

Four-Year B.Ed. Course Manual

Teaching and Assessing Mathematics

















Published by the Ministry of Education; Ghana, under Creative Commons Attribution-Sharealike 4.0 International License.

FOREWORD

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

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

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

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

Professor Mohammed Salifu

Director General, Ghana Tertiary Education Commission

ACKNOWLEDGEMENTS

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

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

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

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

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

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

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

CORE WRITING TEAM

Names of writers	Subject		Names of writers	Subject
Dr. Isaac Eshun			Cletus Ngaaso	Social Studies
Dr. Anthony Baabereyir	-		Mohammed Adam	
Ms. Shirley Dankwa	African Studies		Dr. Emmanuel Adjei-Boateng	
Prof. S.Y. Annor	Agriculture		Dr. Yaw Nyadu Offei	Special Education
Dr. Salome praise Otami			Prof. Samuel Hayford	
Dr. Samuel Frimpong	-		Dr. Awuni	
Robert Quansah	Early Grade		Rev.(Dr) Nyueko Avotri	Technical Vocational
Dr. Abraham Kwadwo Okrah			Elizabeth Lani Ashong	Education and
Dr. Sarah Emma Eshun	English Language			Training
Vivian Acguaye	-		Michael Isorgali	
Felix A. Odonkor			Frnacis Donkor	
Dr. Cecilia Esinam Agbeh	-		Dr. Maxwell Nyatsikor	
Ibrahim Osmanu	French		Prof. Salomey Essuman	
Dr. Kofi Adu-Boahen			Dr. Paul Kwadwo Addo	
Dr. M. Kusimi	-		Dr. Winston Kwame Abroampa	
Dr. Aboagye Dacosta	-		Mr. Kwaku Esia-Donkoh	
Mr. Alexander Otoo	Geography		Mohammed Z. Abdulmumin	Pedagogy
Dr. Yvonne A.A. Ollennu	Ghanaian		Dr. Mohammed Hafiz	Arabic
Kwasi Adomako	Language		Iddris Mohammed	•
Dr. Akwasi Kwarteng Amoako-Gyampah			Mohammed Almu Mahaman	
Anitha Oforiwah Adu- Boahen			Murtada M. Muaz	
Gertrude Nkrumah	History		Dr M. Q. Adjahoe	Music
Prof Charles Owu-Ewie	Literacy		Prof Cosmas Mereku	
Dr. Ahmed Amihere			Prof. Reginald Ocansey	Physical Education
Zakaria Sadiq	Mathematics		Dr. Emmanuel Osei Sarpong	
Dr. R. Addai-Mununkum	RME		E. Kwaku Kwaa-Aidoo	ICT

INTRODUCTION TO COURSE MANUALS

Welcome to this B.Ed. Course manual.

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

The manuals serve the following purposes:

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

Specifically, they also:

- support coherent lesson planning and teaching which will enable student teachers to achieve the NTS and become good teachers who ensure all pupils' learning whilst offering tutors the flexibility for adaptation for local needs and contexts.
- Provide a lesson by lesson overview of the course, building on and developing the material in the course specifications.
- Inform tutors, student teachers and others working with student teachers about:
 - 1. What is to be taught and why.
 - 2. how it can be taught.
 - 3. how it should be assessed.
- Provide opportunities for student teachers to develop and apply knowledge during supported teaching in school, creating a strong bond between learning in school and in the training institution.
- Reflect the stage of student teacher development, set out in the model for progress across the four years of the B.Ed.
- Can be used as self-study tools by student teachers.
- Ensure that all information necessary to inform teacher training is in one place (serves as reference document).
- The manuals are the basis of the codes and university professional development sessions to ensure Principals, tutors, lecturers and heads of department are fully familiar with the details of: courses, outcomes, content, approaches, assessments and lessons.

Who are course manuals for:

- College of Education Tutors
- Teacher Education University Lecturers
- Student Teachers
- Mentors and Lead Mentors
- All Those with An Interested In Teacher Education.

USING THIS MANUAL

Writers of the manuals engaged widely with colleagues in each subject area at each stage of development. Besides, writers envisaged themselves in varied contexts as they wrote, to suggest methodologies and strategies for teaching the strands which would ensure student teachers are enabled to achieve the learning outcomes. In view of our commitment to creativity, problem solving, collaboration and to lifelong learning, we expect that individual tutors will "own" their manuals and become user-developers. lessons in the manuals will be strands for weekly Pd meetings where tutors/lecturers will situate the lessons in the contexts of their colleges and their student teachers, to maximize the benefits.

It is also expected that tutors will model the best pedagogic practices for student teachers. Key among such practices is the communication of the importance of having a personal teaching philosophy. We expect that tutors and lecturers will explicitly communicate their personal teaching philosophies to their student teachers during the first meeting of every course. in preparation for this, we suggest you set out your personal teaching philosophy and how it will be demonstrated in your teaching using, or adapting, the sample sentence introductions below.

My teaching philosophy is

In view of this philosophy, I will facilitate this course by/through

Course Manual Writing Guide Resources for Course Manual Writing Soft copies of the CWG, New Four-Year B.Ed. Curriculum introduction • Soft and hard copies of the course specifications for the subject for year one and two Soft and hard Course Manual Writing Guide (CMWG) Relevant subject texts **Target Audience** College of Education Tutors **Teacher Education University Lecturers Student Teachers** Mentors The purpose of course manuals To provide a lesson by lesson overview of the course, building on, adapting and developing the material in the course specifications To provide a resource to support professional development sessions for tutors/lecturers on how to plan for and teach courses from the New Four-Year B.Ed. Curriculum To inform tutors /lecturers, student teachers and others working with student teachers about: what is to be taught and why how it can be taught _ how it should be assessed To support consistency in the implementation of the New Four-Year B.Ed. across institutions who train teachers To ensure that all training information on skills, processes, and other information necessary to perform the teaching task are together in one place. To operationalize the Teacher Education Reform Policy; the requirements of the NTS & NTECF and the Four-Year B.Ed. Guiding principles of course manual writing They are written with the learner, the student teacher, in mind: what they will be able to cope with and only include 1. what student teachers need to know, understand, be able to do and be as a basic school teacher 2. They take in to consideration the learner's, the student teacher's, context and possible barriers to, and enablers for, learning 3. They are written with the tutors /lecturers who are going to teach the course in mind. Tutors must be able to adapt and develop the plans in course manuals to fit the context they are teaching in and to support their teaching 4. They are aligned to the key principles and practices of the Teacher Education Reform Policy: the NTECF and the New Four-Year B.Ed. 5. They are written to provide opportunities for student teachers to develop and apply knowledge during supported teaching in school 6. They are written to reflect the stage of student teacher development, set out in the model for progress in the New Four-Year B.Ed. 7. They are written to support progress in student teacher learning, including building on prior learning from the previous programme or course/s and supporting progress to the next course. 8. They are to be used as self-study tools. 9. They are written to have the following characteristics: easy to read; uses active voice and avoids jargon; uses bullet points to offset text; uses images What a teacher educator needs to know, understand and use to inform what they do The aims and structure of the education system and Education strategic Plan . The Basic School Curriculum The Inclusion Policy The teacher education system: The National Teacher's Standards, the vision for teacher education and the core principles of the New Four-Year B.Ed. Andragogy, effective methods and practices for teaching adult learners Assessment Literacy. Assessment for, of and as learning -Educative Assessment

Guidance for completing the course manual writing proforma: two sections

A. Cou	rse Information					
Title Page						
i.	Course name: as in course :	specification ur	iless important reason wh	y not		
II.	The vision for the New Four-Year B.Ed. Curriculum					
"To transfor	"To transform initial teacher education and train highly qualified, motivated new teachers who are effective, engaging and					
fully prepare	fully prepared to teach the basic school curriculum and so improve the learning outcomes and life chances of all learners					
honosty inte	s set out in the National Tea	chers Stanuard	as. In doing this to institut	new teachers the N	lation's core v	values of
learners "	ginty, creativity and respons	sible citizerisiiip	and to achieve inclusive,	equitable, fiigh qua		
iii	Course Details: as in course	e specification	unless important reason v	why not		
Pre-	The programme / previous	semester cour	ses studied.			
requisite/s						
Co-	Links to other courses bein	ng taught, suppo	ort coherence in student e	experience and avoi	d duplication	
Requisites		0 0 / 11			,	
Course		Course Code		Credit Value	3	
Level						
Table of con	tents					
Each manua	will include:					
1. The	goal for the subject or learn	ning area				
2. Cou	rse description					
3. Key	contextual factors					
4. Cor	e and cross cutting issues, in	icluding equity	and inclusion			
5. Cou	rse Learning outcomes					
0. COU 7 Top	rse content	c				
7. Tea 8 Cou	rse Assessment component	5 .c				
9 Rea	ding and reference list					
10. Har	douts, power points and ot	her resources fo	or lessons			
11 Diar	10. Handouts, power points and other resources for lessons					
11. Plans for each lesson in the semester						
A. Cou	rse information	nester				
A. Cou 1. God	is for each lesson in the sem rse information Il for the Subject or Learning	g Area				
A. Cou 1. God This can be f	is for each lesson in the series rse information Il for the Subject or Learning ound in subject goal docume	nester g Area ent. It should b	e a short statement which	captures what new	/ teachers wil	ll know,
A. Cou 1. Goo This can be f understand a	is for each lesson in the sen rse information Il for the Subject or Learning ound in subject goal docume and be able to do in this sub	g Area ent. It should b ject at the end	e a short statement which of their training. This state	captures what new ement should be lin	/ teachers wil ked to achiev	I know, ring the
A. Cou 1. Goo This can be f understand a vision for the	is for each lesson in the series rse information If for the Subject or Learning ound in subject goal docume and be able to do in this subject curriculum.	nester g Area ent. It should b ject at the end	e a short statement which of their training. This state	captures what new ement should be lin	/ teachers wil ked to achiev	l know, ving the
A. Cou 1. Goo This can be f understand a vision for the 2. Key	rse information if for the Subject or Learning ound in subject goal docum- and be able to do in this sub- e curriculum. contextual factors	nester g Area ent. It should b ject at the end	e a short statement which of their training. This state	i captures what new ement should be lin	/ teachers wil ked to achiev	l know, ving the
A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific	g Area ent. It should b ject at the end cation. It should	e a short statement which of their training. This state d address what needs are	captures what new ement should be lin to be considered t	v teachers wil ked to achiev to reflect the	I know, ring the Ghanaian
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at l	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- curriculum. contextual factors found in the course specific ocal and national levels.it	g Area ent. It should b ject at the end cation. It should includes poten	e a short statement which of their training. This state d address what needs are itial knowledge and skills	captures what new ement should be lin e to be considered to s gaps and any spe	v teachers wil ked to achiev to reflect the ecific: gende	I know, ving the e Ghanaian r, cultural,
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at l linguistic, co	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam	e a short statement which of their training. This state d address what needs are itial knowledge and skills nple, that might be barri	e captures what new ement should be lin to be considered to gaps and any spe ers to learning for	v teachers wil ked to achiev to reflect the ecific: gender student tea	I know, ving the Ghanaian r, cultural, icchers and
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at l linguistic, co eventually b	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss	aester g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r	e a short statement which of their training. This state d address what needs are stial knowledge and skills aple, that might be barri related bias that need add	e to be considered to gaps and any spe ers to learning for pressing. Potential b	teachers wil ked to achiev to reflect the ecific: gende student tea arriers to lea	I know, ving the Ghanaian r, cultural, icchers and rning must
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac	e a short statement which of their training. This state d address what needs are ntial knowledge and skills nple, that might be barri related bias that need add chieve the learning outcon	e captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential b nes.	teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear	l know, ring the Ghanaian r, cultural, ichers and rning must
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac	e a short statement which of their training. This state d address what needs are tial knowledge and skills nple, that might be barri related bias that need add chieve the learning outcon	e captures what new ement should be lin to be considered to gaps and any spe ers to learning for ressing. Potential bones.	teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear	I know, ring the Ghanaian r, cultural, uchers and rning must
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be	rse information <i>If or the Subject or Learning</i> ound in subject goal docume and be able to do in this sub- e curriculum. <i>contextual factors</i> found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen <i>rse Description</i> found in the course specific produces, what student teach	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out	e a short statement which of their training. This state d address what needs are ttial knowledge and skills aple, that might be barri related bias that need add chieve the learning outcon of statement should provid of studying this course	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential bones. de a clear understa	teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha	I know, ring the Ghanaian r, cultural, inchers and rning must
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific nould in the course specific pound in the course specific nould in the course specific pound in the course specific	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out	e a short statement which of their training. This state d address what needs are stial knowledge and skills uple, that might be barri related bias that need add chieve the learning outcon ef statement should provis of studying this course.	e captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential bo nes. de a clear understa	v teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha	I know, ring the e Ghanaian r, cultural, ichers and rning must at studying
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific nvolves, what student teach e and transferable skills and found in the course specific	aester g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c	e a short statement which of their training. This state d address what needs are stial knowledge and skills ople, that might be barri related bias that need add chieve the learning outcon ef statement should provid of studying this course. issues, including equity ar	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential b nes. de a clear understa nd inclusion	v teachers will ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha	I know, ving the e Ghanaian r, cultural, ichers and rning must at studying
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at l linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor This can be developed t	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific nvolves, what student teach e and transferable skills and found in the course specific prough this course? This ne	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting f cation. Which c	e a short statement which of their training. This state d address what needs are stial knowledge and skills ople, that might be barri related bias that need add chieve the learning outcon of statement should provid of studying this course. issues, including equity ar ore and transferable skills de explicit to student tead	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for lressing. Potential bo nes. de a clear understa de a clear understa nd inclusion s or cross cutting is chers. Are there spo	v teachers will ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha	I know, ving the e Ghanaian r, cultural, inchers and rning must at studying applied or to do with
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at 1 linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor This can be developed tl equity and in	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific involves, what student teach e and transferable skills and found in the course specific involves, what student teach e and transferable skills and found in the course specific involues this course? This ne- inclusion which must be add	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eds to be mad ressed so that	e a short statement which of their training. This state d address what needs are ntial knowledge and skills ople, that might be barri related bias that need add chieve the learning outcon of statement should provision of studying this course. issues, including equity ar core and transferable skills de explicit to student teac all student teachers can f	e captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for lressing. Potential b nes. de a clear understa nd inclusion s or cross cutting is chers. Are there sp fully take part? For	v teachers will ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha ssues will be ecific issues f example, issu	I know, ving the e Ghanaian r, cultural, icchers and rning must at studying applied or to do with ues related
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor This can be developed th equity and in to gender an	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific nvolves, what student teach e and transferable skills and found in the course? This ne incugh this course? This ne inclusion which must be add d mathematics or science.	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eeds to be mad ressed so that	e a short statement which of their training. This state d address what needs are tial knowledge and skills nple, that might be barri related bias that need add chieve the learning outcon of studying this course. issues, including equity ar fore and transferable skills de explicit to student teac all student teachers can f	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential b nes. de a clear understa nd inclusion s or cross cutting is chers. Are there spe fully take part? For o	teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear nding of what issues will be ecific issues to example, issues	I know, ring the Ghanaian r, cultural, uchers and rning must at studying applied or to do with ues related
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor This can be developed the equity and in to gender an 5. Cou	rse information il for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific nvolves, what student teach te and transferable skills and found in the course specific nrough this course? This ne inclusion which must be add d mathematics or science. rse Learning Outcomes	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eeds to be mad ressed so that	e a short statement which of their training. This state d address what needs are stial knowledge and skills uple, that might be barri related bias that need add chieve the learning outcon of studying this course. issues, including equity ar store and transferable skills de explicit to student teac all student teachers can f 6. Learning indica	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential b nes. de a clear understa nd inclusion s or cross cutting is chers. Are there sp ully take part? For or tors	v teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha essues will be ecific issues t example, issu	I know, ring the e Ghanaian r, cultural, inchers and rning must at studying applied or to do with ues related
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Corr This can be developed t equity and in to gender an 5. Cou These are i	rse information If or the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific nvolves, what student teach e and transferable skills and found in the course specific nvolves, what student teach e and transferable skills and found in the course specific nvolves, what student teach e and transferable skills and found in the course specific nvolues this course? This ne nclusion which must be add d mathematics or science. rse Learning Outcomes n the course specification	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject n t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eeds to be mad ressed so that	e a short statement which of their training. This state d address what needs are stial knowledge and skills aple, that might be barri related bias that need add chieve the learning outcon ef statement should provie of studying this course. issues, including equity ar core and transferable skills de explicit to student teac all student teachers can f 6. Learning indica • Measurable/assessa	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential be nes. de a clear understa de a clear understa nd inclusion s or cross cutting is chers. Are there sp fully take part? For tors	v teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha esues will be ecific issues f example, issu	I know, ring the e Ghanaian r, cultural, ichers and rning must at studying applied or to do with ues related wat provide
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor This can be developed t equity and in to gender an 5. Cou These are i learning out	rse information If or the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific nvolves, what student teach the and transferable skills and found in the course specific nrough this course? This ne inclusion which must be add d mathematics or science. rse Learning Outcomes in the course specification comes should specify the ex-	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eeds to be mad ressed so that	e a short statement which of their training. This state d address what needs are stial knowledge and skills ople, that might be barri related bias that need add chieve the learning outcon ef statement should provid of studying this course. issues, including equity ar core and transferable skills de explicit to student tead all student teachers can f 6. Learning indica • Measurable/assessa evidence of learning	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential be nes. de a clear understa de a clear understa de a clear understa de a clear understa s or cross cutting is chers. Are there spe fully take part? For tors bble/observable per g or other changes	v teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha essues will be ecific issues to ecific issues to example, issue formances th taking place	I know, ring the e Ghanaian r, cultural, icchers and rning must at studying applied or to do with ues related nat provide in student
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at l linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Corr This can be developed t equity and in to gender an 5. Cou These are i learning out what the stu	rse information if for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific tovolves, what student teach e and transferable skills and found in the course specific nough this course? This ne inclusion which must be add d mathematics or science. rse Learning Outcomes In the course specification comes should specify the ex- dent teachers will know, un	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eeds to be mad ressed so that	e a short statement which of their training. This state d address what needs are stial knowledge and skills ople, that might be barri related bias that need add chieve the learning outcon ef statement should provid of studying this course. issues, including equity ar fore and transferable skills de explicit to student tead all student teachers can f 6. Learning indica • Measurable/assessa evidence of learning teachers' behaviour	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential b nes. de a clear understa de a clear understa nd inclusion s or cross cutting is chers. Are there sp ully take part? For tors ble/observable per g or other changes r which demonstra	v teachers will ked to achiev to reflect the ecific: gendel student tea arriers to lead nding of what escific issues the ecific issues the example, issue formances the taking place te that they	I know, ving the e Ghanaian r, cultural, icchers and rning must at studying applied or to do with ues related at provide in student have met
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor This can be developed tl equity and in to gender an 5. Cou These are i learning out what the stu be able to	rse information if for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is acid ressed to enable studen rse Description found in the course specific nvolves, what student teach e and transferable skills and found in the course specific nvolves, what student teach e and transferable skills and found in the course specific nvolves, what student teach e and transferable skills and found in the course specific nvoly this course? This ne nclusion which must be add d mathematics or science. rse Learning Outcomes In the course specification comes should specify the ex- dent teachers will know, und do at the end of the course	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting f cation. Which c eds to be mad ressed so that . The course spectations of iderstand and rse not what	e a short statement which of their training. This state d address what needs are ntial knowledge and skills nple, that might be barri related bias that need add chieve the learning outcon of studying this course. issues, including equity ar fore and transferable skills de explicit to student teac all student teachers can f 6. Learning indica • Measurable/assessa evidence of learning teachers' behaviour the learning outcom	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for lressing. Potential b nes. de a clear understa de a clear understa de a clear understa s or cross cutting is chers. Are there sp ully take part? For tors ully take part? For ble/observable per g or other changes which demonstra ie/s.	v teachers will ked to achiev to reflect the ecific: gender student tea arriers to lear nding of what essues will be ecific issues th example, issues formances th taking place te that they	I know, ving the e Ghanaian r, cultural, inchers and rning must at studying applied or to do with ues related nat provide in student have met
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at 1 linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor This can be developed th equity and in to gender an 5. Cou These are i learning out what the stu be able to student teac	rse information if for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific noulves, what student teach e and transferable skills and found in the course specific nough this course? This ne nclusion which must be add d mathematics or science. rse Learning Outcomes In the course specification comes should specify the ex- dent teachers will know, un do at the end of the course.	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eds to be mad ressed so that . The course opectations of iderstand and rse not what They must be	e a short statement which of their training. This state d address what needs are tial knowledge and skills ople, that might be barri related bias that need add chieve the learning outcom of studying this course. issues, including equity ar fore and transferable skills de explicit to student tead all student teachers can f 6. Learning indica • Measurable/assessa evidence of learning teachers' behaviour the learning outcom • What the student to	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for lressing. Potential bines. de a clear understa de a clear understa de a clear understa s or cross cutting is chers. Are there sp fully take part? For or tors ible/observable per g or other changes r which demonstra- te/s. eacher will need to	r teachers will ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha essues will be ecific issues to example, issues formances th taking place te that they do to show	I know, ring the e Ghanaian r, cultural, icchers and rning must at studying applied or to do with ues related hat provide in student have met they have
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor This can be developed th equity and in to gender an 5. Cou These are i learning out what the stu be able to student teac appropriate	rse information if for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific nouly in the course specific nough this course? This ne inclusion which must be add d mathematics or science. rse Learning Outcomes in the course specification comes should specify the ex- dent teachers will know, un do at the end of the course. and realistic to the learning the individual in the course.	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eds to be mad ressed so that . The course opectations of iderstand and rse not what They must be per's abilities,	e a short statement which of their training. This state d address what needs are ntial knowledge and skills nple, that might be barri related bias that need add chieve the learning outcom of studying this course. issues, including equity ar fore and transferable skills de explicit to student teac all student teachers can f 6. Learning indica • Measurable/assessa evidence of learning teachers' behaviour the learning outcom • What the student to achieved the learning	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential b nes. de a clear understa de a clear understa de a clear understa s or cross cutting is chers. Are there sp fully take part? For tors tors s or other changes which demonstra- te/s. eacher will need to ing outcome. (in a	r teachers will ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha ssues will be ecific issues to example, issu formances th taking place te that they do to show n inclusive lear	I know, ving the e Ghanaian r, cultural, icchers and rning must at studying applied or to do with ues related in student have met they have esson, this
A. Cou A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, co eventually b be explicitly 3. Cou This can be this course in 4. Cor This can be developed th equity and in to gender an 5. Cou These are i learning out what the stu be able to student teac appropriate experience,	rse information if for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific nould in the course specific nough this course? This ne inclusion which must be add d mathematics or science. rse Learning Outcomes In the course specification comes should specify the ex- dent teachers will know, un do at the end of the course and realistic to the learn the identified level of the	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject r t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eds to be mad ressed so that . The course opectations of iderstand and rse not what They must be per's abilities, e course and	e a short statement which of their training. This state d address what needs are stial knowledge and skills ople, that might be barri related bias that need add chieve the learning outcom of studying this course. issues, including equity ar fore and transferable skills de explicit to student tead all student teachers can f 6. Learning indica • Measurable/assessa evidence of learning teachers' behaviour the learning outcom • What the student to achieved the learnin should vary and be	to captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for lressing. Potential b nes. de a clear understa de a clear understa de a clear understa de a clear understa s or cross cutting is chers. Are there spe fully take part? For tors tors ble/observable per g or other changes which demonstra- ie/s. eacher will need to ing outcome. (in all responsive to stude	v teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear nding of what essues will be ecific issues to example, issues formances th taking place te that they do to show n inclusive le ent teacher's	I know, ving the e Ghanaian r, cultural, icchers and rning must at studying applied or to do with ues related in student have met they have esson, this individual
11. Plat A. Cou 1. Goo This can be f understand a vision for the 2. Key This can be context at I linguistic, cc eventually b be explicitly 3. Cou This can be developed t equity and in to gender an 5. Cou These are i learning out what the stu be able to student teac appropriate experience, content. Th	rse information if for the Subject or Learning ound in subject goal docume and be able to do in this sub- e curriculum. contextual factors found in the course specific ocal and national levels.it inceptual, infrastructural is asic school children? E.g. iss addressed to enable studen rse Description found in the course specific rough the course specific nough this course? This ne inclusion which must be add d mathematics or science. rse Learning Outcomes n the course specification comes should specify the ex- dent teachers will know, un do at the end of the cour- hers will do on the course. and realistic to the learn the identified level of the ey must be measurable	g Area ent. It should b ject at the end cation. It should includes poten sues, for exam ues of subject of t teachers to ac cation. This brie ers will get out d cross cutting cation. Which c eeds to be mad ressed so that . The course spectations of iderstand and rse not what They must be per's abilities, e course and e – allowing pont	e a short statement which of their training. This state d address what needs are stial knowledge and skills pple, that might be barri related bias that need add chieve the learning outcom ef statement should provie of studying this course. issues, including equity an core and transferable skills de explicit to student tead all student teachers can f 6. Learning indica • Measurable/assessa evidence of learning teachers' behaviour the learning outcom • What the student to achieved the learni should vary and be characteristic)	a captures what new ement should be lin e to be considered to s gaps and any spe ers to learning for ressing. Potential be nes. de a clear understa de a clear understa ad inclusion s or cross cutting is chers. Are there spe fully take part? For tors ble/observable per g or other changes r which demonstrate eacher will need to ng outcome. (in an responsive to stude	v teachers wil ked to achiev to reflect the ecific: gender student tea arriers to lear nding of wha essues will be ecific issues to ecific issues to example, issu formances th taking place te that they do to show n inclusive le ent teacher's	I know, ring the e Ghanaian r, cultural, icchers and rning must at studying applied or to do with ues related have met they have esson, this individual

