues relating to the lesson for clarification. <i>ii.</i> Collect all-inclusive resources (such as projector, flip chart and sticky notes) you need ahead of time, prepare samples of TLMs you may	NB: <i>i.</i> Read the course manual the PD session guide, the NTEAP, and the NTS ahead of time to identify any outstanding issues relating to the lesson for clarification.	

need and rehearse how these may be used to support the achievement of your goals		
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Age Level

Name of Subject/s:

- a. Upper Primary
- a. Mathematics: Teaching and Assessing
- b. Teaching and Assessing JHS Mathematic
- b. JHS (Core) c. JHS (Elective)
 - c. Mathematics

Tutor PD Session for Lesson 2 in the Course Manual

Lesson Tittle:

- a. Upper Primary: The Four Basic Operations (Teaching and Assessing)
- **b.** JHS (Core): Construction, Angles and Polygons (Teaching and Assessing 2)
- c. JHS (Elective): Teaching Mensuration: Learning, Teaching And Applying

pro wh the sho to wr an say ses ne an sho co	cus: the bullet points ovide the frame for nat is to be done in e session. The SWL ould use the bullets guide what they ite for the SL/HoD d tutors to do and y during each ssion. Each bullet eds to be addressed d specific reference ould be made to the urse manual/s.	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 stage of the session.	Time in session
1.	Introduction to the	Introduction	Introduction	20 mins
	session	1.1 Ice breaker activity:	1.1 Ice breaker activity:	
•	Review prior	Begin with an	participate in an	
	learning	investigational activity.	investigational activity.	
•	A critical friend to	Example: speed work in	Example: speed work in	
	share findings for a	turns - What fraction of	turns - What fraction of	
	short discussion	the circumference of a	the circumference of a	
	and lessons learned	cylindrical tank is its	cylindrical tank is its	
٠	Reading and	diameter?	diameter?	
	discussion of the			
	introductory	1.2 Ask tutors to tell how	1.2 Tell how useful the	
	sections of the	useful the PD session of	previous PD session	
	lesson up to and	lesson 1 was and how it	was and how it	
	including learning	influenced their	influenced your	
	outcomes and	teaching over the	teaching over the	
	indicators	week. Lead them to	week. Provide	
•	Overview of	provide examples of	examples of how	
	content and	how student teachers	student teachers were	
	identification of any	were prepared to	prepared to employ the	

distinctive aspects	employ the various	various strategies and	
of the lesson/s,	strategies and skills	skills during the basic	
NB The guidance for	during the basic school	school classroom work	
SL/HoD should identify	classroom work in STS	in STS Field Experience	
and address any areas	Field Experience in year	in year 4 semester 1.	
where tutors might	4 semester 1.	,	
require clarification on			
•	1.3 Ask a critical friend to	1.3 As a critical friend,	
any aspect of the			
lesson.	give feedback on	share your observation	
NB SL/HoD should ask	observation during	on the previous lesson.	
tutors to plan for their	enactment of the		
teaching as they go	previous lesson.		
through the PD session			
	NB:	NB:	
	Things tutor might have	Things tutor might have	
	observed; tutor's choice of	observed; tutor's choice of	
	words, pedagogical	words, pedagogical	
	content knowledge,	content knowledge,	
	content knowledge subject	content knowledge subject	
	matter, use of ICT tools,	matter, use of ICT tools,	
	consideration of GESI	consideration of GESI	
	issues and the use of	issues and the use of	
	NTEAP	NTEAP	
	1.4 As tutors in phase	1.4 Read and discuss the	
	groups, ask them to	introductory section of	
	read and discuss the	the lesson up to	
	introductory section of	Learning Outcomes	
	the lesson including the	(Los).	
	Learning Outcomes		
	(LOs).		
	NB:	NB:	
	Suggest relevant previous	Suggest relevant previous	
	knowledge of students	knowledge of students	
	that will support effective	that will support effective	
	teaching and learning of	teaching and learning of	
	the lesson.	the lesson.	
	1.5 Ask tutors to identify	1.5 Identify the purpose of	
	the purpose of the	the lesson from the	
	lesson from the course	course manual and	
	manual and state their	state your expectations	
		of the PD Session.	
	expectations of the PD		
	Session		
	1 6 Ack tutors in phase	1.6 In phase groups	
	1.6 Ask tutors in phase	1.6 In phase groups,	
1	groups to discuss the	discuss the distinctive	

]
	important or distinctive	aspects of the s lesson	
	aspects of the lesson	including vocabulary	
	including vocabulary	and fundamental	
	and fundamental	concepts.	
	concepts.		
	Distinct Fundamental	Distinct Fundamental	
	<u>Concepts</u>	<u>Concepts</u>	
	a. Upper Primary -	a. Upper Primary -	
	Building an understanding	Building an understanding	
	of operations on numbers	of operations on numbers	
	up to 10,000,000.	up to 10,000,000.	
	b. JHS (Core) -	b. JHS (Core) -	
	Constructing	Constructing	
	perpendicular and parallel	perpendicular and parallel	
	lines, constructing angles,	lines, constructing angles,	
	copying and bisecting	copying and bisecting	
	angles and lines	angles and lines	
	c. JHS (Elective) – lengths,	c. JHS (Elective) – lengths,	
	surface area and volumes	surface area and volumes	
	of 3-D shapes	of 3-D shapes	
	Vocabulary	Vocabulary	
	Upper Primary - Basic	Upper Primary - Basic	
	operations	operations	
	JHS (core) – Construct,	JHS (core) – Construct,	
	perpendicular, parallel,	perpendicular, parallel,	
	bisect	bisect	
	JHS (Elective): surface	JHS (Elective): surface	
	area, volume	area, volume	
2. Concept	Concept Development	Concept Development	15 mins
Development (New			
learning likely to	2.1 Ask tutors to identify	2.1 Identify familiar and	
arise in lesson/s):	, familiar and unfamiliar	unfamiliar concepts in	
 Identification and 	concepts in their	their lessons and	
discussion of new	lessons and discuss	discuss with the larger	
learning, potential	with the larger group.	group.	
barriers to learning	Familiar and Unfamiliar	Familiar and Unfamiliar	
for student teachers	Concepts	<u>Concepts</u>	
or students,	Upper Primary	Upper Primary	
concepts or	Familiar Concepts:	Familiar Concepts:	
pedagogy being	operations on numbers up	operations on numbers up	
introduced in the	to 9,999	to 9,999	
lesson, which need	Unfamiliar concepts:	Unfamiliar concepts:	
to be explored with	operations on numbers up	operations on numbers up	
the SL/HoD	to 10,000,000	to 10,000,000	
NB The guidance for	JHS (core)	JHS (core)	
SL/HoD should set out	Familiar Concepts:	Familiar Concepts:	

what they need to do	Constructing lines and	Constructing lines and	
to introduce and	angles	angles	
explain the issues/s	Unfamiliar concepts:	Unfamiliar concepts:	
with tutors	Copying and bisecting	Copying and bisecting	
	lines and angles	lines and angles	
	JHS (Elective):	JHS (Elective):	
	Familiar Concepts:	Familiar Concepts:	
	Teaching lengths and	Teaching lengths and	
	surface area of 3-D shapes	surface area of 3-D shapes	
	Unfamiliar concepts:	Unfamiliar concepts:	
	Teaching volumes of 3-D	Teaching volumes of 3-D	
	shapes	shapes	
	Shapes	Shapes	
	2.2 Lead tutors to draw	2.2 Draw connections	
	connections among	among concepts in the	
	concepts in the various	various lessons in line	
	lessons in line with the	with the basic school	
	Basic School	curriculum.	
	Curriculum.		
	Example: In operations,	Example: In operations,	
	repeated addition is	repeated addition is	
	multiplication while	multiplication while	
	repeated subtraction is	repeated subtraction is	
	division. Operations are	division. Operations are	
	everyday life actions	everyday life actions	
	(Bsc:B6.1.2.5). Volumes is	(Bsc:B6.1.2.5). Volumes is	
	a product of base area and	a product of base area and	
	height (B5.3.2.2).	height (B5.3.2.2).	
	2.3 Engage tutors in think-	2.3 Individually, outline the	
	pair-share strategies to	challenging areas in	
	outline possible	your lesson, share with	
	challenging areas in	a member of the same	
	developing	phase group and then	
	understanding of:	with the whole group.	
	 division of multi-digit 	with the whole group.	
	numbers (<i>Upper</i>		
	Primary)		
	 Copying angles (JHS- Core) 		
	,		
	Volumes of pyramids		
	NB:	NB:	
	Encourage tutor to makes	Encourage tutor to makes	
	sure challenges are	sure challenges are	
	discussed by considering	discussed by considering	
	aiscussed by considering	and the second by considering	

students learning styles	students learning styles	
inclusivity.	inclusivity.	
2.4 Lead tutors to discuss	2.4 Participate actively in	
misconceptions and	the discussion on	
barriers in teaching and	misconceptions and	
learning of the lesson.	barriers in teaching and	
<u> </u>	learning of the lesson	
Misconceptions	Misconceptions	
Example:	Example:	
a. Upper Primary –	a. Upper Primary –	
Multiplication and division	Multiplication and division	
-	-	
cannot be done by low	cannot be done by low	
achievers	achievers	
b. JHS (Core) –	b. JHS (Core) –	
Perpendicular occurs only	Perpendicular occurs only	
when a vertical and	when a vertical and	
horizontal lines meet.	horizontal lines meet.	
c. JHS (Elective) –Plane	c. JHS (Elective) –Plane	
shapes have faces	shapes have faces	
<u>Barriers</u>	<u>Barriers</u>	
Some possible barriers	Some possible barriers	
Inadequate relevant	Inadequate relevant	
previous knowledge of	previous knowledge of	
students	students	
Unavailability learning	• Unavailability learning	
Resources	Resources	
 Lack of content 	Lack of content	
-	-	
knowledge of the	knowledge of the	
teacher	teacher	
NB:	NB:	
Guide tutors to discuss	Guide tutors to discuss	
how learning resource,	how learning resource,	
time and teacher	time and teacher	
competence could be	competence could be	
barrier to teaching and	barrier to teaching and	
learning Fraction and Rigid	learning Fraction and Rigid	
motion.	motion.	
2.5 Support tutors to	2.5 Identify as many GESI	
identify GESI	responsive resources	
responsive resources	such as supporting	
such as supporting	staff with experts in	
staff with experts in	sign language as well	
•	as resources such	
sign language as well		
as resources such	teacher and learner	

		teacher and learner	resource packs,	
		resource packs,	textbooks, course	
		textbooks, course	manual, Posters	
		manual, Posters	illustrating people	
		illustrating people	using mathematics in	
		using mathematics in	the jobs; video clips	
		the jobs; video clips	downloaded from the	
		downloaded from the	internet. (NTS 3j, PD	
		internet (NTS 3j, PD	Manual pp.38)	
		Manual pp.38)		
3	Planning for	Teaching and learning	Teaching and learning	40 mins
5.	teaching, learning	activities	activities	40 11113
	and assessment	activities	activities	
	activities for the	2 1 Ack tutors to suggest	2 1 Suggost tooching and	
		3.1 Ask tutors to suggest	3.1 Suggest teaching and	
	lesson/s	teaching and learning	learning activities for	
•	Reading and	activities for the lesson	the lesson taking into	
	discussion of the	taking into account	consideration slow	
	teaching and	slow learners, learners	learners, learners who	
	learning activities	who are dyscalculia,	are dyscalculia,	
•	Noting and	students who suppress	students who suppress	
	addressing areas	the opposite sex	the opposite sex during	
	where tutors may	during lessons.	lessons.	
	require clarification			
•	Noting	Suggested Learning	Suggested Learning	
	opportunities for	Activities	Activities	
	making links to the	<u>Upper Primary</u> : Engage	<u>Upper Primary</u> : Engage	
	Basic School	student teachers series of	student teachers series of	
	Curriculum	number game in building	number game in building	
		an understanding of basic	an understanding of basic	
•	Noting	operations.	operations.	
	opportunities for		JHS core: Employ the	
	integrating: GESI	JHS core: Employ the		
	responsiveness and	principle of multiple	principle of multiple	
	ICT and 21 st C skills	embodiment in building an	embodiment in building an	
•	Reading, discussion,	understanding bisection of	understanding bisection of	
	and identification of	angles	angles	
	continuous	JHS(Elective):	JHS(Elective):	
	assessment	Engage student teachers	Engage student teachers	
	opportunities in the	in a discussion towards	in a discussion towards	
	lesson. Each lesson	building an understanding	building an understanding	
	should include at	of volumes of 3-Ds using	of volumes of 3-Ds using	
	least two	variety of TLRs	variety of TLRs	
	opportunities to use			
	continuous	NB: Be conscious of:	NB: Be conscious of:	
		<i>i.</i> Provision made for slow	i. Provision made for	
	assessment to	learners challenged	physically challenged	
	support student			
	teacher learning			

٠	Resources:	ii. Both genders taking	ii. Both genders taking	
	\circ links to the	leading roles in group task	leading roles in group task	
	existing PD	iii. Even distribution of	iii. Even distribution of	
	Themes, for	questions to different	questions to different	
	example, action	categories of learners	categories of learners	
	research,	based on gender, ability,	based on gender, ability,	
	questioning and	previous experience, etc	previous experience, etc	
	to other external	NTS 1a, b, c, d, 2b, e, f, 3b,	NTS 1a, b, c, d, 2b, e, f, 3b,	
	reference	с	С	
	material:			
	literature, on	3.2 Let tutors read the	3.2 Read the activities	
	web, Utube,	activities outlined in	outlined in your course	
	physical	their course manuals	manual and identify	
	resources, power	and identify areas that	areas that require	
	point; how they	require clarification.	clarification.	
	should be used.	NB:	NB:	
	Consideration	Refer to the Basic School	Refer to the Basic School	
	needs to be given	Curriculum (BSC pp. xv –	Curriculum (BSC pp. xv –	
	to local	xvii) Identify challenging	xvii) Identify challenging	
	availability	areas that require	areas that require	
	\circ guidance on any	clarification, using	clarification, using	
	power point	GeoGebra to clarify the	GeoGebra to clarify the	
	presentations,	otherwise dark spots in	otherwise dark spots in	
	TLM or other	"Rid motion".	"Rid motion".	
	resources which			
	need to be	3.3 Lead tutors to	3.3 Brainstorm some	
	developed to	brainstorm to come up	pedagogical	
	support learning	with some pedagogical	approaches and their	
٠	Tutors should be	approaches and their	related core	
	expected to have a	related core	competencies likely to	
	plan for the next	competencies likely to	be inculcated in	
	lesson for student	be inculcated in	students and for that	
	teachers	students and for that	matter Basic School	
		matter Basic School	learners.	
		learners.		
		Example	Example	
		<u>(a) Upper Primary:</u>	<u>(a) Upper Primary:</u>	
		Strategy: Expository, Think	Strategy: Expository, Think	
		pair Share, Discussion and	pair Share, Discussion and	
		Brainstorming	Brainstorming	
		Core Competencies:	Core Competencies:	
		Problem solving, critical	Problem solving, critical	
		and creative thinking and	and creative thinking and	
		communication.	communication.	
		<u>(b)HS (core)</u>	<u>(b)HS (core)</u>	

Strategy: Expository, Think pair Share, group project, internet search Core Competencies: Problem solving, critical and creative thinking and communication. (c) JHS (Elective) Strategy: interactive and Collaborative group work, Discussion Core Competencies: Critical thinking skills, Collaborative learning and Problem-Solving Skills. 3.4 Ask tutors to mention some GESI responsive resources that can be used with the suggested approaches and strategies in achieving the LOs. Example: Resources may include supporting staff with experts in sign language as well as resources such teacher and learner resource packs, textbooks, course manual, projectors, flip charts, sticky notes, braille, tactile materials, audio and audio-visuals that can be used in the teaching and learning of the concepts mentioned above (NTS 3j) 3.5 Using discussion, lead tutors to come out with assessment strategies ('as' and ('for') to be used during	Strategy: Expository, Think pair Share, group project, internet search Core Competencies: Problem solving, critical and creative thinking and communication. (b) JHS (Elective) Strategy: interactive and Collaborative group work, Discussion Core Competencies: Critical thinking skills, Collaborative learning and Problem-Solving Skills. 3.4 Mention some GESI responsive resources that can be used with the suggested approaches and strategies in achieving the LOS. Example: Resources may include supporting staff with experts in sign language as well as resources such teacher and learner resource packs, textbooks, course manual, projectors, flip charts, sticky notes, braille, tactile materials, audio and audio-visuals that can be used in the teaching and learning of the concepts mentioned above (NTS 3j) 3.5 Discuss to come up with assessment strategies ("as and "for") to be used	
tutors to come out with assessment	with assessment strategies ("as and	

NB:	NB:
Assessment must involve;	Assessment must involve;
the subject project and	the subject project and
Subject Portfolio.	Subject Portfolio.
Examples of subject	Examples of subject
project and subject	project and subject
portfolio	portfolio
Upper Primary	Upper Primary
Subject project: Use any	Subject project: Use any
known strategy to	known strategy to
demonstrate	demonstrate
multiplication of 5-digit	multiplication of 5-digit
and a 2-digit number.	and a 2-digit number.
Subject Portfolio: Project	Subject Portfolio: Project
on using any 3 concrete	on using any 3 concrete
material to teach division	material to teach division
of 3 digit numbers by a 1	of 3 digit numbers by a 1
digit number	digit number
JHS (Core)	JHS (Core)
Subject project: Construct	Subject project: Construct
a triangle. Bisect all its	a triangle. Bisect all its
angles and write any	angles and write any
conclusions that you can	conclusions that you can
draw from it.	draw from it.
Subject Portfolio: Write	Subject Portfolio: Write
step by step how you will	step by step how you will
teach a JHS learner how to	teach a JHS learner how to
copy and draw angles.	copy and draw angles.
JHS (Elective)	JHS (Elective)
Subject Project:	Subject Project:
Assignment – Write the	Assignment – Write the
relationship between	relationship between
volume of a cone and	volume of a cone and
cinder.	cinder.
Subject Portfolio: Search	Subject Portfolio: Search
on the internet to come	on the internet to come
out with 5 sites which	out with 5 sites which
talks about measurement	talks about measurement
of total surface area of	of total surface area of
solids.	solids.
NB: Assessment must be	NB: Assessment must be
aligned to the NTEAP.	aligned to the NTEAP.
Continuous assessment	Continuous assessment
activities (assignments,	activities (assignments,
quizzes, group	quizzes, group
, , , , , , , , , , , , , , , , , , , ,	

		presentations, etc, should	presentations, etc, should	
		be used to create subject	be used to create subject	
		projects and build subject	projects and build subject	
		portfolios (See, Appendix	portfolios (See, Appendix	
)	11)	
		3.6 Ask each tutor to develop a sample of assessment item based on the LOs and share with the whole group.	3.6 Develop a sample of assessment items based on the LOs and share with the whole group.	
		3.7 Lead tutors to discuss the various ways they can support student teachers to build their subject portfolio.	3.7 Discuss the various ways you can support student teachers to build their subject portfolio.	
		Example: Encouraging student teachers to file all	E.g. encouraging student teachers to file all their	
		their assignments with	assignmeOnts with	
		feedback in their folders.	feedback in their folders.	
		3.8 Let a tutor model a presentation of an activity using Power point and making sure that both genders take leading roles in their groups and in the demonstration of the use of power point.	3.8 Model presentation of an activity using Power point and making sure that both genders take leading roles in their groups and in the demonstration of the use of power point. (NTS 1a, b, 2b, e, 3b, c, J; BSC pp. 23)	
4.	Evaluation and	Reflective Activity	Reflective Activity	15 mins
	review of session: Tutors should	4.1 Engage tutors in self-	4.1 Show by fingers/nods	
	Identifying critical	evaluation as well as	of 5 or 3 or 1 as to those	
	friends to observe	encourage tutors to	who "really got it", "got	
	lessons and report	provide feedback of	some of it" or "didn't get	
	at next session.	the PD session taking	it" respectively. Explain	
•	Identifying and	into consideration	how you really got the	
	addressing any	inclusivity – how to be	lesson.	
	outstanding issues	patient with		
	relating to the	Stutterers, using tactile and audio		
	lesson/s for	devices for visually		
	clarification	uevices for visually		

challongod naving		
challenged, paying attention to all courses, etc. Ask tutors to show by fingers/nods their level of satisfaction with the session. (NTS 1a, 3i).		
4.2 Engage tutors to identify unresolved issues relating to this lesson for clarification	4.2 Reflect on the activities in the session and outline unresolved issues relating to the lesson	
NB: Take note of all unresolved issues and use any of following strategies to address them: - put on SL/SWL WhatsApp platform for discussion - tutors to research and submit it in the next PD session for discussion	NB: Take note of all unresolved issues and use any of following strategies to address them: - put on SL/SWL WhatsApp platform for discussion - research and submit it in the next PD session for discussion	
4.3 Ask tutors to identify a critical friend of the same or related discipline to observe their teaching and record their findings to be presented after delivery or in the Next PD session. (NTS 1a)	4.3 Identify critical friend of the same or related discipline observes teaching and record his/her findings to be presented after delivery or in the Next PD session. (NTS 1a)	
Advance Preparation NB: Ask tutors to read Lesson 4 of the Course Manual on: Upper Primary - Fraction Concepts (Teaching and Assessment) JHS(Core) - Fraction concepts (Teaching and Assessment)	Advance Preparation NB: Read Lesson 4 of the Course Manual on: Upper Primary - Fraction Concepts 2: (Teaching and Assessment) JHS(Core) - Operations on fractions: (Teaching and Assessment)	

JHS(Elective) – Teaching	JHS(Elective) – Teaching
Rigid Motion	Indices and logarithms1
NB:	NB:
Read the course manual,	Read the course manual,
the PD session guide	the PD session guide
ahead of time to identify	ahead of time to identify
any outstanding issues	any outstanding issues
relating to the lesson for	relating to the lesson for
clarification.	clarification.
Collect all-inclusive	Collect all-inclusive
resources (such as	resources (such as
projector, flip chart and	projector, flip chart and
sticky notes) you need	sticky notes) you need
ahead of time, prepare	ahead of time, prepare
samples of TLMs you may	samples of TLMs you may
need.	need.

Age Level

Name of Subject/s:

a. Upper Primary

c. JHS (Elective)

- a. Mathematics: Teaching and Assessing
- b. JHS (Core)
- a. Mathematics: Teaching and Assessingb. Teaching and Assessing JHS Mathematic
- D. Teaching and Assess
- c. Mathematics

Tutor PD Session for Lesson 3 in the Course Manual

Lesson Tittle:

- a. Upper Primary: Fraction concepts1 (Teaching and Assessing)
- b. JHS (Core): Fraction concepts (Teaching and Assessing)
- c. JHS (Elective): Teaching Rigid Motion

pro wh the sho to and say ses ned and sho	cus: the bullet points ovide the frame for nat is to be done in e session. The SWL ould use the bullets guide what they ite for the SL/HoD d tutors to do and y during each asion. Each bullet eds to be addressed d specific reference ould be made to the urse manual/s.	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 stage of the session.	Time in session
1.	Introduction to the session	Introduction	Introduction	20 mins
•	Review prior learning A critical friend to share findings for a short discussion and lessons learned Reading and discussion of the introductory sections of the	 1.1 Ice breaker activity: Begin with an investigational activity: for example, if the hour hand of a clock is on 12 and minute hand is on 3 what fractions does the space between the hands show. 	1.1 Ice breaker activity: participate in an investigational activity: for example, if the hour hand of a clock is on 12 and minute hand is on 3 what fractions does the space between the hands show.	
•	lesson up to and including learning outcomes and indicators Overview of content and	1.2 Ask tutors to tell how useful the previous PD session was and how it influenced their teaching in the previous lesson.	1.2 Tell how useful the previous PD session was and how it influenced their teaching in the previous lesson.	

identification of any distinctive aspects of the lesson/s, NB The guidance for	Lead them to provide examples of how students were	Provide examples of how students were prepared to employ the
SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask	prepared to employ the various strategies and skills during the basic school classroom work in STS Field Experience in year 4 semester 1	various strategies and skills during the basic school classroom work in STS Field Experience in year 4 semester 1
tutors to plan for their teaching as they go through the PD session	1.3 Ask a critical friend to give feedback on observation during enactment of the previous lesson. NB:	 1.3 As a critical friend share your observation on the previous lesson. NB:
	Things tutor might have observed; tutor's choice of words, pedagogical content knowledge, content knowledge subject matter, ICT tools, GESI and the use of NTEAP	Things tutor might have observed; tutor's choice of words, pedagogical content knowledge, content knowledge subject matter, ICT tools, GESI and the use of NTEAP
	1.4 Ask tutors to read and discuss the introductory section of the lesson including the Learning Outcomes (LOs) in phase groups.	1.4 Read and discuss the introductory section of the lesson up to Learning Outcomes (Los)).
	NB: Suggest relevant previous knowledge of students that will support effective teaching and learning of the lesson.	NB: Suggest relevant previous knowledge of students that will support effective teaching and learning of the lesson.
	1.5 Ask tutors to identify the purpose of the lesson from the course manual and state their expectations of the PD Session	1.5 Identify the purpose of the lesson from the course manual and state your expectations of the PD Session.

PURPOSE OF THE	PURPOSE OF THE
LESSON	LESSON
Upper Primary &	Upper Primary &
JHS(CORE)	JHS(CORE)
Introduce student	 Introduce student
teachers to the	teachers to the course
course manual to	manual to enable
enable them devel	
awareness of what	
they are expected	
in this lesson.	in this lesson.
develop student	 develop student
teachers'	teachers'
understanding of t	he understanding of the
nature and	nature and
importance of	importance of
mathematics, as w	ell mathematics, as well
as, meaning of	as, meaning of
fractions; Building	an fractions; Building an
understanding of	understanding of
common fractions	
and finding	finding equivalent
equivalent fraction	
It also introduces t	
student teachers t	
the relationship	the relationship
between common	
fractions, equivale	
decimal numbers,	decimal numbers, and
and percent.	percent.
JHS (Elective)	JHS (Elective)
build on student	build on student
teachers' knowled	
and experiences of	
polygons and their	
properties	properties
expose student	
teachers to the	 expose student teachers to the
development of	development of
conceptual understanding of	conceptual
understanding of	understanding of rigid
rigid motion by usi	
manipulatives and	· · · · · · · · · · · · · · · · · · ·
practical activities	practical activities

				,
		1.6 Ask tutors in phase	1.6 In phase groups,	
		groups to discuss the	discuss the distinctive	
		important or distinctive	aspects of the s lesson	
		aspects of the lesson	including vocabulary	
		including vocabulary	and fundamental	
		and fundamental	concepts.	
		concepts.		
		Distinct Aspects	Distinct Aspects	
		a. Upper Primary/JHS	a. Upper Primary/JHS	
		(core): Building an	(core): Building an	
		understanding of common	understanding of common	
		fractions,	fractions,	
		b. JHS (Elective) - Teaching	b. JHS (Elective) - Teaching	
		Number plane, scale	Number plane, scale	
		drawing	drawing	
		Vocabulary	Vocabulary	
		Upper Primary/JHS (core)	Upper Primary/HS (core)	
		Examples: Fraction,	Examples: Fraction,	
		Equivalent, decimals,	Equivalent, decimals,	
		comparing and ordering	comparing and ordering	
		JHS (Elective): Number,	JHS (Elective): Number,	
		plane, rotation, scale	plane, rotation, scale	
		factor and symmetry.	factor and symmetry.	
		Fundamental Concepts	Fundamental Concepts	
		Upper Primary/JHS (core)	Upper Primary/JHS (core)	
		 Meaning of Common Fraction 	 Meaning of Common Fraction 	
		Finding Equivalent	Finding Equivalent	
		Fraction	Fraction	
		Comparing and	Comparing and	
		ordering of fractions	ordering of fractions	
		JHS (Elective)	JHS (Elective)	
		Teaching:	Teaching:	
		Number plane	Number plane	
		Rotations (through	 Rotations (through 	
		given angles of rotation	given angles of rotation	
		about a given point)	about a given point)	
		• Enlargement with given	• Enlargement with given	
		scale factor	scale factor	
2.	Concept	Concept Development	Concept Development	15 mins
	Development (New	2.1 Ask tutors to identify		
	learning likely to	familiar and unfamiliar	2.1 Identify familiar and	
	arise in lesson/s):	concepts in their	unfamiliar concepts in	
•	Identification and	lessons and discuss	their lessons and	
	discussion of new	with the larger group.	discuss with the larger	
	learning, potential		group.	
	learning, potential		group.	

barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors	 Familiar and Unfamiliar Concepts Upper Primary/JHS (core) Examples of Familiar Concepts: Commons Fraction (¹/₂, ³/₅, ³/₇ etc.) and Equivalent Fractions (¹/₂, ²/₄, ⁴/₈ etc.) Unfamiliar concepts: JHS (Elective): Application of fractions in real life situations. Examples of Familiar Concepts: Rotation through a given angle Unfamiliar concepts: Scale drawing 2.2 Lead tutors to draw connections among concepts in the various lessons in line with the Basic School Curriculum. Example: The connection or the relationship among the concepts: Common Fraction and Angles is that angles can be converted into fractions, while fractions can also be converted to angle. (Bsc:B5.1.5.1) 2.3 Ask tutors to use Think- Pair-Share to outline possible challenging areas in: Developing an understanding of decimal fractions and 	Familiar and UnfamiliarConceptsUpper Primary/JHS (core)Examples of FamiliarConcepts: CommonsFraction $(\frac{1}{2}, \frac{3}{5}, \frac{3}{7} etc.)$ andEquivalent Fractions $(\frac{1}{2}, \frac{2}{4}, \frac{4}{8} etc.)$ Unfamiliar concepts:JHS (Elective): Applicationof fractions in real lifesituations.Examples of FamiliarConcepts: Rotationthrough a given angleUnfamiliar concepts: Scaledrawing2.2 Draw connectionsamong concepts in thevarious lessons in linewith the basic schoolcurriculum.Example: The connectionor the relationship amongthe concepts: CommonFraction and Angles is thatangles can be convertedinto fractions, whilefractions can also beconverted to angle.(Bsc:B5.1.5.1)2.3 Individually, outline thechallenging areas inyour lesson, share witha member of the samephase group and thenwith the whole group.
	possible challenging areas in:Developing an understanding of	your lesson, share with a member of the same phase group and then