7. Course content		
In the course specification. This should provide an outl	ine of the academic and / or practical	content of the course. It should
be clear how this content relates to the achievement	t of the intended learning outcomes.	The name of each unit in the
course should be briefly set out - the name should mal	ke it clear what the unit is about.	
Unit Topic	Sub-topic (If any)	Teaching and learning
		activities to achieve the
		learning outcome
8. Course Assessment Components		
In the course specification. The NTS and the NTECF r	equire a move away from largely exa	mination-based assessment to
strategies to enable assessment of student teachers'	skills, knowledge and understanding	against the learning outcomes
and through these the against the NTS		
• There should be a maximum of 3 assessment co	omponents per 3 credit-course; to a	void over loading student and
tutors/ lecturers		
• The learning outcomes to be assessed by each ass	essment component should be identifi	ed.
Each assessment component should explicitly refe	rence the NTS or aspects of the NTS it	will assess.
• Each assessment component should include:		
• The category or type, for example: written, co	ursework or practical, teaching, exami	nation, collaborative project or
presentation, poster, TLM		
• The type of assessment: of, for and /or as.		
• An indication of the size of each assessment c	omponent (e.g. duration of exams, wo	rd limit of written submissions,
length of presentations; whether presentation	ns have an individual or group etc.).	
 The weighting of each assessment component 	nt should be expressed as a % of tota	al course mark (overall in each
course: 60% continuous assessment of course	work, 40% examination of course wor	·k).
Each assessment should be manageable and relevation	ant to supporting the student teachers	' development.
The guidance on assessing student teachers from the N	ITS, the NTECF the CWG and the New	Four Year B.Ed. should be
used.		
9. Teaching and learning strategies		
Detail in this section should show how the total learni	ng hours will be used to achieve the i	ntended learning outcomes, to
provide a guide to the teaching and learning strateg	ies to be used. Each teaching strate	gy should be selected as most
appropriate to achieving the learning outcomes. This r	nay include team teaching or addition	al tutors. As stated in the B.Ed.
experiential learning and interactive teaching approach	nes are encouraged	
10. Required Reading and reference list		
One or two compulsory texts which must be made ava	ilable to the student teachers and a SH	IORT list of 5 relevant
references. These lists should be annotated with the ke	ey value of each text. Use APA style of	writing.
11. Teaching and Learning Resources	, , , , , , , , , , , , , , , , , , , ,	
Instructional resources required to support learning du	Iring the course e.g.: TLMs, lab and wo	rkshop equipment, videos,
projectors		
Course related professional development for tutors/	ecturers	
This is not included the course manual but profession	al development needs must be identifi	ed to ensure all tutors /
lecturers are prepared to teach the course identify any	specific topics or issues which may be	challenging for tutors /
lecturers.	· · · · · · · · · · · · · · · · · · ·	
B. Semester lesson plans		

Guidance for Lesson planning

The expanded format is ddesigned to support writing lessons which address the key features of the new B.Ed. curriculum The completed format will be an important piece of evidence for CoE in being awarded **Transitional Support Funding (TSF)**

Things to consider when writing and reviewing lessons:

- Will all student teachers be able to achieve the learning outcomes and demonstrate the indicators by undertaking the activities set out in the lesson?
- What might be barriers to learning? How can you address these barriers?
- How does the lesson support progress in and or consolidate student teacher learning; including building on prior learning and supporting progress to next lessons?
- How will you can address transition from school to CoE in the first semester?
- Are there explicit links between learning outcomes, learning indicators and assessments?
- Do all activities support student teachers in achieving the lesson learning outcomes?
- Is there an emphasis on interactive, learner focused approaches to training new teachers?
- Does it explicitly address cross cutting -issues: equity and inclusion, gender, SEN, ICT?

• Does it explicitly develop core skills, including: professional values and attitudes, classroom enquiry and reflection?

- Overall the lesson must be 'do-able' for the student teacher
 - in the time available