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	 Teaching line and 		
	rotational symmetry		
	and orders of rotation		
	NB:	NB:	
		Tutor makes sure	
	Tutor makes sure		
	Challenges are discussed	Challenges are discussed	
	by considering students	by considering students	
	learning styles. Also taking	learning styles. Also taking	
	into consideration GESI.	into consideration GESI.	
	2.4 Lead tutors to discuss	2.4 Participate actively in	
	misconceptions and	the discussion on	
	barriers in teaching and	misconceptions and	
	_	barriers in teaching and	
	learning of the lesson.	5	
		learning of the lesson	
	MICCONCEPTIONS	MICCONCEPTIONS	
	MISCONCEPTIONS	MISCONCEPTIONS	
	Example:	Example:	
	a. UP/JHS (core) – A	a. UP/JHS (core) – A	
	common misconception is	common misconception is	
	that learners believe the	that learners believe the	
	numerator and	numerator and	
	denominator are the	denominator are the	
	same.	same.	
	b. JHS(Elective) –Learners	b. JHS(Elective) –Learners	
	believe that Rigid Motion	believe that Rigid Motion	
	and Coordinate Geometry	and Coordinate Geometry	
	-	are the same.	
	are the same.	are the sume.	
	BARRIERS	BARRIERS	
	Some possible barriers	Some possible barriers	
	• Time	• Time	
	Learning Resources	Learning Resources	
	Teacher Competence	Teacher Competence	
	NB:	NB:	
	Guide tutors to discuss	Guide tutors to discuss	
	how learning resource,	how learning resource,	
	time and teacher	time and teacher	
	competence could be	competence could be	
	-	-	
	barrier to teaching and	barrier to teaching and	
	learning Fraction and Rigid	learning Fraction and Rigid	
	motion.	motion.	
	2.5 Support tutors to	2.5 Identify as many GESI	
	identify GESI	responsive resources	
	responsive resources	such as supporting	

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		such as supporting staff	staff with experts in	
		with experts in sign	sign language as well	
		language as well as	as resources such	
		resources such teacher	teacher and learner	
		and learner resource	resource packs,	
		packs, textbooks,	textbooks, course	
		course manual, Posters	manual, Posters	
		illustrating people	illustrating people	
		using mathematics in	using mathematics in	
		the jobs; video clips	the jobs; video clips	
		downloaded from the	downloaded from the	
		internet (NTS 3j, PD	internet. (NTS 3j, PD	
		Manual pp.38)	Manual pp.38)	
3.	Planning for	Teaching and learning	Teaching and learning	40 mins
	teaching, learning	activities	activities	
	and assessment			
	activities for the	3.1 Ask tutors to suggest	3.1 Suggest teaching and	
	lesson/s	teaching and learning	learning activities for	
•	Reading and	activities for the lesson	the lesson taking into	
	discussion of the	taking into account	consideration GESI	
	teaching and	GESI issues.		
	learning activities	Suggested Learning	Suggested Learning	
•	Noting and	Activities	Activities	
•	addressing areas	Upper Primary/JHS core:	Upper Primary/JHS core:	
		Engage student teachers	Engage student teachers	
	where tutors may	in a discussion towards	in a discussion towards	
	require clarification			
•	Noting	building an understanding	building an understanding	
	opportunities for	of common fractions using	of common fractions using	
	making links to the	variety of TLRs.	variety of TLRs.	
	Basic School	JHS(Elective):	JHS(Elective):	
	Curriculum	Engage student teachers	Engage student teachers	
•	Noting	in a number game as a	in a number game as a	
	opportunities for	starter.	starter.	
	integrating: GESI			
	responsiveness and	NB: Be conscious of:	NB: Be conscious of:	
	ICT and 21 st C skills	i. Provision made for	i. Provision made for	
•	Reading, discussion,	physically challenged	physically challenged	
	and identification of	ii. Both genders take	ii. Both genders take	
	continuous	leading roles in group task	leading roles in group task	
	assessment	iii. Even distribution of	iii. Even distribution of	
	opportunities in the	questions to different	questions to different	
	lesson. Each lesson	categories of learners	categories of learners	
		based on gender, ability,	based on gender, ability,	
	should include at	previous experience, etc	previous experience, etc	
	least two	NTS 1a, b, c, d, 2b, e, f, 3b,	NTS 1a, b, c, d, 2b, e, f, 3b,	
	opportunities to use	_	-	
	continuous	С	C	

assessment to	3.2 Let tutors read the	3.2 Read the activities
support student	activities outlined in	outlined in your course
teacher learning	their course manuals	manual and identify
Resources:	and identify areas that	areas that require
\circ links to the	require clarification.	clarification.
existing PD	NB:	NB:
Themes, for	Refer to the Basic School	Refer to the Basic School
example, action	Curriculum (BSC pp. xv –	Curriculum (BSC pp. xv –
		xvii) Identify challenging
research,	xvii) Identify challenging	
questioning and	areas that require	areas that require
to other external	clarification, using	clarification, using
reference	GeoGebra to clarify the	GeoGebra to clarify the
material:	otherwise dark spots in	otherwise dark spots in
literature, on	"Rid motion".	"Rid motion".
web, Utube,		
physical	3.3 Lead tutors to	3.3 Brainstorm to come up
resources, power	brainstorm to come up	with some pedagogical
point; how they	with some pedagogical	approaches and their
should be used.	approaches and their	related core
Consideration	related core	competencies likely to
	competencies likely to	be inculcated in
needs to be given	be inculcated in	students and for that
to local		
availability	students and for that	matter Basic School
 guidance on any 	matter Basic School	learners.
power point	learners.	
presentations,	Example	Example
TLM or other	(a) Upper Primary/JHS	(a) Upper Primary/JHS
resources which	(core)	(core)
need to be	Strategy: Expository, Think	Strategy: Expository, Think
developed to	pair Share, Discussion and	pair Share, Discussion and
support learning	Brainstorming	Brainstorming
 Tutors should be 	Core Competencies:	Core Competencies:
expected to have a	Problem solving, critical	Problem solving, critical
plan for the next	and creative thinking and	and creative thinking and
lesson for student	communication.	communication.
	(b) JHS (Elective)	
teachers		(b) JHS (Elective)
	Strategy: interactive and	Strategy: interactive and
	Collaborative group work,	Collaborative group work,
	Discussion	Discussion
	Core Competencies:	Core Competencies:
	Critical thinking skills,	Critical thinking skills,
	Collaborative learning and	Collaborative learning and
	Problem-Solving Skills.	Problem-Solving Skills.
	_	
	3.4 Ask tutors to explain	3.4 Suggest teaching
	some suggested	strategies to be used in
	teaching strategies	achieving the Los of the
L	leaching strategies	

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that can help inculcate	lesson and explain how	
core competencies in	they can help inculcate	
student teachers and	core competencies in	
for that matter Basic	student teachers and	
School learners.	for that matter Basic	
	School learners.	
Example:	Example:	
Using (a) Group Work	Using (a) Group Work	
Assign student teachers in	Assign student teachers in	
groups to explore	groups to explore	
equivalent fractions-	equivalent fractions-	
Social and Leadership Skills	Social and Leadership Skills	
(b) collaborative group	(b) collaborative group	
discussion on scale	discussion on scale	
drawing- Communication	drawing- Communication	
Skills and Critical Thinking	Skills and Critical Thinking	
3.5 Ask tutors to mention	3.5 Mention some GESI	
some GESI responsive	responsive resources	
resources that can be	that can be used with	
used with the	the suggested	
suggested approaches	approaches and	
and strategies in	strategies in achieving	
achieving the LOs.	the LOs.	
Example:	Example:	
Resources may include	Resources may include	
supporting staff with	supporting staff with	
experts in sign language	experts in sign language	
as well as resources such	as well as resources such	
teacher and learner	teacher and learner	
resource packs, textbooks,	resource packs, textbooks,	
course manual, projectors,	course manual, projectors,	
flip charts, sticky notes,	flip charts, sticky notes,	
braille, tactile materials,	braille, tactile materials,	
audio and audio-visuals	audio and audio-visuals	
that can be used in the	that can be used in the	
teaching and learning of	teaching and learning of	
the concepts mentioned	the concepts mentioned	
above (NTS 3j)	above (NTS 3j)	
3.6 Using discussion, lead	3.6 Discuss to come up	
tutors to come out	with assessment	
with assessment	strategies ("as and	
strategies ('as' and	"for") to be used	
'for') to be used during	during the lesson.	
teaching of the lesson.		

NB:	NB:	
Assessment must involve;	Assessment must involve;	
the subject project and	the subject project and	
Subject Portfolio.	Subject Portfolio.	
Examples of subject	Examples of subject	
project and subject	project and subject	
portfolio	portfolio	
UP/JHS:	UP/JHS:	
subject project (class	subject project (class	
exercise): Arrange the	exercise): Arrange the	
following fractions in an	following fractions in an	
ascending order	ascending order	
	-	
$\frac{3}{5}$, $\frac{2}{3}$, $\frac{1}{5}$ and $\frac{3}{7}$ (5 marks).	$\frac{3}{5}, \frac{2}{3}, \frac{1}{5}$ and $\frac{3}{7}$ (5 marks).	
Subject Portfolio: Project	Subject Portfolio: Project	
on using any five	on using any five	
manipulatives to	manipulatives to	
represent fractions as	represent fractions as	
rational numbers,	rational numbers,	
equivalent, and/or	equivalent, and/or	
operator. (15 marks).	operator. (15 marks).	
JHS (Elective):	JHS (Elective):	
Subject Project:	Subject Project:	
(Assignment): State the	(Assignment): State the	
involves in rotating object	involves in rotating object	
in 90° (5 marks)	in 90° (5 marks)	
Subject Portfolio: A	Subject Portfolio: A	
project on using the	project on using the	
google search to Find	google search to Find	
student.	student.	
NB: Assessment must be	NB: Assessment must be	
aligned to the NTEAP.	aligned to the NTEAP.	
Continuous assessment	Continuous assessment	
activities (assignments,	activities (assignments,	
quizzes, group	quizzes, group	
presentations, etc, should	presentations, etc, should	
be used to create subject	be used to create subject	
projects and build subject	projects and build subject	
portfolios (See, Appendix	portfolios (See, Appendix	
<i>II)</i>)	
3.7 Ask each tutor to	3.7 Develop a sample of	
develop a sample of	assessment items	
assessment item based	based on the LOs and	
on the LOs and share	share with the whole	
with the whole group.	group.	

Example: Upper Primary	Example: Upper Primary	
and JHS (Core) Grades –	and JHS (Core) Grades –	
Interview 6 basic school	Interview 6 basic school	
teachers during the STS	teachers during the STS	
<i>activity to tell</i> eight	activity to tell eight	
practical applications of	practical applications of	
fractions in the classroom	fractions in the classroom	
JHS Grade – In groups of	JHS Grade – In groups of	
three, use examples to	three, use examples to	
differentiate rotational	differentiate rotational	
symmetry and orders of	symmetry and orders of	
rotation	rotation	
Τοτατιοπ	Τοτατιοπ	
3.8 Lead tutors to discuss	3.8 Discuss the various	
the various ways they	ways you can support	
can support student	student teachers to	
teachers to build their	build their subject	
	•	
subject portfolio.	portfolio.	
E.g. encouraging student	E.g. encouraging student	
teachers to file all their	teachers to file all their	
assignments with	assignments with	
feedback in their folders.	feedback in their folders.	
3.9 Let a tutor model a	3.9 Model presentation of	
presentation of an	an activity using Power	
activity using Power	point and making sure	
point and making sure		
	that both genders take	
that both genders take	leading roles in their	
-		
U		
use of power point.	• • • • • • •	
	J; BSC pp. 23)	
Upper Primary/JHS(Core)-	Upper Primary/JHS(Core)-	
Developing conceptual	Developing conceptual	
understanding of	understanding of	
multiplication and division	-	
of common and decimal	division of common and	
-		
- x - = - 7 7 7 7	$\frac{-1}{7} \times 2 = \frac{-1}{7}$	
$\frac{1}{2} \div \frac{1}{2} = \frac{1}{2} \times \frac{6}{2} = 3$	$\frac{1}{2} \div \frac{1}{2} = \frac{1}{2} \times \frac{6}{2} = 3$	
$2 \cdot 6 \cdot 2 \cdot 1 = 5$	$2 \cdot 6 \cdot 2 \cdot 1 = 3$	
JHS (Elective)-	JHS (Elective)-	
	JEIGCUVE)-	
leading roles in their groups and in the demonstration of the use of power point. Upper Primary/JHS(Core)- Developing conceptual understanding of multiplication and division of common and decimal fraction. Examples: $\frac{3}{7} \times \frac{1}{7} = \frac{3}{7}$ $\frac{1}{2} \div \frac{1}{6} = \frac{1}{2} \times \frac{6}{1} = 3$	groups and in the demonstration of the use of power point. (NTS 1a, b, 2b, e, 3b, c, J; BSC pp. 23) Upper Primary/JHS(Core)- Developing conceptual understanding of multiplication and division of common and decimal fraction. Examples: $\frac{3}{7} \times 2 = \frac{6}{7}$ $\frac{1}{2} \div \frac{1}{6} = \frac{1}{2} \times \frac{6}{1} = 3$	

		rotational symmetry and orders of rotation	rotational symmetry and orders of rotation	
		(NTS 1a, b, 2b, e, 3b, c,	(NTS 1a, b, 2b, e, 3b, c,	
		J; BSC pp. 23 PD	J; BSC pp. 23 PD	
		manual 21)	manual 21)	
4.	Evaluation and review of session:	Reflective Activity	Reflective Activity	15 mins
	Tutors should	4.1 Engage tutors in self-	4.1 Show by fingers/nods	
•	Identifying critical	evaluation as well as	of 5 or 3 or 1 as to those	
	friends to observe	encourage tutors to	who "really got it", "got	
		provide feedback of	some of it" or "didn't get	
	lessons and report	the PD session taking	-	
	at next session.	into consideration	it" respectively. Explain if	
•	Identifying and		you really got the lesson	
	addressing any	inclusivity – how to be		
	outstanding issues	patient with		
	relating to the	Stutterers, using		
	lesson/s for	tactile and audio		
	clarification	devices for visually		
		challenged, paying		
		attention to all		
		courses, etc.		
		Ask tutors to show by		
		fingers/nods their		
		level of satisfaction		
		with the session. (NTS		
		1a, 3i).		
		4.2 Engage tutors to	4.2 Reflect on the activities	
		identify unresolved	in the session and	
		issues relating to this	outline unresolved	
		lesson for clarification	issues relating to the	
			lesson	
		NB:	NB:	
		Take note of all	Take note of all	
		unresolved issues and	unresolved issues and	
		use any of following	use any of following	
		strategies	strategies	
		-	– put on SL/SWL	
		 put on SL/SWL WhatsApp platform for 		
		WhatsApp platform for	WhatsApp platform for	
		discussion	discussion	
		 tutors to research for 	 tutors to research for 	
		the next PD session for	the next PD session for	
		discussion	discussion	

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4.3 Ask a critical friend to observe your teaching and record his/her findings to be presented after delivery or in the Next PD session.	4.3 Identify critical friend observes teaching and record his/her findings to be presented after delivery or in the Next PD session.	
NB: Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a)	NB: Identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a)	
Advance Preparation	Advance Preparation	
 4.4 Ask tutors to read Lesson 4 of the Course Manual on: Upper Primary - Fraction Concepts 2: (Teaching and Assessment) JHS(Core) - Operations on fractions: (Teaching and Assessment) JHS(Elective) – Teaching Indices and logarithms1 	 4.4 Read Lesson 4 of the Course Manual on: Upper Primary - Fraction Concepts 2: (Teaching and Assessment) JHS(Core) - Operations on fractions: (Teaching and Assessment) JHS(Elective) – Teaching Indices and logarithms1 	
NB: Read the course manual, the PD session guide ahead of time to identify any outstanding issues relating to the lesson for clarification. Collect all-inclusive resources (such as projector, flip chart and sticky notes) you need ahead of time, prepare samples of TLMs you may need.	NB: Read the course manual, the PD session guide ahead of time to identify any outstanding issues relating to the lesson for clarification. Collect all-inclusive resources (such as projector, flip chart and sticky notes) you need ahead of time, prepare samples of TLMs you may need.	

Age Levels/s:

Name of Subject/s:

a. Upper Grade

- a. Mathematics: Teaching and Assessingb. Teaching and Assessing JHS Mathematics
- b. JHS (Core)c. JHS (Elective)
- c. Mathematics

Tutor PD Session for Lesson 4 in the Course Manual

Lesson Title:

- a. Upper Grade: Fraction Concepts 2: (Teaching and Assessment)
- b. JHS (Core): Operations on fractions: (Teaching and Assessment)
- c. JHS (Electives): Teaching Indices and logarithms1

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. 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 stage of the session.	Time in session
1. Introduction to the	Introduction	Introduction	20 mins
session			
Review prior	1.1 Ice breaker activity:	1.1 Ice breaker: Express	
learning	Engage tutors in an	the fraction	
 Reading and 	investigational activity	representing the	
discussion of the	(e.g. Express the	unshaded in the	
introductory	unshaded region as a	exponent form).	
sections of the	fraction and in the		
lesson up to and	exponent form).		
including learning			
outcomes and			
indicators			
Overview of content			
and identification of	1.2 Ask tutors to tell how	1.2 Ask tutors to tell how	
any distinctive	useful the week 3 PD	useful the week 3 PD	
aspects of the	session (NTS 1b)	session (NTS 1b)	
lesson/s,	influenced their	2C221011 (1412 TD)	

NB: The guidance for	teaching over the	teaching over the	
SL/HoD should identify	week. Lead them to	week. Lead them to	
and address any areas	provide examples of	Provide examples of	
where tutors might	how students were	how students were	
require clarification on	prepared to employ	prepared to employ	
any aspect of the	the various strategies	the various strategies	
lesson.	and skills during the	and skills during the	
NB: SL/HoD should ask	basic school classroom	basic school classroom	
tutors to plan for their	work in STS Field	work in STS Field	
teaching as they go	Experience in year 4	Experience in year 4	
through the PD session	semester 1	semester 1	
	1.3 Ask a critical friend to	1.3 As a critical friend,	
	share with members,	share with members,	
	observation made	feedback on the	
	during the enactment	observation you made	
	of lesson 3.	during the enactment	
	Upper Primary: Fraction	of lesson 3.	
	Concept I (Teaching and	UP: Fraction Concept I	
	Assessing)	(Teaching and Assessing)	
	JHS (Core): UP: Fraction	JHS (Core): UP: Fraction	
	Concept I (Teaching and	Concept I (Teaching and	
	Assessing)	Assessing)	
	JHS (Elective): Teaching	JHS (Elective): Teaching	
	Rigid Motion	Rigid Motion	
	1.4 Lead tutors to discuss	1.4 Discuss any challenges	
	any challenges that	that arose during the	
	arose during the	enactment. Eg In what	
	enactment. Eg In what	ways did the students	
	ways did the students	appreciate the need to	
	appreciate the need to	consider equality and	
	consider equality and	equity during the	
	equity during the	lesson and during STS	
	lesson and during STS	activities?	
	activities?	activities:	
	NB:	NB:	
	 Remember to put 	► Work in your phase	
	members into groups	group and contribute to	
	according to the phases	the whole group discussion.	
	to be taught in the		
	semester and contribute	Pay attention to all NTS references and calient	
	to the whole group	references and salient	
	discussion.	points necessary for the	
	Pay attention to all NTS	development of your	
	references and salient	teaching plan.	
	points necessary for the		

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	development of their		
	teaching plan.		
	1.5 Ask tutors to silently read the introductory sections of lesson 4 in the course manual (including the learning outcomes-LOs). Let tutors suggest relevant previous knowledge of students that will support effective teaching and learning of the lesson.	1.5 Silently read the introductory sections of lesson 4 in the course manual (including the LOs. Suggest relevant previous knowledge of students that will support effective teaching and learning of the lesson.	
	1.6 Guide tutors to read the course manual and identify the purpose and state their expectations of the lesson 4 PD session on post-in cards and share with the whole group. NTS 2b	1.6 Read the course manual silently and identify the purpose of lesson 4 and state your expectations on post-in cards and share with the whole group. NTS 2b (NTS 2b).	
	1.7 Ask tutors in phase groups to discuss the important or distinctive aspects of lesson 4 including vocabulary and fundamental concepts.	1.7 Identify the important features of lesson 4 in the course manual taking note of cross cutting themes (including developing awareness of equity and diversity issues and issues on ICT).	
	Distinctive aspects	Distinctive aspects	
	a. Upper Primary-	a. Upper Primary-	
	Developing the concepts	Developing the concepts	
	of and relationships	of and relationships	
	among percent, ratio and	among percent, ratio and	
	proportion;	proportion;	
	Exploring basic	Exploring basic	
	applications of fractions,	applications of fractions,	
	percent, ratio, and	percent, ratio, and	
	proportion to real life.	proportion to real life.	
	b. JHS (core) – Mental	b. JHS (core) – Mental	
	strategies for adding,	strategies for adding,	

	and dividing b Basic applicat fractions to re c. JHS (Electiv powers of nur	Subtracting, multiplying and dividing by fractions; Basic applications of Fractions to real life. C. JHS (Elective) — Teaching powers of numbers; Feaching prime power Factorization		subtracting, multiplying and dividing by fractions; Basic applications of fractions to real life. c. JHS (Elective) – Teaching powers of numbers; Teaching prime power factorization		
 2. Concept Development (New learning likely to arise in lesson/s): Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD NB: The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors 	concepts i lessons an with the la Examples: Familiar Concepts The concept of fractions and percent Mental strategies for adding and subtracting Powers of numbers 2.2 Lead tutor concepts i	to identify in dunfamiliar in their in discuss arger group. Unfamiliar concepts Application of ratio and proportion to real life Mental strategies for multiplying and dividing fractions Prime power factorization rs to draw ins among in the various line with the ol in. the tutors to s beyond the es. by: and ratios are from the tutors to s beyond the es.	2	your lesso with the la <u>Examples</u> Familiar Concepts The concept of fractions and percent Mental strategies for adding and subtracting Prime power factorization .2 In your ph draw conr among co	miliar and concepts in n and discuss arger group. Unfamiliar concepts Application of ratio and proportion to real life Mental strategies for multiplying and dividing fractions Powers of numbers, Powers of numbers, ase group, nections ncepts in the d in line with school	15 mins

whereas division is repeated subtraction; Subtraction is the inverse of addition and vice versa whiles multiplication is the inverse of division and vice versa JHS (ELECTIVE): Repeated multiplication of the same factor generates powers of numbers		
 2.3 Ask tutors through Think-Pair-Share to outline possible challenging areas in teaching and assessing the lesson. <i>Example:</i> Upper Primary: Clearing learners' misconceptions on ratios as two different numbers to develop the concept of ratio as a form of fraction. JHS (Core): Developing practical project for ratios and proportion. JHS (Elective): Developing real life application of powers of numbers 	2.3 Individually, outline the challenging areas in your lesson, share with a member of the same phase group and then with the whole group.	
2.4 Lead tutors to discuss misconceptions and barriers in teaching and learning of the lesson.	2.4 In whole group, discuss misconceptions and barriers in teaching and learning of the lesson.	
Example: Upper Primary: – Ratio shows 2 distinct whole numbers; Ratio is not a fraction. b. JHS – Mental strategies do not support learning of the concept of multiplying and dividing by fractions	Example: Upper Primary: – Ratio shows 2 distinct whole numbers; Ratio is not a fraction. b. JHS – Mental strategies do not support learning of the concept of multiplying and dividing by fractions	

		JHS (Electives): Repeated addition can be written in the exponent form. Barriers may include weak prior knowledge, lack of appropriate resources, lack of opportunity to use ICT due to failure of electric power (lights-out), bad/interrupted network, unavailability of internet bundle for students, inadequate contact time due to staff meetings.	JHS (Electives): Repeated addition can be written in the exponent form. Barriers may include weak prior knowledge, lack of appropriate resources, lack of opportunity to use ICT due to failure of electric power (lights-out), bad/ interrupted network, unavailability of internet bundle for students, inadequate contact time due to staff meetings.	
3.	Planning for teaching, learning and assessment activities for the	Planning for Teaching and learning Activities for the Lesson	Planning for Teaching and learning activities	40 mins
•	lesson/s Reading and discussion of the teaching and	3.1 Ask tutors in their phase groups to suggest teaching and learning activities for	3.1 In your phase group, suggest teaching and learning activities for teaching the lesson	
•	learning activities Noting and addressing areas where tutors may	the lesson ensuring; i. Provision is made for SEN ii. Both genders take	ensuring; i. Provision is made for SEN ii. Both genders take	
•	require clarification Noting opportunities for making links to the	leading roles in group task iii. Even distribution of questions to different categories of learners	leading roles in group task, etc referring to NTS 1a, b, c, d, 2b, e, f, 3b, c	
•	Basic School Curriculum Noting	based on gender, ability, previous experience, etc. referring to NTS 1a, b, c, d, 2b, e, f, 3b, c		
	opportunities for integrating: GESI responsiveness and ICT and 21 st C skills	 3.2 Ask tutors to read the activities outlined in their course manuals 	3.2 Read the activities outlined in your course manual and identify	
•	Reading, discussion, and identification of continuous assessment	and identify areas that require clarification.	areas that require clarification.	
	opportunities in the lesson. Each lesson should include at least two	NB: Refer to the Basic School Curriculum (BSC pp. xv – xvii) and http://uk.sagepub.com	NB: Refer to the Basic School Curriculum (BSC pp. xv – xvii) and http://uk.sagepub.com	
	opportunities to use	for explanations on "The	for explanations on "The	

continuous	concept and operations on	concept and operations on	
assessment to	fraction" and search	fraction" and search	
support student	through "IXL Math".	through "IXL Math".	
teacher learning			
Resources:	3.3 Lead tutors to	3.3 Brainstorm some	
 links to the 	brainstorm some	pedagogical	
existing PD	pedagogical	approaches that can	
Themes, for	approaches and their	be employed during	
example, actio		the lesson and their	
research,	the concepts taking	effectiveness towards	
		learning of the	
questioning an to other exterr		-	
	,	concepts. Mention	
reference	Example:	any GESI issues that	
material:	i) The use of inquiry to	need consideration	
literature, on	explore generalizations for	while using those	
web, Utube,	powers of numbers.	approaches	
physical	(ii) The use of		
resources, pow			
point; how the			
should be used	,		
Consideration	(BSC pp. xv)		
needs to be giv			
to local	stutterers, using tactile or		
availability	braille for visually		
 guidance on ar 	-		
power point	support for those who		
presentations,			
TLM or other	attention to all Phases.		
resources whic	ch 🛛		
need to be	3.4 Ask tutors to explain	3.4 Suggest teaching	
developed to	some suggested	strategies to be used	
support learnir	ng teaching strategies that	in achieving the Los of	
• Tutors should be	can help inculcate core	the lesson and explain	
expected to have	a competencies in	how they can help	
plan for the next	student teachers and	inculcate core	
lesson for student	t for that matter Basic	competencies in	
teachers	School learners.	student teachers and	
		for that matter Basic	
		School learners.	
	Example.	Example	
	a) Pedagogical	a) Pedagogical	
	approaches: Group Work	approaches: Group Work	
	to explore the relationship	to explore the relationship	
	among fractions,	among fractions,	
	percentages, percentages,	percentages, percentages,	
	ratio and proportions –	ratio and proportions –	
			I]

Associated 24st as at	Accepted 21st and	
Associated 21 st century	<u>Associated 21st century</u>	
<u>skills</u> : Social and	<u>skills</u> : Social and	
Leadership Skills	Leadership Skills	
b) <u>Pedagogical</u>	b) <u>Pedagogical</u>	
approaches: Using	approaches: Using	
investigation to identify	investigation to identify	
generalizations on laws of	generalizations on laws of	
indices	indices	
Associated 21 st century	Associated 21 st century	
skills: Critical Thinking	skills: Critical Thinking	
NB: Let tutors suggest	NB: Suggest more	
more examples beyond	examples beyond those	
those suggested above.	suggested above.	
3.5 Ask tutors to mention	3.5 Mention some GESI	
some GESI responsive	responsive resources	
resources that can be	that can be used with	
used with the		
	the suggested	
suggested approaches	approaches and	
and strategies in	strategies in achieving	
achieving the LOs.	the LOs.	
Example	Example	
Resources may include	Resources may include	
supporting staff with	supporting staff with	
experts in sign language	experts in sign language	
as well as resources such	as well as resources such	
as teacher and learner	as teacher and learner	
resource packs, textbooks,	resource packs, textbooks,	
course manual, projectors,	etc	
flip charts, sticky notes,		
braille, tactile materials,		
audio and audio-visuals		
that can be used in the		
teaching and learning of		
the concepts mentioned		
above (NTS 3j)		
2.6 Load tutors to discuss	2.6 Using discussion land	
3.6 Lead tutors to discuss	3.6 Using discussion, lead	
assessment strategies	tutors to come out	
('as' and 'for') to be	with assessment	
used during teaching of	strategies ('as' and	
the lesson.	'for') to be used during	
NB: Continuous	teaching of the lesson.	
assessment activities	NB: Continuous	
(assignments, quizzes,	assessment activities	
group presentations, etc.	(assignments, quizzes,	
should be used to create	group presentations, etc.	
	U II /	

subject projects and build subject portfolios).	should be used to create subject projects and build subject portfolios).
Example: A project on how to teach to depict the relationship among fraction, decimal, ratio and percentages (UP).	Example: A project on how to teach to depict the relationship among fraction, decimal, ratio and percentages (UP).
A project on investigation of the operations and applications on fraction, decimal, ratio and percentages to real life (JHS - Core)	A project on investigation of the operations and applications on fraction, decimal, ratio and percentages to real life (JHS - Core)
A project on developing an understanding of Prime power factorization to teach any (JHS – Elective)	A project on developing an understanding of Prime power factorization to teach any (JHS – Elective)
NB: Make reference to assessment in the course manual and NTEAP	NB: Make reference to assessment in the course manual and NTEAP
3.7 Ask each tutor to develop a sample of assessment item based on the LOs and share with the whole group.	3.7 Develop a sample of assessment items based on the LOs and share with the whole group.
Example: Upper Primary – Develop a game that can be used in teaching the concept of fractions JHS (Core) – Write a report on the steps you will use to teach operations on fractions JHS (Elective) – Interview	Example: Upper Primary – Develop a game that can be used in teaching the concept of fractions JHS (Core) – Write a report on the steps you will use to teach operations on fractions JHS (Elective) – Interview
10 JHS teachers on how they introduce powers of numbers to learners.	10 JHS teachers on how they introduce powers of numbers to learners.