•

•	with the skills, knowledge and understanding they have

Lesson Duration									
Lesson description	It is essen	tial that stu	ident teache	rs know wha	at this lesson is	about. The lesso	n		
Descious student tooshor	descriptio	n should be	e short, cleai	, and access	ible to all stude	nts.			
knowledge, prior learning (assumed)	 What links to previous knowledge / prior learning need to be built in to the lesson? Prior learning could be from: this course and previous lessons; from senior high school; from supported teaching in school/practicum; from other courses. NB important to build on work from previous lessons If you are unsure about previous knowledge or prior learning how you need to check for this as part of the activity in the lesson/s. If the expected prior knowledge is not addenued to the lesson of the activity in the lesson. 								
	adequ	adequate you will need to modify the lesson.							
Possible barriers to learning in the lesson	 What specific conceptual, linguistic, social, cultural, conceptual, gender, or ability related issues might stop student teachers in achieving the learning outcomes; act as barriers to their learning? How will you address these? Does this lesson require that student teachers examine their own bias? If so, you will need to plan to support and address this 								
Points on equity, inclusivity	• Your	eed to rep	resent and a	ddress diver	sity in your les	son-plan. Are the	ere multiple		
(gender, SEN), and addressing diversity	 How need to represent and address diversity in your resson-plan. Are there multiple diversity issues (see <u>diversity wheel</u>)? How would these issues be addressed with student teachers during activities for both their own learning and the learning of the students they will teach? How are issues of diversity (equity and inclusion) addressed in your lesson plan so that student teachers can see diversity modelled during this teaching and learning activity? 								
	How	are issues o	of diversity (equity and i	nclusion) addre	essed in your les	son plan so		
	that s	tudent tead	chers can lea	rn how to ad	dress it with the	e students they w	vill teach?		
	• For each	xample: ger	nder stereot	ype issues re	lated to: PE, lit	eracy and langua	age, science		
	and n	nathematics	5.						
Lesson Delivery – chosen to	Face-to-	Practical	Work-	Seminars	Independent	e-learning	Practicum		
support students in achieving	tace	Activity	Based		g face Activity Based Study opportunities				
the outcomes	Leaning								
Lesson Delivers, main made	Face-to-face: opportunity for an extended and coherent line of argument. It includes					of argument. It is	naludas		
Lesson Delivery – main mode	Face-to-fa	ice: opport	Leaning tunity for an	extended an	d coherent line	of argument. It in	ncludes		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving	Face-to-fa	i ce: opport	Leaning tunity for an ning, questic	extended an on and answe	d coherent line er, etc. This can	of argument. It is be tutor and / or	ncludes student		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A	i ce: opport , brainstorr d. It should	Leaning tunity for an ning, questic not usually l abling experi	extended an on and answe be the main i mentation a	d coherent line er, etc. This can mode. ad the analysis :	of argument. It in be tutor and / or	ncludes student		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document	nce: opport n, brainstorr d. It should Activity: ena	Leaning tunity for an ning, questic not usually l abling experi rials, as well	extended an on and answe be the main i mentation an as physical a	d coherent line er, etc. This can mode. nd the analysis a ctivities.	of argument. It in be tutor and / or and discussion of	ncludes student issues,		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document Work bas	ice: opport b, brainstorr d. It should Activity: ena as and mate ed learning	Leaning tunity for an ning, questic not usually l abling experi rials, as well : to allow stu	extended an on and answe be the main i mentation a as physical a idents to und	d coherent line er, etc. This can mode. nd the analysis a ctivities. lertake observa	of argument. It in be tutor and / or and discussion of tion, enquiry and	ncludes student issues, I/or hands-		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical J document Work bass on develo	ace: opport a, brainstorr d. It should Activity: ena as and mate ed learning pment worl	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stu k (mostly TVI	extended an on and answe be the main i mentation a as physical a idents to und ET)	d coherent line er, etc. This can mode. nd the analysis a ctivities. lertake observa	of argument. It in be tutor and / or and discussion of tion, enquiry and	ncludes student issues, I/or hands-		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document Work bas on develo Seminars:	ice: opport brainstorr d. It should Activity: ena ss and mate ed learning pment worl to generat	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stu k (mostly TVI te group and	extended an on and answe be the main i mentation an as physical a idents to und ET) individual cr	d coherent line er, etc. This can mode. nd the analysis a ctivities. lertake observa eativity, discuss	of argument. It in be tutor and / or and discussion of tion, enquiry and ion and reflectio	ncludes student issues, I/or hands- n: student		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical / document Work bas on develo Seminars: and / or tr	ice: opport brainstorr d. It should Activity: ena is and mate ed learning pment worl to generat utor led	Leaning tunity for an ning, questic not usually l abling experi rials, as well : to allow stu k (mostly TVI te group and	extended an on and answe be the main i mentation and as physical a idents to unce ET) individual cr	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss	of argument. It in be tutor and / or and discussion of tion, enquiry and ion and reflectio	ncludes student issues, I/or hands- n: student		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document Work bas on develo Seminars: and / or tu Independ	ice: opport brainstorr d. It should Activity: ena s and mate ed learning pment worl to generat utor led ent study:	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stu k (mostly TVI te group and to enable stu	extended an on and answe be the main i mentation a as physical a idents to und ET) individual cr	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva	of argument. It in be tutor and / or and discussion of tion, enquiry and ion and reflectio	I/or hands- n: student		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document Work bas on develo Seminars: and / or tu Independ materials developm	ice: opport brainstorr d. It should Activity: ena s and mate ed learning pment worl to generat utor led ent study: to promote ent This ca	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stuk (mostly TVI te group and to enable stu individual an n be part of	extended an on and answe be the main i mentation a as physical a idents to und eT) individual cr udents to eng nd collaborat	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva cive enquiry, mo	of argument. It in be tutor and / or and discussion of tion, enquiry and sion and reflectio ant and appropria ore in-depth analy	I/or hands- n: student issues, l/or hands- n: student ate ysis and		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document Work bas on develo Seminars: and / or tu Independ materials developm E-learning	ice: opport by brainstorr d. It should Activity: ena is and mate ed learning pment worl to generat utor led ent study: to promote ent. This ca	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stu k (mostly TVI te group and to enable stu individual an n be part of ties – involvi	extended an on and answe be the main i mentation and as physical a idents to unce T) individual cr udents to engen and collaboration any of the about the about the second any of the use of	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva tive enquiry, mo bove modes interactive pac	of argument. It in be tutor and / or and discussion of tion, enquiry and ion and reflectio int and appropria ore in-depth analy kages and virtual	I/or hands- n: student issues, I/or hands- n: student ote ysis and I learning		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document Work bas on develo Seminars: and / or tu Independ materials developm E-learning environme	ice: opport brainstorr d. It should Activity: ena s and mate ed learning pment worl to generat utor led ent study: to promote ent. This ca copportunit ents. This ca	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stu k (mostly TVI te group and to enable stu individual an n be part of ties – involvi an be part of	extended an on and answe be the main i mentation and as physical and idents to unce ET) individual cr udents to engend collaborate any of the about the about the second any of the about the about the second any of the about the second the secon	d coherent line er, etc. This can mode. nd the analysis a ctivities. lertake observa eativity, discuss gage with releva tive enquiry, mo bove modes interactive pac bove modes of b	of argument. It in be tutor and / or and discussion of tion, enquiry and ion and reflectio int and appropria ore in-depth analy kages and virtual delivery. It is unli	ncludes student issues, I/or hands- n: student nte ysis and I learning kely to be a		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document Work bass on develo Seminars: and / or tu Independ materials developm E-learning environmed	ice: opport by brainstorr d. It should Activity: ena s and mate ed learning pment worl to generat utor led ent study: to promote ent. This ca copportuni ents. This ca node in its o	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stuk (mostly TVI te group and to enable stu individual an n be part of ties – involvi an be part of wn right.	extended an on and answe be the main i mentation at as physical a idents to unce T) individual cr individual cr idents to eng nd collaborat any of the at ng the use of any of the a	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva tive enquiry, mo ove modes interactive pac bove modes of o	of argument. It in be tutor and / or and discussion of tion, enquiry and tion and reflectio ant and appropria ore in-depth analy kages and virtual delivery. It is unli	ncludes student issues, I/or hands- n: student ate ysis and I learning kely to be a		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document Work bass on develo Seminars: and / or tu Independ materials developm E-learning environme delivery m Practicum	ice: opport by brainstorr d. It should Activity: ena as and mate ed learning pment worl to generat utor led ent study: to promote ent. This ca gopportunit ents. This ca bode in its o (supported	Leaning tunity for an ning, questic not usually I abling experi rials, as well to allow stuk (mostly TVI te group and to enable stu individual ar n be part of ties – involvi an be part of wn right. d teaching in	extended an on and answe be the main i mentation al as physical a idents to und eT) individual cr indents to eng nd collaborat any of the ab any of the a any of the a	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva tive enquiry, mo ove modes interactive pac bove modes of bove modes of the pact	of argument. It in be tutor and / or and discussion of tion, enquiry and sion and reflectio ant and appropria ore in-depth analy kages and virtual delivery. It is unli	I/or hands- n: student issues, l/or hands- n: student te ysis and l learning kely to be a to		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical / document Work bas on develo Seminars: and / or tu Independ materials developm E-learning environm delivery m Practicum	ice: opport by brainstorr d. It should Activity: ena s and mate ed learning pment worl to generat utor led ent study: to promote ent. This ca s opportunit ents. This ca hold e in its o (supported e and learn	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stu k (mostly TVI te group and to enable stu individual an n be part of ties – involvi an be part of twn right. d teaching in from the bas	extended an on and answe be the main i mentation and as physical and idents to unce eT) individual cr individual cr indi cr individual cr individual cr individual cr indi	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva tive enquiry, mo bove modes interactive pac bove modes of poort to enable in text by doing c	of argument. It in be tutor and / or and discussion of tion, enquiry and ion and reflectio int and appropria ore in-depth analy kages and virtual delivery. It is unli student teachers ibservations and	ncludes student issues, I/or hands- n: student ete ysis and I learning kely to be a to child study		
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to-fa discussion teacher le Practical A document Work bas on develo Seminars: and / or tu Independ materials developm E-learning environm delivery m Practicum experienc in Y1 to fu	ice: opport by brainstorr d. It should Activity: ena as and mate ed learning pment worl to generat utor led ent study: to promote ent. This ca gopportunit ents. This ca bode in its o (supported e and learn II class teac	Leaning tunity for an not usually h abling experi rials, as well to allow stuk (mostly TVI te group and to enable stu individual an n be part of ties – involvi an be part of wm right. d teaching in from the bas hing in and a	extended an on and answe be the main i mentation and as physical and idents to unce ET) individual cr individual cr indi cr individual cr individual cr individual cr indi	d coherent line er, etc. This can mode. nd the analysis a ctivities. lertake observa eativity, discuss gage with releva- tive enquiry, mo- bove modes interactive pac- bove modes of a port to enable in text by doing c ch in Y4.	of argument. It is be tutor and / or and discussion of tion, enquiry and ion and reflectio int and appropria ore in-depth analy kages and virtual delivery. It is unli student teachers ibservations and	ncludes student 'issues, I/or hands- n: student ete ysis and I learning kely to be a to child study		
 Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes. Purpose for the lesson, what you want the 	Face-to-fa discussion teacher le Practical A document Work bass on develo Seminars: and / or tu Independ materials developm E-learning environme delivery m Practicum experience in Y1 to fu	ice: opport by brainstorr d. It should Activity: ena as and mate ed learning pment worl to generat itor led ent study: to promote ent. This ca copportunit ents. This ca is definits of (supported e and learn Il class teac is the mair	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stuk (mostly TVI te group and to enable stu- individual an n be part of ties – involvi an be part of wn right. d teaching in from the bas hing in and a n thing you w	extended an on and answe be the main i mentation and as physical and idents to unce ET) individual cr individual cr indi cr individual cr individual cr individual cr indi	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva- tive enquiry, mo- bove modes interactive pac- bove modes of port to enable ntext by doing of ch in Y4.	of argument. It in be tutor and / or and discussion of tion, enquiry and tion and reflectio int and appropria ore in-depth analy kages and virtual delivery. It is unli student teachers observations and	ncludes student issues, I/or hands- n: student ate ysis and I learning kely to be a to child study and be able		
 Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes. Purpose for the lesson, what you want the students to achieve 	Face-to-fa discussion teacher le Practical A document Work bass on develo Seminars: and / or tu Independ materials developm E-learning environme delivery m Practicum experience in Y1 to fu	ice: opport by brainstorr d. It should Activity: ena as and mate ed learning pment worl to generat utor led ent study: to promote ent. This ca goportunia ents. This ca to de in its o (supported e and learn Il class teac is the mair as a result o	Leaning tunity for an ming, questic not usually l abling experi rials, as well : to allow stu k (mostly TVI te group and to enable stu individual an n be part of ties – involvi an be part of wn right. d teaching in from the bas hing in and a n thing you w of this lessor	extended an on and answe be the main i mentation and as physical and idents to unce eT) individual cr individual c	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva tive enquiry, mo- toove modes interactive pace bove modes of the port to enable intext by doing of ch in Y4. teachers to kn	of argument. It is be tutor and / or and discussion of tion, enquiry and ion and reflectio int and appropria ore in-depth analy kages and virtual delivery. It is unli student teachers observations and	ncludes student issues, l/or hands- n: student n: student te ysis and l learning kely to be a to child study and be able		
 Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes. Purpose for the lesson, what you want the students to achieve, serves as basis for the 	Face-to-fa discussion teacher le Practical A document Work bass on develo Seminars: and / or tu Independ materials developm E-learning environme delivery m Practicum experienc in Y1 to fu What to do Is this Unde	ice: opport by brainstorr d. It should Activity: ena as and mate ed learning pment worl to generat utor led ent study: to promote ent. This ca gopportunit ents. This ca bode in its o i (supported e and learn Il class teac is the mair as a result o s lesson ain rstanding b	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stuk (mostly TVI te group and to enable stu individual an n be part of ties – involvi an be part of wn right. d teaching in from the bas hing in and a n thing you w of this lessor ned at: Lear	extended an on and answe be the main in mentation and as physical and idents to unce eT) individual cr individual cr ist school contents is school): sup sic school contents is school contents	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva- tive enquiry, mo- pove modes interactive pac- bove modes of poort to enable of the ender of the enable of the ender of the enable of the enable of the enable of the ender of the enable of the ender of the enable of the enable of the enable of the enable of the enable of the ender of the enable of the enable of the ender of the enable of the enab	of argument. It in be tutor and / or and discussion of tion, enquiry and ion and reflectio ion and reflectio int and appropria bre in-depth analy kages and virtual delivery. It is unli student teachers observations and ow, understand a concept? Develop pether to creat	ncludes student issues, l/or hands- n: student n: student te ysis and l learning kely to be a to child study and be able ping a skill?		
 Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes. Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An 	Face-to-fa discussion teacher le Practical A document Work bass on develo Seminars: and / or tu Independ materials developm E-learning environm delivery m Practicum experienc in Y1 to fu • What to do • Is this Unde know	ice: opport brainstorr d. It should Activity: ena s and mate ed learning pment worl to generat tor led ent study: to promote ent. This ca goportunit ents. This ca code in its o f (supported e and learn II class teac is the mair as a result o s lesson ain rstanding h ledge? Prace	Leaning tunity for an ning, questic not usually l abling experi rials, as well to allow stuk (mostly TVI te group and to enable stu individual an n be part of ties – involvi an be part of ties – involvi an be part of thing in and a n thing you w of this lessor ned at: Lear ow various ticing the ap	extended an on and answe be the main i mentation and as physical a idents to unce eT) individual cr individual cr individual cr and collaborat any of the ab ng the use of any of the ab school): sup sic school con inction resear vant student i? ning or emb concepts an plication of r	d coherent line er, etc. This can mode. nd the analysis a ctivities. dertake observa eativity, discuss gage with releva- tive enquiry, mo- bove modes interactive pac- bove modes of port to enable a next by doing of chin Y4. teachers to kn edding a new of a skills come to new knowledge	of argument. It in be tutor and / or and discussion of tion, enquiry and ion and reflectio int and appropria ore in-depth analy kages and virtual delivery. It is unli student teachers observations and ow, understand a concept? Develop ogether to create	ncludes student 'issues, I/or hands- n: student ate ysis and I learning kely to be a to child study and be able ping a skill? e a body of		

Write in full aspects of the NTS addressed					
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome 	 Learning Outcome The learning or enable studen purpose for th For example, it teachers are present mathematics or the learning or the students win order to be What the students win order to be Be realistic in achieved in ar 	es putcomes for the at teachers to ac ne lesson. in mathematics: prepared to teac operation. In thi utcomes would vould need to k able to teach the lent teacher will a result of this lesson the student omes may be de r a number of le terms of what co by one lesson	e lesson will hieve the student h a specific is instance, be the things now and do ne operation. I know and be esson. 'By the will' eveloped and ssons an be	 Learning Indi Measura performa evidence changes teachers' demonst the learn What the need to o achieved an inclus vary and teacher's 	cators ble/assessable/observable ances that provide e of learning or other taking place in student ' behaviour which rate that they have met ing outcome/s. e student teacher will do to show they have the learning outcome. (in ive lesson, this should be responsive to student s individual characteristic)
	Some learning specific stude	g outcomes may nt teacher need	address s		
Content of lesson picked and developed from the course specification	Time or stage Identify how much time will	Topics and sub-topics (if any):	Teaching and depending or collaborative	learning to ac n delivery mo group work or	chieve learning outcomes: de selected. Teacher led, independent study
Unit/s covered from the course specification:	be required for each part of the lesson		 Plan to m expected teachers Plan for a support s teachers towards a demonstr achieving outcomes Where por activities students participar Make link aspects o Four-Year program between pedagogi State if te involved o tutors con 	ity odel what is of student in ctivities to tudent in working and / or rating the learning s. ossible set up with as active nts sto other f the New r B.Ed. me or subject and c knowledge eam teaching or additional ntributing	Student ActivityFor example: Interactiveand collaborative groupand pair work, e.g.,•identifying,developing,presenting andevaluating suitableresources andmaterials•picking out keypoints fromeducation texts,raising questionsand issues•sharing practice andexperience•preparing for schoolvisits•self and peerassessmentOther examples•Student teacher ledseminars•ICT e.g. discussionusing VLE•Video observationof and analysis ofteaching•Role-play
skills will be used or developed and how	thinking and comn	nunication skills	, use of ICT	ng, problem so	nving, social skills, creative
Which cross cutting issues will be addressed or developed and how	Cross cutting issue professional value	s include: asses and attitudes,	sment literacy a reflection and o	and assessing s classroom enqu	tudents' progress and uiry

Lesson assessments – evaluation of learning: of, for and as learning within the lesson	 Assessment as learning: ongoing self-assessment by student teachers reflecting on their own learning and making adjustments so that they achieve deeper understanding, occurs throughout the learning process. <i>This needs to be planned for in the lesson</i>. Assessment of learning: is usually summative and is mostly done at the end of a task, unit of work, placement etc. Weighted Assessment Components in course outlines. <i>This needs to be planned for in the lesson</i>. Assessment for learning: is using assessment as a means of finding out what students know, understand and are able to do and using that information to adapt teaching approaches and to differentiate according to different student needs, it occurs through the learning the part of the Assessment components and it.
Instructional Resources	 through the learning process, may be part of the Assessment components, and it occurs when assessing prior learning Differentiation in lessons (UDL guidelines): the lesson needs to include a range of teaching and assessment strategies to motivate and reach all learners The approach to assessment in lessons must be appropriate to the teaching and learning strategies This may include: handouts, power points, examples of children's work, video, ICT
	activities, examples of previous student teachers' work
Required Text (core)	
Additional Reading List	

Year of B.Ed.	2	Semester	2	Place of lesson	in semester	1 234567	89101112		
Title of Lesson	The Ma	athematics Curi	iculum		Lesson Durat	ion	3 Hours		
Lesson description	This less mather and ski objecti suppor capabil childre eviden teache	This lesson focuses on developing knowledge and understanding of the current upper primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge and skills to analyse the similarities and differences between the standard-based curriculum and the objective-based curricula. Emphasis will be placed on the effectiveness of which the curricula support children's learning of mathematics. The lesson will help student teachers to develop their capability in creating accessible, safe, secure, and happy learning environment for middle childhood children including those with special education needs. In addition, student teachers will explore evidence of assumptions on equity and inclusivity in the official mathematics curriculum and how							
Previous student	Studen	t-teachers have	e been tau	ight psychological	basis of teachir	ng and learning an	d theories in the		
knowledge, prior	Algebra	a.		er printery, us wen	us, Leann _b , 1	cucining, and rippi)			
learning	Ū								
(assumed)									
Possible barriers	0	Primary scho	ol teacher	s have knowledge	of the need to	create safe, secure	and happy		
lesson		happy learning	ng environ	ments for middle (childhood child	ren including those	with special		
		educational r	eeds (SEN	I) to learn successf	ully.				
	0	Primary scho	ol teacher	s are aware of the	characteristics	of children within	the stage of		
		middle childh	ood; how	ever, they are less	familiar with th	ne implications of t	he		
		characteristic	S (I.e. COgi Jearning	nitive, physical, en	iotional, psycho	osocial) of middle c	childhood to		
	0	Currently, the	ose teachi	ng primary school	are trained to t	each all classes fro	m early grade		
		through JHS a	and gain b	readth of knowled	ge without the	necessary depth for	or teaching all		
		subjects and	abilities of	f upper primary					
	0	The school sy	stem lacks	s mechanisms to ic	lentify and sup	port pupils with lea	arning		
	0	Primary scho	ol teacher	EN. rs are less knowler	geable and co	mnetent in annlvir	ng differentiated		
	0	instruction a	nd assessr	ment; consequent	ly, they are les	able to promote	e inclusion of all		
		children.				·			
	0	Primary scho	ol teacher	s are familiar with	ICT, but they a	are less confident i	n integrating ICT		
		in teaching and learning.							
	0	teachers are	less motiv	vated to conduct cl	assroom inquir	v to improve teach	ning and support		
		learning, an e	ssential sl	kill to ensure the fu	ull participation	of all pupils.			
Lesson Delivery –	Face-to	- Practical	Work-	Seminars	Independ	e-learning	Practicum		
chosen to support	face	Activity	Based		ent Study	opportunities			
achieving the									
outcomes									
Lesson Delivery -	Face-to	o-face: opport	unity for a	in extended and co	herent line of a	argument. It includ	es discussion,		
main mode of	brainst	orming, questio	on and ans	swer, etc. This can	be tutor and / o	or student teacher	led. It should		
delivery chosen to	not usu Practic	ally be the main all Activity: ena	n mode. bling expe	rimentation and t	he analysis and	discussion of issue	s documents		
teachers in	and ma	aterials, as well	as physica	al activities.	le allarysis allu		s, uocuments		
achieving the	Indepe	ndent study: t	o enable s	students to engage	with relevant a	and appropriate ma	aterials to		
learning	promo	te individual an	d collabor	ative enquiry, mor	e in-depth anal	lysis and developm	ent. This can be		
outcomes.	part of	any of the abo	ve modes	ving the use of test	vactivo nadve -	oc and vietual lac	aing		
	enviror	nng opportunit nments, This ca	n be nart (of any of the above	eractive packag modes of deliv	es and virtual learr verv. It is unlikely t	o be a deliverv		
	mode i	n its own right.				tery. it is unlikely t			