	 3.8 Lead tutors to discuss the various ways they can support student teachers to build their subject portfolio. E.g. Encouraging student teachers to file all feedback on micro teaching in their folders. 3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration equality and equity in assigning roles and in choosing material for teaching) NTS 1a, b, 2b, e, 3b, c, J; BSC pp. iii) 	 3.8 Discuss the various ways you can support student teachers to build their subject portfolio. E.g. Encouraging student teachers to file all feedback on micro teaching in their folders. 3.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration equality and equity in assigning roles and in choosing material for teaching) NTS 1a, b, 2b, e, 3b, c, J; BSC pp. iii) 	
4. Evaluation and	Evaluation and review of	Evaluation and review of	15 mins
review of session:Tutors need to	session:	session:	
identify critical friends to observe lessons and report at next session	4.1 Engage tutors in providing feedback of the PD session taking into consideration –	4.1 Reflect and provide feedback on this PD session taking into	
 Identifying and addressing any outstanding issues relating to the lesson/s for clarification 	Clarity of content, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 1	 consideration – Clarity of content, pedagogical approaches employed, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi)? and make notes that will help you to teach Lesson 1 4.2 Identify unresolved 	
addressing any outstanding issues relating to the lesson/s for	Clarity of content, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 1	of content, pedagogical approaches employed, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi)? and make notes that will help you to teach Lesson 1	

any of following strategies to address them.research into the issues raised.i. put on SL/SWL WhatsApp/Telegram platform for discussioni. put on SL/SWL WhatsApp/Telegram platform for discussionWhatsApp/Telegram platform for discussioni. tutors to research for the next PD session for discussion4.3 Ask tutors to identify a critical friend from the same or related discipline to observe the enactment of their lesson and provide feedback during the next PD Session (NTS 1a).4.3 Identify a critical friend from the same or related discipline to observe the enactment of your lesson and to provide feedback during the next PD Session (NTS 1a).Advance Preparation NB: Inform tutors to remember to prepare their teaching plan for Lesson 4 taking note of important or distinctive aspects of the lesson and crosscutting issues. Inform tutors to read Lesson 5 of the Course Manual on: Upper Primary - Micro Lessons and use of technology across Primary school numeracy: (Teaching and Assessing) JHS (Core) - Micro Lessons and use of technology across JHS numeracy: (Teaching and Assessing) JHS (Elective) - Concept of Sets: Learning, teaching and applying NB: <i>i. Read the course manual</i> the PD session guide, theNB: I. Read the course manual the PD session guide, the		l	
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Age Levels/s:

Name of Subject/s:

a. Upper Primary

- b. JHS (Core)
- a. Mathematics: Teaching and Assessing
- b. Teaching and Assessing JHS Mathematics
- c. JHS (Elective)
- c. Mathematics

Tutor PD Session for Lesson 5 in the Course Manual

Lesson Tittle:

- a. Upper Primary: Micro Lessons and u se of technology across Primary school numeracy: (Teaching and Assessing).
- b. JHS (CORE) Micro Lessons and use of technology across JHS numeracy: (Teaching and Assessing).
- c. JHS (Elective) Learning, teaching and applying Indices and Logarithm

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. 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 stage of the session.	Time in session
 Introduction to the session Review prior learning A critical friend to share findings for a short discussion and lessons learned Reading and discussion of the introductory sections of the lesson up to and including learning outcomes and indicators 	 Introduction 1.1 Ice breaker activity: Ask tutors to share any experience they have had with a mathematics teacher during their early school days which has influences their perception of the subject. 1.2 Ask tutors to tell how useful the lesson 4 of the PD session was and how it influenced their 	 Introduction 1.1 Share your experience you have had with a mathematics teacher during your early school days which has influences your perception of the subject. 1.2 Tell how useful the previous PD session was and how it influenced your 	20 mins

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 Overview of content and identification of any distinctive aspects of the lesson/s, NB: The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB: SL/HoD should ask tutors to plan for their teaching as they go through the PD session 	 teaching over the week. Lead them to provide examples of how students were prepared to employ the various strategies and skills during the basic school classroom work in STS Field Experience in year 4 semester 1 NB: Draw tutors' attention to all NTS references and salient points necessary for the development of their proforma. 1.3 Ask the critical friend to give feedback on his/her observation of the last enacted lesson laying emphasis on clarity of concepts explained, assessment stratogies. 	teaching over the week. Provide examples of how students were prepared to employ the various strategies and skills during the basic school classroom work in STS Field Experience in year 4 semester 1NB: Pay attention to NTS references and salient points necessary for the development of your proforma.1.3 As a critical friend, describe how the previous lesson observed went laying emphasis on clarity of concepts explained, assessment strategies, ICT intogration GESI
	strategies, ICT integration, GESI, Twenty First Century Skills. 1.4 Lead tutors to discuss any challenges that arose during the enactment. For example, how do explanations obtained by students through Internet research complicate the comprehension of concepts? 1.5 Ask the tutors to read individually and discuss the introduction sections of the lesson in pairs	ICT integration, GESI, Twenty First Century Skills. 1.4 Discuss any challenges encountered during enactment. 1.5 Read one-on-one and discuss the introductory sections of the lesson up to the learning outcomes.

through to the		
learning outcomes.		
-	 1.6 In pairs, discuss the distinctive features of Lesson 5, such as fundamental concepts and awareness of equity and diversity issues and ICT issues. Distinctive aspects include the interactive nature of the activities, emphasizing connection concepts: a. Upper Primary: eg. classroom assessment resources and evaluation and recording, interpretation of performance data and reports. b. JHS (Core) – eg. Plan and design micro lessons. c. JHS (Elective) – eg. Logarithms and its 	
 c. JHS (Elective) – eg. Logarithms and its properties. NB 1. Be ready to answer tutor questions for clarification. Anticipated questions: How will TLM be used to teach indices and logarithms? What are the likely RPK's for solving logarithms? 2. Guide tutors to discuss the possible responses to the anticipated questions, bearing in mind pedagogy, mixed paired, ICT 	properties.	

Development (New learning likely to arise in lesson/s):2.1 Lead tutors in their phase group to identify familiar and unfamiliar concepts in their lessons and discuss with the larger group.2.1 In your phase group identify familiar and unfamiliar concepts in your lessons and discuss with the larger group.• Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors2.2 Ask tutors to make concepts of the various lessons in2.2 In your phase groups, make connections between the lesson concepts and in	
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to be explored with the SL/HoDInterpreting data, LogarithmsNB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutorsIndices,2.2 Ask tutors to make connections between the concepts of the2.2 In your phase groups, make connections between the lesson	
the SL/HoDLogarithmsNB The guidance forIndices,SL/HoD should set outIndices,what they need to doIndices,to introduce and2.2 Ask tutors to makeexplain the issues/sconnections betweenwith tutorsthe concepts of the	
NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors 2.2 Ask tutors to make connections between the concepts of the	
SL/HoD should set out what they need to do to introduce and explain the issues/s with tutorsIndices,2.2 In your phase groups, make connections between the lesson	
what they need to do to introduce and explain the issues/s with tutors2.2 Ask tutors to make connections between the concepts of the2.2 In your phase groups, make connections between the lesson	
to introduce and explain the issues/s with tutors2.2 Ask tutors to make connections between the concepts of the2.2 In your phase groups, make connections between the lesson	
explain the issues/s connections between make connections with tutors the concepts of the between the lesson	
with tutors the concepts of the between the lesson	
the concepts of the	
various lessons in concepts and in	
accordance with the accordance with the	
Basic School Basic School	
Curriculum (BSC). Curriculum.	
Example: Upper	
Primary/JHS core – Activity	
on assessment procedures.	
JHS (Elective) – Linking	
indices in JHS to logarithm	
expressions.	
2.3 Using Think-Pair-Share 2.3 Individually, describe	
ask tutors to outline the difficult points of	
possible endienging	
assessing the lesson. member of the same phase group and then	
with the entire group.	
Example: Example:	
Giving examples of Giving examples of application of logarithm to	
application of logarithm to application of logarithm to	
real life. real life.	
2.4 Lead tutors to discuss 2.4 Discuss the	
misconceptions and misconceptions and	

		harriars to tooching	barriars to toophing	
		barriers to teaching	barriers to teaching	
		and learning of the	and learning this	
		lesson.	lesson.	
		Example:		
		a. Upper Prim & JHS (Core)		
		Grade: – relating theory to		
		practical by applying		
		teaching pedagogy.		
		b. JHS (Elective) –		
		Logarithm and indices are		
		not related.		
		Barriers:		
		Insufficient basic		
		knowledge of indices in		
		SHS. Lack of appropriate		
		resources, lack of		
		opportunity to use ICT due		
		to failure of electric power		
		(lights-out), bad/weak		
		network, unavailability of		
		internet bundle for		
		students and emergency		
		academic staff meetings.		
3.	Planning for	Planning for teaching,	Planning for teaching,	40 mins
3.	Planning for teaching, learning	Planning for teaching, learning and assessment	Planning for teaching, learning and assessment	40 mins
3.	-			40 mins
3.	teaching, learning	learning and assessment	learning and assessment	40 mins
3.	teaching, learning and assessment	learning and assessment	learning and assessment	40 mins
3.	teaching, learning and assessment activities for the	learning and assessment activities	learning and assessment activities	40 mins
3.	teaching, learning and assessment activities for the lesson/s	learning and assessment activities 3.1 In their phase groups,	learning and assessment activities 3.1 Suggest teaching and	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and	learning and assessment activities3.1 In their phase groups, ask tutors to suggest	learning and assessment activities3.1 Suggest teaching and learning activities in	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson 	40 mins
3. •	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is given to persons with SEN 	40 mins
3. •	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer 	40 mins
3. • •	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take 	40 mins
3. • •	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. 	40 mins
3. •	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; equal opportunity is given to persons with SEN to ask and answer questions in Class. both genders take leading roles in group task. even distribution of 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of questions to different 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; equal opportunity is given to persons with SEN to ask and answer questions in Class. both genders take leading roles in group task. even distribution of questions to different 	40 mins
3. • •	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum Noting	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of questions to different categories of learners 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of questions to different categories of learners 	40 mins
3. • •	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum Noting opportunities for	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of questions to different categories of learners based on gender, ability, 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of questions to different categories of learners based on gender, ability, 	40 mins
3. • •	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum Noting opportunities for integrating: GESI	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of questions to different categories of learners based on gender, ability, previous experience, etc. 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of questions to different categories of learners based on gender, ability, previous experience, etc. 	40 mins
3. • •	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum Noting opportunities for	 learning and assessment activities 3.1 In their phase groups, ask tutors to suggest teaching and learning activities for the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of questions to different categories of learners based on gender, ability, 	 learning and assessment activities 3.1 Suggest teaching and learning activities in your phase groups to teach the lesson ensuring; i. equal opportunity is given to persons with SEN to ask and answer questions in Class. ii. both genders take leading roles in group task. iii. even distribution of questions to different categories of learners based on gender, ability, 	40 mins

		Concernante de la concernante	for works and works at
•	Reading, discussion,	females and males in	females and males in
	and identification of	class, referring to NTS 1a,	class, referring to NTS 1a,
	continuous	b, c, d, 2b, e, f, 3b, c.	b, c, d, 2b, e, f, 3b, c.
	assessment		
	opportunities in the	3.2 Ask tutors to read the	3.2 Read the activities
	lesson. Each lesson	activities outlined in	outlined in your course
	should include at	their course manuals	manuals and identify
	least two	and identify areas that	areas that require
		require clarification.	clarification.
	opportunities to use	·	
	continuous	NB: Refer to	NB: Refer to
	assessment to	https://www.21caf.org	https://www.21caf.org &
	support student	and	https://www.researchgate
	teacher learning		
•	Resources:	https://www.researchgate	<u>.net</u> for explanations on
	 links to the 	<u>.net</u> for explanations on	"Connections between the
	existing PD	"Connections between the	theoretical perspectives
	Themes, for	theoretical perspectives	and learning of
	example, action	and learning of	mathematics" and search
	research,	mathematics" and search	through
	questioning and	through	<u>https://www.mathsisfun.c</u>
	to other	<u>https://www.mathsisfun.c</u>	<u>om</u> to clarify the otherwise
	external	<u>om</u> to clarify the otherwise	dark spots in "Quadratic
	reference	dark spots in "logarithms	Equations". dark spots in
	material:	<i>"</i> .	"Logarithms".
	literature, on	3.3 Lead tutors to	3.3 Brainstorm to come up
	web, Utube,	brainstorm to come up	with some pedagogical
	physical	with some pedagogical	approaches that can
	resources,	approaches and their	be employed during
	power point;	impact on learning of	the lesson and their
	how they	the concepts taking	effectiveness towards
	should be used.	into consideration	learning of the
	Consideration	inclusivity.	concepts. Mention
	needs to be		any GESI issues that
	given to local		need consideration
	availability		while using those
	o guidance on any		approaches.
	power point	Example: i) The use of	
	presentations,	Example: i) The use of	Example: i) The use of
	TLM or other	inquiry to explore	inquiry to explore
	resources which	Connections between the	Connections between the
	need to be	theoretical perspectives	theoretical perspectives
		and learning of	and learning of
	developed to	mathematics.	mathematics.
	support	(ii) The use of	(ii) The use of
	learning	differentiation and	differentiation and
•	Tutors should be	scaffolding to ensure that	scaffolding to ensure that
	expected to have a	no learner is left behind	no learner is left behind
	plan for the next	(SBC pp. xv)	(SBC pp. xv)
L		· · · · · · · · · · · · · · · · · · ·	3 - FF /

lesson for student	Engago students in	Engage students in
	Engage students in	Engage students in
teachers	meaningful "hands-on"	meaningful "hands-on"
	activities to explore	activities to explore
	logarithm equation.	logarithm equation.
	iii) Being patient with	iii) Being patient with
	stutterers, using tactile or	stutterers, using tactile or
	braille for persons with	braille for persons with
	low/no vision, providing	low/no vision, providing
	peer support for those	peer support for those
	who might need, while you	who might need, while you
	pay attention to all	pay attention to all
	phases, marginalized	phases, marginalized
	learners are encouraged	learners are encouraged
	to work with peers, speak	to work with peers, speak
	to make learners with	to make learners with
	hearing difficulty to read	hearing difficulty to read
	their lips, teaching and	their lips, teaching and
	learning resources are	learning resources are
	devoid of gender biases,	devoid of gender biases,
	etc.	etc.
	3.4 Ask tutors to explain	3.4 Suggest teaching
	some suggested	strategies to be used
	teaching strategies that	in achieving the LOs of
	can help inculcate core	the lesson and explain
	competencies in	how they can help
	student teachers and	inculcate core
	for that matter Basic	competencies in
	School learners.	student teachers and
	Example: Using	for that matter Basic
	a) Internet Search in their	School learners.
		School learners.
	group to identify the	
	Connections between the	
	theoretical perspectives	
	and learning of	
	Mathematics – use of	
	Digital Literacy Skills,	
	Leadership Skills.	
	Collaborative Skills,	
	b) Exploring Logarithm by	
	graphing – Critical	
	Thinking, Problem Solving	
	3.5 Ask tutors to mention	3.5 Mention some GESI
	some GESI responsive	responsive resources
	resources that can be	that can be used with
	used with the	the suggested

· · · · ·	
suggested approaches	approaches and
and strategies in	strategies in achieving
achieving the LOs.	the LOs.
Example: Resources may	Example: Resources may
include supporting staff	include supporting staff
with experts in sign	with experts in sign
language as well as	language as well as
resources such teacher	resources such teacher
and learner resource	and learner resource
packs, textbooks, course	packs, textbooks, etc
manual, projectors, flip	
charts, sticky notes,	
•	
braille, tactile materials, audio and audio-visuals	
that can be used in the	
teaching and learning of	
the concepts mentioned	
above (NTS 3j)	
3.6 Using discussion, lead	3.6 Using discussion, lead
tutors to come out	tutors to come out
with assessment	with assessment
strategies ('as' and	strategies ('as' and
	'for') to be used during
'for') to be used during	
teaching of the lesson.	teaching of the lesson.
NB: Continuous	NB: Continuous
assessment activities	assessment activities
(assignments, quizzes,	(assignments, quizzes,
group presentations, etc.	group presentations, etc.
should be used to create	should be used to create
subject projects and build	subject projects and build
subject portfolios).	subject portfolios).
E.g. Project on how to	E.g. Project on how to
plan, design, and prepare	plan, design, and prepare
manipulatives and other	manipulatives and other
models to teach selected	models to teach selected
concepts in Primary	concepts in Primary
	School/JHS mathematics
School/JHS mathematics	-
using locally available	using locally available
and/or IT resources	and/or IT resources
Prepare and model	Prepare and model
interactive, and innovative	interactive, and innovative
ways of teaching	ways of teaching
mathematics, including,	mathematics, including,
mathematics, including, micro-teaching to Primary	mathematics, including, micro-teaching to Primary

emphasis on multiple teaching strategies that promote equity and inclusivity. (UP and JHS Core)	emphasis on multiple teaching strategies that promote equity and inclusivity. (UP)
A project on investigation of logarithm application (JHS Elective).	Make reference to assessment in the course manual and NTEAP
Make reference to assessment in the course manual and NTEAP	
3.7 Ask each tutor to develop a sample of assessment item based on the LOs and share with the whole group.	3.7 Develop a sample of assessment items based on the LOs and share with the whole group.
Example: Upper Primary and JHS (Core): Interview at least 5 basic school teachers during the STS activity on which theory support their philosophy of teaching. JHS Elective: In groups of four, draw three different logarithms graphs and write a report on the difference and similarities in the graphs.	Example: Upper Primary and JHS (Core): Interview at least 5 basic school teachers during the STS activity on which theory support their philosophy of teaching. JHS Elective: In groups of four, draw three different logarithms graphs and write a report on the difference and similarities in the graphs.
3.8 Lead tutors to discuss the various ways they can support student teachers to build their subject portfolio.	3.8 Discuss the various ways you can support student teachers to build their subject portfolio.
Example: Encouraging student teachers to i) file all their assignments with feedback in their folders. ii. file all reports and presentation.	Example: Encouraging student teachers to i) file all their assignments with feedback in their folders. ii. file all reports and presentation.

		3.9 Ask a tutor to model a presentation of an activity using projector, internet search and ensuring both genders take leading roles in the groups, teaching and learning resources are devoid of gender biases, persons with physical challenged is called to work examples, give equal access to teaching and learning resources, etc. NTS 1a, b, 2b, e, 3b, c, J; BSC pp. iii)	3.9 Prepare and model a presentation of an activity using projector, internet search and ensuring both genders take leading roles in the groups, teaching and learning resources are devoid of gender biases, persons with physical challenged is called to work examples. NTS 1a, b, 2b, e, 3b, c, J; BSC pp. iii)	
•	Evaluation and review of session: Tutors should Identifying critical friends to observe lessons and report at next session Identifying and addressing any outstanding issues relating to the lesson/s for clarification	 Evaluation and review of session 4.1 Engage tutors in providing feedback of the PD session taking into consideration – Clarity of content, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 5 	 Evaluation and review of session 4.1 Reflect and provide feedback on this PD session taking into consideration – Clarity of content, pedagogical approaches employed, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi)? and make notes that will help you to teach Lesson 5 	15 mins
		4.2 Engage tutors to identify unresolved issues relating to this lesson for clarification. NB: Take note of all unresolved issues that may need further research or consultation and use any of following strategies to address them.	 4.2 Identify unresolved issues relating to this lesson for clarification. NB: Put your unresolved issues unto the department's WhatsApp/ Telegram platform and research into the issues raised. 	

i. put on SL/SWL WhatsApp/ Telegram platform for discussion ii. tutors to research for the next PD session for discussion		
4.3 Ask tutors to identify a critical friend from the same or related discipline to observe the enactment of their lesson and provide feedback during the next PD Session (NTS 1a).	4.3 Identify a critical friend from the same or related discipline to observe the enactment of your lesson and to provide feedback during the next PD Session (NTS 1a).	
Advance Preparation	Advance Preparation	
 4.4 Ask tutors to remember to prepare teaching plan for Lesson 5 taking note of important or distinctive aspects of the lesson and crosscutting issues and read Lesson 6 of the Course Manual on: Upper Primary - Diagnosis and remediation; assessment resources/records, and monitoring progress: (Teaching and Assessing. JHS(Core): Diagnosis and remediation; assessment resources/records, and monitoring progress: (Teaching and Assessing. JHS(Core): Diagnosis and remediation; assessment resources/records, and monitoring progress: (Teaching and Assessing). JHS (Elective.): Teaching handling data. 	 4.4 Remember to prepare teaching plan for the lesson 5 taking note of important or distinctive aspects of the lesson and crosscutting issues and read Lesson 6 of the Course Manual on: Upper Primary - Diagnosis and remediation; assessment resources and monitoring progress: (Teaching and Assessing. JHS (Core): Diagnosis and remediation; assessment resources and monitoring progress: (Teaching and Assessing). JHS (Elective): Teaching Handling Data. 	
NB: i. Read the course manual	NB: Read the course manual	
and the PD session guide ahead of time to identify	and the PD session guide ahead of time	

any outstanding issues	
relating to the lesson for	
clarification.	
ii. Collect all-inclusive	
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	

Age Levels/s:

Name of Subject/s:

- a. Upper Gradeb. JHS (Core)c. JHS (Elective)
- a. Mathematics: Teaching and Assessing
- b. Teaching and Assessing JHS Mathematics
- c. Mathematics

Tutor PD Session for Lesson 6 in the Course Manual

Lesson Title:

- a. Upper Grade Diagnosis and remediation; assessment resources/records, and monitoring progress: (Teaching and Assessing)
- b. JHS (Core) Diagnosis and remediation; assessment resources/records, and monitoring progress: (Teaching and Assessing)
- c. JHS(Specialism) Teaching Handling Data:

Focus: the bullet p provide the frame what is to be done the session. The S ¹ should use the bull to guide what the write for the SL/H and tutors to do a say during each session. Each bulle needs to be addre and specific refere should be made to course manual/s.	for Leading the session. When in the SL/HoDs will have the SL/HoDs will have the Say during each stage of the session of the s	o Session. What PD Session	Time in session
1. Introduction to session	the Introduction to the session	Introduction to the session	20 mins
 Review prior learning Reading and discussion of the introductory sections of the lesson up to an including learni outcomes and indicators Overview of co and identificati any distinctive aspects of the lesson/s, 	according to the subjects and age d phases. ng Eg i. Ask tutors to mentio the best food or ages ntent or shoes size,	according to the subjects and age phases Eg. Mention: i. the food you like best ii. your ages iii. your shoes size N 1.2 Discuss how useful the previous PD session	

ND The guidence for	influence of the sin	toophing over the	
NB The guidance for SL/HoD should identify and address any areas where tutors might require clarification on any aspect of the lesson. NB SL/HoD should ask tutors to plan for their teaching as they go	influenced their teaching in lesson 5. Lead them to provide examples of how students were prepared to employ the various strategies and skills during the basic school classroom work in STS Field	teaching over the week. Provide examples of how students were prepared to employ the various strategies and skills during the basic school classroom work in STS Field Experience in year 4	
through the PD session	Experience in year 4 semester 1 1.3 Lead tutors to discuss	semester 1 1.3 Discuss the overview	
	the overview of the subject age phases to be covered in this PD session and how it will be organised.	of the subject age phases to be covered in this PD session and how it will be organised.	
	<i>i.</i> Upper grade and JHS (Core) lessons focus on children understand & develop mathematical concept which will be applied in micro lessons planning and teaching and the use of technology		
	across primary & JHS school numeracy and associated theories as well as psychological factors influencing learning. ii. JHS (Elective) lesson		
	seeks to develop student teachers' conceptual understanding of handling data in the JHS mathematics curriculum	1 4 Darticipato in the	
	1.4 Ask a critical friend to give feedback on observation during the enactment of lesson 6.	1.4 Participate in the critiquing of the feedback on observation during the enactment of lesson 6.	

1.5 Ask tutors to suggest the purpose of the lesson and state their expectations of the PD Session.	1.5 Engage tutors to suggest the purpose of the lesson and state your expectations of the PD Session.	
1.6 Guide tutors to establish the linkage between CLOs and the LOs of the lesson for each of the Phases.	1.6 Participate in the linkage of the CLOs and the LOs of the lesson for each of the phases.	
1.7 Ask tutors in phase groups to discuss the important or distinctive aspects of the lesson including vocabulary and fundamental concepts.	1.7 In pairs discuss the distinctive aspects of the lesson including vocabulary and fundamental concepts related to the components of the front matters.	
Distinctive aspects include the interactive nature of the activities, emphasis on connecting concepts: a. Upper Prim & JHS (Core) Grade: – eg. Investigation on theories and theoretical principles that are relevant to the learning and teaching of mathematics.		
b. JHS (Elective): – eg. The exploration of different ways of understanding of relevant theories and principles of learning and their implications for teaching data handling.		
Be ready for likely questions from tutors for clarification. Anticipated questions: i. Is it not enough for students to mentally		

	count and readily identify them? ii. Should students memorise formula or learn how to apply formula? iii. Why do we have to worry students with algebraic expression in data handling? N/B: Guide tutors to discuss the possible answers to the anticipated questions, bearing in mind pedagogy, GESI, ICT – E.g. the most appropriate methods depend on age and previous knowledge of learners, objective of lesson.		
2. Concept Development (New learning likely to	Concept Development (New learning likely to arise in lesson/s)	Concept Development (New learning likely to arise in lesson/s)	15 mins
 arise in lesson/s): Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors 	 2.1 Ask tutors to identify familiar and unfamiliar concepts in the lesson and discuss with the larger group. Familiar Unfamiliar Concept Concept central tendency descriptive variables 2.2 Lead tutors to draw connections among concepts in the various lessons in line with the basic school curriculum. 	 2.1 Participate in the identification of familiar and unfamiliar concepts in the lesson and discuss with the larger group. Familiar Unfamiliar Concept Concept Concept coding descriptive variables 2.2 Draw connections among concepts in the various lessons in line with the basic school curriculum. 	