•	Purpose for	The purpose of the lesson is to;					
	the lesson, what you want the	 equip student teachers with knowledge of the nature and structure of a good mathematics curriculum and skills to analyse the similarities and differences between the standard-based curriculum and the objective-based curricula. 					
	students to achieve, serves as						
	basis for the learning outcomes. An						
	expanded version of the description.						
•	Learning	Learning Outcomes	Learning Indicators	Identify Which cross-cutting issues-			
	Outcome for			core and transferable skills,			
	the lesson,			inclusivity, equity and addressing			
	picked and			diversity. How will these be			
	developed			addressed or developed?			
	from the	 Domonstrato 	Outline and analyse the different definitions of	Communication skills: through critiquing and analysing			
	specification	knowledge and	curriculum based on	presentations			
•	Learning	understanding of key	different views and to	P			
	indicators for	definitions of	come out with differences				
	each learning outcome	curriculum offered by different authors;	and similarities	This and values of teaching			
		 Demonstrate knowledge and understanding of key philosophies and goals of the current upper primarymathematics curriculum 	 Outline the major philosophies underlying the current standard–based upper primarymathematics curriculum and the goals to be achieved as compared to the objective-based curriculum 	 Ethics and values of teaching: through supporting student teachers to understand and demonstrate the ethics of the profession bearing in mind the unique characteristics of young children 			
		 Demonstrate the core and transferrable skills like problem solving and creativity and taking advantage of the affordances of ICT integrating it into teaching and learning (NTS 	 Use knowledge gained from learning theories in mathematics to design appropriate problem- solving tasks. 	 Problem solving, critical and creative thinking: through objective analysis of facts and concept that will lead to creative thinking 			
		 Demonstrate an understanding of the principles for the selection of objectives; selection of concepts; selection of learning activities/experiences and developmentally appropriate TLMs 	 Poster/TLM Identify and describe the principles for the selection of objectives; selection of concepts; selection of learning activities or experiences and developmentally appropriate TLMs 	 Social and communication skills: consciously develop observation and presentation skills during classroom instructions to support student teachers to transfer this to STS 			

Торіс Т	Sub-topic(s)	Stage/ Time	Teaching and learning to activities to achieve learning outcomes depending on delivery mode selected. Teacher-lead collaborative groupwork or independent.			
			Teacher Activity	Student Activity		
	What is curriculum?		Introduce student teachers to the course manual for them to develop awareness of the nature and demand of the course as well as what is expected of them	Participate in the discussion based on the introduction of the course manual by asking questions and giving comment;		
	Standards-based versus objective- based curriculum		Engage student teachers in a brainstorming session to outline meaning and different views of the concept of curriculum; Orchestrate a discourse based on the meaning of curriculum by posing questions and tasks that elicit, engage, and challenge each student teacher's thinking;	Participate in the brainstorming session to outline their conceptions of curriculum to the best of their knowledge; Search the definition(s) and meaning of curriculum on the internet and to discuss their findings in small groups Engage actively in the discourse to answer questions posed and to explain or justify their responses;		
The mathematics curriculum		3 Hours	Give a verbal exposition on the nature and structure of the current standards-based and objective-based curricula Ask student teachers to clarify and justify their ideas orally and in	Listen attentively to the verbal exposition and ask questions for clarification or provide comment(s) to ensure participation and understanding of the nature and structure of the current standards- based and objective-based curricula;		
			Provide copies of the official KG-P3 curriculum (NACCA) for student teachers to analyse	Engage in a think-pair-share session to clarify and justify their ideas orally and in writing		
			Monitor student teachers' participation in discussion based on factors that influence the choice of aims and competencies of a	Examine the official KG-P3 curriculum (NACCA), analyse critically, and outline the aims and required competencies that is required of the learners		
	Choosing aims and competencies mathematics learning		mathematics curriculum Encourages each student teacher to participate in Assign student teachers to write on what a good mathematics curriculum is.	Outline the differences and similarities between NACCA's standards-based and CRDD's objective-based curricula for upper primarymathematics; Discuss the factors that affect the choice of aims and competencies of a mathematics curriculum		

	Write a reflective paper on the topic "what is a good mathematics curriculum for upper primarypupils?
Lesson	Component 1: Formative assessment
assessments – evaluation of learning: of, for and as learning within the lesson	Summary Assessment Method: reflective paper presentation Student teachers to write a reflective paper on the features of a good upper primarymathematics curriculum,Outline and analyse the different definitions of curriculum based on different views, come out with differences and similarities, as well as the major philosophies underlying the current upper primarypupils'mathematics curriculum.(Assessment for learning)
	Related CLOs: 1, 2, 3 NTS:
	 1a) Critically and collectively reflects to improve teaching and learning. 2 b) Has comprehensive knowledge of the official school curriculum, including learning outcomes. 2b) Has comprehensive knowledge of the official school curriculum, including learning
	outcomes 31) Listens to learners and gives constructive feedback
	3m) Identifies and remediates learners' difficulties or misconceptions, referring learners whose needs lie outside the competency of the teacher.
	 Component 2: Formative assessment Summary of assessment Method:(Group and individual presentation) Identify and describe the principles for the selection of objectives, concepts and learning activities or experiences, using variety of resources including ICT tools. (Assessment as learning) Weighing: 20%
	Related CLOs: 1, 2, 3 NTS:
	3j) Produces and uses a variety of teaching and learning resources including ICT, to enhance learning 2f) Demonstrate value as well as respect for equity and inclusion in the mathematics
	classroom (knowledge)
	 Component 3: Formative assessment Summary of assessment Method: (class exercise) Outline the similarities and differences between NaCCA's standards-based curriculum and CRDD's objective-based curriculum. (Assessment of learning) Weighting: 20% Related CLOS: 2.3.5
	 NTS: 2b) Has comprehensive knowledge of the official school curriculum, including learning outcomes. 2f) Demonstrate value as well as respect for equity and inclusion in the mathematics classroom (knowledge) 3k) Integrates a variety of assessment modes into teaching to support learning.
	Note: The assessment procedures should make room for differentiation - gender, equity, SEN, and inclusivity.
Instructional	Posters illustrating people using mathematics in the jobs; video clips downloaded from the
Required Text	Internet; Arthur, L. Grainger, T. & Wray, D. (2006) Learning to Teach in the Primary School, Canada: Taylor &
(core)	Francis e-Library. <u>https://www.pdfdrive.com/learning-to-teach-in-the-primary-school-</u> d20209294 html
	Confer, C. (2005). Teaching Number Sense. Sausalito: Math Solutions Publications. https://www.pdfdrive.com/teaching-number-sense-grade-1-d184198309.html.
Additional Reading List	Lakoff, G. &Núñez, R. E. (2000). Where Mathematics comes from. New York: Basic Books. Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Tutor notes. Accra: Unimax Publishers.
	Martin, J. et. al. (1994). <i>Mathematics for teacher training in Ghana: Students activities</i> .Accra: Unimax Publishers.

CPD Needs	 How to design and/or use some innovative materials and ideas for teaching selected concepts (e.g. developing and using the "Read my mind" word games to reinforce concept developed)
	 Instructional strategies needed to consciously engage student teachers to participate effectively and to be ready to share their past experiences without fear of ridicule;

Year of B.Ed.	2 S	emester	2 F	Place of lesson i	n semester	1 2 34567	89101112
Title of Lesson	Counting	and Number	Relationsh	ins			
The of Lesson	counting	Lesson Duration 3 Hours					
Lesson description Previous student teacher knowledge, prior learning (assumed)	This lesson focuses on developing knowledge and conceptual understanding of counting and number relationships as treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of number relationships in upper primary children. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include counting, representing numbers in multiple ways in both English and a Ghanaian languages and number relationships Most essentially, they will explore instructional strategies that incorporate principles underlying equity and inclusivity. Student-teachers have been taught psychological basis of teaching and learning and theories in the learning of mathematics in Early Grade. They have also studied Number and Algebra, the Year one Semester One course. The lesson on Mathematics curriculum has also exposed them to the nature of the current early grade mathematics curriculum.						
Possible barriers to learning in the lesson	 Primary school teachers have knowledge of the need to create safe, secure and happy learning environment; but they are less capable in creating accessible, safe, secure and happy learning environments for middle childhood children including those with special educational needs (SEN) to learn successfully. Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in teaching and learning. 						
Lesson Delivery – chosen to support students in achieving the outcomes Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to- face	Practical Activity Activity ace: opportuning, questic y be the mai Activity: enal rials, as well ent study: to ndividual and y of the above gopportuniti ents. This cal	Work- Based Leaning unity for an on and answ n mode. bling experi as physical o enable stu d collabora ve modes tes – involvi n be part of	Seminars	Independ ent Study erent line of a tutor and / o analysis and o in-depth analy active package nodes of deliv	e-learning opportunities	Practicum Practicum Pra

•	Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	The purpose of the lesson is to; equip student teachers with the knowledge and understanding needed to handle the content of the early grade mathematics, specifically, concepts based on counting and understanding of number relationships and to devise possible strategies to address potential deficiencies that can serve as barriers of effective learning by all young children.					
•	Learning Outcome for the lesson, picked and	Learning Outcomes	Learning indicators	core and transferable skills, inclusivity, equity and addressing diversity. How will these be			
•	from the course specification Learning indicators for each learning outcome	 Demonstrate knowledge and understanding of how early adolescents grow, develop and learn number concepts and other mathematics concepts in the upper primary curriculum ((NTS, 2b) 	 Identify and justify the appropriateness or situational favourableness of the various uses of numbers and their operations. 	 Ethics and values of teaching: demonstrate the ethics of the profession bearing in mind the unique characteristics of middle childhood child, Teachers' Standards, child's rights, laws protecting children 			
		 Demonstrate competencies in using differentiated instructional strategies, with a focus on a thematic approach which promotes play-based learning to cater for the needs of all 	• Outline and analyse strategies young children use in developing pre- number concepts such as classification, ordering (seriation), patterning, one- to-one correspondence, and conservation of number.	 Needs of the student teachers: Consciously identify and address the needs of student teachers and to inspire them for effective transfer of knowledge 			
		 children in the early grade classroom, including those with SEN (NTS 3f, pg. 14) Demonstrate knowledge and understanding of how communication 	 Outline how the knowledge and understanding of the pre-number concept influence children's understanding of counting and number relationships. Identify and describe the basic principles underlying 	 Problem solving, critical and creative thinking: through objective analysis of facts and concept that will lead to creative thinking 			
		promote early adolescents' development and use of number concepts such as cardinal, ordinal, and nominal;	the cardinal, ordinal, and nominal uses of number and to develop effective communicative skills needed for engaging young learners in a mathematics discourse.	 Social and communication skills: consciously develop observation and presentation skills during classroom instructions to support student teachers to transfer this to STS Communication skills: through critiquing and analysing presentations 			

Topic Title	Sub-topic(s)	Stage/ Time	ge/ Teaching and learning to activities to achieve learning outcome depending on delivery mode selected. Teacher-lead collaboration groupwork or independent.	
			Teacher Activity	Student Activity
	Counting and representing numbers in multiple of waysin both English and a Ghanaian language	3 Hours	Engage student teachers in a review of the previous lesson to ensure a smooth transition from discussing the nature and structure of the curriculum and looking at the development of content knowledge and pedagogical content knowledge of counting and number relationships.	Participate in the review of the previous lesson to ensure a smooth transition from discussing the nature and structure of the curriculum, by asking questions and/or providing insight into issues relating the nature and structure of the curriculum and the development of competencies in planning and teaching concepts based on counting and number relationships.
	language		Engage student teachers through mental drills to serve as a starter for the lesson, using skip counting forwards and backwards from given numbers.	Participate in the warm up exercise to prepare them for the lesson ahead.
Counting and Number Relationships			Assign student teachers to groups based on different cultural backgrounds to explore socio-cultural activities in their various settings and outline the implicit use of number in the nominal sense in such activities (e.g., using numerals to identify certain cultural troupes	Form groups based on their different cultural backgrounds to explore socio-cultural activities in their various settings and outline the implicit use of number in the nominal sense in such activities (e.g., using numerals to identify certain cultural troupes).
			Ask student teachers to count in both English language and some Ghanaian languages	Count or compare groups of up to 9 objects and then up to 19 objectsin various ways using both English language and some Ghanaian languages
			Ask student teachers to define the term number and numeral and establish their differences	Define the term number and numeral and establish their differences and ask question(s) for clarification
			React to the definitions and interpretations of number and numeral given by student teachers.	
			Engage student teachers to match and assign numbers to given groups of objects (fingers, number cards, numeral cards, etc.)	Match and assign numbers to given groups of objects (fingers, number cards, numeral cards, etc.)
				Skip count to 1000 by 2s, 5s, 10s,

		Assign student teachers to skip count to 1000 by 2s, 5s, 10s, 25s and 100s, starting at a multiple of these numbers, using a number chart Initiate and facilitate a discussion on how numbers can be represented in different ways	25s and 100s, starting at a multiple of these numbers, using a number chart Participate actively in the discussion based on the different representations of given numbers Engage actively in the discourse to answer questions posed and to				
			explain or justify their responses;				
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	 Component 1: For Summary Assessment Met Student teachers t groups of objects of learning) Weighting: 20% Related CLOs: 1, 2, NTS: 	 Component 1: Formative assessment Summary Assessment Method: reflective paper presentation Student teachers to write a reflective paper on how to match and assign numbers to give groups of objects using appropriate TLMs and other relevant materials.(Assessment for learning) Weighting: 20% Related CLOs: 1, 2, 3 NTS: 					
	 2 b) Has comprehensive knowledge of the official school curriculum, including learning outcomes. 2b) Has comprehensive knowledge of the official school curriculum, including learning outcomes 3l) Listens to learners and gives constructive feedback 3m) Identifies and remediates learners' difficulties or misconceptions, referring learners whose needs lie 						
	 Component 2: Formative assessment Summary of assessment Method:(Group and individual presentation) Student teachers to write short lesson plan for teaching numbers and numerals for peer review (Assessment as learning) Weighing: 20% Related CLOs: 1, 2, 3 NTS: 3j) Produces and uses a variety of teaching and learning resources including ICT, to 						
	2f) Demonstrate classroom (k	value as well as respect for equi nowledge)	ty and inclusion in the mathematics				
	• Component 3: For Summary of assessment M Assign student teachers to and numerals. (Assessment Weighting: 20% Related CLOs: 2, 3, 5 NTS:	• Component 3: Formative assessment mmary of assessment Method: (class exercise) sign student teachers to write short notes on how to establish the relationship between numbers d numerals. (Assessment of learning) sighting: 20% lated CLOS: 2, 3, 5					
	 2b) Has comprehensive known of the second second	wledge of the official school curriculum, including learning outcomes. s well as respect for equity and inclusion in the mathematics classroom sessment modes into teaching to support learning. edures should make room for differentiation - gender, equity, SEN, and					
Instructional	Posters illustrating peo	ple using mathematics in the jobs;	video clips downloaded from the				
Resources	internet;		the Drive my Cable al. Course des Testa - C				
(core)	Arthur, J., Grainger, T. & W Francis e-Library.	https://www.pdfdrive.com/lea	the Primary School. Canada: Taylor & arning-to-teach-in-the-primary-school-				

	<u>d20209294.html</u>					
	Confer, C. (2005). Teaching Number Sense. Sausalito: Math Solutions Publications.					
	https://www.pdfdrive.com/teaching-number-sense-grade-1-d184198309.html.					
Additional	Lakoff, G. & Núñez, R. E. (2000). Where Mathematics comes from. New York: Basic Books.					
Reading List	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Tutor notes. Accra: Unimax					
	Publishers.					
	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Students activities. Accra:					
	Unimax Publishers.					
CPD Needs	How to design and/or use some innovative materials and ideas for teaching selected					
	concepts (e.g. developing and using the "Read my mind" word games to reinforce concept					
	developed)					
	Instructional strategies needed to consciously engage student teachers to participate					
	effectively and to be ready to share their past experiences without fear of ridicule:					

Year of B.Ed.	2 S	emester	2	Place of lesson i	n semester	12 3 4 5 6 7	89101112
Title of Lesson	Place valu	e 10 to 1 00	า				
	Lesson Duration 3 Hours						3 Hours
Lesson description Previous student teacher knowledge, prior learning	This lesson focuses on developing knowledge and conceptual understanding of place valueas treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of counting and representing numbers in multiple ways including place valuein both English and a Ghanaian languagesamongupper primary children. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about place values and create classroom environment that nurtures number sense. Specific areas to be covered include counting, representing place values in multiple ways amongupper primary childrenMost essentially, and they will explore instructional strategies that incorporate principles underlying equity and inclusivity. Student-teachers have been introduced to the nature and structure of curriculum, as well as, counting and number relationships.						
(assumed) Possible barriers to learning in the lesson	 Primary school teachers have knowledge of the need to create safe, secure and happy learning environment; but they are less capable in creating accessible, safe, secure and happy learning environments for middle childhood children including those with special educational needs (SEN) to learn successfully. Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in teaching and learning. 						
Lesson Delivery – chosen to support students in achieving the outcomes Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	Face-to- face	Practical Activity Conce: opportuning, question y be the mai Activity: ena rials, as well ent study: t ndividual an y of the above g opportuniti ents. This can	Work- Based Leaning unity for an on and answ n mode. bling exper as physical o enable st d collabora ve modes ies – involv n be part o	Seminars Sem	Independ ent Study erent line of arget tutor and / or analysis and d with relevant an in-depth analyse active packages nodes of delive	e-learning opportunities	Practicum Practicum set discussion, ed. It should s, documents terials to ent. This can be ing b be a delivery

•	Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	 The purpose of the lesson is to; equip student teachers with the knowledge, skills and strategies for promoting understanding of number relationships in early grade children.(NTS 2b) Has comprehensive knowledge of the official school curriculum, including learning outcomes devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. (NTS 2c) Has secure content knowledge, pedagogical knowledge and pedagogicalcontent knowledge for the school and grade they teach in. 3k) Integrates a variety of assessment modes into teaching to support learning 				
•	Learning Outcome for the lesson, picked and	Learning Outcomes	Learning	ndicators	Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be	
	developed from the	Domonstrato	• Outlin	o and analyse how	addressed or developed?	
•	from the course specification Learning indicators for each learning outcome	 Demonstrate knowledge and understanding of principles of counting and representation of numbers in multiple ways (both English and a Ghanaian 	 Outlin repea proce manit and so repre can b 	ne and analyse how ted opportunities to ed from concrete pulation to pictorial ymbolic sentation of numbers e developed.	 Problem solving, critical and creative thinking:through objective analysis of facts and concept that will lead to creative thinking and assessment strategies appropriate for upper primary. 	
		 Demonstrate the development of number concepts and other mathematics concepts in the upper 	 Identify, explain, and/or analyse the principles underlying counting and use this to describe given numbers and the relationships between the Identify numbers in different positions around a given number and to describe the relationships between such quantities or numbers; Provide SRJ recordings of professional values demonstrated and attitudes during engagements with people including pupils, mentors, tutors, and peers 		 Communication skills: through critiquing and analysing presentations 	
		 Demonstrate skills in identifying traits of professionalism in school using knowledge and experiences gained 			 Problem solving, critical and creative thinking: through objective analysis of facts and concept that will lead to creative thinking and assessment strategies appropriate for upper primary. 	
		from interacting with your peers during lessons and group work and subsequently make appropriate journal entries (NTS, 1d, 1f, 1g, & 2a			• Ethics and values of teaching: demonstrate the ethics of the profession bearing in mind the unique characteristics of middle childhood child, Teachers' Standards, child's rights, laws protecting children	
	Topic Title	Sub-topic(s)	Stage/ Time	Teaching and learnin outcomes depending lead collaborative gro	g to activities to achieve learning on delivery mode selected. Teacher- upwork or independent.	
				Teacher Activity	Student Activity	
Pla 1,0	ce value 10 to 00	Counting and representing numbers in multiple ways including place valuein both English and a Ghanaian language	3 Hours	Review the previous lesson on counting and number relationships	Participate in the review by asking questions and commenting on relevant issues;	