Г	5	E a su ala
	Example:	Example:
	Upper Prim & JHS (Core)	Upper Prim & JHS (Core)
	Grade:	Grade: Connecting logical
	Connecting logical and	and psychological
	psychological approaches	approaches to learning
	to learning mathematics	mathematics in
	in understanding	understanding
	mathematical theories	mathematical theories
	and concept; Ability to	and concept; Ability to
	count verbally;	count verbally;
	Recognizing numerals;	Recognizing numerals;
	Understanding one-to-one	Understanding one-to-one
	correspondence.	correspondence.
	(PD Theme 3)	(PD Theme 3)
	JHS(Elective): establish	JHS (Elective): establish
	and analyse the	and analyse the
	relationship between the	relationship between the
		-
	concepts; handling data	concepts; handling data
	and how this can be used	and how this can be used
	to plan a micro lesson	to plan a micro lesson
	based on similar concepts.	based on similar concepts.
	2.3 Ask tutors to use	2.3 Individually, outline
	Think-Pair-Share to	the challenging areas
	outline possible	in your lesson, share
	challenging areas in	with a member of the
	teaching and assessing	same phase group and
	of:	then with the whole
		group.
		group.
	a. Upper Prim & JHS (Core)	a. Upper Prim & JHS (Core)
	Grade: theoretical	<i>Grade:</i> theoretical
	principles that explains	principles that explains
	children's learning of	children's learning of
	mathematics	mathematics.
	b. JHS (Elective)	b. JHS (Elective)
	application of central	application of central
	tendency in real life.	tendency in real life.
	N/B	
	Eg. The use of	
	differentiated instruction	
	to cater for the needs of	
	all children in the early	
	and upper grade and JHS	
	classrooms, including	

environment to stimulate learning (NTS 3c 3f, pg. 14).2.4 Lead tutors to discuss misconceptions and barriers in teaching and learning of the lesson.2.4 Discuss the misconceptions and barriers in teaching and learning of the lesson.Example: Misconceptions a. Upper Prim & JHS (Core) Grade: Some mathematics topics are not related to real life. b. JHS (Elective): the use of bar graph for continuous data representation instead of discrete data. Barriers Barriers Barriers may include weak prior knowledge, lack of appropriate resources, lack of opportunity to use ICT due to failure of electric power (lights-out), bad/weak network, unavailability of internet bundle for students, inadequate contact time due to staff meetings, Different learning needs, misconceptions about the lesson2.4 Discuss the misconceptions and barriers in teaching and learning of the lessonendextend to reine teaching and learning of the lesson2.4 Discuss the misconceptions and barriers in teaching and learning of the lesson2.4 Discuss the misconceptions and learning of the lesson2.4 Discuss the misconceptions and barriers in teaching and learning of the lesson2.4 Discuss the misconceptions about the lesson2.4 Discuss the misconceptions about the lesson	those with special educational needs (SEN) and creating a safe, secure		
misconceptions and barriers in teaching and learning of the lesson. Example: Misconceptions a. Upper Prim & JHS (Core) Grade: Some mathematics topics are not related to real life. b. JHS (Elective): the use of bar graph for continuous data representation instead of discrete data. Barriers B	learning (NTS 3c 3f, pg. 14).		
	misconceptions and barriers in teaching and learning of the lesson. Example: Misconceptions a. Upper Prim & JHS (Core) Grade: Some mathematics topics are not related to real life. b. JHS (Elective): the use of bar graph for continuous data representation instead of discrete data. Barriers Barriers may include weak prior knowledge, lack of appropriate resources, lack of opportunity to use ICT due to failure of electric power (lights-out), bad/weak network, unavailability of internet bundle for students, inadequate contact time due to staff meetings, Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about the	misconceptions and barriers in teaching and learning of the lesson. Example: Misconceptions a. Upper Prim & JHS (Core) Grade: Some mathematics topics are not related to real life. b. JHS (Elective): the use of bar graph for continuous data representation instead of discrete data. Barriers Barriers may include weak prior knowledge, lack of appropriate resources, lack of opportunity to use ICT due to failure of electric power (lights-out), bad/weak network, unavailability of internet bundle for students, inadequate contact time due to staff meetings, Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about the	

3.	Planning for	Planning for teaching,	Planning for teaching,	
	teaching, learning	learning and assessment	learning and assessment	
	and assessment	activities for the lesson/s	activities for the lesson/s	
	activities for the	-		
	lesson/s	3.1 In their phase groups,	3.1 Suggest teaching and	
•	Reading and	ask tutors to suggest	learning activities for	
	discussion of the	teaching and learning	the lesson.	
	teaching and	activities for the		
	learning activities	lesson.		
•	Noting and	i. Provision is made for		
	addressing areas	physically challenged		
	where tutors may	persons and persons		
	require clarification	with other forms of		
•	Noting	disability		
	opportunities for	ii. Both genders take		
	making links to the	leading roles in group task		
	Basic School	iii. Even distribution of		
	Curriculum	questions to different		
•	Noting	categories of learners		
	opportunities for	based on gender, ability,		
	integrating: GESI	previous experience, etc.		
	responsiveness and	referring to NTS 1a, b, c, d,		
	ICT and 21 st C skills	2b, e, f, 3b, c.		
•	Reading, discussion,			
	and identification of	3.2 Ask tutors to go	3.2 Read the activities	
	continuous	through the lesson in	outlined in your course	
	assessment	the course manual and	manual and identify	
	opportunities in the	identify areas that	areas that require	
	lesson. Each lesson	require clarification.	clarification.	
	should include at	Eg.		
	least two	Strategies to clarify the		
	opportunities to use	otherwise dark spots may		
	continuous	include investigation,		
	assessment to	internet search, etc.		
1	support student	2.2 Add to take to	2.2 Projectore and	
1	teacher learning	3.3 Ask tutors to	3.3 Brainstorm and	
•	Resources:	brainstorm and explain	explain how	
	\circ links to the	how how	a theoretical perspectives	
1	existing PD	a. theoretical perspectives	a. theoretical perspectives	
1	Themes, for	and principles of learning are relevant to	and principles of learning that are relevant to	
1	example, action	children's learning	children's learning.	
1	research,	b. relates handling data to	b. relates handling data to	
1	questioning and	real life problem for	real life problem for	
1	to other external	improvement learners	improvement learners	
1	reference	understanding of the	understanding of the	
1	material:	central tendency. Refer	central tendency. Refer	
	literature, on	central tendency. Refer		

web, Utube,	to Basic School	to Basic School	
· · ·			
physical	Curriculum (BSC pp. 93	Curriculum (BSC pp. 93	
resources, power	– 97; 171-173).	– 97; 171-173).	
point; how they			
should be used.	3.4 Lead tutors to come	3.4 Suggest some	
Consideration	up with some	pedagogical	
needs to be given	pedagogical	approaches and their	
to local	approaches and their	related core	
availability	related core	competencies likely to	
 guidance on any 	competencies likely to	be inculcated in	
power point	be inculcated in	students and for that	
presentations,	students and for that	matter Basic School	
TLM or other	matter Basic School	learners.	
resources which	learners. eg.		
need to be	(a) UP/JHS (core):		
developed to	Strategy: Expository,		
support learning	inquiry and Discussion: to		
Tutors should be	explore the effectiveness		
expected to have a	of children's learning of		
plan for the next	mathematics through		
lesson for student	games and understanding		
teachers	size, shape and patterns.		
	Core Competencies:		
	problem formulation and		
	identification, problem		
	solving, critical and		
	creative thinking and		
	communication		
	(b) JHS Elective		
	Strategy: interactive and		
	collaborative group work		
	(with the aid of ICT tools		
	and other manipulatives		
	to collect and analyse		
	data.		
	Core Competencies:		
	critical thinking and		
	problem-solving skills,		
	digital literacy,		
	communication and		
	collaboration, and		
	creativity & innovation.		
		2 F.M. 11	
	3.5 Ask tutors to mention	3.5 Mention some GESI	
	some GESI responsive	responsive resources	

		i
resources that can be used with the suggested approaches and strategies in achieving the LOs. E.g. Resources may include supporting staff with experts in sign language as well as resources such teacher and learner resource packs, textbooks, course manual, prisms,	that can be used with the suggested approaches and strategies in achieving the LOs. <i>E.g Resources may</i> <i>include supporting staff</i> <i>with experts in sign</i> <i>language as well as</i> <i>resources such teacher</i> <i>and learner resource</i> <i>packs, textbooks, etc</i>	
pyramids, projectors, flip charts, sticky notes, braille, tactile materials, audio and audio-visuals that can be used in the teaching and learning of the concepts mentioned above (NTS 3j)		
3.6 Ask tutors to identify and discuss Continuous Assessment for the lesson to support student teacher learning (NTS 3k). NB: Assessment must be aligned to the NTEAP and required course Assessment to include	3.6 Identify and discuss continues assessment strategies for the lesson to support student teacher learning (NTS 3k).	
subject project, subject portfolio and end of semester examination Example: Upper Primary	Example: Upper Primary	
and JHS (Core) Grades: Interview about 8 basic school teachers during the STS activity on mathematics that basic school learners are exposed to a) at home & b) during play. JHS (Elective): In groups of four, develop any game	and JHS (Core) Grades: Interview about 8 basic school teachers during the STS activity on mathematics that basic school learners are exposed to a) at home & b) during play. JHS (Elective): In groups of four, develop any game	

	for teaching any concept within your course outline. 3.7 Lead tutors to discuss the various ways they can support student teachers to build their subject portfolio. <i>E.g. encouraging student</i> <i>teachers to file all their</i> <i>assignments with</i> <i>feedback, presentation,</i> <i>reports in their folders.</i> <i>Taking notes in class and</i> <i>filing them.</i>	 for teaching any concept within your course outline. 3.7 Discuss the various ways you can support student teachers to build their subject portfolio. E.g. encouraging student teachers to file all their assignments with feedback, presentation, reports, in their folders. 	
	3.8 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESI issues (eg. Both gender taking the leading roles in their groups) NTS 1a, b, 2b, e, 3b, c, J; BSC pp. iii	3.8 Model a presentation of an activity using projector, internet search and taking into consideration GESI issues (eg. Both gender taking the leading roles in their groups) NTS 1a, b, 2b, e, 3b, c, J; BSC pp. iii	
 4. Evaluation and review of session: Tutors need to identify critical friends to observe lessons and report at next session Identifying and addressing any outstanding issues relating to the lesson/s for clarification 	 Evaluation and review of session: 4.1 Engage tutors in providing feedback of the PD session taking into consideration – Clarity of concepts, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 7 	Evaluation and review of session: 4.1 Reflect and provide feedback on this PD session taking into consideration – Clarity of concepts, pedagogical approaches employed, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi)? and make notes that will help you to teach Lesson 7	15 mins

4.2 Engage tutors to	4.2 Identify unresolved	
identify unresolved	issues relating to this	
issues relating to this	lesson for clarification.	
lesson for clarification.		
N/B: Take note of all	N/B: Put your unresolved	
unresolved issues that	<i>issues unto</i> the	
may need further research	department's WhatsApp/	
or consultation and use	Telegram platform and	
any of following strategies	research into the issues	
to address them.	raised.	
i. put on SL/SWL		
WhatsApp platform for		
discussion		
ii. tutors to research for		
the next PD session for		
discussion		
4.3 Ask tutors to identify a	4.3 Identify a critical friend	
critical friend from the	from the same or	
same or related	related discipline to	
discipline to observe	observe the	
the enactment of their	enactment of your	
lesson and provide	lesson and to provide	
feedback during the	feedback during the	
next PD Session (NTS	next PD Session (NTS	
1a).	1a).	
	,	
Advance Preparation	Advance Preparation	
4.4 Ask tutors to remember	4.4 Remember to prepare	
to prepare proforma for		
Lesson 7 taking note of	Lesson 7 taking note of	
important or	important or	
distinctive aspects of	distinctive aspects of	
the lesson and	the lesson and	
crosscutting issues and	crosscutting issues and	
read Lesson 7 of the	read Lesson 7 of the	
Course Manual on:	Course Manual on:	
Upper Primary:	Upper Primary:	
Shape and Space:	Shape and Space:	
(Teaching and	(Teaching and	
Assessment)	Assessment)	
JHS(Core):	JHS(Core):	
Shape, Space and	Shape, Space and	
Measurement: (Teaching	Measurement: (Teaching	
and Assessment)	and Assessment)	
JHS(Elective):	JHS(Elective):	

T 1: D 1 1:1:	
Teaching Probability	Teaching Probability
NB:	NB:
i. Read the course manual	Take note of the PD
and the PD session guide	session guide ahead of
ahead of time to identify	time to identify any
any outstanding issues	outstanding issues relating
relating to the lesson for	to the lesson for
clarification.	clarification.
ii. Collect needed	
resources (such as	
projector, flip chart and	
sticky notes) you need	
ahead of time, prepare	
samples of TLRs you may	
need and rehearse how	
these may be used to	
support the achievement	
of your goals.	

Age Level(s)

Name of Subject(s):

- a. Upper Primary
- a. Mathematics: Teaching and Assessing
- b. Teaching and Assessing JHS Mathematic
- b. JHS (Core)c. JHS (Elective)
- c. Mathematics

Tutor PD Session for Lesson 7 in the Course Manual

Lesson Tittle:

- a. Upper Primary: Shape and Space: (Teaching and Assessment)
- b. JHS (Core): Shape, Space and Measurement: (Teaching and Assessment)
- b. JHS (Elective): Teaching Probability

pr wl th sh to wi an sa se ne an sh	ocus: the bullet points ovide the frame for hat is to be done in e session. The SWL ould use the bullets guide what they rite for the SL/HoD ad tutors to do and y during each ssion. Each bullet eeds to be addressed ad specific reference ould be made to the burse manual/s.	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 stage of the session.	Time in session
1.	Introduction to the session	Introduction	Introduction	20 mins
•	Review prior learning A critical friend to share findings for a short discussion and lessons learned Reading and discussion of the introductory sections of the lesson up to and including learning outcomes and indicators Overview of content and identification of	 1.1 Ice breaker activity: Begin with mental drills using related games: <i>Example: When a ludo</i> dice is tossed how many faces is/are likely to show. 1.2 Ask tutors to tell how useful the previous PD session was and how it influenced their teaching in the previous lesson. Lead them to provide examples of how students were 	 1.1 Ice breaker activity: participate in mental drills using related games: Example: When a ludo dice is tossed how many faces is/are likely to show. 1.2 Tell to tell how useful the previous PD session was and how it influenced their teaching in the previous lesson. Provide examples of how students were prepared to employ the 	

aspects of the	prepared to employ	various stratogics and
lesson/s,	the various strategies	various strategies and skills during the basic
NB The guidance for	and skills during the	school classroom work
-	basic school classroom	
SL/HoD should identify		in STS Field Experience
and address any areas	work in STS Field	in year 4 semester 1
where tutors might	Experience in year 4	
require clarification on	semester 1	
any aspect of the		
lesson.	1.3 Ask a critical friend to	1.3 As a critical friend
NB SL/HoD should ask	give feedback on	share your observation
tutors to plan for their	observation during	on the previous lesson.
teaching as they go	enactment of the	Upper Primary/JHS
through the PD session	previous lesson.	(Core)
	Upper Primary/JHS	
	(Core)	
	a. Diagnosis and	a.Diagnosis and
	remediation;	remediation;
	assessment	assessment
	resources/records, and	resources/records, and
	monitoring progress:	monitoring progress:
	(Teaching and	(Teaching and
	Assessing)	Assessing)
	JHS (Elective)	JHS (Elective)
	b. Teaching Handling	b. Teaching Handling
	Data:	Data:
	NB:	NB:
	Things tutor might	Things tutor might have
	have observed; tutor's	observed; tutor's choice of
	choice of words,	words, pedagogical
	pedagogical content	content knowledge,
	knowledge, content	content knowledge subject
	knowledge subject	matter, the use of ICT
	matter, the use of ICT	tools, GESI and the use of
	tools, GESI and the use	NTEAP
	of NTEAP	
	1.4 Ask tutors to read and	1.4 Read and discuss the
	discuss the	introductory section of
	introductory section of	the lesson (up to
	the lesson including	learning outcomes).
	the learning outcomes	
	(LOs) in phase groups.	
	(200) pridoc Broupsi	
	NB: Suggest relevant	NB: Suggest relevant
	previous knowledge of	previous knowledge of
	students that will support	students that will support
l		

effective teaching and	effective teaching and	
learning of the lesson.	learning of the lesson.	
1.5 Ask tutors to identify	1.5 Identify the purpose of	
the purpose of the	the lesson from the	
lesson from the course	course manual and	
manual and state their	state your expectations	
expectations of the PD	of the PD Session.	
Session	of the f D Session.	
PURPOSE OF THE LESSON	PURPOSE OF THE LESSON	
Upper Primary JHS(CORE)	Upper JHS(CORE)	
Introduce student	Primary	
teachers to the course	Introduce student	
manual to enable them	teachers to the course	
develop awareness of	manual to enable them	
what they are expected of in this lesson.	develop awareness of what they are expected	
Develop student	of in this lesson.	
teachers' understanding	Develop student	
of spatial visualization;	teachers' understanding	
the concept of space;	of spatial visualization;	
line segments, angles	the concept of space;	
and shapes; 3-D and 2-D	line segments, angles	
Shapes	and shapes; 3-D and 2-D	
Introduce the student	Shapes	
teachers to prepare and model interactive, and	Introduce the student teachers to prepare and	
innovative ways of	model interactive, and	
teaching mathematics.	innovative ways of	
•	teaching mathematics.	
JHS (Elective)	JHS (Elective)	
expose student teachers	 expose student teachers 	
to the development of	to the development of	
conceptual	conceptual	
understanding for	understanding for	
teaching probability and	teaching probability and	
related conceptsdevelop appropriate	 related concepts develop appropriate 	
learning strategies where	learning strategies	
percentages (taxation,	where percentages	
discount, commissions,	(taxation, discount,	
VAT, etc.) can be applied.	commissions, VAT, etc.)	
	can be applied.	
1.6 Ask tutors in phase	1.6 In phase groups,	
groups to discuss the	discuss the distinctive	
important or distinctive	aspects of the s lesson	
aspects of the lesson	including vocabulary	
including vocabulary	and fundamental	
and fundamental	concepts related to the	
	-	
concepts.	components of the	
	front matters.	

 <u>Distinct Aspects</u> Upper Primary/JHS (core): Informal geometry and spatial sense Spatial visualization (PD Themes 1 & 3) JHS (Elective): Outcomes of an Experiment 	 <u>Distinct Aspects</u> Upper Primary/JHS (core): Informal geometry and spatial sense Spatial visualization (PD Themes 1 & 3) JHS (Elective): Outcomes of an Experiment
 Probability of an outcome <u>Vocabulary</u> Upper Primary/JHS (core) Examples: Spatial, Sense, Geometry, Visualization, Segment (PD Themes 1 &3) JHS (Elective): Probability, Experiment, Outcome, <u>Fundamental Concepts</u> UP/JHS (core) Introduce the lesson on integers as shape and space. Shapes and their properties Hand sketching of common solids (PD Themes 1 &3) JHS (Elective) Teaching: Outcomes of an 	 Probability of an outcome <u>Vocabulary</u> Upper Primary/JHS (core) Examples: Spatial, Sense, Geometry, Visualization, Segment (PD Themes 1 &3) JHS (Elective): Probability, Experiment, Outcome, <u>Fundamental Concepts</u> UP/JHS (core) Introduce the lesson on integers as shape and space. Shapes and their properties Hand sketching of common solids (PD Themes 1 &3) JHS (Elective) Teaching: Outcomes of an
 experiment Probability of an outcome Probability of a given event in table Equally likely outcomes 	 experiment Probability of an outcome Probability of a given event in table Equally likely outcomes

2.	Concept	Concept Development	Concept Development	15 mins
	Development (New			
	learning likely to	2.1 Ask tutors to identify	2.1 Identify familiar and	
	arise in lesson/s):	familiar and unfamiliar	unfamiliar concepts in	
•	Identification and	concepts in their	their lessons and	
	discussion of new	lessons and discuss	discuss with the larger	
	learning, potential	with the larger group.	group.	
	barriers to learning	Familiar and Unfamiliar	Familiar and Unfamiliar	
	for student teachers	Concepts	Concepts	
	or students,	Upper Primary/JHS (core)	Upper Primary/JHS (core)	
	concepts or	Familiar Concepts: Shapes	Examples of Familiar	
	pedagogy being	and their properties and	Concepts: Shapes and their	
	introduced in the	Hand sketching of	properties and Hand	
	lesson, which need	common solids	sketching of common	
	to be explored with	Unfamiliar concepts:	solids	
	the SL/HoD	Spatial visualization and	Unfamiliar concepts:	
NP	The guidance for	Relationship among faces,	Spatial visualization and	
	/HoD should set out	edges and vertices.	Relationship among faces,	
	hat they need to do	JHS (Elective):	edges and vertices.	
	introduce and	Examples of Familiar	JHS (Elective):	
	plain the issues/s	Concepts: Outcomes of an	Examples of Familiar	
	th tutors	experiment and	Concepts: Outcomes of an	
vvi		Probability of an outcome	experiment and Probability	
		Unfamiliar concepts:	of an outcome	
		Probability of a given	Unfamiliar concepts:	
		event in table, equally	Probability of a given event	
		likely outcomes	in table, equally likely	
		likely outcomes	outcomes	
			outcomes	
		2.2 Lead tutors to draw	2.2 Draw connections	
		connections among	among concepts in the	
		concepts in the various	various lessons in line	
		lessons in line with the	with the basic school	
		Basic School	curriculum.	
		Curriculum.		
		NB:	NB:	
		Anticipated question	Anticipated question	
		What is the relationship	What is the relationship	
		between 2D-shapes and	between 2D-shapes and	
		3D shapes? (Bsc:B5.1.5.1)	3D shapes? (Bsc:B5.1.5.1)	
		2.3 Ask tutors to use Think-	2.3 Individually, outline the	
		Pair-Share to outline	challenging areas in	
		possible challenging	your lesson, share with	
		areas in:	a member of the same	
		Upper Primary:	phase group and then	
			with the whole group.	

		ı
a. Shape and Space:		
(Teaching and		
Assessment)		
JHS(Core):		
b. Shape, Space and		
Measurement: (Teaching		
and Assessment)		
c. Teaching Probability		
NB:	NB:	
Upper Primary/JHS (core)	UP/JHS (core)	
In groups let both genders	In groups let both genders	
take leading role by using	take leading role by using	
the internet to explore the	the internet explore the	
challenging areas, for	challenging areas, for	
example: using models of	example: using models of	
3-D shapes for practical	3-D shapes for practical	
investigation to explore	investigation to explore	
the relationship among	the relationship among	
the number of faces,	the number of faces,	
edges, and vertices of	edges, and vertices of	
given shapes.	given shapes.	
2.4 Lead tutors to discuss	2.4 Participate actively in	
misconceptions and	the discussion on	
barriers in teaching and	misconceptions and	
learning of the lesson.	barriers in teaching and	
	learning of the lesson.	
Misconcontions	-	
Misconceptions	Misconceptions	
a. Upper Primary/JHS	a. Upper Primary/JHS	
(core) – Plane Shapes	(core) – Plane Shapes	
have edges.	have edges.	
b. JHS (Elective) –	b.JHS (Elective) –Common	
Common shapes are	shapes are not	
not recognised unless	recognised unless they	
they are upright or in	are upright or in their	
their usual orientation.	usual orientation.	
Possible Barriers	Possible Barriers	
Upper Primary/JHS (core)		
	Upper Primary/JHS (core)	
Inability to differentiate	Inability to differentiate	
between two concepts	between two concepts.	
such as the difference	e.g., The difference	
between Sample Space	between Sample Space	
and event.	and event.	
JHS (Elective)	JHS (Elective)	
Inability to explore the	Inability to explore the	
concepts of equally likely	concepts of equally likely	
concepts of equality interv	concepts of equality interv	

		and not equally likely	and not equally likely	
		outcomes through	outcomes through	
		practical activities.	practical activities.	
		2.5 Support tutors to	2.5 Identify as many GESI	
		identify GESI	responsive resources	
		responsive resources	such as supporting staff	
		such as supporting staff	with experts in sign	
		with experts in sign	language as well as	
		language as well as	resources such teacher	
		resources such teacher	and learner resource	
		and learner resource	packs, textbooks,	
		packs, textbooks,	course manual, Posters	
		course manual, Posters	illustrating people	
		illustrating people	using mathematics in	
		using mathematics in	the jobs; video clips	
		the jobs; video clips	downloaded from the	
		downloaded from the	internet. (NTS 3j, PD	
		internet (NTS 3j, PD	Manual pp.38)	
		Manual pp.38)		
3.	Planning for	Teaching and learning	Teaching and learning	40 mins
	teaching, learning	activities	activities	
	and assessment			
	activities for the	3.1 Ask tutors to suggest	3.1 Suggest teaching and	
	lesson/s	teaching and learning	learning activities for	
•	Reading and	activities for the lesson	the lesson taking into	
	discussion of the	taking into account	consideration GESI	
	teaching and	GESI issues.		
	learning activities	Suggested learning	Suggested learning	
	Noting and	Activities	Activities Upper	
-	addressing areas	Upper Primary/JHS core:	Primary/JHS core:	
	where tutors may	Provide student-teachers	Provide student-teachers	
	require clarification	with e-learning	with e-learning	
	•	opportunities to explore	opportunities to explore	
•	Noting	the concept of shape and	the concept of shape and	
	opportunities for	space.	space.	
	making links to the Basic School	JHS(Elective):	JHS(Elective):	
		Example of suggested	Example of suggested	
	Curriculum	learning Activities	learning Activities	
•	Noting	Use interactive and	Use interactive and	
	opportunities for			
	integrating: GESI	collaborative group work	collaborative group work	
	responsiveness and	to develop conceptual	to develop conceptual	
	ICT and 21 st C skills	understanding of the	understanding of the	
•	Reading, discussion,	concepts of sample space,	concepts of sample space,	
	and identification of	events, and the idea of	events, and the idea of	
1	continuous	probability of an outcome.	probability of an outcome.	

		ND	NB
	assessment	NB:	NB:
	opportunities in the	i. Make provision for	i. Make provision for
	lesson. Each lesson	physically challenged	physically challenged
	should include at	ii. Both genders take	ii. Both genders take
	least two	leading roles in group task	leading roles in group task
	opportunities to use	iii. Even distribution of	<i>iii. Even distribution of</i>
	continuous	questions to different	questions to different
	assessment to	categories of learners	categories of learners
	support student	based on gender, ability,	based on gender, ability,
	teacher learning	previous experience, etc	previous experience, etc
	Resources:	NTS 1a, b, c, d, 2b, e, f, 3b,	NTS 1a, b, c, d, 2b, e, f, 3b,
•		-	_
	 links to the 	С	C
	existing PD		
	Themes, for	3.2 Let tutors read the	3.2 Read the activities
	example, action	activities outlined in	outlined in your course
	research,	their course manuals	manual and identify
	questioning and	and identify areas that	areas that require
	to other	require clarification.	clarification.
	external		
	reference	NB:	NB:
	material:	Refer to the Basic School	Refer to the Basic School
	literature, on	Curriculum (BSC pp. xv –	Curriculum (BSC pp. xv –
	web, Utube,	xvii) Identify challenging	xvii) Identify challenging
	physical	areas that require	areas that require
	resources,	clarification, using	clarification, using
	power point;	GeoGebra to clarify the	GeoGebra to clarify the
	how they	otherwise dark spots in	otherwise dark spots in
	should be used.	"Teaching probability".	"Teaching probability
		reaching probability .	reaching probability
	Consideration		
	needs to be	3.3 Lead tutors to	3.3 Brainstorm to come up
	given to local	brainstorm to come up	with some pedagogical
	availability	with some pedagogical	approaches and their
	 guidance on any 	approaches and their	related core
	power point	related core	competencies likely to
	presentations,	competencies likely to	be inculcated in
	TLM or other	be inculcated in	students and for that
	resources which	students and for that	matter Basic School
	need to be	matter Basic School	learners.
	developed to	learners.	
	support		
	learning	Example	Example
_	-	•	-
•	Tutors should be	(a) Upper Primary/JHS	(a) Upper Primary/JHS
	expected to have a	(core)	(core)
	plan for the next	Strategy: Expository, Think	Strategy: Expository, Think
	lesson for student	pair Share, Discussion and	pair Share, Discussion and
	teachers	Brainstorming	Brainstorming

		1
Core Competencies: Problem solving, critical and creative thinking and communication. (b) JHS (Elective) Strategy: interactive and Collaborative group work, Discussion Core Competencies: Critical thinking skills, Collaborative learning and Problem-Solving Skills.	Core Competencies: Problem solving, critical and creative thinking and communication. (b) JHS (Elective) Strategy: interactive and Collaborative group work, Discussion Core Competencies: Critical thinking skills, Collaborative learning and Problem-Solving Skills.	
3.4 Ask tutors to explain some suggested teaching strategies that can help inculcate core competencies in the student teachers and for that matter basic school learners. Example: Discussions on the concept of shape and space- Communication skills	3.4 Suggested teaching strategies that can help inculcate core competencies in the student teachers and for that matter basic school learners.	
3.5 Ask tutors to mention some GESI responsive resources that can be used with suggested approaches and strategies in achieving the Los.	3.5 Mention some GESI responsive resources that can be used with suggested approaches and strategies in achieving the Los.	
Example: Resources may include supporting staff with experts in sign language as well as resources such teacher and learner resource packs, textbooks, course manual, projectors, flip charts, sticky notes, braille, tactile materials, audio and audio-visuals that can be used in the teaching and learning of	Example: Resources may include supporting staff with experts in sign language as well as resources such teacher and learner resource packs, textbooks, course manual, projectors, flip charts, sticky notes, braille, tactile materials, audio and audio-visuals that can be used in the teaching and learning of	

F	1		
	the concepts mentioned	the concepts mentioned	
	above (NTS 3j)	above (NTS 3j)	
	2.6 Load tutors to discuss	2 6 Discuss to come up	
	3.6 Lead tutors to discuss	3.6 Discuss to come up	
	assessment strategies	with assessment	
	("as and "for") to be	strategies ("as and	
	used during the	"for") to be used	
	lesson.	during the lesson.	
	1035011.	during the lesson.	
	NB:	NB:	
	Assessment must involve;	Assessment must involve;	
	the subject project and	the subject project and	
	Subject Portfolio.	Subject Portfolio.	
	Subject i ortjono.	Subject i ortjono.	
	E a constant	E a verte a	
	Examples	Examples	
	Upper Primary/JHS (Core):	Upper Primary/JHS (Core):	
	Subject project (class	Subject project (class	
	exercise): Hand sketch a	exercise): Hand sketch a	
	rectangle and a square (5	rectangle and a square (5	
	marks).	marks).	
	Subject Portfolio: Project	Subject Portfolio: Project	
	on investigating the	on investigating the	
	properties of 2D and 3D	properties of 2D and 3D	
	shapes using	shapes using	
	manipulatives and Google	manipulatives and Google	
	search.	search.	
	JHS (Elective):	JHS (Elective):	
	Subject Project:	Subject Project:	
	(Assignment): Identify the	(Assignment): Identify the	
	sample spaces for the	sample spaces for the	
	following:	following:	
	a. Dice	a. Dice	
	b. Coin	b. Coin	
	c. A pack of cards	c. A pack of cards	
	Subject Portfolio: A project	Subject Portfolio: A project	
	on using the google search	on using the google search	
	to Find both experimental	to Find both experimental	
	and theoretical	and theoretical	
	probabilities.	probabilities.	
		·	
	Assessment must be	Assessment must be	
	aligned to the NTEAP.	aligned to the NTEAP.	
	Continuous assessment	Continuous assessment	
	activities (assignments,	activities (assignments,	
	quizzes, group	quizzes, group	
	presentations, etc, should	presentations, etc, should	

I		
be used to create subject	be used to create subject	
projects and build subject	projects and build subject	
portfolios (See, Appendix	portfolios (See, Appendix	
11)	11)	
3.7 Ask each tutor to	3.7 Develop a sample of	
develop a sample of	assessment items	
assessment item based	based on the LOs and	
on the LOs and share	share with the whole	
with the whole group.	group.	
	0.001	
Example: Upper Primary	Example: Early, Upper	
and JHS (Core) Grades –	Primary and JHS (Core)	
Interview 8 basic school	Grades – Interview 8 basic	
teachers during the STS	school teachers during the	
activity to tell the	STS activity to tell the	
relationship among the	relationship among the	
number of faces, edges,	number of faces, edges,	
	and vertices of given	
and vertices of given	5.0	
shapes.	shapes.	
JHS Grade – In groups of	JHS Grade – In groups of	
three, use different	three, use different	
activities to differentiate	activities to differentiate	
between sample spaces	between sample spaces	
and event.	and event.	
3.8 Lead tutors to discuss	3.8 Discuss the various	
the various ways they	ways you can support	
can support student	student teachers to	
teachers to build their	build their subject	
subject portfolio.	portfolio.	
Example Encouraging	Example: Encouraging	
student teachers to file all	student teachers to file all	
their assignments with	their assignments with	
feedback in their folders	feedback in their folders.	
3.9 Ask a tutor to model a	3.9 Prepare and model a	
presentation of an	presentation of an	
activity using	activity using	
projector, internet	projector, internet	
search and taking into	search and taking into	
consideration GESI	consideration GESI	
issues (eg. Both	issues. (eg. Both	
genders taking the	genders taking the	
leading roles in their	leading roles in their	

		groups) NTS 1a, b, 2b,	groups) NTS 1a, b, 2b,	
		e, 3b, c, J; BSC pp. iii)	e, 3b, c, J; BSC pp. iii)	
4.	Evaluation and review of session:	Reflective Activity	Reflective Activity	15 mins
•	Tutors should Identifying critical friends to observe lessons and report at next session.	4.1 Engage tutors in self- evaluation as well as encourage tutors to provide feedback of the PD session taking	4.1 Show by fingers/nods of 5 or 3 or 1 as to those who "really got it", "got some of it" or "didn't get it"	
•	Identifying and addressing any outstanding issues relating to the lesson/s for clarification	 into consideration inclusivity – how to be patient with Stutterers, using tactile and audio devices for visually challenged, paying attention to all courses, etc. 4.1.1 Ask tutors to show by fingers/nods their level of satisfaction with the session. (NTS 1a, 3i). 	respectively. Explain if you really got the lesson	
		 4.2 Engage tutors to identify unresolved issues relating to this lesson for clarification NB: Take note of all unresolved issues and use any of following strategies put on SL/SWL WhatsApp platform for discussion Tutors to research for the next PD session for discussion 	4.2 Reflect on the activities in the session and outline unresolved issues relating to the lesson	
		4.3 Ask a critical friend to observe your teaching and record his/her findings to be presented after delivery or in the Next PD session.	4.3 Identify critical friend observes teaching and record his/her findings to be presented after delivery or in the Next PD session.	

	NB:	NB:
	Remind tutors to identify a	Identify a critical friend
	critical friend from the	from the same or related
	same or related discipline	discipline to observe
	to observe during teaching	during teaching and
	and provide feedback (NTS	provide feedback (NTS 1a)
	1a)	
	Advance Preparation	Advance Preparation
	4.4 Ask tutors to read	4.4 Ask tutors to read
	Lesson of the Course	Lesson of the Course
	Manual on:	Manual on:
	Upper Primary -	Upper Primary -
	Measurement: (Teaching	Measurement: (Teaching
	and Assessing)	and Assessing)
	JHS(Core) - Handling Data	JHS(Core) - Handling Data
	and Chance: (Teaching	and Chance: (Teaching
	and Assessing)	and Assessing)
	JHS(Elective) – Teaching	JHS(Elective) – Teaching
	Percentages and its	Percentages and its
	applications	applications
	NB:	NB:
	Read the course manual,	Read the course manual,
	the PD session guide	the PD session guide
	ahead of time to identify	ahead of time to identify
	any outstanding issues	any outstanding issues
	relating to the lesson for	relating to the lesson for
	clarification.	clarification.
	Collect all-inclusive	Collect all-inclusive
	resources (such as	resources (such as
	projector, flip chart and	projector, flip chart and
	sticky notes) you need	sticky notes) you need
	ahead of time, prepare	ahead of time, prepare
	samples of TLMs you may	samples of TLMs you may
	need.	need.
L	neeu.	necu.

Age Levels/s:

Name of Subject/s:

a. Upper Gradeb. JHS (Core)

c. JHS (Elective)

- a. Mathematics: Teaching and Assessing
- b. Teaching and Assessing JHS Mathematics
- c. Mathematics

Tutor PD Session for Lesson 8 in the Course Manual

Lesson Title:

- a. Upper Grade: Measurement (Teaching and Assessing)
- b. JHS (Core): Handling Data and Chance (Teaching and Assessing)
- c. JHS (Electives): Teaching Percentages and its applications

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. 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 stage of the session.	Time in session
1. Introduction to the	Introduction	Introduction	20 mins
session			
Review prior	1.1 Ice breaker activity:	1.1 Ice breaker:	
learning	Engage tutors in an	Participate in the	
 Reading and 	investigational activity	investigational activity	
discussion of the	by responding to the	by responding to the	
introductory	mental task. (eg. Which	mental task. (eg. Which	
sections of the	non-standard unit of	nonstandard unit of	
lesson up to and	measurement is used	measurement is used	
including learning	by	by	
outcomes and	a. Gari sellers	a. Gari sellers	
indicators	b. Cloth sellers	b. Cloth sellers	
Overview of content	c. Children during	c. Children during	
and identification of	play?	play?	
any distinctive	1.2 Ask tutors to tell how	1.2 Ask tutors to tell how	
aspects of the	useful the week 7 PD	useful the week 7 PD	
lesson/s,			
	session (NTS 1b)	session influenced your	

NP: The guidance for	influenced their	tooching and how	
NB: The guidance for	influenced their	teaching and how	
SL/HoD should identify	teaching over the week	students will employ	
and address any areas	and how students will	the various concepts	
where tutors might	employ the various	during the STS Field	
require clarification on	concepts during the	Experience.	
any aspect of the	STS Field Experience.		
lesson.			
NB: SL/HoD should ask	1.3 Ask a critical friend to	1.3 As a critical friend,	
tutors to plan for their	share with members,	share with members,	
teaching as they go	feedback on the	feedback on the	
through the PD session	observation made	observation you made	
	during the enactment	during the enactment	
	of lesson 7. That is:	of lesson 7. That is:	
	Upper Primary	Upper Primary	
	Shape and Space:	Shape and Space:	
	(Teaching and	(Teaching and	
	Assessment)	Assessment)	
	JHS (Core)	JHS (Core)	
	Shape, Space and	Shape, Space and	
	Measurement: (Teaching	Measurement: (Teaching	
	and Assessment)	and Assessment)	
	JHS (Elective)	JHS (Elective)	
	Teaching Probability	Teaching Probability	
	1.4 Lead tutors to discuss	1.4 Discuss any challenges	
	any challenges that	that arose during the	
	arose during the	enactment. Eg In what	
	enactment. Eg In what	ways did the students	
	ways did the students	appreciate the need to	
	appreciate the need to	consider equality and	
	consider equality and	equity during the	
	equity during the	lesson and during STS	
	lesson and during STS	activities?	
	activities?	ND.	
	NB:	NB:	
	Remember to put	Work in your phase	
	members into groups	group and contribute to	
	according to the phases	the whole group	
	to be taught in the	discussion.	
	semester and contribute	Pay attention to all NTS	
	to the whole group	references and salient	
	discussion.	points necessary for the	
	Pay attention to all NTS	development of your	
	references and salient	teaching plan.	
	points necessary for the		
	development of their		
	teaching plan.		

1.5 Ask tutors to silently read the introductory sections of lesson 8 in the course manual (including the learning outcomes-LOs). Let tutors suggest relevant previous knowledge of students that will support effective teaching and learning of the lesson.	1.5 Silently read the introductory sections of lesson 8 in the course manual (including the LOs. Suggest relevant previous knowledge of students that will support effective teaching and learning of the lesson.	
1.6 Guide tutors to read the course manual silently and identify the purpose and state their expectations of the lesson 8 PD session on post-in cards and share with the whole group. NTS 2b	1.6 Read the course manual silently and identify the purpose of lesson 8 and state your expectations on post-in cards and share with the whole group. NTS 2b (NTS 2b).	
1.7 Ask tutors in phase groups to discuss the important or distinctive aspects of lesson 8 including vocabulary and fundamental concepts.	1.7 In your phase group, identify the important features of lesson 8 in the course manual taking note of cross cutting themes (including developing awareness of equity and diversity issues and issues on ICT).	
Distinctive aspects a. Upper Primary- measurement using non- standard and standard units; Measurement of	Distinctive aspects a. Upper Primary- measurement using non- standard and standard units; Measurement of	
angles b. JHS (core) – Collecting, interpreting and presenting data in multiple ways; Measures of central tendencies; Chance	angles b. JHS (core) – Collecting, interpreting and presenting data in multiple ways; Measures of central tendencies; Chance	
c. JHS (Elective) – Percentage and its	c. JHS (Elective) – Percentage and its	

	applications; Money and	applications; Money and	
	taxes; Wages, salaries	taxes; Wages, salaries	
	and bank transactions	and bank transactions	
2 Concert	Concert Development	Concert Development	15 mins
2. Concept Development (New	Concept Development	Concept Development	15 mins
learning likely to	2.1 Ask tutors to identify	2.1 Identify familiar and	
arise in lesson/s):	familiar and unfamiliar	unfamiliar concepts in	
 Identification and 	concepts in their	your lesson and discuss	
discussion of new	lessons and discuss	with the larger group.	
learning, potential	with the larger group.	Upper Primary	
barriers to learning	Upper Primary	Familiar Concepts:	
for student teachers	Familiar Concepts:	Traditional unit of	
or students,	Traditional unit of	measuring length	
concepts or	measuring length	Unfamiliar concepts:	
pedagogy being	Unfamiliar concepts:	Referent non-standard	
introduced in the	Referent non-standard	units for measuring	
lesson, which need	units for measuring	capacity	
to be explored with	capacity	JHS (Core)	
the SL/HoD	JHS (Core)	Familiar Concepts:	
NB: The guidance for	Familiar Concepts:	Collecting data; Measures	
SL/HoD should set out	Collecting data; Measures	of central tendencies	
what they need to do	of central tendencies	Unfamiliar concepts:	
to introduce and	Unfamiliar concepts:	Interpreting and	
explain the issues/s with tutors	Interpreting and presenting data in	presenting data in multiple ways; Chance	
with tutors	multiple ways; Chance	JHS (Elective)	
	JHS (Elective)	Familiar concepts:	
	Familiar concepts:	Concept of Percentage	
	Concept of Percentage	Unfamiliar concepts:	
	Unfamiliar concepts:	Taxation, discount,	
	Taxation, discount,	commissions and VAT	
	commissions and VAT		
	2.2 Lead tutors to draw	2.2 In your phase group,	
	connections among	draw connections	
	concepts in the various	among concepts in the	
	lessons in line with the	lesson and in line with	
	basic school	the basic school	
	curriculum.	curriculum.	
	NB: Encourage tutors to		
	give examples beyond the		
	suggested ones.		
	Example	Example	
	Upper Primary: The use of	Upper Primary: The use of	
	standard units helps	standard units helps	
	eliminate	eliminate	

misundarstanding	misundorstanding	٦
misunderstanding	misunderstanding	
associated with the use of	associated with the use of	
non-standard units for	non-standard units for	
measuring.	measuring.	
BSC; B4.3.1.1, B5.3.1.1	BSC; B4.3.1.1, B5.3.1.1	
JHS (Core): Data can be	JHS (Core): Data can be	
deduced from charts and	deduced from charts and	
graphs. A measure of	graphs. A measure of	
central tendencies	central tendencies	
describes a set of data by	describes a set of data by	
identifying the central	identifying the central	
position within that set of	position within that set of	
data. BSC; B4.4.1.1,	data. BSC; B4.4.1.1,	
B4.4.1.2, B5.4.1.1,	B4.4.1.2, B5.4.1.1,	
B5.4.1.2	B5.4.1.2	
JHS (ELECTIVE): Simple	JHS (ELECTIVE): Simple	
interest, Income tax and	interest, Income tax and	
compound interest are	compound interest are	
computed in percentages.	computed in percentages.	
BSC; B4.1.5.1, B5.1.5.1	BSC; B4.1.5.1, B5.1.5.1	
2.3 Ask tutors through	2.3 Individually, outline the	
Think-Pair-Share to	challenging areas in	
outline possible	your lesson, share with	
challenging areas in	a member of the same	
teaching and assessing	phase group and then	
the lesson.	with the whole group.	
Example:	Example:	
Upper Primary: Using	Upper Primary: Using	
appropriate TLMs for	appropriate TLMs for	
measuring angles	measuring angles	
JHS (Core): Availability of	JHS (Core): Availability of	
grid boards in the basic	grid boards in the basic	
schools for demonstration	schools for demonstration	
by teachers and for	by teachers and for	
student teachers to have	student teachers to have	
the feel of the teaching of	the feel of the teaching of	
the lesson in basic school	the lesson in basic school	
classroom.	classroom.	
JHS (Elective): Developing	JHS (Elective): Developing	
understanding of taxation	understanding of taxation	
with available TLMs	with available TLMs	
2.4 Lead tutors to discuss	2.4 In whole group, discuss	
misconceptions and	misconceptions and	
barriers in teaching	barriers in teaching and	
and learning of the	learning of the lesson.	
lesson.		

1		Example:	Example:	
		Example:	Example:	
		Upper Primary: –	Upper Primary: –	
		Measurement is only done	Measurement is only done	
		with standard units	with standard units	
		b. JHS (Core) – Chance is	b. JHS (Core) – An angle is	
		computed only in common	only a figure and not a	
		fractions	measure.	
		JHS (Electives): Taxation is	JHS (Electives): Taxation is	
		a difficult topic	a difficult topic	
		Barriers may include weak	Barriers may include weak	
		prior knowledge in the	prior knowledge in the	
		concept of probability,	concept of probability, lack	
		lack of appropriate	of appropriate resources	
		resources for practicing,	for practicing, lack of	
		lack of opportunity to use	opportunity to use ICT due	
		ICT due to failure of	to failure of electric power	
		electric power (lights-out),	(lights-out), interrupted	
		interrupted network,	network, unavailability of	
		unavailability of internet	internet bundle for	
		bundle for students,	students, inadequate	
		inadequate contact time	contact time due to staff	
		due to staff meetings.	meetings.	
	Dianning for	Dianaing for Toophing and	Discution (as Taxabitan and	40
3.	Planning for	Planning for Teaching and	Planning for Teaching and	40 mins
3.	Planning for teaching, learning	Planning for Teaching and learning Activities for the	Planning for Teaching and learning activities	40 mins
3.	teaching, learning and assessment	learning Activities for the	learning activities	40 mins
3.	teaching, learning and assessment			40 mins
3.	teaching, learning and assessment activities for the	learning Activities for the Lesson	learning activities	40 mins
	teaching, learning and assessment activities for the lesson/s	learning Activities for the Lesson 3.1 Ask tutors in their	learning activities 3.1 In your phase group,	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and	learning Activities for the Lesson3.1 Ask tutors in their phase groups to	learning activities 3.1 In your phase group, suggest teaching and	40 mins
	teaching, learning and assessment activities for the lesson/s Reading and discussion of the	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and 	learning activities 3.1 In your phase group, suggest teaching and learning activities for	40 mins
	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for 	learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; 	learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring;	40 mins
	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task, etc. referring to NTS 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of questions to different 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of questions to different categories of learners 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task, etc. referring to NTS 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of questions to different categories of learners based on gender, ability, 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task, etc. referring to NTS 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of questions to different categories of learners based on gender, ability, previous experience, etc. 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task, etc. referring to NTS 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of questions to different categories of learners based on gender, ability, previous experience, etc. referring to NTS 1a, b, c, d, 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task, etc. referring to NTS 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of questions to different categories of learners based on gender, ability, previous experience, etc. 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task, etc. referring to NTS 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum Noting	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of questions to different categories of learners based on gender, ability, previous experience, etc. referring to NTS 1a, b, c, d, 2b, e, f, 3b, c 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task, etc. referring to NTS 1a, b, c, d, 2b, e, f, 3b, c 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum Noting opportunities for	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of questions to different categories of learners based on gender, ability, previous experience, etc. referring to NTS 1a, b, c, d, 2b, e, f, 3b, c 3.2 Ask tutors to read the 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task, etc. referring to NTS 1a, b, c, d, 2b, e, f, 3b, c 3.2 Read the activities 	40 mins
•	teaching, learning and assessment activities for the lesson/s Reading and discussion of the teaching and learning activities Noting and addressing areas where tutors may require clarification Noting opportunities for making links to the Basic School Curriculum Noting opportunities for integrating: GESI	 learning Activities for the Lesson 3.1 Ask tutors in their phase groups to suggest teaching and learning activities for the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task iii. Even distribution of questions to different categories of learners based on gender, ability, previous experience, etc. referring to NTS 1a, b, c, d, 2b, e, f, 3b, c 	 learning activities 3.1 In your phase group, suggest teaching and learning activities for teaching the lesson ensuring; i. Provision is made for SEN ii. Both genders take leading roles in group task, etc. referring to NTS 1a, b, c, d, 2b, e, f, 3b, c 	40 mins

•	Reading, discussion,	manuals and identify	and identify areas that	
	and identification of	areas that require	require clarification.	
	continuous	clarification.		
	assessment	ND. Defende the Ducie	ND. Defende the Decis	
	opportunities in the lesson. Each lesson	NB: Refer to the Basic	NB: Refer to the Basic	
	should include at	School Curriculum (BSC pp. xv – xvii) and	School Curriculum (BSC pp. xv – xvii) and	
	least two	https://statisticsbyjim.com	https://statisticsbyjim.co	
	opportunities to use	for explanations on "The	m	
	continuous	concept of statistics and	for explanations on "The	
	assessment to	operations on fraction"	concept of statistics and	
	support student	and search through "IXL	operations on fraction"	
	teacher learning	Math".	and search through "IXL	
•	Resources:		Math".	
	 links to the 			
	existing PD	3.3 Lead tutors to brainstorm some	3.3 Brainstorm some	
	Themes, for example, action	pedagogical	pedagogical approaches that can	
	research,	approaches and their	be employed during	
	questioning and	impact on learning of	the lesson and their	
	to other external	the concepts taking	effectiveness towards	
	reference	into consideration	learning of the	
	material:	inclusivity.	concepts. Mention	
	literature, on	Example:	any GESI issues that	
	web, Utube,	i) The use of inquiry to	need consideration	
	physical	explore the range of	while using those	
	resources, power	values that probability takes.	approaches	
	point; how they should be used.	(ii) The use of		
	Consideration	differentiation and		
	needs to be given	scaffolding to ensure that		
	to local	no learner is left behind		
	availability	(BSC pp. xv)		
	\circ guidance on any	iii) Being patient with		
	power point	stutterers, using tactile or		
	presentations,	braille for visually		
	TLM or other	challenged, providing peer		
	resources which	support for those who		
	need to be	might need, while you pay attention to all Phases.		
	developed to support learning			
	Tutors should be	3.4 Ask tutors to explain	3.4 Suggest teaching	
	expected to have a	some suggested	strategies to be used	
	plan for the next	teaching strategies that	in achieving the LOs of	
	lesson for student	can help inculcate core	the lesson and explain	
	teachers	competencies in	how they can help	
		student teachers and	inculcate core	

	for that matter Basic	competencies in	
	School learners.	student teachers and	
		for that matter Basic	
		School learners.	
	Example:	Example:	
	a) Pedagogical	a) Pedagogical	
	approaches:	approaches:	
	Group Work to explore the	Group Work to explore the	
	relationship among	relationship among	
	Associated 21 st century	Associated 21 st century	
	skills:	skills:	
	Social and Leadership Skills	Social and Leadership Skills	
		p	
	b) Pedagogical	b) Pedagogical	
	approaches: Using	approaches: Using	
	investigation to identify	investigation to identify	
	generalizations on laws of	generalizations on laws of	
	indices Associated 21 st	indices Associated 21 st	
	<u>century skills</u> :	century skills:	
	Critical Thinking	<u>Critical Thinking</u>	
		NB: Let tutors suggest	
	NB: Let tutors suggest	more examples beyond	
	more examples beyond	those suggested above.	
		those suggested upove.	
	those suggested above.		
	3.5 Ask tutors to mention	3.5 Mention some GESI	
	some GESI responsive	responsive resources that can be used with	
	resources that can be		
	used with the suggested	the suggested	
	approaches and	approaches and	
	strategies in achieving	strategies in achieving	
	the LOs.	the LOs.	
	E.g. Resources may include	E.g. Resources may include	
	supporting staff with	supporting staff with	
	experts in sign language	experts in sign language	
	as well as resources such	as well as resources such	
	as teacher and learner	as teacher and learner	
	resource packs, grid	resource packs, textbooks,	
	boards, graph sheets,	etc	
	textbooks, course manual,		
	projectors, flip charts,		
	sticky notes, braille, tactile		
	materials, audio and		
	audio-visuals that can be		
	used in the teaching and		
	learning of the concepts		
	mentioned above (NTS 3j)		
<u> </u>		1	

3.6 Lead tutors to discuss	3.6 Using discussion, lead	
assessment strategies ('as' and 'for') to be	tutors to come out with assessment	
. ,	strategies ('as' and	
used during teaching of the lesson.	. .	
	'for') to be used during	
NB: Continuous	teaching of the lesson. NB: Continuous	
assessment activities		
	assessment activities	
(assignments, quizzes,	(assignments, quizzes,	
report writing, group	report writing, group	
presentations, etc. should	presentations, etc. should	
be used to create subject	be used to create subject	
projects and build subject	projects and build subject	
portfolios).	portfolios).	
Example: A project on how	Example: A project on how	
to teach measurement of	to teach measurement of	
area from non-standard	area from non-standard	
unit up to and including	unit up to and including	
standard unit. (Upper	standard unit. (Upper	
Primary)	Primary)	
	, , , , , , , , , , , , , , , , , , ,	
A project on investigation	A project on investigation	
of experiments that will	of experiments that will	
generate P(E)=0;	generate P(E)=0;	
0 <p(e)<1, p(e)="1</td"><td>0<p(e)<1, e)="1</td" p(=""><td></td></p(e)<1,></td></p(e)<1,>	0 <p(e)<1, e)="1</td" p(=""><td></td></p(e)<1,>	
(JHS - Core)	(JHS - Core)	
	· · · ·	
A project on developing an	A project on developing an	
understanding of taxation.	understanding of taxation.	
(JHS – Elective)	(JHS – Elective)	
NB: Make reference to	NB: Make reference to	
assessment in the course	assessment in the course	
manual and NTEAP	manual and NTEAP	
3.7 Ask each tutor to	3.7 Develop a sample of	
develop a sample of	assessment items	
assessment item based	based on the LOs and	
on the LOs and share	share with the whole	
with the whole group.	group.	
Example:	Example:	
Upper Primary – Interview	Upper Primary – Interview	
10 basic school learners on	10 basic school learners on	
10 non-standard units	10 non-standard units	
used in their community	used in their community	

 4. Evaluation and review of session: Tutors need to identify critical friends to observe lessons and report at next session Identifying and addressing any outstanding issues relating to the lesson/s for clarification 	Evaluation and review of session: 4.1 Engage tutors in providing feedback of the PD session taking into consideration – Clarity of content, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 1	Evaluation and review of session: 4.1 Reflect and provide feedback on this PD session taking into consideration – Clarity of content, pedagogical approaches employed, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi)? and make notes that will help you to teach Lesson 1	15 mins
	 search and can be abea and teaching the concept of chance 3.8 Lead tutors to discuss the various ways they can support student teachers to build their subject portfolio. E.g. Encouraging student teachers to file all feedback on micro teaching in their folders. 3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration equality and equity in assigning roles and in choosing material for teaching) NTS 1a, b, 2b, e, 3b, c, J; BSC pp. iii) 	 game that can be used in teaching the concept of chance 3.8 Discuss the various ways you can support student teachers to build their subject portfolio. E.g. Encouraging student teachers to file all feedback on micro teaching in their folders. 3.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration equality and equity in assigning roles and in choosing material for teaching) NTS 1a, b, 2b, e, 3b, c, J; BSC pp. iii) 	
	JHS (Core) – Write a report on the steps you will use to representation of data on a particular graph. JHS (Elective) – Develop a game that can be used in	JHS (Core) – Write a report on the steps you will use to representation of data on a particular graph. JHS (Elective) – Develop a game that can be used in	

Г Т			
4.7	2 Engage tutors to	4.2 Identify unresolved	
	identify unresolved	issues relating to this	
	issues relating to this	lesson for clarification.	
	lesson for clarification.	NB: Put your unresolved	
	B: Take note of all	<i>issues unto</i> the	
	nresolved issues that	department's WhatsApp/	
	ay need further research	Telegram platform and	
	consultation and use	research into the issues	
	ny of following strategies	raised.	
	address them.	i. put on SL/SWL	
	put on SL/SWL	WhatsApp/ Telegram	
	'hatsApp/ Telegram	platform for discussion	
-	atform for discussion	ii. tutors to research for	
	tutors to research for	the next PD session for	
	e next PD session for	discussion	
dis	scussion		
4.3	3 Ask tutors to identify a	4.3 Identify a critical friend	
	, critical friend from the	from the same or	
	same or related	related discipline to	
	discipline to observe	observe the enactment	
	the enactment of their	of your lesson and to	
	lesson and provide	provide feedback	
	feedback during the	during the next PD	
	next PD Session (NTS	Session (NTS 1a).	
	1a).		
Ac	dvance Preparation	Advance Preparation	
NE	3:	NB:	
	Inform tutors to	Inform tutors to	
	remember to prepare	remember to prepare	
	their teaching plan for	their teaching plan for	
	Lesson 8 taking note of	Lesson 8 taking note of	
	important or distinctive	important or distinctive	
	aspects of the lesson	aspects of the lesson	
	and crosscutting issues.	and crosscutting issues.	
\triangleright	Inform tutors to read	Read Lesson 9 of the	
	Lesson 9 of the Course	Course Manual on:	
	Manual on:		
	SSON 9	LESSON 9	
	oper Primary –	Upper Primary –	
	easurement 2 (Teaching	Measurement 2 (Teaching	
	nd Assessing)	and Assessing)	
	IS (Core) - Rational and	JHS (Core) - Rational and	
1.00			
	rational numbers 1 eaching and Assessing)	Irrational numbers 1 (Teaching and Assessing)	

Measurement II NB:	JHS (Elective) – Measurement II NB:
NB:	
	NB:
i. Read the course manual the PD session guide, the NTEAP, and the NTS ahead of time to identify any outstanding issues relating to the lesson for clarification. ii. Collect all-inclusive 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, the NTEAP, and the NTS ahead of time to identify any outstanding issues relating to the lesson for clarification.