	Engage student teachers in a warm up activity that is relevant to the lesson to serve as a starter for the lesson, e.g., a place value game. Assign student teachers to design a place value chart or any relevant TLM to explore concepts on place value	Play a place value game and/or any relevant games they are familiar with and are related to the lesson; Design place value chart based on using base ten structured materials i.e. 100s, 10s and 1s, (bundled/loose sticks; a flat, long, and unit lego-blocks; flat, strip and loose square cut-outs; etc.) using both English and a Ghanaian language for exploring concepts involving place value
	Assign student teachers in their collaborative groups to identify and explain place value concepts that are relevant for the development of mathematical ideas at the upper primary level	Identify and explain place value concepts that are relevant for the development of mathematical ideas at the upper primary level, for example, describing the place values of digits in given numbers
	Orchestrate discussion based on the physical representation of numbers in multiple ways, for example, group objects to illustrate the number of hundreds, tens, and ones in a given number	Engage in a think-pair-share session to clarify and justify their ideas orally and in writing, for example, express numbers less than 100 as "so many" tens and "so many" ones as well as, numbers greater than 100 but less than 1000 as "so many"hundreds, "so many" tens, and "so many" ones Pay attention to the exposition and ask questions for clarity.
	Lead a discussion on strategies for selecting appropriate models to represent given numbers.	Use manipulatives and other relevant TLMs to model and explain the place value concept
	Provide copies of the official P4-P6 curriculum (NACCA) for student teachers to analyse how place value concepts are developed (PD Themes 1 & 3)	Examine the official P4-P6 NACCA curriculum and analyse critically how place value concepts are outlined and to provide instructional procedures and activities that support the development of place value concepts

Lesson	Component 1: Formative assessment
assessments –	Summary Assessment Method: reflective paper presentation
evaluation of	Assign student teachers to outline the differences and similarities between NaCCA's
learning: of, for	standards-based and CRDD's objective-based curricula with respect to place value
and as learning	concepts.(Assessment for learning)
within the lesson	Weighting: 20%
	Related CLOs: 1, 2, 3
	NTS:
	2 b) Has comprehensive knowledge of the official school curriculum, including learning
	outcomes.
	outcomes
	3m) Identifies and remediates learners' difficulties or misconceptions, referring learners
	whose needs lie outside the competency of the teacher.
	Component 2: Formative assessment
	Summary of assessment Method: (individual presentation)
	Assign student teachers to use manipulatives and other relevant TLMs to model and explain the
	place value concept. (Assessment as learning)
	Related CLOs: 1, 2, 3
	NTS:
	2f) Demonstrate value as well as respect for equity and inclusion in the mathematics
	classroom (knowledge)
	3j) Produces and uses a variety of teaching and learning resources including ICT, to
	enhance learning
	Component 3: Formative assessment
	Summary of assessment Method: (class exercise)
	Assign student teachers to write short notes on how to establish the relationship between numbers
	and numerals. (Assessment of learning)
	Polatod CLOC: 2, 2, 5
	NTS.
	2b) Has comprehensive knowledge of the official school curriculum, including learning outcomes.
	2f) Demonstrate value, as well as, respect for equity and inclusion in the mathematics classroom
	(knowledge)
	3k) Integrates a variety of assessment modes into teaching to support learning.
	Note: The assessment procedures should make room for differentiation - gender, equity,
to star attained	SEN, and inclusivity.
Instructional	Posters number charts; ten frames, video clips downloaded from the internet; tape measure
Required Text	Arthur J. Grainger, T. & Wray, D. (2006) Learning to Teach in the Primary School, Canada: Taylor &
(core)	Francis e-Library https://www.pdfdrive.com/learning-to-teach-in-the-primary-school-
()	d20209294.html
	Confer, C. (2005). Teaching Number Sense. Sausalito: Math Solutions Publications.
	https://www.pdfdrive.com/teaching-number-sense-grade-1-d184198309.html.
Additional	Lakoff, G. & Núñez, R. E. (2000). Where Mathematics comes from. New York: Basic Books.
Reading List	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Tutor notes. Accra: Unimax
	Publishers.
	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Students activities. Accra:
	Unimax Publishers.
CPD Needs	 How to design and/or use some innovative materials and ideas for teaching selected
	concepts (e.g. developing and using ten trames)
	 Instructional strategies needed to consciously engage student teachers to participate
	enectively and to be ready to share their past experiences without fear of ridicule;
	 now to use tape measure and other relevant low cost or no cost materials to develop number relationships;
	המחשבו הפומנוטווגוווףג,

Year of B.Ed.	2 S	emester	1 P	Place of lesson in	n semeste	1234567	89101112	
	1							
Title of Lesson	Addition	Addition of numbers within 99and then numbers within 999 Lesson Duration 3 Hours						
Lesson description Previous student	This lesson focuses on developing knowledge and conceptual understanding addition of numbers within 99and then numbers within 999as treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of addition of numbers within 99and then numbers within 999. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include 1-digit, 2-digit and 3-digit addition as putting together and counting on; mentalstrategies -composing numbers, constant difference, decomposing numbers, etc.;.Most essentially, they will explore instructional strategies that incorporate principles underlying equity and inclusivity.							
teacher knowledge, prior learning	counting	counting and number relationships.						
(assumed)								
Possible barriers to learning in the lesson	 Prima envir envir 	 Primary school teachers have knowledge of the need to create safe, secure and happy learning environment; but they are less capable in creating accessible, safe, secure and happy learning environments for middle childhood children including these with special educational needs 						
Lesson Delivery –	 (SEN) to learn successfully. Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in teaching and learning. Primary school teachers are familiar with how to conduct classroom inquiry; however, teachers are less motivated to conduct classroom inquiry to improve teaching and support learning, an escaptial ckill to ensure the full participation of all pupils 							
chosen to support students in achieving the outcomes	face	Activity	Based Leaning		ent Study	opportunities		
Lesson Delivery -	Face-to-f	ace: opport	unity for an	extended and cohe	erent line of	argument. It include	es discussion,	
main mode of	brainstor	ming, questio	on and answ	ver, etc. This can be	tutor and /	or student teacher l	ed. It should	
delivery chosen to	not usual	ly be the mai	n mode.					
support student	Practical	Activity: ena	bling experi	mentation and the	analysis and	discussion of issues	s, documents	
teachers in	and mate	erials, as well	as physical a	activities.	ith rolevent	and appropriate the	torials to	
achieving the	nromoto	individual an	u enable stu d collaborat	tive enquiry more	n-depth apa	and appropriate ma	terials to	
outcomes.	part of ar	norvioual all	ve modes	uve enquiry, more i	n-ucpui dild			
	E-learnin environm	g opportunit	ies – involvi n be part of	ng the use of intera any of the above m	ictive packag nodes of deli	es and virtual learn very. It is unlikely to	ing o be a delivery	

the lesson, what you want the students to achieve, serves as basis for the learning Outcomes. An expanded version of the description.•equip student teachers with the knowledge, skills and strategies from multiple ways including place value. •••Learning Outcome for the lesson, picked and developed from the•earning OutcomesLearning IndicatorsIdentify core ainclusivity diversity addressed•Demonstrate•Explain and illustrate with•Soci	The purpose of the lesson is to;							
what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.multiple ways including place value.•devise possible strategies to model how to pose questions that numbers and create classroom environment that nurtures number s absis for the learning outcomes. An expanded version of the description.••Learning Outcome for the lesson, picked and developed from theLearning OutcomesLearning Indicators•Learning outcomesLearning IndicatorsIdentify core a inclusivity diversity addressed	• equip student teachers with the knowledge, skills and strategies for representing numbers in							
want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description. • devise possible strategies to model how to pose questions that numbers and create classroom environment that nurtures number s basis for the learning outcomes. An expanded version of the description. • Learning Outcome for the lesson, picked and developed from the Learning Outcomes Learning Indicators Identify core inclusivity addressed • Demonstrate • Explain and illustrate with • Soci	multiple ways including place value.							
students to achieve, serves as basis for the learning outcomes. An expanded version of the description. numbers and create classroom environment that nurtures number s basis for the learning outcomes. An expanded version of the description. • Learning Outcome for the lesson, picked and developed from the Learning Outcomes Learning Indicators Identify core inclusivity diversity addressed	• devise possible strategies to model how to pose questions that encourage thinking about							
achieve, serves as basis for the learning outcomes. An expanded version of the description.	numbers and create classroom environment that nurtures number sense							
serves as basis for the learning outcomes. An expanded version of the description. Learning Outcomes • Learning Outcome for the lesson, picked and eveloped from the • • Demonstrate • Explain and illustrate with								
basis for the learning outcomes. An expanded version of the description. - • Learning Outcome for the lesson, picked and developed from the Learning Outcomes Learning Indicators Identify core a inclusivity diversity addresset • Demonstrate • Explain and illustrate with • Soci								
learning outcomes. An expanded version of the description. - • Learning Outcome for the lesson, picked and developed from the Learning Outcomes Learning Indicators • Demonstrate • Explain and illustrate with • Soci								
outcomes. An expanded version of the description. • Learning Outcomes for the lesson, picked and developed from the Learning Outcomes Identify core a inclusivity addresse • Demonstrate • Explain and illustrate with • Soci								
expanded version of the description. • Learning Learning Outcomes Learning Indicators Outcome for the lesson, picked and developed from the • Demonstrate • Explain and illustrate with								
version of the description. • Learning Outcomes for the lesson, picked and developed from the Learning Outcomes Learning Indicators Identify core at inclusivity addresse • Demonstrate • Explain and illustrate with • Soci								
description. • Learning Outcome for the lesson, picked and developed from the Learning Outcomes Learning Indicators Identify core inclusivity addresse • Demonstrate • Explain and illustrate with • Soci								
Learning Outcomes Learning Outcomes Learning Indicators Identify core a inclusivity diversity addresse from the Demonstrate Explain and illustrate with Soci								
Outcome for the lesson, picked and developed from the core inclusivity diversity addresse • Demonstrate • Explain and illustrate with	Which cross-cutting issues-							
the lesson, inclusivi picked and diversity developed • Demonstrate • Demonstrate • Explain and illustrate with • Soci	and transferable skills,							
picked and developed from the diversity addresse • Demonstrate • Explain and illustrate with	ty, equity and addressing							
developed from the addresse • Demonstrate • Explain and illustrate with • Soci	v. How will these be							
from the•Demonstrate•Explain and illustrate with•Soci	ed or developed?							
	al and communication							
course knowledge and appropriate models skills	s: consciously develop							
specification understanding of (bundles of tens and obse	ervation and presentation							
Learning models and hundreds, tens and ones), skill:	s during classroom							
indicators for interpretations of the meaning of each digit in inst	ructions to support student							
each learning addition of 1-, 2 and given multi-digit numbers; tead	chers to transfer this to STS							
outcome 3-digit numbers;								
Explain why the value of a digit depends upon its placement within a presonumeral;	nmunication skills: through quing and analysing sentations							
 Demonstrate knowledge and understanding of how place value permits efficient representation of whole numbers and the development Decompose numbers up to 1,000 into 100s, 10s, and 1s, in multiple ways (e.g., 600 = 100 + 100 + 100 + 100 + 100 + etc.,) Prob creat obje 100 or 300 + 200 + 100, etc.,) 	olem solving, critical and tive thinking: through ective analysis of facts and cept that will lead to tive thinking and essment strategies ropriate for upper primary							
sense1,000 with similar digits but different values (769 versus 967) and numbers which are completely different (796 versus 456)Digi inte inte inte are completely different (796 versus 456)• Demonstrate knowledge and understanding of how communication promotes young children's development and use of place value concepts• Digi inte are completely different (796 versus 456)• Digi inte are completely different (796 versus 456)• Identify, explain, and/or analyse the principles underlying the place value concept (that the value of each place is ten times as the value of the next place• Soci skill	tal literacy: Surfing the rnet for relevant rmation on curriculum ninologies. al and communication s: consciously develop ervation and presentation s during classroom ructions to support student thers to transfer this to STS							

Topic Title	Sub-topic(s) Stage/ Time Teaching and learn outcomes dependin lead collaborative g		Teaching and learnin outcomes depending lead collaborative gro	ng to activities to achieve learning on delivery mode selected. Teacher- oupwork or independent.				
			Teacher Activity	Student Activity				
	1-digit, 2-digit and 3-digit addition as putting together and counting on		Engage student teachers in a review of the previous lesson on place value Engage student teachers in a warm up activityinvolving identification of numbers in different positions around a given in a number chart	Participate in the review based on place valueDemonstrate mental additionstrategies (sums within 99 and then sums within 200)Participate in an activity to identify numbers in different positions around a given number in a number chart $50 100 150 200 250 300 600 600 650 700 750 800 850 900 900 950 1000 1050 1100 1150 1200 1150 $				
Addition: numbers within 99; and then numbers within 999	Mentalstrategies - composing numbers, constant difference, decomposing numbers, etc.;	3 Hours	Engage student teachers in an interactive, fun activity involving addition of whole numbers. For example, ask student teachers to give any three-digit number, transpose the number in two ways to have three 3-digit. The activity is based on finding the sum of the three numbers before doing the actual computation. Thus, if a student teacher mentions 235, the other two transposed numbers will be 352, and 523, in such a way that none of the digit will be in the same position to obtain 2 3 5 3 5 2 +5 2 3 11 1 0	For example, the number to the right of 750 is 800, below 750 is 1,050; to the left of 750 is 700; on top of 750 is 450. What are the numbers around 550 in the various positions? Participate in in the interactive, fun activity involving addition of whole numbers. For example, ask student teachers to give any three-digit number, transpose the number in two ways to have three 3-digit. The activity is based on finding the sum of the three numbers before doing the actual computation Work out more examples in their collaborative groups and to establish the principles underlying the fun activity.				

	Assign student teachers to use manipulatives to demonstrate addition as putting together; and addition as counting on, involving decomposition and composition of numbers to be submitted later for	Use manipulatives to demonstrate addition as putting together; and addition as counting on involving decomposition and composition of numbersto be submitted later for
	peer review Ask student teachers to solvesimple addition of everyday addition problems using 'counting on	peer review
	strategies Lead a discussion on strategies for selecting appropriate models for adding whole numbers	Act out a simple addition situation and apply 'counting on strategies to model an addition and solve a simple, everyday addition problems within 20.
	using knowledge and understanding of place value. Assign student teachers to analyse	Listen attentively to the verbal exposition and ask question for clarification or provide comment(s) to ensure participation and understanding of the nature and principles underlying the addition of
	curriculum (NACCA) how concepts based on addition of whole numbers are developed (PD Themes 1 & 3)	whole numbers Analyse the official P4-P6 curriculum (NACCA) how concepts based on addition of whole numbers are developed.
	Use an exposition to introduce the addition of whole numbers using lattice addition strategy, e.g.,	Read further on the the differences and similarities between the standards-based and objectives- based curricula based on place value concepts
	$\begin{array}{c} 2 & 3 & 5 \\ 3 & 5 & 2 \\ + & 5 & 2 & 3 \end{array}$	Pay attention to the exposition meant for the introduction of addition of whole numbers using the lattice addition strategy. Ask questions and/or give comments to enhance understanding.
	This shows that the lattice addition strategy gives the same result.	Work more examples in groups for consolidation

Lesson	Component 1: Formative assessment						
assessments –	Summary Assessment Method: Group assignment						
evaluation of	Summary Assessment Method: Group assignment Student teachers are assigned to outline different strategies for solving problems based on even day						
learning: of for	addition such as (counting on and atticact rate giosand to justify its usefulness or otherwise						
and as learning	Autorition such as counting on andiatticestrategiesand to justify its userulness or otherwise						
within the lesson	Moighting: 20%						
within the lesson	Related Close 1, 2, 2						
	NTC.						
	NIS:						
	2 b) Has comprehensive knowledge of the official school curriculum, including learning						
	outcomes.						
	2b) Has comprehensive knowledge of the official school curriculum, including learning						
	outcomes						
	3m) Identifies and remediates learners' difficulties or misconceptions, referring learners						
	whose needs lie outside the competency of the teacher.						
	Component 2: Formative assessment						
	Summary of assessment Method:(individual presentation)						
	Assign student teachers to use manipulatives and models to demonstrate addition as 'putting						
	together' and 'counting on', involving decomposition and composition of numbers to be						
	submitted later for peer review. (Assessment as learning)						
	Weighing: 20%						
	Related CLOs: 1, 2, 3						
	NTS:						
	2f) Demonstrate value as well as respect for equity and inclusion in the mathematics						
	classroom (knowledge)						
	3j) Produces and uses a variety of teaching and learning resources including ICT, to						
	enhance learning						
	Component 3: Formative assessment						
	Summary of assessment Method: (class exercise)						
	Assign student teachers to outline and analyse the various mental additionstrategies for sums						
	within 99 and then sums within 200. (Assessment of learning)						
	Weighting: 20% Related CLOs: 2, 3, 5						
	NTS:						
	2b) Has comprehensive knowledge of the official school curriculum, including learning outcomes.						
	2f) Demonstrate value, as well as, respect for equity and inclusion in the mathematics classroom						
	(knowledge)						
	3k) Integrates a variety of assessment modes into teaching to support learning.						
	Note: The assessment procedures should make room for differentiation - gender, equity, SEN, and						
	inclusivity.						
Instructional	Posters, number charts; ten frames, video clips downloaded from the internet; tape measure;						
Resources	ten-structured materials; beads; hundreds frame, place value chart						
Required Text	Arthur, J., Grainger, T. & Wray, D. (2006). Learning to Teach in the Primary School. Canada: Taylor &						
(core)	Francis e-Library. <u>https://www.pdfdrive.com/learning-to-teach-in-the-primary-school-</u>						
	<u>d20209294.html</u>						
	Confer, C. (2005). Teaching Number Sense. Sausalito: Math Solutions Publications.						
	https://www.pdfdrive.com/teaching-number-sense-grade-1-d184198309.html.						
Additional	Lakoff, G. & Núñez, R. E. (2000). Where Mathematics comes from. New York: Basic Books.						
Reading List	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Tutor notes. Accra: Unimax						
	Publishers.						
	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Students activities. Accra:						
	Unimax Publishers.						
CPD Needs	How to design and/or use some innovative materials and ideas for teaching selected concepts						
	(e.g. developing and using ten frames)						
	Instructional strategies needed to consciously engage student teachers to participate						
	effectively and to be ready to share their past experiences without fear of ridicule;						
	How to use the lattice addition strategy for solving problems in addition of whole numbers						