Age Levels/s:

Name of Subject/s:

- a. Upper Primary
- b. JHS Core)
- c. JHS (Elective)
- a. Mathematics: Teaching and Assessing
- b. Teaching and Assessing JHS Mathematics
- c. Mathematics

Tutor PD Session for Lesson 9 in the Course Manual

Lesson Tittle:

- a. Upper Primary: Measurement 2
- b. JHS (Core): Rational and Irrational numbers 1
- c. JHS (Elective): Money and taxes, wages, salaries and bank transactions (pay in slips and checks), simple and compound interest,

pr wh th sh to wn an sa se an sh co	cus: the bullet points ovide the frame for hat is to be done in e session. The SWL ould use the bullets guide what they rite for the SL/HoD id tutors to do and y during each ssion. Each bullet eeds to be addressed of specific reference ould be made to the urse manual/s.	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 stage of the session.	Time in session
1.	Introduction to the	Introduction	Introduction	20 mins
•	session Review prior learning A critical friend to share findings for a short discussion and lessons learned Reading and discussion of the introductory	 1.1 Ice breaker activity: Begin with an investigational activity for the lessons. E.g., How will you guide a 12-year-old learner to identify the number of fives (5s) in 16. 	1.1 Demonstrate with any relevant learning resources to determine the number of fives in 16.	
•	introductory sections of the lesson up to and including learning outcomes and indicators Overview of content and identification of any distinctive	1.2 Ask tutors to discuss how useful the previous PD session was and how it influenced their teaching in lesson 8. Lead them to provide examples of how students were	1.2 Discuss the usefulness the previous semester's PD session was and how it influenced your teaching in lesson 8. Provide examples of how students were prepared to employ the	

aspects of the	prepared to employ the	various strategies and	
lesson/s,	various strategies and	skills during the basic	
NB The guidance for	skills during the basic	school classroom work	
SL/HoD should identify	school classroom work	in STS Field Experience	
and address any areas	in STS Field Experience	in year 4 semester 1	
where tutors might	in year 4 semester 1		
require clarification on			
any aspect of the	1.3 Ask a critical friend to	1.3 As a critical friend	
lesson.	give feedback on	share his/her	
NB SL/HoD should ask	observation during	observation on the	
tutors to plan for their	enactment of the	eighth lesson.	
teaching as they go	seventh (8 th) lesson.		
through the PD session			
	NB: Thing's tutor might		
	have observed; tutor's		
	choice of words,		
	pedagogical content		
	knowledge, content		
	knowledge subject matter,		
	ICT tools, GESI and the use		
	of NTEAP.		
	1.4 Ask tutors to read and	1.4 Read and discuss the	
	discuss the	introductory section of	
	introductory section of	the lesson (up to	
	the lesson including	learning outcomes).	
	the learning outcomes	Suggest relevant	
	(LOs) in phase groups.	previous knowledge of	
		students that will	
		support effective	
		teaching and learning	
		of the lesson.	
	1.5 Ask tutors to identify	1.5 Identify the purpose of	
	the purpose of the	the lesson from the	
	lesson from the course	course manual and	
	manual and state their	state your	
	expectations of the PD	expectations of the PD	
	Session.	Session.	
	Upper Primary	Upper Primary	
	i. Prepare and model	i. Prepare and model	
	interactive, develop	interactive, develop and	
	and innovative ways of	innovative ways of	
	teaching student	teaching student	
	teachers'	teachers' understanding	
	understanding of	of Perimeter and areas	
	Perimeter and areas of	of triangle,	

triangle, Circumference	Circumference and areas	
and areas of circular	of circular regions;	
regions; Surface area	Surface area and	
and volumes of prisms	volumes of prisms and	
	•	
and pyramids.	pyramids.	
JHS Core	JHS Core	
ii. Prepare and model	ii. Prepare and model	
interactive, develop	interactive, develop	
and innovative ways of	and innovative ways of	
teaching student	teaching student	
teachers'	teachers'	
understanding of	understanding of	
student teachers'	student teachers'	
understanding of the	understanding of the	
nature and importance	nature and importance	
of Rational and	of Rational and	
Irrational numbers,	Irrational numbers,	
future Mathematics to	future Mathematics to	
JHS learners.	JHS learners.	
JHS (Elective)	JHS (Elective)	
Expose student teachers	Expose student teachers	
to:	to:	
i. develop the	i. develop the	
-	-	
understanding of	understanding of	
money and taxes and	money and taxes and	
other related concepts;	other related concepts;	
ii. investigate activities to	ii. investigate activities to	
develop the concept of	develop the concept of	
money and taxes,	money and taxes,	
wages, salaries and	wages, salaries and	
bank transactions.	bank transactions.	
1.6 Ask tutors in phase	1.6 In phase groups,	
groups to discuss the	discuss the distinctive	
important or	aspects of the s lesson	
distinctive aspects of	including vocabulary	
the lesson including	and fundamental	
vocabulary and	concepts related to the	
fundamental concepts.	components of the	
	front matters.	
Distinct Aspects	Distinct Aspects	
Upper Primary	Upper Primary	
Perimeter and areas of	Perimeter and areas of	
triangles, Circumference	triangles, Circumference	
and areas of circular	and areas of circular	

	1
regions; Surface area and regions; Surface area and	
volumes of prisms and volumes of prisms and	
pyramids. pyramids.	
JHS(Core) JHS(Core)	
The Real number system, The Real number system,	
relationships among the relationships among the	
various aspects of real various aspects of real	
number system and number system and	
Operations and properties Operations and properties	
of rational numbers of rational numbers	
application of real number application of real number	
system to real life. system to real life.	
JHS(Elective) JHS(Elective)	
Money and taxes, wages, Money and taxes, wages,	
salaries and bank salaries and bank	
transactions (pay in slips transactions (pay in slips	
and checks), simple and and checks), simple and	
compound interest. compound interest.	
Vocabulary Vocabulary	
Upper Primary: Upper Primary:	
measurement, area, measurement, area,	
volume, prism, pyramid, volume, prism, pyramid,	
etc etc	
JHS (core): rational, JHS (core): rational,	
irrational, denominator, irrational, denominator,	
numerator, pi, etc. numerator, pi, etc.	
JHS (Elective): money, JHS (Elective): money,	
bank, taxes, compound, bank, taxes, compound,	
depreciates, payment, etc. depreciates, payment, etc.	
Fundamental Concepts Fundamental Concepts	
Upper Primary: Upper Primary:	
Measurement of Area, Measurement of Area,	
Volume, Volume,	
JHS (Core): Addition, JHS (Core): Addition,	
Subtraction, Multiplication Subtraction, Multiplication	
and Division of Rational and Division of Rational	
and Irrational Numbers, and Irrational Numbers,	
etc etc	
JHS (Elective): Money, JHS (Elective): Money,	
taxation, etc. taxation, etc.	
2. Concept Concept Development Concept Development 15	mins
Development (New	
learning likely to 2.1 Ask tutors to identify 2.1 Identify familiar and	
arise in lesson/s): familiar and unfamiliar unfamiliar concepts in	
Identification and concepts in their your lesson and	

learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors	lessons and discuss with the larger group.Familiar ConceptsUnfamiliar conceptsMeasureme nt of money.Measureme nt of TaxationMeasureme nt of length and areaMeasureme nt of UndersteinCounting to establish quantitiesEstimation quantitiesAddition, subtraction and no f rational numbersDivision of rational numbers2.2 Lead tutors to draw concepts in the various lessons in line with the	discuss with the larger group. 2.2 In your phase groups, draw connections among concepts in the lesson and in line with
	 lessons in line with the basic school curriculum. Eg. UPPER PRIMARY: estimating and measuring perimeter, surface area connects to rational numbers which also connect to buying and selling using money (BSC B4.1.3.2; B 5.3.2.2; B9.1.1.2). JHS: the connection is that estimating quantities is link application of everyday commercial activities (BSC: B 5.1.4.1; B5.1.5.1; B9.1.1.2). 2.3 Lead tutors to use Think-Pair-Share to outline possible challenging areas in teaching their lessons. 	 lesson and in line with the basic school curriculum. 2.3 Individually, outline the challenging areas in teaching your lesson, share with a member of the same phase

Example:	group and then with	
Upper Primary (Teaching	the whole group.	
	the whole group.	
measurement): non-		
availability of resource		
materials for teaching		
shapes and space.		
JHS Core/Elective (rational		
and irrational &		
measurement of money		
and taxation)		
• Inadequate pedagogical		
content knowledge for		
teaching volume of		
taxation and irrational		
numbers.		
• Teaching a lesson		
without the relevant		
resources including ICT		
tools.		
Each of the above can be		
addressed through further		
reading and advance		
preparation – e.g.		
searching the internet for		
solutions to the identified		
challenging areas.		
5 5		
2.4 Lead tutors to discuss	2.4 In whole group, discuss	
misconceptions and	misconceptions and	
barriers to learning in	barriers to learning in	
the lesson.	the lesson.	
Example:	Example:	
Example:	a. UPPER PRIMARY: –	
a. UPPER PRIMARY: -		
Misconception of space	misconception of space	
shape and measurement	shape and measurement	
is that a square is not a	is that a square is not a	
rectangle; a square is not	rectangle; a square is not	
a rhombus; slant height	a rhombus; slant height	
of a pyramid is	of a pyramid is	
considered as the actual	considered as the actual	
height of the pyramids.	height of the pyramids.	
b. JHS (Core/Elective)–	b. JHS (Core/Elective) –	
Misconception of	Misconception of	
irrational number is that pi	irrational number is that pi	
	is the same as $\frac{22}{7}$ and	
is the same as $\frac{22}{7}$ and	/	
measurement and	measurement and	

		estimation of quantity and	estimation of quantity and	
		money are not the same.	money are not the same.	
		Barriers to learning may	Barriers to learning may	
		include: weak prior	include: weak prior	
		knowledge, students	knowledge, students	
		engaging in non-academic	engaging in non-academic	
		activities to the detriment	activities to the detriment	
		of academic engagement,	of academic engagement,	
		lack of appropriate	lack of appropriate	
		resources, lack of	resources, lack of	
		opportunity to use ICT	opportunity to use ICT	
		tools due to power	tools due to power	
		outages, interrupted	outages, interrupted	
		internet connectivity,	internet connectivity,	
		unavailability of internet	unavailability of internet	
		bundle for accessing the	bundle for students,	
		internet, inadequate	inadequate contact time	
		contact time due to staff	due to staff meetings.	
		meetings.		
3.	Planning for	Teaching and learning	Teaching and learning	40 mins
	teaching, learning	activities	activities	
	and assessment			
	activities for the	3.1 Ask tutors to suggest	3.1 Suggest teaching and	
	lesson/s	teaching and learning	learning activities for	
•	Reading and	activities for the lesson	the lesson taking into	
	discussion of the	taking into account	consideration GESI.	
	teaching and	GESI issues.		
	learning activities			
•	Noting and	Example:	Example:	
	addressing areas	i. equal opportunity is	i. equal opportunity is	
	where tutors may	given to persons with SEN	given to persons with SEN	
	require clarification	to ask and answer	to ask and answer	
	•	questions in class.	questions in class.	
	Noting	ii. ensures equal	ii. ensures equal	
	opportunities for	participation of female	participation of female	
	making links to the			
	Dacia Cabaal			
	Basic School	and males during role	and males during role	
•	Curriculum	play. iii. positive feedback	play. iii. positive feedback	
I	Curriculum Noting	play. iii. positive feedback is given to both males and	play. iii. positive feedback is given to both males and	
	Curriculum Noting opportunities for	play. iii. positive feedback is given to both males and females,	play. iii. positive feedback is given to both males and females,	
	Curriculum Noting opportunities for integrating: GESI	play. iii. positive feedback is given to both males and females, iv. body language does not	play. iii. positive feedback is given to both males and females, iv. body language does not	
	Curriculum Noting opportunities for integrating: GESI responsiveness and	play. iii. positive feedback is given to both males and females, iv. body language does not exclude girls or shows	play. iii. positive feedbackis given to both males andfemales,iv. body language does notexclude girls or shows	
	Curriculum Noting opportunities for integrating: GESI responsiveness and ICT and 21 st C skills	play. iii. positive feedback is given to both males and females, iv. body language does not exclude girls or shows preferential treatment to	play. iii. positive feedback is given to both males and females, iv. body language does not exclude girls or shows preferential treatment to	
•	Curriculum Noting opportunities for integrating: GESI responsiveness and ICT and 21 st C skills Reading, discussion,	play. iii. positive feedback is given to both males and females, iv. body language does not exclude girls or shows preferential treatment to boys,	 play. iii. positive feedback is given to both males and females, iv. body language does not exclude girls or shows preferential treatment to boys, etc 	
•	Curriculum Noting opportunities for integrating: GESI responsiveness and ICT and 21 st C skills	play. iii. positive feedback is given to both males and females, iv. body language does not exclude girls or shows preferential treatment to	play. iii. positive feedback is given to both males and females, iv. body language does not exclude girls or shows preferential treatment to	

	accoccmont	poors ats NTS 1a b s d	
	assessment	peers, etc. NTS 1a, b, c, d,	
	opportunities in the	2b, e, f, 3b, c	
	lesson. Each lesson		
	should include at	3.2 Let tutors read the	3.2 Read the activities
	least two	activities outlined in	outlined in your course
	opportunities to use	their course manuals	manual and identify
	continuous	and identify areas that	areas that require
	assessment to	require clarification.	clarification.
	support student	Strategies to clarify the	
	teacher learning	otherwise dark spots may	
•	Resources:	include investigation,	
	 links to the 	internet search, etc.	
	existing PD		
	Themes, for	3.3 Lead tutors to	3.3 Brainstorm to come up
	example, action	brainstorm to come up	with some pedagogical
	research,	with some pedagogical	approaches and their
	questioning and	approaches and their	related core
	to other external	related core	competencies likely to
	reference	competencies likely to	be inculcated in
	material:	be inculcated in	students and for that
	literature, on	students and for that	matter Basic School
	web, Utube,	matter Basic School	learners.
	physical	learners. eg.	
	resources, power	(a)UP/JHS (core)	
	point; how they	Strategy: Expository and	
	should be used.		
	Consideration	Discussion	
	needs to be given	Core Competencies:	
	to local	Problem solving, critical	
	availability	and creative thinking and	
	 guidance on any 	communication.	
	power point	(b) JHS (Elective)	
		Strategy: interactive and	
	presentations,	Collaborative group work,	
	TLM or other	Discussion	
	resources which	Core Competencies:	
	need to be	Critical thinking skills,	
	developed to	Collaborative learning and	
	support learning	Problem-Solving Skills.	
•	Tutors should be		
	expected to have a	3.4 Ask tutors to discuss	3.4 Discuss the assessment
	plan for the next	the assessment	strategies to be used
	lesson for student		_
	teachers	strategies to be used	during teaching of the
		during teaching of the	lesson- Subject Project
		lessons.	and Subject Portfolio).
		NB: Assessment must	Assessment must be
		involve; the subject project	aligned with the
		and Subject Portfolio	NTEAP.

 projects and build subject portfolios (See, Appendix II) 3.5 Lead tutors to discuss the various ways they can support student teachers to build their project and subject portfolio. 3.6 Let a tutor model a presentation of an activity using ICT tools and taking into consideration GESI 	 3.5 Discuss the various ways they can support student teachers to build their project and subject portfolios. 3.6 Model a presentation of an activity using ICT tools and taking into consideration GESI issues in the lessons 	
Assessment must be aligned to the NTEAP. Continuous assessment activities (assignments, quizzes, group presentations, etc, should be used to create subject		
UP, JHS (Core): Mathematics Curriculum JHS (Elective): <i>Project</i> based on money and taxes and also answer questions on worksheets based on simple and compound interests.		
based on: Assign student teachers to complete teacher-made worksheets on operations and properties of rational and irrational numbers as found in the Primary School.		

		in their groups and in		[]
		in their groups and in the demonstration of the use of ICT tools) to teach their lessons. (NTS 1a, b, 2b, e, 3b, c, J; BSC pp. 23 PD manual 21)		
4.	Evaluation and review of session:	Reflective Activity	Reflective Activity	15 mins
•	Tutors should Identifying critical friends to observe lessons and report at next session. Identifying and addressing any outstanding issues relating to the lesson/s for clarification	4.1 Engage tutors in self- evaluation as well as encourage tutors to provide feedback of the PD session taking into consideration inclusivity – how to be patient with Stutterers, speak to leaners with hearing difficult to read their lips, using tactile and audio devices for person low/no vision is supported with brailed device, paying attention to all courses, etc. Ask tutors to show by fingers/nods their level of satisfaction with the session. (NTS 1a, 3i).	4.1 Show by fingers/nods of 5 or 3 or 1 as to those who "really got it", "got some of it" or "didn't get it" respectively. Explain if you really got the lesson.	
		 4.2 Engage tutors to identify unresolved issues relating to this lesson for clarification. NB: Take note of all unresolved issues and use any of following strategies - put on SL/SWL WhatsApp platform for discussion -tutors to research for the next PD session for discussion 	4.2 Reflect on the activities in the session and outline unresolved issues relating to the lesson.	

 [
4.3 Ask a critical friend to observe your teaching and record his/her findings to be presented after delivery or in the Next PD session.	4.3 Identify critical friend observes teaching and record his/her findings to be presented after delivery or in the Next PD session.	
NB: Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a)	NB: Identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a)	
Advance Preparation	Advance Preparation	
 4.4 Ask tutors to remember to prepare proforma for Lesson 9 taking note of important or distinctive aspects of the lesson and crosscutting issues and read Lesson 10 of the Course Manual on: Upper Primary - Handling Data 1 (Teaching and Assessing) JHS(Core) - Fractions 1 (Teaching and assessing). JHS(Elective) – Percentages and its applications 	4.4 Remember to prepare proforma for the lesson 9 taking note of important or distinctive aspects of the lesson and crosscutting issues and read Lesson 10 of the Course Manual on: Upper Primary - Handling Data 1 (Teaching and Assessing) JHS(Core) - Fractions 1 (Teaching and assessing). JHS(Elective) – Percentages and its applications.	
NB: <i>i.</i> Read the course manual the PD session guide, the NTEAP, and the NTS ahead of time to identify any outstanding issues relating to the lesson for clarification. <i>ii.</i> Collect all-inclusive 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.	

Age Levels/s:

Name of Subject/s:

- a. Upper Grade
- b. JHS (Core)
- c. JHS (Elective)
- a. Mathematics: Teaching and Assessing
- b. Teaching and Assessing JHS Mathematics
- c. Mathematics

Tutor PD Session for Lesson 10 in the Course Manual

Lesson Title:

- a. Upper Primary: Data 1 (Teaching and Assessing)
- b. JHS (Core): Fractions 1 (Teaching and Assessing)
- c. JHS (Elective): Percentages and its applications

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. 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 stage of the session.	Time in session
1. Introduction to the session	Introduction	Introduction	20 mins
 Review prior learning Reading and discussion of the introductory sections of the lesson up to and including learning outcomes and indicators Overview of content and identification of 	1.1 Begin with an ice breaker activity by engaging tutors in an investigational activity (e.g. Estimate the number of a group of people in the College as a percentage of a larger group – What percent of teaching staff are females?)	1.1 Ice breaker: Estimate the number of a group of people in the College as a percentage of a larger group – Example: What percent of teaching staff are females?)	
any distinctive aspects of the lesson/s, NB: The guidance for SL/HoD should identify	1.2 Ask tutors to tell how useful the week 9 PD session influenced their teaching over the week and how	1.2 Tell how useful the week 9 PD session influenced your teaching and how students will employ	

and address any areas	students will employ	the various concepts	
where tutors might	the various concepts	during the STS Field	
require clarification on	during the STS Field	Experience.	
any aspect of the	Experience.		
lesson.			
NB: SL/HoD should ask	1.3 Ask a critical friend to	1.3 As a critical friend,	
tutors to plan for their	share with members,	share with members,	
teaching as they go	observation made	feedback on the	
through the PD session	during the enactment	observation you made	
	of lesson 9.	during the enactment	
		of lesson 9.	
	Upper Primary:	Upper Primary:	
	Measurement 2 (Teaching	Measurement 2 (Teaching	
	and Assessing)	and Assessing)	
	•	JHS (Core): Rational and	
	JHS (Core): Rational and Irrational numbers 1	· · ·	
		Irrational numbers 1	
	(Teaching and Assessing)	(Teaching and Assessing)	
	JHS (Elective): Money and	JHS (Elective): Money and	
	taxes, wages, salaries and	taxes, wages, salaries and	
	bank transactions	bank transactions	
	1.4 Lead tutors to discuss	1.4 Discuss any challenges	
	any challenges that	that arose during the	
	arose during the	enactment. Eg In what	
	enactment. Eg In what	ways did the students	
	ways did the students	appreciate the need to	
	appreciate the need to	consider equality and	
	consider equality and	equity during the	
	equity during the	lesson and during STS	
		-	
	lesson and during STS	activities?	
	activities?		
	NB:	NB:	
	Remember to put	Work in your phase	
	members into groups	group and contribute to	
	according to the phases	the whole group	
	to be taught in the	discussion.	
	semester and ask them	Pay attention to all NTS	
	to contribute to whole	references and salient	
	group discussions.	points necessary for the	
	Pay attention to all NTS	development of your	
	references and salient	teaching plan.	
	points necessary for the		
	development of their		
	teaching plan.		
	1 5 Ask tutors to silently	1 5 Silontly road the	
	1.5 Ask tutors to silently read the introductory	1.5 Silently read the introductory sections	
L			

sections of lesson 4 in	of lesson 4 in the	
the course manual	course manual	
(including the LOs). Let	(including the LOs.	
tutors suggest relevant	Suggest relevant	
previous knowledge of	previous knowledge of	
students that will	students that will	
support effective	support effective	
teaching and learning	teaching and learning	
of the lesson.	of the lesson.	
or the lesson.	of the lesson.	
1.6 Guide tutors to read	1.6 Read the course	
the course manual and	manual silently and	
	_	
identify the purpose	identify the purpose of	
and state their	lesson 10 and state on	
expectations of the PD	post-in cards, your	
session on lesson 10	expectations of the PD	
on post-in cards and	session of this lesson	
share with the whole	and share with the	
group. NTS 2b	whole group. NTS 2b	
	(NTS 2b).	
1.7 Ask tutors in phase	1.7 Identify the important	
groups to discuss the	features of lesson 10 in	
important or	the course manual	
distinctive aspects of	taking note of cross	
lesson 10 including	cutting themes	
vocabulary,	(including vocabulary,	
fundamental concepts	fundamental concepts	
and developing	and developing	
awareness of equity	awareness of equity	
and diversity issues	and diversity issues	
and issues on ICT.	and issues on ICT).	
Distinctive aspects	Distinctive aspects	
a. Upper Primary-	a. Upper Primary-	
Developing the concepts		
, , ,	Developing the concepts	
of Collecting, interpreting	of Collecting, interpreting	
and presenting data	and presenting data	
Exploring various sources	Exploring various sources	
of data	of data	
b. JHS (core) – fractional	b. JHS (core) – fractional	
parts, naming fractions	parts, naming fractions	
and interpreting fractions.	and interpreting fractions.	
c. JHS (Elective) –	c. JHS (Elective) –	
Insurance (types and	Insurance (types and	
benefits), income tax,	benefits), income tax,	
value added tax and	value added tax and	
custom duties	custom duties	

2. Concept	Concept Development	Concept Development	15 mins
Development (New			
learning likely to	2.1 Ask tutors to identif	y 2.1 Ask tutors to identify	
arise in lesson/s):	familiar and unfami	iar familiar and unfamiliar	
 Identification and 	concepts in their	concepts in their	
discussion of new	lessons and discuss	lessons and discuss	
learning, potential	with the larger grou		
barriers to learning	Examples:	Examples:	
for student teachers	Familiar Unfamiliar	Familiar Unfamiliar	
	Concepts concepts	Concepts concepts	
or students,	Collecting Interpreting	Collecting Interpreting	
concepts or	data and	data and	
pedagogy being	Upper presenting	Upper presenting	
introduced in the	primary data	primary data	
lesson, which need			
to be explored with	Naming Interpreting	Naming Interpreting	
the SL/HoD	fractions fractions.	fractions fractions.	
NB: The guidance for	JHS(Core)	JHS(Core)	
SL/HoD should set out	Insurance Income tax,	Insurance Income tax,	
what they need to do	(types and value added		
to introduce and	benefits) tax and	benefits) tax and	
explain the issues/s	JHS(Electiv custom	JHS(Elective) custom	
with tutors	e) duties	duties	
with tutors			
	2.2 Lead tutors to draw	2.2 In your phase group	
		2.2 In your phase group,	
	connections among	draw connections	
	concepts in the vari	0	
	lessons in line with		
	basic school	the basic school	
	curriculum.	curriculum.	
	NB: Encourage tutors to		
	give examples beyond t	he	
	suggested ones.		
	Example.		
	Upper Primary: Data		
	collected can be presen	ed	
	on charts and graphs.		
	B4.4.1.1		
	JHS (Core): Fractions		
		_	
	expresses equal portion		
	of a unit, a group of		
	objects or as compariso	n.	
	B4.1.3.1		
	JHS (ELECTIVE): Insuran	ce	
	and taxes are calculate	1	
	using percentages.		
	B5.1.5.1		

2.3 Ask tutors through Think-Pair-Share to outline possible challenging areas in teaching and assessing the lesson.	2.3 Individually, outline the challenging areas in your lesson, share with a member of the same phase group and then with the whole group.	
Example: Upper Primary: Developing the skill of interpreting data and graphs in electronic media. JHS (Core): Developing the skill of interpreted fraction through ICT tools. JHS (Elective): Developing understanding of the effects of value added tax on the citizens		
 2.4 Lead tutors to discuss misconceptions and barriers in teaching and learning of the lesson. Example of Misconceptions: Upper Primary: – All forms of data can be represented by any chart and graph. JHS (Core) – Fractions expresses on part of a whole JHS (Electives): Value added tax is the same as custom duties Barriers may include weak prior knowledge, lack of appropriate resources, lack of opportunity to use ICT due to failure of electric power (lights-out), bad/interrupted network, unavailability of internet 	 2.4 In whole group, discuss misconceptions and barriers in teaching and learning of the lesson. Example of Misconceptions: a. Upper Primary: – All forms of data can be represented by any chart and graph. b. JHS (Core) – Fractions expresses on part of a whole c. JHS (Electives): Value added tax is the same as custom duties Barriers may include weak prior knowledge, lack of appropriate resources, lack of opportunity to use ICT due to failure of electric power (lights-out), bad/ interrupted network, unavailability of internet 	

		bundle for students,	bundle for students,	
		inadequate contact time	inadequate contact time	
1		due to staff meetings.	due to staff meetings.	
3.	Planning for	Planning for Teaching and	Planning for Teaching and	40 mins
	teaching, learning	learning Activities for the	learning activities	
	and assessment	Lesson		
	activities for the			
	lesson/s	3.1 Ask tutors in their	3.1 In your phase group,	
•	Reading and	phase groups to	suggest teaching and	
	discussion of the	suggest teaching and	learning activities for	
	teaching and	learning activities for	teaching the lesson	
	learning activities	the lesson ensuring;	ensuring;	
•	Noting and	i. Provision is made for	i. Provision is made for	
	addressing areas	SEN	SEN	
	where tutors may	ii. Both genders take	ii. Both genders take	
	require clarification	leading roles in group task	leading roles in group	
•	Noting	iii. Even distribution of	task, etc referring to NTS	
	opportunities for	questions to different	1a, b, c, d, 2b, e, f, 3b, c	
	making links to the	categories of learners		
	Basic School	based on gender, ability,		
	Curriculum	previous experience, etc.		
•	Noting	referring to NTS 1a, b, c, d,		
	opportunities for	2b, e, f, 3b, c		
	integrating: GESI			
	responsiveness and	3.2 Ask tutors to read the	3.2 Read the activities	
	ICT and 21 st C skills	activities outlined in	outlined in your	
•	Reading, discussion,	their course manuals	course manual and	
	and identification of	and identify areas that	identify areas that	
	continuous	require clarification.	require clarification.	
	assessment	ND. Defente the Dest.	ND. Defende the Desig	
1	opportunities in the	NB: Refer to the Basic	NB: Refer to the Basic	
	lesson. Each lesson	School Curriculum (BSC pp.	School Curriculum (BSC pp.	
1	should include at	xv – xvii) and	xv – xvii) and	
1	least two	http://uk.sagepub.com	http://uk.sagepub.com	
1	opportunities to use	for explanations on	for explanations on	
1	continuous	pedagogical approaches"	pedagogical approaches"	
1	assessment to	and search through "IXL	and search through "IXL	
1	support student	Math".	Math".	
1	teacher learning	2.2 Load tutors to	2.2 Proinctorm come	
•	Resources:	3.3 Lead tutors to	3.3 Brainstorm some	
	 links to the 	brainstorm some	pedagogical	
	existing PD	pedagogical	approaches that can	
	Themes, for	approaches and their	be employed during the lesson and their	
	example, action	impact on learning of		
	research,	the concepts taking	effectiveness towards	
1	questioning and	into consideration	learning of the	
		inclusivity.	concepts. Mention	

to other external reference material: literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be giver to local availability o guidance on any power point presentations, TLM or other resources which need to be developed to support learning • Tutors should be	 i) The use of inquiry to explore generalizations for powers of numbers. (ii) The use of differentiation and scaffolding to ensure that no learner is left behind (BSC pp. xv) iii) Being patient with stutterers, using tactile or braille for visually challenged, providing peer support for those who might need, while you pay attention to all Phases. 3.4 Ask tutors to explain some suggested teaching strategies that can help inculcate core competencies in 	 any GESI issues that need consideration while using those approaches 3.4 Suggest teaching strategies to be used in achieving the Los of the lesson and explain how they can help 	
	-	-	
	various interpretation of fractions. <u>Associated 21st century</u> <u>skills</u> : Critical Thinking NB: Let tutors suggest more examples beyond those suggested above.	various interpretation of fractions. <u>Associated 21st century</u> <u>skills</u> : Critical Thinking NB: Suggest more examples beyond those suggested above.	