Year of B.Ed.	2 S	emester	1 Pla	ice of lesson ii	n semestei	12 3 4 5 6 7	89101112
Title of Lesson	Classroom 1	assessment	in mathemat	ics in the Upper I	Primary L	esson Duration	3 Hours
Lesson description Previous student	This lesson focuses on developing knowledge and conceptual understanding assessment as treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of addition of assessment in the Upper Primary level. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include syllabus guidelines for classroom assessment and Effective assessmentskills. Most essentially, they will explore instructional strategies that incorporate principles underlying equity and inclusivity.						
teacher	counting a	and number	relationships	and place value.			,
knowledge, prior							
(assumed)							
Possible barriers to learning in the lesson	 Primary school teachers have knowledge of the need to create safe, secure and happy learning environment; but they are less capable in creating accessible, safe, secure and happy learning environments for middle childhood children including those with special educational needs 						
	 Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in teaching and learning. Primary school teachers are familiar with how to conduct classroom inquiry; however, teachers are less motivated to conduct classroom inquiry to improve teaching and support learning, an essential skill to ensure the full participation of all pupils. 						
Lesson Delivery –	Face-to-	Practical	Work-	Seminars	Independ	e-learning	Practicum
students in achieving the outcomes			Leaning				
Lesson Delivery –	Face-to-face: opportunity for an extended and coherent line of argument. It includes discussion,						
delivery chosen to	not usually be the main mode.						
support student	Practical Activity: enabling experimentation and the analysis and discussion of issues, documents						
teachers in	and materials, as well as physical activities.						
learning	promote individual and collaborative enquiry, more in-depth analysis and development. This can be						
outcomes.	part of any of the above modes						
	E-learning environme mode in it	environments. This can be part of any of the above modes of delivery. It is unlikely to be a delivery mode in its own right.					

 Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description. 	The purpose of the lesson is to; equip student teachers with the knowledge, skills and strategies for representing numbers in multiple ways including place value. devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense				
Learning Outcome for the lesson, picked and doublest	Learning Outcomes	Learning Indicators	Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?		
picked and developed from the course specification • Learning indicators for each learning outcome	Demonstrate understanding of syllabus guidelines for classroom assessment and skills of effective assessment for teaching mathematics in the specialism including design an assessment tool with the rubrics [NTS 2b, 3l, 3m]. Value as well as respect equity and inclusivity in the mathematics classroom by [NTS, 1f];	 Explain syllabus guidelines for classroom assessment for learning (AfL), assessment of learning (AoL) and assessment as learning (AaL) Explain the steps and strategies involved in designing a good assessment tool Design an assessment tool with the rubrics for assessing mathematics learning in upper primary Design and implement appropriate remediation in upper primary (i.e. Do action research) Appreciate the contributions of, and supports, colleagues in the mathematics classroom. Cooperate with colleagues in carrying out mathematics tasks. Engage in reflective thinking about how mathematics was taught in student teachers basic school days. 	 diversity. How will these be addressed or developed? Social and communication skills: consciously develop observation and presentation skills during classroom instructions to support student teachers to transfer this to STS Communication skills: through critiquing and analysing presentations Assessment literacy: through modelling of effective assessment strategies and record keeping Assessment literacy: through modelling of effective assessment strategies to deal with remediation Respect and diversity: designing lesson for diverse learners with different learning styles Personal development: through collaborating with peers in the development and presentation of tasks Equity and inclusivity: Providing equitable learning 		

Topic Title	Sub-topic(s)	Stage/ Time	Teaching and learning activities to achieve learning outcomes depending on delivery mode selected. Teacher- lead collaborative groupwork or independent.		
			Teacher Activity	Student Activity	
Classroom assessment in mathematics in the Upper Primary 1	Syllabus guidelines for classroom assessment Effective assessmentskills	3 Hours	Engage student teachers in a discussion based on their past experiences about examinations; Examine student teachers' conceptions of assessment and give feedback Assign student teachers to examine guidelines on classroom assessment in the old and current upper primarylevel mathematics curricula; Give a verbal exposition on purposes of different forms of assessment (e.g., assessment for learning, and assessment as learning) in mathematics learning in upper primary level; Assign student teachers to search on the internet for detailed information on the features of effective assessment	Participate in the discussion by giving their past experiences on B.E.C.E, WASSCE, and other relevant examination; Provide responses based on the questions posed and react to feedback. Study the old and current early grade mathematics curricula for guidelines on classroom assessment; write and present a short report on how effective assessment influence learning of upper primary level mathematics in small groups Pay attention during the exposition and participate by asking questions and giving comments; outline the similarities and difference among the forms of assessment (e.g., assessment for learning, assessment of learning, and assessment as learning) in mathematics learning in upper primary level; Do internet search on the features of effective and outline assessment strategies and to discuss the implications of this in classroom instruction;	
Lesson	Component 1: For Summany Assessment Met	mative ass	essment		
evaluation of	Assign student tea	achers to wi	rite a reflective paper ba	sed on the similarities and differences	
learning: of, for	among the forms of	of assessme	ent and their implication	s for classroom practice.(Assessment	
within the lesson	for learning) Weighting: 20%				
within the lesson	Related CLOs: 1, 2, 3				
	NTS:	-			
	2 b) Has comp	orehensive	knowledge of the officia	l school curriculum, including learning	
	outcomes. 2b) Has comprehensive knowledge of the official school curriculum, including learning outcomes 3m) Identifies and remediates learners' difficulties or misconceptions, referring learners				
	whose needs lie outside the competency of the teacher.				
---------------	--				
	Component 2: Formative assessment				
	Summary of assessment Method: (individual presentation)				
	Student teachers are assigned to Identify and explain the various forms of assessment				
	and their respective features. (Assessment as learning)				
	Weighing: 20%				
	Related CLOs: 1, 2, 3				
	NIS:				
	21) Demonstrate value as well as respect for equity and inclusion in the mathematics classroom (knowledge)				
	3j) Produces and uses a variety of teaching and learning resources including ICT, to				
	enhance learning				
	Component 3: Formative assessment				
	Summary of assessment Method: (teacher made test)				
	Assign student teachers to outline some content and lifelong learning standards and their relevance				
	to educational assessment standards in terms of planning and delivery of instruction. (Assessment				
	of learning)				
	Weighting: 20%				
	Related CLOS: 2, 3, 5				
	NIS: 2h) Has comprehensive knowledge of the official school survisulum including learning outcomes				
	20) has comprehensive knowledge of the official school curriculum, including rearming outcomes.				
	(knowledge)				
	3k) Integrates a variety of assessment modes into teaching to support learning.				
	Note: The assessment procedures should make room for differentiation - gender, equity, SEN, and				
	inclusivity.				
Instructional	Posters, number charts; ten frames, video clips downloaded from the internet; tape measure;				
Resources	ten-structured materials; beads; hundreds frame, place value chart				
Required Text	Arthur, J., Grainger, T. & Wray, D. (2006). Learning to Teach in the Primary School. Canada: Taylor &				
(core)	Francis e-Library. <u>https://www.pdfdrive.com/learning-to-teach-in-the-primary-school-</u>				
	<u>d20209294.html</u>				
	Confer, C. (2005). Teaching Number Sense. Sausalito: Math Solutions Publications.				
	nttps://www.pardrive.com/teacning-number-sense-grade-1-d184198309.ntml.				
	in mind: assessment for learning, assessment as learning, assessment of learning				
	https://www.ndfdrive.com/assessment-for-learning-assessment-as-learning-assessment-of-				
	learning-d6259529.html				
Additional	Lakoff, G. & Núñez, R. E. (2000). Where Mathematics comes from. New York: Basic Books.				
Reading List	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Tutor notes. Accra: Unimax				
-	Publishers.				
	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Students activities. Accra:				
	Unimax Publishers.				
CPD Needs	How to design and/or use some innovative materials and ideas for teaching selected concepts				
	(e.g. developing and using ten frames)				
	Instructional strategies needed to consciously engage student teachers to participate effectively				
	and to be ready to share their past experiences without fear of ridicule;				
	 How to use tape measure to develop number relationships; 				

Year of B.Ed.	2 S	emester	1 P	Place of les	son in semester	12 3 4 5 6	789101112			
Title of Lesson	Classroom Assessment of Mathematics in the Upper PrimaryLesson Duration3 Hours									
Lesson description	This lesso in the cur teachers assessme how to pe that nurt tools and principles for stude differenti and to pe	This lesson focuses on developing knowledge and conceptual understanding assessment as treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of addition of assessment in the Upper Primary level. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include design and use of assessment tools and the rubrics.Most essentially, they will explore instructional strategies that incorporate principles underlying equity and inclusivity. Most essentially, the lesson will provide opportunities for student teachers to explore assessment strategies that incorporate principles underlying equity, differentiation and inclusivity to promote effective learning of mathematics in the upper primary and to poor the primary and inclusivity.								
Previous student	Student-t	eachers have	e been intro	oduced to th	e nature and strue	cture of curricul	um, counting and			
teacher	number r	elationships,	place value	s as well as a	ddition					
knowledge, prior										
(assumed)										
Possible barriers to learning in the lesson	 Primenvienvienvienvienvienvienvienvienvienvi	 Primary school teachers have knowledge of the need to create safe, secure and happy learning environment; but they are less capable in creating accessible, safe, secure and happy learning environments for middle childhood children including those with special educational needs (SEN) to learn successfully. Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in teaching and learning. Primary school teachers are familiar with how to conduct classroom inquiry; however, 								
Lesson Delivery –	Face-to-	Practical	Work-	Seminars	Independ	e-learning	Practicum			
chosen to support	face	Activity	Based		ent Study	opportunities				
achieving the										
outcomes										
Lesson Delivery –	Face-to-f	ace: opportu	unity for an	extended an	d coherent line of a	rgument. It inclu	des discussion,			
main mode of	brainstor	ming, questic	on and answ	ver, etc. This	can be tutor and / c	or student teache	r led. It should			
delivery chosen to	not usual	ly be the mai	n mode.	montet!			an dogunante			
teachers	and mate	enals as well	oung experi as physical a	mentation ar	id the analysis and	discussion of issu	ies, aocuments			
achieving the	Independ	lent study: to	o enable stu	udents to eng	age with relevant a	nd appropriate n	naterials to			
learning	promote	individual an	d collaborat	tive enquiry,	more in-depth anal	ysis and develop	ment. This can be			
outcomes.	part of ar	ny of the abov	ve modes							
	E-learnin	g opportuniti	es – involvir a be part of	ng the use of	interactive package	es and virtual lea	rning to be a delivery			
	mode in i	ts own right.		any or the di		it is utilikely				

Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	The purpose of the lesson is to; explore assessment strategies that incorporate principles underlying equity, differentiation and inclusivity to promote effective learning of mathematics in the early grade.						
 Learning Outcome for the lesson, picked and developed from the course specification Learning indicators 	Learning Outco	omes	Learning Indicators	Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?			
for each learning outcome	Demonstrate k understanding features of asso Demonstrate k understanding face of educati well as, apprec part of the edu assessment sta and delivery of	nowledge and of forms and essment; nowledge and of the changing onal assessment, iation for import: cational ndards for plann instruction	 Identify and explain the various forms of assessment and their respective features; Outline similarities and differences among the forms of assessment and their implications for classroom practice; Identify and explain factors that have contributed to the changing face of educational assessment ; 	 Assessment literacy: through modelling of effective assessment strategies and record keeping Assessment literacy: through modelling of effective assessment strategies to deal with remediation Communication skills: through critiquing and analysing presentations 			
Topic Title	Sub-topic(s)	Stage/ Time	Teaching and learning to activ depending on delivery collaborative groupwork or inc	ities to achieve learning outcomes mode selected. Teacher-lead dependent. Student Activity			
Classroom assessment in mathematics in the Upper Primary 2	Design and use of assessment tools and the rubrics.	3 Hours	Review the lesson based on the forms of assessment Engage student teachers in a discussion based on the features of different types of assessment tools; Give a verbal exposition on how to plan, design, and develop different types of assessment tools Assign student teachers to search on the internet for detailed information on the strategies for developing assessment tools for children in the upper primary level Model how to plan, design, and develop assessment tools for the upper primary level	Participate in the review by asking questions and commenting on relevant issues; Contribute to the discussion by asking questions and commenting on issues based on the features of various types of assessment tools; Pay attention to the verbal exposition verbal exposition and ask question for clarification or provide comment(s) to ensure participation and understanding of how to plan, design, and develop different types of assessment tools Search the internet for types and strategies for developing assessment tools for upper primary level			

	1
Assign student teachers to write sample questions (items) and to facilitate a self-correcting and self- monitoring session; (PD Themes 1 & 3)	Participate in the session for planning, designing, and developing appropriate assessment tools for early grade learners and discuss the purpose and format of types of assessment tools, as well as test
Ask student teachers to begin informal discussions withupper primary teachers in their STS schools about how they plan, design, and develop assessment tools; Assign student teachers to design a performance task to assess specific content and lifelong learning standards, with emphasis on requiring them to locate and analyse information as well as draw conclusions about it; Lead student teachers in an interactive practical-based activity to learn how to	blue print and how it is used to plan, design, and develop classroom assessment tasks for upper primary level Examine the official P4-P6 curriculum (NACCA), analyse critically how the various concepts of addition of numbers up to 99 has been structuredare to be taught; Engage actively in the mock writing session and to engage in self-correcting and self- monitoring mode to justify why their attempts are okay or otherwise;
design reflective journals and portfolio and to discuss the purposes of a portfolio	Participate in the discussion based on strategies for planning, designing, and developing assessment tools that are
Engage student teachers to search the internet for definitions of evaluation and explore stages in the assessment process Discuss with student teachers how to use	relevant for upper primary learners, as well as, appropriate models to represent given numbers; Engage in a think-pair-share session to clarify and justify their ideas orally and in writing
judgments in making decisions and preparing reports; Lead a discussion on how to provide opportunities for upper primary children to monitor and evaluate their own learning	Design a performance task to assess specific content and lifelong learning standards, with emphasis on requiring them to locate and analyse information as well as draw conclusions about it; Design reflective journals and portfolio through a practical- based interactive activity and to discuss some of the nurnoses of a
	 portfolio as follows: to I. demonstrate growth II. show the processes used in work and play III. develop compilations of favourite or personally important works IV. show the development of various works or products

			V demonstrate
			achievement
			VI. communicate to parents
			and other stakeholders
			VII. use in the evaluation of a
			programme
			1 0
			Use internet search to explore
			definitions and various views of
			evaluation of assessment tasks
			and techniques within the scope
			of assessing young children's
			learning progress
			Take part in the discussion based
			on how to use judgments in
			making decisions and preparing
			reports for young children
			Participate in the discussion
			hased on how to provide
			opportunities for young children
			to monitor and evaluate their
			own learning
Lesson assessments –	Component 1: Format	tive assessment	
for and as learning within	Summary Assessment Method	: Group assignment	ns 1 E (Association for loarning)
the lesson	• Eligage student teache	ers in item writing based on lesso	is 1-5 (Assessment for learning)
	Component 2: Format	ive assessment	
	Summary of assessment Meth	od: (individual presentation)	
	engage student teac	hers to peer review the items co	nstructed by others in component
	one above. (Asse	essment as learning)	
	Weighing: 20%		
	Related CLOs: 1, 2, 3		
	NIS:		
	Component 3: Format	ne assessment od: (teacher made test)	
	student teachers are given mid	semester exercise	
	Weighting: 20%		
	Related CLOs: 2, 3, 5		
	Related CLOs: 2, 3, 5 NTS:		
	Related CLOs: 2, 3, 5 NTS: Note: The assessment proce	edures should make room for diff	erentiation - gender, equity, SEN,
Instructional Descures	Related CLOs: 2, 3, 5 NTS: Note: The assessment proce and inclusivity.	edures should make room for diff	erentiation - gender, equity, SEN,
Instructional Resources	Related CLOs: 2, 3, 5 NTS: Note: The assessment proce and inclusivity. Posters, number charts; ter ten-structured materials; b	edures should make room for diff n frames, video clips downloaded	erentiation - gender, equity, SEN, from the internet; tape measure;
Instructional Resources Required Text (core)	Related CLOs: 2, 3, 5 NTS: Note: The assessment proce and inclusivity. Posters, number charts; ter ten-structured materials; b Arthur, J., Grainger, T. & Wray.	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu . D. (2006), Learning to Teach in f	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor
Instructional Resources Required Text (core)	Related CLOs: 2, 3, 5 NTS: Note: The assessment proce and inclusivity. Posters, number charts; ter ten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library.	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu . D. (2006). Learning to Teach in https://www.pdfdrive.com/learni	from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school-
Instructional Resources Required Text (core)	Related CLOs: 2, 3, 5 NTS: Note: The assessment proceard inclusivity. Posters, number charts; ter ten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. d20209294.html	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in t https://www.pdfdrive.com/learni	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school-
Instructional Resources Required Text (core)	Related CLOs: 2, 3, 5 NTS: Note: The assessment proce and inclusivity. Posters, number charts; ter ten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. <u>1</u> <u>d20209294.html</u> Confer, C. (2005). Teachin	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in t https://www.pdfdrive.com/learning ng Number Sense. Sausalito	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school- Math Solutions Publications.
Instructional Resources Required Text (core)	Related CLOs: 2, 3, 5 NTS: Note: The assessment proce and inclusivity. Posters, number charts; ter ten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. <u>H</u> <u>d20209294.html</u> Confer, C. (2005). Teachin <u>https://www.pdfdrive.com/tea</u>	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in https://www.pdfdrive.com/learning Number Sense. Sausalito ching-number-sense-grade-1-d18	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school- Math Solutions Publications. 84198309.html.
Instructional Resources Required Text (core)	Related CLOs: 2, 3, 5 NTS: Note: The assessment proce and inclusivity. Posters, number charts; ter ten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. <u>H</u> <u>d20209294.html</u> Confer, C. (2005). Teachin <u>https://www.pdfdrive.com/tea</u> Manitoba Education, Citizenshi	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in t https://www.pdfdrive.com/learning Number Sense. Sausalitor ching-number-sense-grade-1-d18 p and Youth (2006). Rethinking cl	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school- Math Solutions Publications. 34198309.html. assroom assessment with purpose
Instructional Resources Required Text (core)	Related CLOs: 2, 3, 5 NTS: Note: The assessment proceand inclusivity. Posters, number charts; ter ten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. <u>1</u> <u>d20209294.html</u> Confer, C. (2005). Teachin <u>https://www.pdfdrive.com/tea</u> Manitoba Education, Citizenshi in mind: assessment for learnin https://www.pdfdrive.com/tea	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in t https://www.pdfdrive.com/learning ng Number Sense. Sausalito ching-number-sense-grade-1-d18 p and Youth (2006). Rethinking cl ig, assessment as learning, assess	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school- Math Solutions Publications. 34198309.html. assroom assessment with purpose ment of learning.
Instructional Resources Required Text (core)	Related CLOs: 2, 3, 5 NTS: Note: The assessment proceand inclusivity. Posters, number charts; terten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. <u>d20209294.html</u> Confer, C. (2005). Teaching https://www.pdfdrive.com/tea Manitoba Education, Citizenshi in mind: assessment for learnin https://www.pdfdrive.com/ass learning-d6259529.html	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in t https://www.pdfdrive.com/learni ng Number Sense. Sausalito ching-number-sense-grade-1-d18 p and Youth (2006). Rethinking cl g, assessment as learning, assess essment-for-learning-assessment	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school- Math Solutions Publications. 34198309.html. assroom assessment with purpose ment of learning. c-as-learning-assessment-of-
Instructional Resources Required Text (core) Additional Reading List	Related CLOs: 2, 3, 5 NTS: Note: The assessment proceand inclusivity. Posters, number charts; ter ten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. <u>H</u> <u>d20209294.html</u> Confer, C. (2005). Teachin <u>https://www.pdfdrive.com/tea</u> Manitoba Education, Citizenshi in mind: assessment for learnin <u>https://www.pdfdrive.com/asse</u> <u>learning-d6259529.html</u> Lakoff, G. &Núñez, R. E. (2000).	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in t https://www.pdfdrive.com/learning ng Number Sense. Sausalito ching-number-sense-grade-1-d18 p and Youth (2006). Rethinking cl g, assessment as learning, assess essment-for-learning-assessment	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school- Math Solutions Publications. <u>84198309.html</u> . assroom assessment with purpose ment of learning. -as-learning-assessment-of-
Instructional Resources Required Text (core) Additional Reading List	Related CLOs: 2, 3, 5 NTS: Note: The assessment proceand inclusivity. Posters, number charts; terten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. <u>d20209294.html</u> Confer, C. (2005). Teaching https://www.pdfdrive.com/tea Manitoba Education, Citizenshi in mind: assessment for learnin https://www.pdfdrive.com/ass learning-d6259529.html Lakoff, G. & Núñez, R. E. (2000). Martin, J. et. al. (1994).	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in t https://www.pdfdrive.com/learning ng Number Sense. Sausalito ching-number-sense-grade-1-d18 p and Youth (2006). Rethinking cl g, assessment as learning, assess essment-for-learning-assessment Where Mathematics comes from matics for teacher training in Gha	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school- Math Solutions Publications. <u>84198309.html</u> . assroom assessment with purpose ment of learning. -as-learning-assessment-of- D. New York: Basic Books. na: Tutor notes. Accra: Unimax
Instructional Resources Required Text (core) Additional Reading List	Related CLOs: 2, 3, 5 NTS: Note: The assessment proceand inclusivity. Posters, number charts; tenten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. <u>H</u> <u>d20209294.html</u> Confer, C. (2005). Teachin <u>https://www.pdfdrive.com/tea</u> Manitoba Education, Citizenshi in mind: assessment for learnin <u>https://www.pdfdrive.com/asse</u> <u>learning-d6259529.html</u> Lakoff, G. &Núñez, R. E. (2000). Martin, J. et. al. (1994). Mather Publishers.	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in t https://www.pdfdrive.com/learning ng Number Sense. Sausalito ching-number-sense-grade-1-d18 p and Youth (2006). Rethinking cl g, assessment as learning, assess essment-for-learning-assessment Where Mathematics comes from matics for teacher training in Gha	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school- Math Solutions Publications. 34198309.html. assroom assessment with purpose ment of learning. as-learning-assessment-of- D. New York: Basic Books. na: Tutor notes. Accra: Unimax
Instructional Resources Required Text (core) Additional Reading List	Related CLOs: 2, 3, 5 NTS: Note: The assessment proce and inclusivity. Posters, number charts; ter ten-structured materials; b Arthur, J., Grainger, T. & Wray, & Francis e-Library. <u>H</u> <u>d20209294.html</u> Confer, C. (2005). Teachin <u>https://www.pdfdrive.com/tea</u> Manitoba Education, Citizenshi in mind: assessment for learnin <u>https://www.pdfdrive.com/asselearning-d6259529.html</u> Lakoff, G. &Núñez, R. E. (2000). Martin, J. et. al. (1994). Mather Publishers. Martin, J. et. al. (1994). Mather	edures should make room for diff n frames, video clips downloaded eads; hundreds frame, place valu D. (2006). Learning to Teach in t https://www.pdfdrive.com/learni ng Number Sense. Sausalito ching-number-sense-grade-1-d18 p and Youth (2006). Rethinking cl g, assessment as learning, assess essment-for-learning-assessment Where Mathematics comes from natics for teacher training in Gha	erentiation - gender, equity, SEN, from the internet; tape measure; e chart the Primary School. Canada: Taylor ng-to-teach-in-the-primary-school- Math Solutions Publications. 84198309.html. assroom assessment with purpose ment of learning. -as-learning-assessment-of- N. New York: Basic Books. na: Tutor notes. Accra: Unimax na: Students activities.Accra:

CPD Needs	•	How to design and/or use some innovative materials and ideas for teaching selected concepts (e.g. developing and using ten frames) Instructional strategies needed to consciously engage student teachers to participate effectively and to be ready to share their past experiences without fear of ridicule;
	•	How to use tape measure to develop number relationships;

Year of B.Ed.	2 S	emester	1 PI	lace of lesson i	n semester	1234567	89101112		
Title of Lesson	numeracy 1 Lesson Duration 3 Hours								
Lesson description Previous student teacher knowledge prior	This lesson focuses on developing knowledge and conceptual understanding micro lessons and use of technology across upper primary numeracyas treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of micro lessons and use of technology across upper primary numeracyin the Upper Primary level. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include importance of lesson planning micro lesson planning formats and design of micro lessons. Most essentially, they will explore instructional strategies that incorporate principles underlying equity and inclusivity. Student-teachers have been introduced to the nature and structure of curriculum, counting and number relationships, place values as well as addition								
learning									
(assumed)									
Possible barriers to learning in the lesson	 Prim envii 	ary school te ronment; but ronments for	eachers have t they are les r middle child	knowledge of the ss capable in creat dhood children inc	need to crea ing accessible cluding those	te safe, secure and e, safe, secure and with special educa	d happy learning happy learning tional needs		
	(SEN (SEN Prim child cogn Curr thro subje The and O Prim instr child O Prim teacl O Prim teacl	 (SEN) to learn successfully. Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in teaching and learning. Primary school teachers are familiar with how to conduct classroom inquiry; however, teachers are less motivated to conduct classroom inquiry to improve teaching and support 							
Lesson Delivery –	Face-to-	Practical	Work-	Seminars	Independ	e-learning	Practicum		
chosen to support students in achieving the outcomes	face	face Activity Based ent Study opportunities Image: Construction of the study							
Lesson Delivery -	Face-to-fa	ice: opportu	unity for an e	extended and cohe	erent line of a	rgument. It include	es discussion,		
main mode of	brainstorr	ning, questic	on and answe	er, etc. This can be	e tutor and / o	or student teacher	led. It should		
delivery chosen to	not usuall	y be the mai	n mode. bling ovnorin	montation and the	analysis and	discussion of issue	c documents		
teachers in	and mater	rials, as well.	as physical a	ictivities.	allalysis allu		s, documents		
achieving the	Independ	ent study: to	o enable stu	dents to engage w	vith relevant a	and appropriate ma	aterials to		
learning	promote i	ndividual an	d collaborati	ve enquiry, more i	in-depth anal	ysis and developm	ent. This can be		
outcomes.	part of an	y of the abov	ve modes						
	E-learning	g opportuniti	es – involvin	ig the use of intera	active package	es and virtual learn	ning		
	environm mode in it	ents. This car	n be part of a	any of the above n	nodes of deliv	very. It is unlikely to	o be a delivery		
	mode in it	ts own right.							

•	Purpose for the	The purpose of the lesson is to;							
	lesson, what you	explore assessment strategies that incorporate principles underlying equity,							
	want the students	differentiation and inclusivity when designing teacher-made assessment tools to ensure							
	to achieve, serves	effective learning of mathematics in the early grade.							
	as basis for the								
	learning outcomes.								
	An expanded								
	version of the								
	description.								
•	Learning Outcome	Learning Outcomes	Learning Indicators	Identify Which cross-cutting issues-					
	for the lesson.		C C	core and transferable skills,					
	picked and			inclusivity, equity and addressing					
	developed from the			diversity. How will these be addressed					
	course specification			or developed?					
	Learning indicators	Demonstrate	 Identify the 	 Assessment literacy: through 					
	for each learning	knowledge and	various tools	modelling of effective assessment					
	outcome	understanding of	(observation	strategies and record keeping					
	outcome	how to plan design	guide	strategies and record keeping					
1		and develop	guestionnaire	Assessment literacy: through					
		and develop	interview	Assessment iteracy. through modelling of offective assessment					
1		classroom	nrotocol	stratogies to deal with					
		assessment tools:	checklist and	romodiation					
		assessment tools,	tests) and their	remeulation					
		Domonstrato	rosportivo	A concernent literation through					
		Demonstrate	fosturos	Assessment literacy: through					
		knowledge and	Idantification	modelling of effective assessment					
			Identity the	strategies that takes care of					
		assessment	content and the	learners developmental needs					
		standards and now	structure of the						
		they are linked to	various	Communication skills: through					
		dimensions of	assessment tools	critiquing and analysing					
		learning;	which are	presentations					
			developmentally						
		Demonstrate	appropriate for	Social and communication skills:					
		knowledge and	young children	consciously develop observation					
		understanding of		and presentation skills during					
		and appreciation for	Identify and	classroom instructions to support					
		important part of	explain factors	student teachers to transfer this					
		the educational	that have	to STS					
		assessment	contributed to						
		standards for	the changing						
1		planning and	face of						
1		delivery of	educational						
		instruction	assessment;						
1									
			Outline the						
			underlying						
1			principles of how						
1			to plan, design,						
1			and develop						
1			teacher-made						
1			assessment tools						
			which are						
			appropriate						
			assessment tools						
			for the early						
			grade level,						
			either						
1			individually or in						
			small groups						

Topic Title	Sub-topic(s)	Stage/ Time	Teaching and learning to activities to achieve learning outcomes depending on delivery mode selected. Teacher-lead collaborative groupwork or independent.			
			Teacher Activity	Student Activity		
Micro Lessons and use of technology across upper primary numeracy1	Importance of lesson planning Micro lesson planning formats Design of micro lessons	3 Hours	Engage student teachers to discuss any of their STS report based on an observation of a mathematics lesson Ask student teachers to discuss the key features of a lesson and to identify key characteristics of productive planning in their collaborative group to be shared in class Lead student teachers in a discussion based on micro lesson planning formats Engage student teachers in a collaborative practical activities involving planning, designing, and preparation of manipulatives and other models for teaching selected concepts in upper primary mathematics Model how to plan, design, and develop lessons for teaching selected mathematics concepts in upper primaryusing appropriate manipulatives and ICT tools Assign student teachers to write sample lesson plans for peer teaching (PD Themes 1 & 3)	Discuss a report on an observation in groups and to share with the class. This is to prepare the grounds for a discussion on the role of lesson planning in teaching mathematics in upper primary. Participate in the review by asking questions and commenting on relevant issues, including the role of planning on teaching mathematics in the upper primary. Play mental games student teachers are familiar with and are related to the lesson, e.g., a place value game which involves a player calling out a 3-digit number and another player instantly mentioning the difference between the 3- digit number called and its reverse before actually doing the subtraction of the smaller of the two numbers from the larger. Thus, if the first player calls out 492, the responds from the second player should be 198, the difference between 492 and 294. Participate in the discussion of the components of lessons with special emphasis on micro lessons Pay attention to the modeling process and ask questions and/or give comments to enhance clarity.		

	Examine the official P4-P6
	curriculum (NACCA),
	analyse critically how the
	various concepts select a
	topic and plan a lesson
	based on it.
	Plan, design, and develop
	lessons for teaching
	selected mathematics
	concepts in upper primary
	Pay attention to the
	modeling process and ask
	questions and/or give
	comments to enhance
	clarity.
	Write sample lesson plans
	in collaborative groups for
	peer teaching to be
	submitted later
Lesson assessments –	Component 1: Formative assessment
evaluation of learning:	Summary Assessment Method: Group assignment
of, for and as learning	Assign student teachers to write a reflective paper on how to plan, design, and
within the lesson	develop lessons for teaching selected mathematics concepts in upper
	primary.(Assessment for learning)
	Weighting: 20%
	Related CLOS: 1, 2, 3
	2 h) Has comprehensive knowledge of the official school curriculum including
	learning outcomes
	2h) Has comprehensive knowledge of the official school curriculum including
	learning outcomes
	3m) Identifies and remediates learners' difficulties or misconceptions, referring
	learners whose needs lie outside the competency of the teacher.
	Component 2: Formative assessment
	Summary of assessment Method: (individual presentation)
	Student teachers are assigned to examine the official P4-P6 curriculum (NaCCA),
	analyse critically how the various concepts select a topic and plan a lesson
	based on it. (Assessment as learning)
	Weighing: 20%
	Related CLOS: 1, 2, 3
	NIS: 2f) Demonstrate value as well as respect for equity and inclusion in the
	21) Demonstrate value as well as respect for equity and inclusion in the mathematics classroom (knowledge)
	3i) Produces and uses a variety of teaching and learning resources including
	ICT to enhance learning
	Component 3: Formative assessment
	Summary of assessment Method: (teacher made test)
	Student teachers present their lessons for colleaguestocritique. (Assessment of learning)
	Weighting: 20%
	Related CLOs: 2, 3, 5
	NTS:
	2b) Has comprehensive knowledge of the official school curriculum, including learning
	outcomes.
	2f) Demonstrate value, as well as, respect for equity and inclusion in the mathematics
	classroom (knowledge)
	3K) Integrates a variety of assessment modes into teaching to support learning.
	note: The assessment procedures should make room for differentiation - gender, equity, SEN,
Instructional Resources	Posters, number charts: ten frames, video clins downloaded from the internet: tane
motivettenal nesources	measure; ten-structured materials: beads: hundreds frame. place value chart
Required Text (core)	Arthur, J., Grainger, T. & Wray, D. (2006). Learning to Teach in the Primary School. Canada:

	Taylor & Francis e-Library. https://www.pdfdrive.com/learning-to-teach-in-the-primary-								
	school-d20209294.html								
	Confer, C. (2005). Teaching Number Sense. Sausalito: Math Solutions Publications.								
	https://www.pdfdrive.com/teaching-number-sense-grade-1-d184198309.html.								
	Manitoba Education, Citizenship and Youth (2006). Rethinking classroom assessment with								
	purpose in mind: assessment for learning, assessment as learning, assessment of learning.								
	https://www.pdfdrive.com/assessment-for-learning-assessment-as-learning-assessment-of-								
	learning-d6259529.html								
Additional Reading List	Lakoff, G. & Núñez, R. E. (2000). Where Mathematics comes from. New York: Basic Books.								
	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Tutor notes. Accra:								
	Unimax Publishers.								
	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Students activities. Accra:								
	Unimax Publishers.								
CPD Needs	How to design and/or use some innovative materials and ideas for teaching selected								
	concepts (e.g. developing and using ten frames)								
	 Instructional strategies needed to consciously engage student teachers to 								
	participate effectively and to be ready to share their past experiences without fear								
	of ridicule;								
	 How to use tape measure to develop number relationships; 								

Year of B.Ed.	2 S	emester	1 P	Place of lesson ir	n semester	12 3 4 5 6 7 🞖	3 9101112	
Title of Lesson	Micro Lessons and use of technology across upper primary numeracy 2 Lesson Duration 3 Hours							
Lesson description Previous student teacher	This lesson focuses on developing knowledge and conceptual understanding micro lessons and use of technology across upper primary numeracyas treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of micro lessons and use of technology across upper primary numeracy in the Upper Primary level. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include engagement in micro teaching with peers and exploration of technology use in the Upper Primary. Most essentially, they will explore instructional strategies that incorporate principles underlying equity and inclusivity. Student-teachers have been introduced to the nature and structure of curriculum, counting and number relationships, place values as well as addition							
knowledge, prior learning (assumed)								
Possible barriers to learning in the lesson	 Prima enviro (SEN) Prima childh cogni Curre throu subje The so other The so other Prima instru childr Prima teach 	 Primary school teachers have knowledge of the need to create safe, secure and happy learning environment; but they are less capable in creating accessible, safe, secure and happy learning environments for middle childhood children including those with special educational needs (SEN) to learn successfully. Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in 						
	 Prima are le essen 	iry school tea iss motivated tial skill to ei	d to conduct nsure the ful	amiliar with now to t classroom inquiry Ill participation of a	to improve t to improve t ll pupils.	eaching and supp	wever, teacners oort learning, an	
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to- face Practical Activity Work- Based Leaning Seminars Independ ent Study e-learning Practicum							
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	 Face-to-face: opportunity for an extended and coherent line of argument. It includes discussion, brainstorming, question and answer, etc. This can be tutor and / or student teacher led. It should not usually be the main mode. Practical Activity: enabling experimentation and the analysis and discussion of issues, documents and materials, as well as physical activities. Independent study: to enable students to engage with relevant and appropriate materials to promote individual and collaborative enquiry, more in-depth analysis and development. This can be part of any of the above modes E-learning opportunities – involving the use of interactive packages and virtual learning environments. This can be part of any of the above modes of delivery. It is unlikely to be a delivery mode in its own right. 							