1	· · · · · · · · · · · · · · · · · · ·	
3.5 Ask tutors to mention some GESI responsive resources that can be used with the suggested approaches and strategies in achieving the LOs. Example Resources may include supporting staff with experts in sign language as well as resources such as teacher and learner resource packs, textbooks, course manual, projectors, flip charts, sticky notes, braille, tactile materials, audio and audio-visuals that can be used in the teaching and learning of the concepts mentioned above (NTS 3j)	3.5 Mention some GESI responsive resources that can be used with the suggested approaches and strategies in achieving the LOs. <i>Example</i> <i>Resources may include</i> <i>supporting staff with</i> <i>experts in sign language</i> <i>as well as resources such</i> <i>as teacher and learner</i> <i>resource packs, textbooks,</i> <i>etc</i>	
 3.6 Lead tutors to discuss assessment strategies ('as' and 'for') to be used during teaching of the lesson. NB: Continuous assessment activities (assignments, quizzes, group presentations, etc. should be used to create subject projects and build subject portfolios). Example: A project on how collecting discrete data and representing it on a graph (Upper Primary). A project on investigation of causes of 20 level 100 students' fear for fractions. (JHS - Core) 	 3.6 Discuss to come out with assessment strategies ('as' and 'for') to be used during teaching of the lesson. NB: Continuous assessment activities (assignments, quizzes, group presentations, etc. should be used to create subject projects and build subject portfolios). Example: A project on how collecting discrete data and representing it on a graph (Upper Primary). A project on investigation of causes of 20 level 100 students' fear for fractions. (JHS - Core) 	

A		
A project on investigating	A project on investigating	
the type of insurance 10	the type of insurance 10	
basic school teachers	basic school teachers	
invest in and why.	invest in and why.	
(JHS – Elective)	(JHS – Elective)	
NB: Make reference to	NB: Make reference to	
assessment in the course	assessment in the course	
manual and NTEAP	manual and NTEAP	
3.7 Ask each tutor to	3.7 Develop a sample	
develop a sample	assessment items	
assessment item based	based on the LOs and	
on the LOs and share	share with the whole	
with the whole group.	group.	
Example:	Example:	
Upper Primary – Develop a	Upper Primary – Develop a	
game that can be used in	game that can be used in	
5	collecting data in the basic	
collecting data in the basic school classroom.	school classroom.	
JHS (Core) – Describe how	JHS (Core) – Describe how	
to name fractions.	to name fractions.	
JHS (Elective) – Use	JHS (Elective) – Use	
internet search to find 5	internet search to find 5	
types of insurance.	types of insurance.	
3.8 Lead tutors to discuss	3.8 Discuss the various	
the various ways they	ways you can support	
can support student	student teachers to	
teachers to build their	build their subject	
subject portfolio.	portfolio.	
E.g. Encouraging student	E.g. Encouraging student	
teachers to file all	teachers to file all	
feedback on micro	feedback on micro	
teaching in their folders.	teaching in their folders.	
3.9 Ask a tutor to model a	3.9 Prepare and model a	
presentation of an	presentation of an	
activity using	activity using	
projector, internet	projector, internet	
search and taking into	search and taking into	
consideration equality	consideration equality	
and equity in assigning	and equity in assigning	
roles and in choosing	roles and in choosing	
material for teaching)	material for teaching)	
NTS 1a, b, 2b, e, 3b, c,	NTS 1a, b, 2b, e, 3b, c,	
J; BSC pp. iii)	J; BSC pp. iii)	

4.	Evaluation and	Evaluation and review of	Evaluation and review of	15 mins
	review of session:	session:	session:	
•	Tutors need to identify critical friends to observe lessons and report at next session Identifying and addressing any outstanding issues relating to the lesson/s for clarification	4.1 Engage tutors in providing feedback of the PD session taking into consideration – Clarity of content, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 10.	4.1 Reflect and provide feedback on this PD session taking into consideration – Clarity of content, pedagogical approaches employed, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi)? and make notes that will help you to teach Lesson 10	
		 4.2 Engage tutors to identify unresolved issues relating to this lesson for clarification. NB: Take note of all unresolved issues that may need further research or consultation and use any of following strategies to address them. i. put on SL/SWL WhatsApp/ Telegram platform for discussion ii. tutors to research for the next PD session for discussion 	 4.2 Identify unresolved issues relating to this lesson for clarification. NB: Put your unresolved issues unto the department's WhatsApp/ Telegram platform and research into the issues raised. 	
		4.3 Ask tutors to identify a critical friend from the same or related discipline to observe the enactment of their lesson and provide feedback during the next PD Session (NTS 1a).	4.3 Identify a critical friend from the same or related discipline to observe the enactment of your lesson and to provide feedback during the next PD Session (NTS 1a).	
		Advance Preparation NB: Inform tutors to remember to prepare	Advance Preparation NB: Remember to prepare your teaching plan for	

their teaching plan for	Lesson 10 taking note of	
Lesson 10 taking note of	important or distinctive	
important or distinctive	aspects of the lesson and	
aspects of the lesson and	crosscutting issues.	
crosscutting issues.	Read Lesson 11 of the	
Inform tutors to read	Course Manual on:	
Lesson 11 of the Course	Upper Primary - Handling	
Manual on:	Data 2 (Teaching and	
Upper Primary - Handling	Assessing)	
Data 2 (Teaching and	JHS (Core) - Fractions 2	
Assessing)	(Teaching and Assessing)	
JHS (Core) - Fractions 2	JHS (Elective) – Teaching	
(Teaching and Assessing)	vectors: Learning,	
JHS (Elective) – Teaching	teaching and applying	
vectors: Learning,		
teaching and applying		
NB:	NB:	
i. Read the course manual	i. Read the course manual	
the PD session guide, the	the PD session guide, the	
NTEAP, and the NTS	NTEAP, and the NTS ahead	
ahead of time to identify	of time to identify any	
any outstanding issues	outstanding issues relating	
relating to the lesson for	to the lesson for	
clarification.	clarification.	
ii. Collect all-inclusive	ii. Collect all-inclusive	
resources (such as	resources (such as	
projector, flip chart and	projector, flip chart and	
sticky notes) you need	sticky notes) you need	
ahead of time, prepare	ahead of time, prepare	
samples of TLMs you may	samples of TLMs you may	
need and rehearse how	need and rehearse how	
these may be used to	these may be used to	
support the achievement	support the achievement	
of your goals	of your goals	

Age Level(s)

Name of Subject(s):

- a. Upper Primary
- a. Mathematics: Teaching and Assessingb. Teaching and Assessing JHS Mathematic
- b. JHS (Core)c. JHS (Elective)
- c. Mathematics

Tutor PD Session for Lesson 11 in the Course Manual

Lesson Tittle:

- a. Upper Primary: Handling Data 2
- b. JHS (Core): Fractions 2
- c. JHS (Elective): Teaching vectors

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. 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 stage of the session.	Time in session
1. Introduction to the session	Introduction	Introduction	20 mins
 Review prior learning A critical friend to share findings for a short discussion and lessons learned Reading and discussion of the introductory sections of the lesson up to and including learning outcomes and indicators Overview of content and identification of any distinctive 	 1.1 Ice breaker activity: Begin with an investigational activity: Example: A man was travelling and got to the middle of the journey. What numerical value will use to represent the distance covered. 1.2 Ask tutors to tell how useful the week 9 PD session influenced their teaching over the week and how students will employ the various concepts during the STS Field 	 1.1 Ice breaker activity: Begin with an investigational activity: <i>Example: A man was</i> travelling and got to the middle of the journey. What numerical value will use to represent the distance covered. 1.2 Tell how useful the week 9 PD session influenced their teaching over the week and how students will employ the various concepts during the STS Field 	

aspects of the	NB:	NB:
lesson/s,	Lead tutors to use their	Lead tutors to use their
NB The guidance for	preferred learning styles in	preferred learning styles in
SL/HoD should identify	reporting how useful the	reporting how useful the
and address any areas	previous PD Session	previous PD Session
where tutors might	(Lesson 10) was.	(Lesson 10) was.
require clarification on		
any aspect of the	1.3 Ask a critical friend to	1.3 Ask a critical friend to
lesson.	give feedback on	give feedback on
NB SL/HoD should ask	observation during	observation during
tutors to plan for their	enactment of the	enactment of the
teaching as they go	previous lesson.	previous lesson.
through the PD session	Upper Primary	Upper Primary
	Handling Data 1 (Teaching	Handling Data 1 (Teaching
	and Assessing)	and Assessing)
	JHS (core)	JHS (core)
	Fractions 1 (Teaching and	Fractions 1 (Teaching and
	Assessing)	Assessing)
	JHS (Elective)	JHS (Elective)
	Percentages and its	Percentages and its
	applications	applications
	NB:	NB:
	Let a critical friend provide	Let a critical friend provide
	feedback during	feedback during
	enactment of the previous	enactment of the previous
	lesson by using power	lesson by using power
	point presentation.	point presentation.
	1.4 Ask tutors to read and	1.4 Ask tutors to read and
	discuss the	discuss the
	introductory section of	introductory section of
	the lesson including	the lesson including
	the learning outcomes	the learning outcomes
	(LOs) in phase groups.	(LOs) in phase groups.
	NB: Suggest relevant	NB: Suggest relevant
	previous knowledge of	previous knowledge of
	students that will support	students that will support
	effective teaching and	effective teaching and
	learning of the lesson.	learning of the lesson.
	1.5 Ask tutors to identify	1.5 Ask tutors to identify
	, the purpose of the	the purpose of the
	lesson from the course	lesson from the course
	manual and state their	manual and state their
	expectations of the PD	expectations of the PD
	Session	Session

D.	urpose of the Lessons	Purpose of the Lessons	
	-	-	
	pper Primary	Upper Primary	
•	Introduce student	Introduce student	
	teachers to the course	teachers to the course	
	manual to enable them	manual to enable them	
	develop awareness of	develop awareness of	
	what they are expected	what they are expected	
	of in this lesson	of in this lesson	
•	Develop student	 Develop student 	
	teachers' understanding	teachers' understanding	
	of ideas of chance and	of ideas of chance and	
	uncertainty	uncertainty	
•	Introduce the student	 Introduce the student 	
	teachers to prepare	teachers to prepare and	
	and model interactive,	model interactive, and	
	and innovative ways of	innovative ways of	
	teaching mathematics.	teaching mathematics.	
	IS (core)	JHS (core)	
JL	. ,		
•	Introduce student	 Introduce student 	
	teachers to the course	teachers to the course	
	manual to enable them	manual to enable them	
	develop awareness of	develop awareness of	
	what they are expected	what they are expected	
	of in this lesson.	of in this lesson.	
•		 develop student 	
	teachers'	teachers' understanding	
	understanding of the	of the nature and	
	nature and importance	importance of	
	of mathematics, as well	mathematics, as well as,	
	as, how to teach	how to teach	
	mathematics to JHS	mathematics to JHS	
	learners	learners	
•	Introduce the student	 Introduce the student 	
	teachers to prepare	teachers to prepare and	
	and model interactive,	model interactive, and	
	and innovative ways of	innovative ways of	
	teaching mathematics,	teaching mathematics,	
	e	e	
		JHS (Elective)	
		, ,	
•	Introduce student	Introduce student	
	teachers to vectors and	teachers to vectors and	
	related concepts and to	related concepts and	
	model adequately how	to model adequately	
	to handle similar	how to handle similar	
	concepts in the basic	concepts in the basic	
	school mathematics	school mathematics	
	curriculum	curriculum	

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1.6 Ask tutors in phase	1.6 Ask tutors in phase	
groups to discuss the	groups to discuss the	
important or	important or	
distinctive aspects of	distinctive aspects of	
the lesson including	the lesson including	
vocabulary and	vocabulary and	
fundamental concepts.	fundamental concepts.	
	innamental concepts.	
Distinct Aspects	Distinct Aspects	
Upper Primary:	Upper Primary:	
Sample Spaces to	Sample Spaces to	
Determine Probability	Determine Probability	
Experimental and	Experimental and	
theoretical probabilities	theoretical probabilities	
JHS (core):	JHS (core):	
 Use of manipulative 	 Use of manipulative 	
materials and other	materials and other	
resources (including ICT	resources (including ICT	
tools) in modelling	tools) in modelling	
multiplication on of	multiplication on of	
fractions	fractions	
Connecting common	 Connecting common 	
and decimal fractions	and decimal fractions	
and percent	and percent	
JHS (Elective):	JHS (Elective):	
Concept of vectors	Concept of vectors	
Components of vectors	Components of vectors	
<u>Vocabulary</u>	<u>Vocabulary</u>	
Upper Primary:	Upper Primary:	
Chance, Uncertainty,	Chance, Uncertainty,	
theoretical, Probability	theoretical, Probability	
and Data	and Data	
JHS (core): Multiplication,	JHS (core): Multiplication,	
Division, Fraction and	Division, Fraction and	
Percentages.	Percentages.	
JHS (Elective): Vector,	JHS (Elective): Vector,	
Operation, Magnitude,	Operation, Magnitude,	
Direction and Bearings	Direction and Bearings	
Direction and Dedimigs	Direction and Dearnings	
Fundamental Concepts	Fundamental Concepts	
UP/JHS (core)	UP/JHS (core)	
 Introduce the lesson 	 Introduce the lesson 	
on integers as shape	on integers as shape	
and space.	and space.	
-	-	
Shapes and their	 Shapes and their 	
properties	properties	

	 Hand sketching of common solids (PD Themes 1 &3) JHS (Elective) Teaching: Outcomes of an experiment Probability of an outcome Probability of a given event in table Equally likely outcomes 	 Hand sketching of common solids (PD Themes 1 &3) JHS (Elective) Teaching: Outcomes of an experiment Probability of an outcome Probability of a given event in table Equally likely outcomes 	
 2. Concept Development (New learning likely to arise in lesson/s): Identification and discussion of new learning, potential barriers to learning for student teachers or students, concepts or pedagogy being introduced in the lesson, which need to be explored with the SL/HoD NB The guidance for SL/HoD should set out what they need to do to introduce and explain the issues/s with tutors 	 Concept Development 2.1 Ask tutors to identify familiar and unfamiliar concepts in their lessons and discuss with the larger group. Familiar and Unfamiliar Concepts Upper Primary Familiar Concepts: Sample Space and Event Unfamiliar concepts: Ideas of chance and uncertainty. determining experimental and theoretical probabilities JHS (Core): Examples of Familiar Concepts: Multiplication and Division of fractions Unfamiliar concepts: Multiplying whole numbers with fractions or Fractions with whole numbers Connecting common and decimal fractions and percent JHS (Elective) 	 Concept Development 2.1 Identify familiar and unfamiliar concepts in their lessons and discuss with the larger group. Familiar and Unfamiliar Concepts Upper Primary Examples of Familiar Concepts: Sample Space and Event Unfamiliar concepts: Ideas of chance and uncertainty. determining experimental and theoretical probabilities JHS (Core): Examples of Familiar Concepts: Multiplication and Division of fractions Unfamiliar concepts: Multiplying whole numbers with fractions or Fractions with whole numbers Connecting common and decimal fractions and percent JHS (Elective) 	15 mins

 Examples of Familiar Concepts: Concept of vectors Components of vectors Unfamiliar concepts: Magnitude and directions of vectors Concept of bearing and back bearings 2.2 Lead tutors to draw 	 Examples of Familiar Concepts: Concept of vectors Components of vectors Unfamiliar concepts: Magnitude and directions of vectors Concept of bearing and back bearings 2.2 Lead tutors to draw
connections among concepts in the various lessons in line with the Basic School Curriculum.	connections among concepts in the various lessons in line with the Basic School Curriculum.
E.g. The connection between possibility of an event and certainty of an event (B5.4.2.1)-Upper Primary	E.g. The connection between possibility of an event and certainty of an event (B5.4.2.1)-Upper Primary
 2.3 Ask tutors to use Think-Pair-Share to outline possible challenging areas in: Upper Primary: Handling Data 2 (PD Themes 1 &3) JHS(Core): 	2.3 Individually, outline the challenging areas in your lesson, share with a member of the same phase group and then with the whole group.
Fractions 2 (PD Themes 1 &3) JHS (Elective): Teaching of Vectors <i>NB:</i> In groups let both genders	NB: In groups let both genders
take leading role by using the internet to explore the possible challenging areas in the lessons Handling Data 2, Fractions 2 and Teaching of Vectors (PD Themes 1 &3)	take leading role by using the internet to explore the possible challenging areas in the lessons Handling Data 2, Fractions 2 and Teaching of Vectors (PD Themes 1 &3)
2.4 Lead tutors to discuss misconceptions and	2.4 Participate actively in the discussion on

	· · · ·	
barriers in teaching	misconceptions and	
and learning of the	barriers in teaching	
lesson.	and learning of the	
	lesson.	
<u>Misconceptions</u>	Misconceptions	
Example:	Example:	
a. Upper Primary:	a. Upper Primary:	
Learners believe that all	Learners believe that	
events are possible	all events are possible	
b. JHS (core):	b. JHS (core):	
Learners believe that	Learners believe that	
the principles for	the principles for	
multiplying two (2)	multiplying two (2)	
fractions is the same as	fractions is the same as	
dividing two (2)	dividing two (2)	
fractions	fractions	
c. Learners believe that	c. Learners believe that	
there is no difference	there is no difference	
between vectors and	between vectors and	
coordinate geometry.	coordinate geometry.	
Barriers	Barriers	
Upper Primary/JHS	Upper Primary/JHS	
Core/JHS (Elective)	Core/JHS (Elective)	
Some possible barriers:	Some possible barriers:	
Different entry	Different entry	
behaviours,	behaviours,	
 different learning 	different learning	
needs,	needs,	
 misconceptions about 	 misconceptions about 	
mathematics	mathematics	
Socio-cultural issues	Socio-cultural issues	
2.5 Support tutors to	2.5 Identify as many GESI	
identify GESI	responsive resources	
responsive resources	such as supporting	
such as supporting staff	staff with experts in	
with experts in sign	sign language as well	
language as well as	as resources such	
resources such teacher	teacher and learner	
and learner resource	resource packs,	
packs, textbooks,	textbooks, course	
course manual, Posters	manual, Posters	
illustrating people using	illustrating people	
mathematics in the	using mathematics in	
jobs; video clips	the jobs; video clips	
downloaded from the	downloaded from the	

		internet (NTS 3j, PD	internet. (NTS 3j, PD	
		Manual pp.38)	Manual pp.38)	
3.	Planning for	Teaching and learning	Teaching and learning	40 mins
	teaching, learning	activities	activities	
	and assessment	2.1. Ask to take to suggest	2.1 Current too shine and	
	activities for the	3.1 Ask tutors to suggest	3.1 Suggest teaching and	
	lesson/s	teaching and learning activities for the lesson	learning activities for the lesson taking into	
•	Reading and		consideration GESI	
	discussion of the	taking into account GESI issues.	consideration desi	
	teaching and	Upper Primary:	Lippor Brimany:	
	learning activities	Example of suggested	Upper Primary: Example of suggested	
•	Noting and	learning Activities:	learning Activities:	
	addressing areas	Discussing the use of	Discussing the use of	
	where tutors may	manipulative materials	manipulative materials	
	require clarification	and ICT tools in modelling	and ICT tools in modelling	
•	Noting	situations by constructing	situations by constructing	
	opportunities for	a sample space to	a sample space to	
	making links to the	determine probabilities	determine probabilities	
	Basic School	(PD Themes 1 &3	(PD Themes 1 &3	
	Curriculum	JHS (Core):	JHS (Core):	
	Noting	Discussing the use of	Discussing the use of	
	opportunities for	manipulative materials	manipulative materials	
	integrating: GESI	and other resources	and other resources	
	responsiveness and	(including ICT tools) in	(including ICT tools) in	
	ICT and 21 st C skills	modelling multiplication of	modelling multiplication of	
•	Reading, discussion,	fractions (PD Themes 1	fractions (PD Themes 1	
	and identification of	&3)	&3)	
	continuous	,		
	assessment	HS(Elective):	HS(Elective):	
	opportunities in the	Example of suggested	Example of suggested	
	lesson. Each lesson	learning Activities:	learning Activities:	
	should include at	Discussion on the concept	Discussion on the concept	
	least two	of vectors and related	of vectors and related	
	opportunities to use	concepts	concepts	
	continuous	NB:	NB:	
	assessment to	i. Make provision for	i. Make provision for	
	support student	physically challenged	physically challenged	
_	teacher learning	ii. Both genders take	ii. Both genders take	
	Resources:	leading roles in group task	leading roles in group task	
	 links to the 	iii. Even distribution of	iii. Even distribution of	
	existing PD	questions to different	questions to different	
	Themes, for	categories of learners	categories of learners	
	example, action	based on gender, ability,	based on gender, ability,	
	research,	previous experience, etc	previous experience, etc	
	questioning and	NTS 1a, b, c, d, 2b, e, f, 3b,	NTS 1a, b, c, d, 2b, e, f, 3b,	
	to other external	C	C	
	reference	-	-	

literature, on web, Utube, physical resources, power point; how they should be used. NB Consideration Ide needs to be given tha to local usin availability clar	Let tutors read the activities outlined in their course manuals and identify areas that require clarification.	3.2 Read the activities outlined in your course manual and identify areas that require clarification. NB: Identify challenging areas that require clarification, using Internet Search to clarify the otherwise dark spots in Handling Data 2 (B5.4.2.1, 4.4.1.1, 5.4.1.1)	
power point presentations, TLM or other resources which need to be developed to support learning • Tutors should be expected to have a plan for the next lesson for student teachers Exa Stra Thi Diss inte Col Co Pro and cor NB. Bot the app less	Lead tutors to brainstorm to come up with some pedagogical approaches and their related core competencies likely to be inculcated in students and for that matter Basic School learners. amples: rategies: Expository, ink pair Share, scussion Brainstorming, eractive and llaborative group work. ore Competencies: oblem solving, critical d creative thinking and mmunication. competencies are plicable to all the son: Handling Data 2 Fractions 2	 Fractions 2, and Teaching vectors. 3.3 Brainstorm to come up with some pedagogical approaches and their related core competencies likely to be inculcated in students and for that matter Basic School learners. Examples: Strategies: Expository, Think pair Share, Discussion Brainstorming, interactive and Collaborative group work. Core Competencies: Problem solving, critical and creative thinking and communication. NB: Both the strategies and the competencies are applicable to all the lesson: Handling Data 2 Fractions 2 Teaching vectors 	
	Teaching vectors	Teaching vectors	

 3.4 Ask tutors to explain some suggested teaching strategies that can help inculcate core competencies in the student teachers and for that matter basic school learners. e.g., Expository, Think pair Share, Discussion Brainstorming, interactive and Collaborative group work. 	 3.4 Suggested teaching strategies that can help inculcate core competencies in the student teachers and for that matter basic school learners. e.g., e.g., Expository, Think pair Share, Discussion Brainstorming, interactive and Collaborative group work. 	
 NB: Lead tutors to explain how the suggested strategies will inculcate core competencies in the student teacher 3.5 Ask tutors to mention some GESI responsive resources that can be used with suggested approaches and strategies in achieving the Los. 	 NB: Lead tutors to explain how the suggested strategies will inculcate core competencies in the student teacher 3.5 Mention some GESI responsive resources that can be used with suggested approaches and strategies in achieving the Los. 	
E.g. Resources may include supporting staff with experts in sign language as well as resources such teacher and learner resource packs, textbooks, course manual, projectors, flip charts, sticky notes, braille, tactile materials, audio and audio-visuals that can be used in the teaching and learning of the concepts mentioned above (NTS 3j)	E.g. Resources may include supporting staff with experts in sign language as well as resources such teacher and learner resource packs, textbooks, course manual, projectors, flip charts, sticky notes, braille, tactile materials, audio and audio-visuals that can be used in the teaching and learning of the concepts mentioned above (NTS 3j)	

 3.6 Lead tutors to discuss assessment strategies ("as and "for") to be used during the lesson. NB: Assessment must involve; the subject project and Subject Portfolio. (i)Example each for the 	 3.6 Discuss to come up with assessment strategies ("as and "for") to be used during the lesson. NB: Assessment must involve; the subject project and Subject Portfolio. (i)Example each for the 	
two forms of project Upper Primary: Subject project (class exercise): In a bag containing 10 red, 4 green and 1 pink bottle tops, let a learner pick one bottle top from the bag. What is the probability of picking black? Subject Portfolio: A project	two forms of project Upper Primary: Subject project (class exercise): In a bag containing 10 red, 4 green and 1 pink bottle tops, let a learner pick one bottle top from the bag. What is the probability of picking black? Subject Portfolio: A project	
on investigating probabilities for the possible outcomes of a simple experiment. JHS (Core): Subject project (class exercise): Show step by step how you will use Cuisenaire rods to solve the following: $\frac{1}{2} \times \frac{3}{4}, \frac{4}{6} \times \frac{1}{2}, and \frac{1}{2} \times \frac{4}{7}$	on investigating probabilities for the possible outcomes of a simple experiment. JHS (Core): Subject project (class exercise): Show step by step how you will use Cuisenaire rods to solve the following: $\frac{1}{2} \times \frac{3}{4'}, \frac{4}{6} \times \frac{1}{2'}, and \frac{1}{2} \times \frac{4}{7}$	
2 A 4 6 2 and 2 A 7 Subject Portfolio: A project on using Cuisenaire rods to teach multiplication of two fractions. JHS (Elective): Subject project (class exercise): List any five examples of vectors.	2 A ' 6 2' and 2 A 7 Subject Portfolio: A project on using Cuisenaire rods to teach multiplication of two fractions. JHS (Elective): Subject project (class exercise): List any five examples of vectors.	

	- · · · · · · · · · · · · · · · · · · ·
Subject Portfolio:	Subject Portfolio:
A project on aapplications	A project on aapplications
of vectors and bearings to	of vectors and bearings to
real life situations.	real life situations.
NB:	NB:
Assessment must be	Assessment must be
aligned to the NTEAP.	aligned to the NTEAP.
Continuous assessment	Continuous assessment
activities (assignments,	activities (assignments,
quizzes, group	quizzes, group
presentations, etc, should	presentations, etc, should
be used to create subject	be used to create subject
	_
projects and build subject	projects and build subject
portfolios (See, Appendix	portfolios (See, Appendix
11)	11)
	2.7 Develop a comple of
3.7 Ask each tutor to	3.7 Develop a sample of
develop a sample of	assessment items
assessment item based	based on the LOs and
on the LOs and share	share with the whole
with the whole group.	group.
Example:	Example:
Upper Primary	Upper Primary
Interview 6 basic school	Interview 6 basic school
teachers during the STS	teachers during the STS
activity to tell the	activity to tell the
manipulative materials	manipulative materials
•	and other resources
and other resources	
(including ICT tools) in	(including ICT tools) in
modelling situations by	modelling situations by
constructing a sample	constructing a sample
space to determine	space to determine
probabilities	probabilities
JHS (core) – In groups of	JHS (core) – In groups of
three, basic school	three, basic school
teachers should tell	teachers should tell
models and manipulatives	models and manipulatives
to develop the concepts	to develop the concepts
involving division of	involving division of
fractions.	fractions.
JHS (Elective)- As teachers	JHS (Elective)- As teachers
to tell strategies for	to tell strategies for
teaching operations of	teaching operations of
vectors.	vectors.

3.8 Lead tutors to discuss the various ways they can support student teachers to build their subject portfolio.3.8 Discuss the various ways you can support student teachers to build their subject portfolio.E.g. encouraging student teachers to file all their assignments with feedback in their folders.E.g. encouraging student teachers to file all their assignments with feedback in their folders.3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESI issues (eg. Both genderS.9 Discuss the various ways you can support student teachers to build their subject portfolio.3.9 Ask a tutor to model a presentation of an activity usingS.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration GESI issues. (eg. Both
teachers to build their subject portfolio.build their subject portfolio.E.g. encouraging student teachers to file all their assignments with feedback in their folders.E.g. encouraging student teachers to file all their assignments with feedback in their folders.3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESISuild their subject portfolio.1.1E.g. encouraging student teachers to file all their assignments with feedback in their folders.3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESI
subject portfolio.portfolio.E.g. encouraging student teachers to file all their assignments with feedback in their folders.E.g. encouraging student teachers to file all their assignments with feedback in their folders.3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESI3.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration GESI3.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration GESI
E.g. encouraging student teachers to file all their assignments with feedback in their folders.E.g. encouraging student teachers to file all their assignments with feedback in their folders.3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESIS.9 encouraging student teachers to file all their assignments with feedback in their folders.
teachers to file all their assignments with feedback in their folders.teachers to file all their assignments with feedback in their folders.3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESI3.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration GESI
assignments with feedback in their folders.assignments with feedback in their folders.3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESI3.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration GESI
feedback in their folders.feedback in their folders.3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESI3.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration GESI
3.9 Ask a tutor to model a presentation of an activity using projector, internet search and taking into consideration GESI3.9 Prepare and model a presentation of an activity using projector, internet search and taking into consideration GESI
presentation of an activity usingpresentation of an activity usingprojector, internetprojector, internetsearch and taking intosearch and taking intoconsideration GESIconsideration GESI
taking the leading rolesgender taking thein their groups) NTSleading roles in their1a, b, 2b, e, 3b, c, J;groups) NTS 1a, b, 2b,BSC pp. iii)e, 3b, c, J; BSC pp. iii)
4. Evaluation and Reflective Activity Reflective Activity 15 min
review of session:
• Tutors should 4.1 Engage tutors in self- 4.1 Show by fingers/nods
Identifying critical evaluation as well as of 5 or 3 or 1 as to
friends to observe encourage tutors to those who "really got
lessons and reportprovide feedback of theit", "got some of it" orat next session.PD session taking into"didn't get it"
Identifying and consideration respectively. Explain if
addressing any inclusivity – how to be you really got the
outstanding issues patient with Stutterers, lesson
relating to the using tactile and audio
lesson/s for devices for visually
clarification challenged, paying
attention to all courses,
etc.
4.1.1 Ask tutors to show
by fingers/nods
their level of
satisfaction with the
session. (NTS 1a, 3i).
4.2 Engage tutors to 4.2 Reflect on the

issues relating to this lesson for clarification	and outline unresolved issues relating to the lesson	
NB:	NB:	
 Take note of all unresolved issues and use any of following strategies put on SL/SWL WhatsApp platform for discussion tutors to research for the next PD session for discussion 	 Take note of all unresolved issues and use any of following strategies put on SL/SWL WhatsApp platform for discussion tutors to research for the next PD session for discussion 	
4.3 Ask a critical friend to observe your teaching and record his/her findings to be presented after delivery or in the Next PD session.	4.3 Identify critical friend observes teaching and record his/her findings to be presented after delivery or in the Next PD session.	
NB: Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a)	NB: Identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a)	
Advance Preparation	Advance Preparation	
 4.4 Ask tutors to read Lesson of the Course Manual on: Upper Primary - End of Semester Review (Lessons 1-11Measurement: (Teaching and Assessing) JHS(Core) - End of Semester Review (Lessons 1-11 JHS(Elective) – Revision of Lessons in the Course Manual 	4.4 Ask tutors to read Lesson of the Course Manual on: Upper Primary - End of Semester Review (Lessons 1-11Measurement: (Teaching and Assessing) JHS(Core) - End of Semester Review (Lessons 1-11 JHS(Elective) – Revision of Lessons in the Course Manual	
	 NB: Take note of all unresolved issues and use any of following strategies put on SL/SWL WhatsApp platform for discussion tutors to research for the next PD session for discussion 4.3 Ask a critical friend to observe your teaching and record his/her findings to be presented after delivery or in the Next PD session. NB: Remind tutors to identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a) Advance Preparation 4.4 Ask tutors to read Lesson of the Course Manual on: Upper Primary - End of Semester Review (Lessons 1-11Measurement: (Teaching and Assessing) JHS(Core) - End of Semester Review (Lessons 1-11 JHS(Elective) - Revision of Lessons in the Course 	lesson for clarificationissues relating to the lessonNB:Take note of all unresolved issues and use any of following strategies- put on SL/SWL WhatsApp platform for discussion- put on SL/SWL WhatsApp platform for discussion- tutors to research for the next PD session for discussion- tutors to research for the next PD session for discussion4.3 Ask a critical friend to observe your teaching and record his/her findings to be presented after delivery or in the Next PD session.4.3 Identify critical friend observes teaching and record his/her findings to be presented after delivery or in the Next PD session.NB: Remind tutors to idscusing and record his/her finding and record his/her findings to be presented after delivery or in the Next PD session.NB: Identify a critical friend from the same or related discipline to observe during teaching and provide feedback (NTS 1a)Advance PreparationAdvance Preparation4.4 Ask tutors to read Lesson of the Course Manual on:Advance Preparation4.4 Ask tutors to read Lesson of the Course Manual on:4.4 Ask tutors to read Lesson of the Course Manual on:Upper Primary - End of Semester Review (Lessons 1-111-11JHS(Elective) - Revision of Lessons in the Course1-11 JHS(Elective) - Revision of Lessons in the Course

NB: Read the course manual, the PD session guide ahead of time to identify any outstanding issues relating to the lesson for clarification. Collect all-inclusive resources (such as projector, flip chart and sticky notes) you need ahead of time, prepare samples of TLMs you may need.	NB: Read the course manual, the PD session guide ahead of time to identify any outstanding issues relating to the lesson for clarification. Collect all-inclusive resources (such as projector, flip chart and sticky notes) you need ahead of time, prepare samples of TLMs you may need.

Age Levels/s:

Name of Subject/s:

- a. Upper Grade
- a. Mathematics: Teaching and Assessing
- b. Teaching and Assessing JHS Mathematics
- c. JHS (Elective)

b. JHS (Core)

c. Mathematics

Tutor PD Session for Lesson 12 in the Course Manual

Lesson Title:

- a. Upper Grade: End of Semester Review (Lessons 1-11)
- b. JHS (Core): End of Semester Review (Lessons 1-11)
- c. JHS (Electives): Revision of the lessons in the course

Focus: the bullet points provide the frame for what is to be done in the session. The SWL should use the bullets to guide what they write for the SL/HoD and tutors to do and say during each session. Each bullet needs to be addressed and specific reference should be made to the course manual/s.	Guidance notes on Leading the session. 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 stage of the session.	Time in session
1. Introduction to the	Introduction	Introduction	20 mins
 session Review prior learning Reading and discussion of the introductory sections of the lesson up to and including learning outcomes and indicators Overview of content and identification of any distinctive aspects of the lesson/s, NB: The guidance for SL/HoD should identify and address any areas 	 1.1 Ice breaker activity: Engage tutors in an investigational activity by asking a member from each of the phases to lead a starter of their choices. 1.2 Ask tutors to tell how useful the week 11 PD session influenced their teaching over the week and how students will employ the various concepts during the STS Field Experience. 	 1.1 Ice breaker: Participate in the investigational activity by leading a starter of your choices. 1.2 Tell how useful the week 11 PD session influenced their teaching and how students will employ the various concepts during the STS Field Experience. 	

where tutors might require clarification on any aspect of the lesson. NB: SL/HoD should ask tutors to plan for their teaching as they go through the PD session	 1.3 Ask a critical friend to share with members, feedback on the observation made during the enactment of lesson 11. That is: Upper Primary Handling Data 2: (Teaching and Assessment) JHS (Core) Fractions 2: (Teaching and Assessment) JHS (Elective) Teaching vectors 	 1.3 As a critical friend, share with members, feedback on the observation you made during the enactment of lesson 11. That is: Upper Primary Handling Data 2: (Teaching and Assessment) JHS (Core) Fractions 2: (Teaching and Assessment) JHS (Elective) Teaching vectors 	
	1.4 Lead tutors to discuss any challenges that arose during the enactment. Eg In what ways did the students appreciate the need to consider equality and equity during the lesson and during STS activities?	1.4 Discuss any challenges that arose during the enactment. Eg In what ways did the students appreciate the need to consider equality and equity during the lesson and during STS activities?	
	 NB: Remember to put members into groups according to the phases to be taught in the semester and contribute to the whole group discussion. Pay attention to all NTS references and salient points necessary for the development of their teaching plan. 	 NB: Work in your phase group and contribute to the whole group discussion. Pay attention to all NTS references and salient points necessary for the development of your teaching plan. 	
	1.5 Ask tutors to silently read the introductory sections of lesson 12 in the course manual (including the learning outcomes-LOs). Let tutors suggest relevant previous knowledge of	1.5 Silently read the introductory sections of lesson 12 in the course manual (including the LOs. Suggest relevant previous knowledge of students that will support effective	

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		students that will	teaching and learning of the lesson.	
		support effective teaching and learning	of the lesson.	
		of the lesson.		
		01 1110 1033011.		
		1.6 Guide tutors to read	1.6 Read the course	
		the course manual	manual silently and	
		silently and identify	identify the purpose of	
		the purpose and state	lesson 12and state	
		their expectations of	your expectations on	
		the lesson 12 PD	post-in cards and share	
		session on post-in	with the whole group.	
		cards and share with	NTS 2b (NTS 2b).	
		the whole group. NTS		
		2b		
		1.7 Ask tutors in phase	1.7 In your phase group,	
		groups to discuss the	identify the important	
		important or	features of lesson 12 in	
		distinctive aspects of	the course manual	
		lesson 12 including	taking note of cross	
		vocabulary and	cutting themes	
		fundamental concepts.	(including developing	
			awareness of equity	
			and diversity issues	
		Distinctivo asposts	and issues on ICT).	
		Distinctive aspects a. Upper Primary- A	Distinctive aspects a. Upper Primary- A	
		reflection on lessons 1-11	reflection on lessons 1-11	
		<i>b. JHS (core)</i> – A reflection	<i>b. JHS (core)</i> – A reflection	
		on lessons 1-11	on lessons 1-11	
		c. JHS (Elective) – A	c. JHS (Elective) – A	
		reflection on lessons 1-11	reflection on lessons 1-11	
-		Company Decision 1	Company Decision 1	45
2.	Concept Development (New	Concept Development	Concept Development	15 mins
	learning likely to	2.1 Ask tutors to mention	2.1 Mention the concepts	
	arise in lesson/s):	the concepts handled	handled in lessons 1 –	
•	Identification and	in lessons 1 – 11.	11.	
	discussion of new	Upper Primary	Upper Primary	
	learning, potential	Concepts: Place value;	Concepts: Place value;	
	barriers to learning	The four basic operations	The four basic operations	
	for student teachers	on Number and Number	on Number and Number	
	or students,	facts; Fractions; Diagnosis	facts; Fractions; Diagnosis	
	concepts or	and remediation,	and remediation,	
	pedagogy being	assessment resources/	assessment resources/	
	introduced in the	records, and monitoring	records, and monitoring	

		1	1
lesson, which need	progress; Micro lessons	progress; Micro lessons	
to be explored with	and use of technology	and use of technology	
the SL/HoD	across upper primary	across upper primary	
NB: The guidance for	numeracy; Shape and	numeracy; Shape and	
SL/HoD should set out	space; measurement;	space; measurement;	
what they need to do	Handling Data	Handling Data	
to introduce and	JHS (Core)	JHS (Core)	
explain the issues/s	Concepts: Shape and	Concepts: Shape and	
with tutors	Space Measurement;	Space, Measurement;	
	Angles, Polygons and	Construction, Angles and	
	Construction; Fraction;	Polygons; Fraction; Micro	
	Micro Lessons and use of	Lessons and use of	
		technology across JHS	
	technology across JHS		
	numeracy; Diagnosis and	numeracy; Diagnosis and	
	remediation, assessment	remediation, assessment	
	resources, and monitoring	resources, and monitoring	
	progress; Handling Data	progress; Handling Data	
	and Chance; Rational and	and Chance; Rational and	
	Irrational numbers	Irrational numbers	
	JHS (Elective)	JHS (Elective)	
	<u>concepts:</u> Teaching	<u>concepts:</u> Teaching	
	shapes and space;	shapes and space;	
	Mensuration; Rigid	Mensuration; Rigid	
	Motion; Indices and	Motion; Indices and	
	logarithms; Handling Data;	logarithms; Handling Data;	
	Probability; Percentages	Probability; Percentages	
	and its applications;	and its applications;	
	Vectors	Vectors	
	2.2 Lead tutors to draw	2.2 Discuss the possible	
	connections among	connections among	
	concepts within the	concepts within the	
	various phases and	various phases and	
	outline how these	outline how these	
	ideas can be used in	ideas can be used in	
	teaching Upper	teaching Upper	
	Primary School	Primary School	
	students.	students.	
	NB: Encourage tutors to	NB: Encourage tutors to	
	give examples beyond the	give examples beyond the	
	suggested ones.	suggested ones.	
	Example	Example	
	Upper Primary: The four	Upper Primary: The four	
	basic operations on	basic operations on	

adequate Place value	adequate Place value	
knowledge.	knowledge.	
BSC; B4.1.1.1, B5.1.1.1	BSC; B4.1.1.1, B5.1.1.1	
JHS (Core): Construction of	JHS (Core): Construction of	
polygons begins with the	polygons begins with the	
construction of angle;	construction of angle;	
Portions of Data can be	Portions of Data can be	
expressed as percentages	expressed as percentages	
(fractions). BSC;, B5.3.1.1	(fractions). BSC;, B5.3.1.1	
JHS (ELECTIVE): Probability	JHS (ELECTIVE): Probability	
can be expressed in	can be expressed in	
	-	
percentages BSC; B4.1.5.1,	percentages BSC; B4.1.5.1,	
B5.1.5.1, B5.4.2.1	B5.1.5.1, B5.4.2.1	
2.3 Ask tutors through	2.3 Individually, write	
Think-Pair-Share to	possible challenging	
outline possible	areas in reviewing all	
challenging areas in	the 11 lesson of the	
reviewing all the 11	semester, share with	
lesson of the semester.	an elbow partner and	
Example:	then with the whole	
a. Teaching all the lessons	group	
in a sequential order.	Example:	
b. Students ability to	a. Teaching all the lessons	
recollect all concepts	in a sequential order.	
	b. Students ability to	
	recollect all concepts	
2.4 Lead tutors to discuss	2.4 Discuss in the whole	
misconceptions and	group, misconceptions	
•		
barriers in learning of	and barriers in learning	
the lesson.	of the lesson.	
Misconceptions: Revision	Misconceptions: Revision	
is not necessary to	is not necessary to	
matured students	matured students	
Barriers may include weak	Barriers may include weak	
prior knowledge in the	prior knowledge in the	
concepts in the lessons,	concepts in the lessons,	
inadequate time to	inadequate time to	
manage all 11 lessons,	manage all 11 lessons,	
lack of opportunity to use	lack of opportunity to use	
ICT due to failure of	ICT due to failure of	
electric power (lights-out),	electric power (lights-out),	
interrupted network,	interrupted network,	
unavailability of internet	unavailability of internet	
bundle for students,	bundle for students,	
Sanaic jui stauents,	bunuic jui students,	

		inadequate contact time	inadequate contact time	
		due to staff meetings.	due to staff meetings.	
3.	Planning for	Planning for Teaching and	Planning for Teaching and	40 mins
	teaching, learning	learning Activities for the	learning activities	
	and assessment	Lesson		
	activities for the			
	lesson/s	3.1 Ask tutors in their	3.1 In your phase group,	
•	Reading and	phase groups to	suggest reflective	
	discussion of the	suggest reflective	activities for reviewing	
	teaching and	activities for reviewing	the past lessons	
	learning activities	the past lessons	ensuring;	
•	Noting and	ensuring;		
	addressing areas	i. Provision is made for	i. Provision is made for	
	where tutors may	SEN	SEN	
	require clarification	ii. Both genders take	ii. Both genders take	
•	Noting	leading roles in group task	leading roles in group	
	opportunities for	iii. Even distribution of	task, etc. referring to NTS	
	making links to the	questions to different	1a, b, c, d, 2b, e, f, 3b, c	
	Basic School	categories of learners		
	Curriculum	based on gender, ability,		
•	Noting	previous experience, etc.		
1	opportunities for	referring to NTS 1a, b, c, d,		
	integrating: GESI	2b, e, f, 3b, c		
1	responsiveness and	3.2 Ask tutors to read the	3.2 Read the activities	
	ICT and 21 st C skills	activities outlined in	outlined in lesson 12 in	
•	Reading, discussion,	lesson 12 of their	your course manual	
	and identification of	course manuals and	and identify areas that	
	continuous	identify areas that	require clarification.	
	assessment	require clarification.		
	opportunities in the			
	lesson. Each lesson should include at	NB: Refer to the Basic	NB: Refer to the Basic	
	least two	School Curriculum (BSC.	School Curriculum (BSC.	
	opportunities to use	Upper primary) and	Upper primary) and	
	continuous	through "IXL Math" for	through "IXL Math" for	
	assessment to	explanations on the	explanations on the	
	support student	concepts under this lesson.	concepts under this lesson.	
	teacher learning	,	,	
	Resources:	3.3 Lead tutors to	3.3 Brainstorm some	
	 links to the 	brainstorm some	pedagogical	
	existing PD	pedagogical	approaches that can be	
	Themes, for	approaches and their	employed during the	
	example, action	impact on reflecting on	lesson and their	
	research,	the concepts taking	effectiveness towards	
	•	into consideration	reflecting on the	
	questioning and to other external	inclusivity.	concepts. Mention any	
	to other external			

reference material: literature, on web, Utube, physical resources, power point; how they should be used. Consideration needs to be given to local availability o guidance on any power point presentations, TLM or other resources which need to be developed to support learning Tutors should be expected to have a plan for the next lesson for student teachers	 Example: The use of inquiry to explore the relationship that exist between the topics handled in the semester The use of differentiation and scaffolding to ensure that no learner is left behind (BSC pp. xv) Being patient with stutterers, using tactile or braille for visually challenged, providing peer support for those who might need, while you pay attention to all Phases. 3.4 Ask tutors to explain some suggested teaching strategies that can help inculcate core competencies in student teachers and for that matter Basic School learners. 	GESI issues that need consideration while using those approaches 3.4 Suggest teaching strategies to be used in achieving the LOs of the lesson and explain how they can help inculcate core competencies in student teachers and	
	Example: a) <u>Pedagogical</u> <u>approaches:</u> Group Work to explore the relationship among <u>Associated 21st century</u> <u>skills</u> : Social and Leadership Skills b) <u>Pedagogical</u> <u>approaches:</u> Using investigation to identify generalizations on laws of indices <u>Associated 21st</u> <u>century skills</u> : Critical Thinking	for that matter Basic School learners. <i>Example:</i> a) <u>Pedagogical</u> <u>approaches:</u> <i>Group Work to explore the</i> <i>relationship among</i> <u>Associated 21st century</u> <u>skills:</u> Social and Leadership Skills b) <u>Pedagogical</u> <u>approaches:</u> Using <i>investigation to identify</i> <i>generalizations on laws of</i> <i>indices</i> <u>Associated 21st</u> <u>century skills:</u> Critical Thinking	

		1
NB: Let tutors suggest	NB: Let tutors suggest	
more examples beyond	more examples beyond	
those suggested above.	those suggested above.	
3.5 Ask tutors to mention	3.5 Mention some GESI	
some GESI responsive	responsive resources	
resources that can be	that can be used with	
used with the	the suggested	
suggested approaches	approaches and	
and strategies in	strategies in achieving	
achieving the LOs.	the LOs.	
E.g. <i>Resources may include</i>	E.g. Resources may include	
supporting staff with	supporting staff with	
experts in sign language	experts in sign language	
as well as resources such	as well as resources such	
as teacher and learner	as teacher and learner	
resource packs, grid	resource packs, textbooks,	
boards, graph sheets,	etc	
textbooks, course manual,		
projectors, flip charts,		
sticky notes, braille,		
tactile materials, audio		
and audio-visuals that can		
be used in the teaching		
and learning of the		
concepts mentioned above		
(NTS 3j)		
3.6 Lead tutors to discuss	3.6 Using discussion, lead	
assessment strategies	tutors to come out	
('as' and 'for') to be	with assessment	
used during the	strategies ('as' and	
reflective activities.	'for') to be used during	
	teaching of the lesson.	
NB: Continuous	NB: Continuous	
assessment activities	assessment activities	
(assignments, quizzes,	(assignments, quizzes,	
report writing, group	report writing, group	
presentations, etc. should	presentations, etc. should	
be used to create subject	be used to create subject	
projects and build subject	projects and build subject	
portfolios).	portfolios).	
Example:	Example:	
A Report on the	A Report on the	
connections among	connections among	
measurement, Fraction	measurement, Fraction	
measurement, machon		

and handling data (Upper Primary)and handling data (Upper Primary)A project on investigating different games that can be used in teaching challenging topics fraction (JHS - Core)A project on investigating different games that can be used in teaching challenging topics fraction (JHS - Core)A project on developing TLMs for teaching percentages and vectors. (JHS - Elective)A project on developing TLMS for teaching percentages and vectors. (JHS - Elective)NB: Make reference to assessment in the course manual and NTEAPA project on developing TLMS for teaching percentages and vectors. (JHS - Elective)3.7 Ask each tutor to develop a sample of assessment item based on the LOs and share with the whole group.3.7 Develop a sample of assessment items based on the LOs and share with the whole group.Example: Interview 5 students in your class on any 2 concepts that are relatedS.A project on investigating different games that can be used in teaching percentages and vectors. (JHS - Core)A project on developing TLMs for teaching percentages and vectors. (JHS - Elective)NB: Make reference to assessment in the course manual and NTEAP3.7 Develop a sample of asses on any 2 concepts that are relatedS.7 Develop a sample of asses on any 2 concepts that are related
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	NTS 1a, b, 2b, e, 3b, c,	NTS 1a, b, 2b, e, 3b, c,	
	-, ,	-,,	
Evaluation and review of session:	Evaluation and review of session:	Evaluation and review of session:	15 mins
	 session: 4.1 Engage tutors in providing feedback of the PD session taking into consideration – Clarity of content, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 1. 4.2 Engage tutors to identify unresolved issues relating to this lesson for clarification. NB: Take note of all unresolved issues that 	 session: 4.1 Reflect and provide feedback on this PD session taking into consideration – Clarity of content, pedagogical approaches employed, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi)? and make notes that will help you to teach Lesson 1 4.2 Identify unresolved issues relating to this lesson for clarification. NB: Put your unresolved issues unto the 	
	 or consultation and use any of following strategies to address them. i. put on SL/SWL WhatsApp/ Telegram platform for discussion ii. tutors to research for the next PD session for discussion 4.3 Ask tutors to evaluate the PD sessions by indicating how the PD sessions have influenced their teaching 	 Telegram platform and research into the issues raised. i. put on SL/SWL WhatsApp/ Telegram platform for discussion ii. tutors to research for the next PD session for discussion 4.3 Ask tutors to evaluate the PD sessions by indicating how the PD sessions have influenced their teaching 	
	review of session: Tutors need to identify critical friends to observe lessons and report at next session Identifying and addressing any outstanding issues relating to the lesson/s for	review of session:session:Tutors need to identify critical friends to observe lessons and report at next session ldentifying and addressing any outstanding issues relating to the lesson/s for clarification4.1 Engage tutors in providing feedback of the PD session taking into consideration - Clarity of content, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 1.4.2 Engage tutors to identify unresolved issues relating to this lesson for clarification. NB: Take note of all unresolved issues that may need further research or consultation and use any of following strategies to address them. i. put on SL/SWL WhatsApp/ Telegram platform for discussion ii. tutors to research for the next PD session for discussion4.3 Ask tutors to evaluate the PD sessions have influenced their	J; BSC pp. iii)J; BSC pp. iii)Evaluation and review of session:Evaluation and review of session:Tutors need to identify critical friends to observe lessons and reportEvaluation and review of session:Ldentify critical dring and addressing any outstanding issues relating to the lesson/s for clarification4.1 Engage tutors in providing feedback of the PD session taking into consideration - Clarity of content, ICT integration, GESI, Twenty First Century Skills (NTS 1a, 3i, BSC pp. x-xvi) and make notes that will help them to teach Lesson 1.4.2 Engage tutors to identify unresolved issues relating to this lesson for clarification.4.2 Engage tutors to identify unresolved issues relating to this lesson for clarification. NB: Take note of all unresolved issues that may need further research or consultation and use any of following strategies to address them. i. put on SL/SWL WhatsApp/ Telegram platform for discussion ii. tutors to research for the next PD session for discussion4.3 Ask tutors to evaluate the PD sessions by indicating how the PD sessions have influenced their4.3 Ask tutors to evaluate the PD session shave influenced their

A	dvance Preparation	Advance Preparation
	B: Inform tutors to remember to prepare	 NB: ➢ Remember to prepare their teaching plan for
	their teaching plan for Lesson 12 taking note of important or distinctive aspects of the lesson and crosscutting issues.	Lesson 12 taking note of important or distinctive aspects of the lesson and crosscutting issues.
	Read over lesson 12 in the course manual, the PD session guide, the NTEAP and the NTS to identify any outstanding issues relating to the lesson for clarification.	Read over lesson 12 in the course manual, the PD session guide, the NTEAP and the NTS to identify any outstanding issues relating to the lesson for clarification.
	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	Collect all-inclusive 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 lesson.	achievement of your lesson.

Appendix 1

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

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

What to Include in PD sessions	Checked and In Place.
Course introductions and conclusions	
• The first PD session of each semester introduces the course manual/s,	
course expectations and course assessment components	
• The final PD session provides the opportunity to review student teachers' learning from the course	
Prior knowledge: Points for tutors on activating student teachers' prior	
knowledge.	
Basic School Curriculum: when topics for student teachers are from the Basic	
School Curriculum the PD session makes explicit links.	
LO: relevance to each session is introduced	
Interactive teaching PD sessions provide opportunities for SL/HOD to model	
interactive approaches to teaching and learning that tutors will use to support	
student teachers	
Lesson Learning outcomes and indicators are introduced	
Integration of subject specific content and subject specific pedagogy is	
modelled in PD sessions through activities for tutors. Any potentially new	
concepts introduced in the lesson are explored with tutors	
Subject Specific Training: where subjects have been grouped together for the	
PD sessions, tutors are guided to engage with activities in the subject course	
manuals to ensure the PD is subject specific. Where appropriate there is direct	
page or point references to activities in each of the relevant subject course	
manuals.	
Integrating GESI: each PD session explicitly includes at least two (2) teaching	
and learning activities from the course manual/s which should be used to	
promote student teachers' understanding of GESI responsiveness and support	
the inclusion of all pupils.	
Assessment, integrating and embedding NTEAP practices: PD sessions include	
at least two (2) continuous assessment opportunities which will support tutors	
in developing student teacher's understanding of, and ability to apply,	
assessment for or as learning.	
Age Specific Training: where relevant tutors are guided to specific activities in	
the course manuals for EG, UP and JHS. Tutors are advised to group student	
teachers according to the age they are training for.	
Building in STS: STS tasks are integrated into the PD sessions. Preparing for work	
in school and opportunities for tutors to draw on what student teachers are	
learning in school by, for example, targeting observations linked directly to the	
themes in the course manuals.	

Building in activities which support the development of 21c skills in particular		
the use of ICT. The development of these is integrated into the PD sessions		
including the use of ICT to support learning. Each PD session should include at		
least two (2) examples of students being required to use ICT to extend their		
learning.		
Resources /TLM . Where specific resources are required, it is clear where tutors		
can access them e.g., videos, online resources or readings.		

Appendix 2.

Course Assessment Components briefly

COMPONENT	SUBJECT PROJECT	
CONPONENT	1 per course per semester,	SUBJECT PORTFOLIO 1 per course per semester, individual or
	individual or collaborative student	collaborative student teacher work.
	teacher work.	
	The Subject project is an assignment	The Subject Portfolio is the deliberate
	designed to enable student teachers	collection of student teachers' work that
	to demonstrate achieving one or	has been selected and organized for a
	more of the CLOs, progress towards	particular subject to show student
L.	achieving identified NTS, development of knowledge and	teacher's learning and progress to achieving the CLOs through examples of
L IS	understanding of: the Basic School	his or her best work.
WHAT IS IT?	Curriculum, GESI responsiveness,	
3	using ICT mand 21stC skills	
	Introduction: a clear statement of	3 items of work produced during the
	aim and purpose	semester selected by student teachers
	Methodology: what the student	with tutor support during the semester as
	teacher has done and why to achieve	best examples of their progress and 200- word reflection on the items*
	the aim and purpose of the project Substantive or main section:	Or 2 items of work and
	Presentation of any artifacts,	A mid semester assessment: case study,
	experiments, TLMs created for the	reflective note, quiz.
	project; presentation, analysis, and	* For each item they select, Student
	interpretation of what has been	teacher's need to reflect on
	done, learned, or found out in	progress against identified NTS; achieving
ITS	relation to focus of the project.	CLOs; increased knowledge and
	Conclusion: Statement of the key	understanding of the Basic School
CONSTITUENTS	outcomes of the project; reflection on what the student teacher has	Curriculum, GESI responsiveness, integration of ICT and how they could have
SN	learnt	approached developing the item
8		differently to achieve a better outcome
-	Overall weighting of project = 30%	Overall weighting of project = 30%
	Weighting of individual parts of	Weighting of individual parts of portfolio
	project out of 100	out of 100
	Introduction – 10	i(a). Each of the three (3) items selected
	Methodology – 20 Substanting section 40	by the student teacher is 30 % (90%). i(b) Presentation and organisation of
	 Substantive section – 40 Conclusion – 30 	portfolio 10%.
		OR
		ii(a). Each of the two (2) items selected by
F		the student teacher is 30 % (60%).
GH		ii(b)Mid semester assessment 30%
WEIGHT		ii(c)Presentation and organisation of
	End of comostor Exam weight 40% T	portfolio 10% crassess: achievement of one or more of the
		tified NTS, development of knowledge and
EXAM	understanding of the Basic School Curr	
EX	approaches and to integrate ICT and 22	

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T-TEL Support Team		
Professor Jophus Anamuah-Mensah	T-TEL – T-TEL Board Chair	
Professor Jonathan Fletcher	T-TEL – Key Advisor, Teaching & Learning Partnerships	
Bea Noble-Rogers	T-TEL – International Teacher Education Curriculum Expert	
Dr. Sam Awuku	T-TEL – Key Advisor, Leadership for Learning &	
	Institutional Development	
Dinah Adiko	T-TEL – Key Advisor, Gender Equality and Social Inclusion	
Beryl Opong-Agyei	T-TEL – National Teacher Education Coordinator	
Marjorie Tackie	T-TEL – Gender Equality and Social Inclusion Coordinator	
Hawa Nindow	T-TEL – Education Advisor	
Peter Chammik Jayom	T-TEL – Education Advisor	
Wilhemina Gyamfi	T-TEL – Education Advisor	
Issahaku Abudulai	T-TEL – Education Advisor	
Victor Sunkwa Asamoah	T-TEL – Education Advisor	
James Adefrah	T-TEL – Education Advisor	
Roger Kwamina Aikins	GM – Commercial (Oversees design, print and distribution)	

SUBJECT WRITING TEAM

SUBJECT	NAME	INSTITUTION
Mathematics	Prof. Gabriel Asare Okyere	Kwame Nkrumah University of Science and
		Technology, Kumasi
	Eric Abban	Mt. Mary College of Education, Somanya
	Eric Kwame Austro Gozah	Dambai College of Education Dambai
	Akuffo Frank Assah	University for Development Studies, Tamale
French	Dr Stella Afi Makafui	Kwame Nkrumah University of Science and
	Yegblemenawo	Technology, Kumasi
	Osmanu Ibrahim	Mt Mary College of Education, Somanya
	Felix Asare Odonkor	University of Education, Winneba
Language and	Prof. Charles Owu-Ewie	University of Education, Winneba
Literacy	Dr. Abraham Okrah	University of Ghana, Legon Accra
	Dr. Kwesi Adomako	University of Education, Winneba
	Abdul-Moomin Abdul-Aziz	Nusrat Jahan Ahmadiyya College of Education,
		Wa
	Comfort Dorvlo	Accra College of Education, Accra
	Freda Asante-Kumi	Accra College of Education, Accra
	Awudu Rafick	University for Development Studies, Tamale
PEMD	Justice Gideon Adjerakor	University of Education, Winneba
	Godfred Teye Mensah Akuffo	Bia Lamplighter College of Education, Sefwi
		Debiso
	Philemon D.K. Agbenyega	Dambai College of Education, Dambai
	Dr Emmanuel Osei Sarpong	University of Education, Winneba

Pedagogy	Dr Winston Kwame Abroampa	Kwame Nkrumah University of Science and Technology, Kumasi
	Dr. Maxwell Kwesi Nyatsikor	University for Development Studies, Tamale
	Dr John Sedofia	University of Ghana, Legon Accra
	Fadilata Seidu	Nusrat Jahan Ahmadiyya College of Education, Wa
	Kweku Essia Donkor	University of Education, Winneba
	Dr Nyadu Offei	University of Education, Winneba
	John Aditorem	Tumu College of Education, Tumu
Science	Prof Rueben Yao Tamakloe	Kwame Nkrumah University of Science and
		Technology, Kumasi
l	Maxwell Bunu	Ada College of Education, Ada
	Valentina Osei-Himah	Atebubu College of Education, Atebubu
	Comfort Korkor Sam	University for Development Studies, Tamale
	Ambrose Ayikue	St. Francis College of Education, Hohoe
ICT	Victoria Boafo	Mampong Technical College of Education, Ashanti Mampong
	Richard Adusei	University for Development Studies, Tamale
	Paul Mensah	St. Louis College of Education, Kumasi
TVET	Rev. Dr. Nyuieko Avotri	Former Principal, Mampong Technical College of Education, Ashanti Mampong
	Michael Eco Adixey	Akatsi College of Education, Akatsi
	Rev Godwin Gbadagba	Dambai College of Education, Dambai
	David Ankutse	Accra College of Education
	Grace Annagmeng Mwini	Tumu College of Education
	Rejoice Makafui Tsotorvor	Akatsi College of Education, Akatsi
Social	Dr Dacosta Aboagye	Kwame Nkrumah University of Science and
Sciences		, Technology, Kumasi
	Dr. Mohammed Adam	University of Education, Winneba
	Tia Yahaya	Tamale College of Education
	Stephen Koomson	St Vincent College of Education
	Joseph Mihaye	Accra College of Education
	Ibrahim Abudulai	Gambaga College of Education
	Limpu Isaac Digbun	Bagabaga College of Education
	Felix Dongballe	McCoy College of Education
	Burukum Achor	Dambai College of Education
	Mercy Sarpong Mintah- Botchey	Presbyterian College of Education, Akropong
	Salifu Fawzi Rahaman	Nusrat Jahan Ahmadiyya College of Education, Wa

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