•	Purpose for the	The purpose of the lesson is to							
	lesson, what	explore assessment strategies that incorporate principles underlying equity, differentiation and							
	you want the	inclusivity when using and evaluating teacher-made assessment tools to ensure effective learning							
	students to	of mathematics in the early grade.							
	achieve, serves		, .						
	as basis for the								
	learning								
	outcomes. An								
	expanded								
	version of the								
	description.								
•	Learning	Learning Outcomes	Learning Indicators	Identify Which cross-cutting issues-					
	Outcome for		-	core and transferable skills,					
	the lesson,			inclusivity, equity and addressing					
	picked and			diversity. How will these be					
	developed from			addressed or developed?					
	the course		Develop strategies for	 Assessment literacy: through 					
	specification	Demonstrate	administering various types	modelling of effective					
•	Learning	knowledge and	of assessment tools:	assessment strategies and					
	indicators for	understanding of		record keeping					
	each learning	effective strategies	• Design marking schemes for						
	outcome	for administering	scoring a teacher-made test	 Assessment literacy: through 					
		educational	and provide accurate	modelling of effective					
		assessment tools to	interpretation of assessment	assessment strategies to deal					
		enhance learning;	results of a small group of	with remediation					
		6,	voung children						
			,						
		Demonstrate	 Describe how to use 	 Problem solving, critical and 					
		knowledge and	information to evaluate: that	creative thinking: through					
		understanding of	is, to grade, to judge young	objective analysis of facts and					
		strategies for	children's progress, and to	concept that will lead to creative					
		scoring and	iudge voung children's	thinking and assessment					
		interpreting	attitudes toward the learning	strategies appropriate for upper					
		assessment results	of mathematics in early	nrimary					
			grade	Printery					
			Біййс						
		Demonstrate	Explain how learning	Communication skills: through					
		understanding of	outcomes can beln one to	critiquing and analysing					
		how to evaluate	nlan valid evaluation	nresentations					
		accessment tacks	procedures	presentations					
		hased of certain	procedures						
		criteria such as	Evaluate given accordinate	• Accordment literacy, through					
		techniques and	Lvaluate given assessment	 Assessment inerdcy: through modelling of offective 					
		trends in oarly grade	casks based on techniques	modelling of effective					
		accossment:	and trends in early grade	assessment strategies that takes					
		assessment;	assessment for	care of learners developmental					
			developmentally	needs					
			appropriateness						

Topic Title	Sub-topic(s)	Stage/ Time	Teaching and learning to activities to achieve learning outcomes depending on delivery mode selected. Teacher- lead collaborative groupwork or independent.		
			Teacher Activity	Student Activity	
	Engagement in micro teaching with peers	3 Hours	Engage student teachers to discuss any of their STS report based on an observation of a mathematics lesson	Discuss a report on an observation in groups and to share with the class. This is to prepare the grounds for a discussion on the role of lesson planning in teaching mathematics in early grade.	
	Exploration of technology use in the Upper Primary		Lead student teachers in a discussion based on the use of technology in micro lesson planning	Participate in the discussion based on the use of technology in micro lesson planning	
Micro Lessons and use of technology			Engage student teachers in a collaborative practical activities involving planning, designing, and preparation of manipulatives and other models for teaching selected concepts in upper primary mathematics using ICT	Plan, design, and develop lessons for teaching selected mathematics concepts in upper primary using ICT	
across upper primary numeracy 2			Engage student teachers in micro teaching of lessons to ensure they consider the principles underlying equity and inclusivity through the use of multiple teaching strategies.	Participate in the micro teaching of lessons with emphasis on applying the principles underlying equity and inclusivity through the use of multiple teaching strategies.	
			Encourage student teachers to provide genuine feedback on the instructional strategies used by their colleagues Assign student teachers	Provide genuine feedback on the instructional strategies used by their colleagues meant for improving their teaching skills.	
			to write a reflective paper on their views of the micro teaching sessions and the experiences and add it to their portfolios	Write a reflective paper on their views of the micro teaching sessions and the experiences and add it to their portfolios	

Lesson assessments	Component 1: Formative assessment
 evaluation of 	Summary Assessment Method: Group assignment
learning: of, for and	Assign student teachers to demonstrate using practical activities involving planning,
as learning within	designing, and preparation of manipulatives and other models to teach selected concepts in
the lesson	upper primary mathematics using ICT
	Write a reflective paper on their views of the micro teaching sessions and the experiences
	and add it to their portfolios
	(Assessment for learning)
	Weighting: 20%
	Related CLOs: 1, 2, 3
	NTS:
	2 b) Has comprehensive knowledge of the official school curriculum, including
	learning outcomes.
	2b) Has comprehensive knowledge of the official school curriculum, including
	learning outcomes
	3m) Identifies and remediates learners' difficulties or misconceptions, referring learners
	whose needs lie outside the competency of the teacher.
	Component 2: Formative assessment
	Summary of assessment Method:(individual presentation)
	Student teachers are assigned to outline how multiple teaching strategies promote
	equity and inclusivity. (Assessment as learning)
	Weighing: 20%
	Related CLOs: 1, 2, 3
	NTS:
	2f) Demonstrate value as well as respect for equity and inclusion in the
	mathematics classroom (knowledge)
	3j) Produces and uses a variety of teaching and learning resources including ICT, to
	enhance learning
	Component 3: Formative assessment
	Summary of assessment Method: (teacher made test)
	Student teachers present their lessons for colleagues to critique. (Assessment of learning)
	Weighting: 20%
	Related CLOs: 2, 3, 5
	NTS:
	2b) Has comprehensive knowledge of the official school curriculum, including learning
	outcomes.
	2f) Demonstrate value, as well as, respect for equity and inclusion in the mathematics
	classroom (knowledge)
	3k) Integrates a variety of assessment modes into teaching to support learning.
	Note: The assessment procedures should make room for differentiation - gender, equity, SEN, and
	inclusivity.
Instructional	Posters, number charts; ten frames, video clips downloaded from the internet; tape measure;
Resources	ten-structured materials; beads; hundreds frame, place value chart
Required Text (core)	Arthur, J., Grainger, T. & Wray, D. (2006). Learning to Teach in the Primary School. Canada: Taylor
	& Francis e-Library. <u>https://www.pdfdrive.com/learning-to-teach-in-the-primary-school-</u>
	Confer, C. (2005). Teaching Number Sense. Sausalito: Math Solutions Publications.
	https://www.pdfdrive.com/teaching-number-sense-grade-1-d184198309.ntml.
	Manitoba Education, Citizenship and Youth (2006). Rethinking classroom assessment with
	purpose in minu: assessment for learning, assessment as learning, assessment or learning.
	https://www.puturive.com/assessment-tor-tearning-assessment-as-tearning-assessment-or-
Additional Poading	Lakoff G & Núžaz R E (2000) Where Mathematics comes from Now York: Posis Rooks
List	Lakoli, G. & Nullez, K. E. (2000). Where Mullerhulls comes from New Tork. Basic Books.
LIST	Dublishors
	Publishers. Martin 1 at al (1994) Mathematics for teacher training in Chana: Students activities Accra:
	Iniaran, J. et. al. (1994). Mathematics for teacher training in Ghana. Statents activities. Actid.
CPD Needs	How to decign and/or use some innovative materials and ideas for teaching calented
CFD Neeus	 now to design and/or use some innovative indicated and ideas for reaching selected concepts (e.g. developing and using ten frames).
	 Instructional strategies needed to consciously engage student toochors to participate
	final unional subjects needed to consciously engage student teachers to participate effectively and to be ready to chare their pact experiences without foar of ridicular
	encentery and to be ready to share their past experiences without real of huldule,

How to use tape measure to develop number relationships;

Year of B.Ed.	2	Semester	1 8	Place of lesson in	n semester	12 3 4 5 6 7 8	3 9 10 11 12
Title of Lesson	Subtraction of whole numbers within 19 and then numbers						
	within 99	within 99 Lesson Duration 3 Hours					
Lesson description	This lesson focuses on developing knowledge and conceptual understanding Subtraction of whole numbers within 19 and then numbers within 99as treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of Subtraction of whole numbers within 19 and then numbers within 99. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include 1-digit and 2-digit subtraction as removing or take a part; counting down and mentalstrategies: difference, friendly jump, making doubles, compensation, decomposing numbers, constant difference; and problem solving. Most essentially, they will explore instructional strategies that incorporate principles underlying equity and						
Previous student	Student-	teachers have	e been intr	roduced to the nat	ure and struc	cture of curriculur	n, counting and
teacher	number	relationships,	place value	es as well as addition	n		
learning							
(assumed)							
Possible barriers to learning in the lesson	 Primary school teachers have knowledge of the need to create safe, secure and happy learning environment; but they are less capable in creating accessible, safe, secure and happy learning environments for middle childhood children including those with special educational needs (SEN) to learn successfully. Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in teaching and learning. 						
Lesson Delivery –	Face-to-	Practical Activity	Work- Based	Seminars	Independ ent Study	e-learning	Practicum
students in achieving the outcomes			Leaning				
Lesson Delivery –	Face-to-	face: opportu	unity for an	extended and cohe	erent line of a	rgument. It include	es discussion,
main mode of delivery chosen to	brainstor	ming, questic Ilv be the mai	on and ansv n mode	ver, etc. This can be	e tutor and / o	or student teacher	ied. It should
support student	Practical	Activity: enal	bling experi	imentation and the	analysis and	discussion of issue	s, documents
teachers in	and mate	erials, as well	as physical	activities.			
achieving the	Indepen	dent study: to	o enable sti	udents to engage w	ith relevant a	nd appropriate ma	aterials to
outcomes.	part of a	ny of the abov	le modes	tive enquiry, more i	m-ueptil analy	ysis allu üevelopm	
	E-learnin environn mode in	n g opportuniti nents. This can its own right.	i es – involvi n be part of	ing the use of intera f any of the above n	active package nodes of deliv	es and virtual learn very. It is unlikely to	iing o be a delivery

•	Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	The purpose of the lesson is to; explore assessment strategies that incorporate principles underlying equity, differentiation and inclusivity when designing teacher-made assessment tools to ensure effective learning of mathematics in the early grade.					
•	Learning Outcome for the lesson, picked and developed	Learning Outcomes	Learning Indicators	Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?			
•	from the course specification Learning indicators for each learning outcome	 Demonstrate knowledge and understanding of how to plan, design, and develop appropriate plan for a micro lesson 	 Exhibit knowledge and application of learning theory, content knowledge, middle childhood learners' developmental needs, and how to use these to plan a lesson to meet the early grade curriculum goals 	 Needs of the student teachers: makingconscious efforts to identify and address these needs and to inspire them for effective transfer of knowledge 			
		 Demonstrate competencies in using differentiated instructional strategies, with a focus on a thematic approach and which promotes play- based learning to 	 Outline contextual considerations, ICT tools and TLMs including community resources that create a bridge between the curriculum goals and middle childhood learners' experiences 	 Use of ICT: by integrating ICT in developing number and other concepts in the mathematics classroom. (CLO 2) 			
		cater for the needs of all children in the early years` classroom, including those with SEN (NTS 3f, pg. 14)	 Plan a lesson using learner- centred learning strategies that match upper primary children's level of thinking. Undertake small scale classroom enquiry focussed on children's learning and progress, demonstrating an emerging ability to reflect on their developing understanding of teaching, learning and assessing children in early grade mathematics. (equity and inclusion) 	 Respect and diversity: designing lesson for diverse learners with different learning styles Equity and inclusivity: Providing equitable learning opportunities for all learners Equity and inclusivity: Providing equitable learning opportunities for all learners 			
			 Outline strategies that cater for the needs of all children in the early years` classroom, including those with SEN 	 Needs of the student teachers:makingconscious efforts to identify and address these needs and to inspire them for effective transfer of knowledge 			

Topic Title	Sub-topic(s)	Stage/ Time	Teaching and learning to activities to achieve learning outcomes depending on delivery mode selected. Teacher- lead collaborative groupwork or independent.		
			Teacher Activity	Student Activity	
			Engage student teachers in a warm up involving working with tens, by highlighting the point that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 have the same relationship as the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9.	Participate in the warm up involving working with tens and contribute to the discussion by asking questions and commenting on how this activity is related to the lesson under review. For example, student teachers should be supported reflect on the fact that since $2 + 3 =$ 5 and $20 + 30 = 50$, then $5 - 2 = 3means 50 - 20 = 30$	
Subtraction: of	1-digit and 2-digit subtraction as removing or take a part; counting down and mentalstrategies: difference, friendly jump, making doubles, compensation, decomposing numbers,		Encourage student teachers who have observed lessons based on subtraction of whole numbers up to 99 in their STS sessions to share their report to the class. Ask student teachers to outline interpretations for the operation of	Share STS report based on subtraction of whole numbers up to 99. Issues arising out of the presentation by some student teachers are discussed Outline the meaning and interpretations for the operation of subtraction, including physical and pictorial models for each interpretation of the operation, in groups and share their work	
numbers within 19and then numbers within 99	constant difference; and problem solving	3 Hours	subtraction in groups and share their work Provide a forum for feedback from peers as others present their work	Critique others presentation to ensure understanding by all Critique others presentation to ensure understanding by all	
			Assign student teachers to outline the instruction approaches suggested by the CRDD and NACCA curricula and to submit later Give a verbal exposition on an overview of teaching	Outline the instructional strategies suggested by the CRDD and NACCA curricula by examining the official P4-P6 curriculum (NACCA), analyse critically how the various concepts of subtraction of numbers up to 99 has been structuredare to be taught, as compared to that of CRDD.	
			the subtraction algorithm and explore student teachers' views about this.	Pay attention to the exposition by asking questions as well as give comments including sharing their views about the subtraction algorithm	
			Engage student teachers in an interactive discussion to explore the thinking models	Participate in the discussion to explore the thinking models for subtraction (i.e., take away,	

		for subtraction (i.e., take away, comparison, and missing addend) with emphasis on how Ghanaian upper primary approach each of them (PD Themes 1 & 3)	comparison, and missing addend) with emphasis on how Ghanaian upper primary approach each of them Play mental games that student teachers are familiar with and are related to the lesson, e.g., a place value game which involves a player calling out a 3-digit number and another player instantly mentioning the difference between the 3-digit number called and its reverse before actually doing the subtraction of the smaller of the two numbers from the larger. Thus, if the first player calls out 492, the responds from the second player should be 198, the difference between 492 and 294.			
Lesson	Component 1: Formative ass	essment				
assessments –	Summary Assessment Method: Group	assignment				
evaluation of	 Assign student teachers to outline 	the instruction approac	hes suggested by the CRDD and			
and as learning	(Assessment for learning)					
within the lesson	Weighting: 20%					
	Related CLOs : 1, 2, 3					
	NTS:					
	2 b) Has comprehensive l	knowledge of the official	school curriculum, including learning			
	2b) Has comprehensive k	nowledge of the official	school curriculum. includina learnina			
	outcomes					
	3m) Identifies and remediates	s learners' difficulties or	misconceptions, referring learners			
	whose needs lie outs	side the competency of t	he teacher.			
	Component 2: Formative asse	essment				
	Summary of assessment Method:(gro	up presentation)	models for subtraction (i.e. take			
	 Student teachers are assigned away, comparison, and missir 	a addend) with emphas	is on how Ghanaian upper primary			
	approach each of them. (Asse	essment as learning)				
	Weighing: 20%					
	Related CLOs: 1, 2, 3					
	NIS: 2f) Demonstrate value as well as respect for equity and inclusion in the mathematics					
	classroom (knowledge)		ity and inclusion in the mathematics			
	3j) Produces and uses a	variety of teaching and l	earning resources including ICT, to			
	enhance learning					
	Component 3: Formative asset	essment				
	Summary of assessment Method: (100) write class exercise on models for teac	cher made test)	ling physical and pictorial models) for			
	each interpretation of subtraction (A	ssessment of learning)	ing physical and pictorial models) for			
	Weighting: 20%	0,				
	Related CLOs: 2, 3,					
	NTS:	the official cohool curric				
	20) Has comprehensive knowledge of 2f) Demonstrate value, as well as, i (knowledge)	respect for equity and in	clusion in the mathematics classroom			
	3k) Integrates a variety of assessment	modes into teaching to s	support learning.			
	Note: The assessment proce	edures should make roo	m for differentiation - gender, equity,			
	SEN, and inclusivity.					

Instructional	Posters, number charts; ten frames, video clips downloaded from the internet; tape measure;							
Resources	ten-structured materials; beads; hundreds frame, place value chart							
Required Text	Arthur, J., Grainger, T. & Wray, D. (2006). Learning to Teach in the Primary School. Canada: Taylor &							
(core)	Francis e-Library. <u>https://www.pdfdrive.com/learning-to-teach-in-the-primary-school-</u>							
	d20209294.html							
	Confer, C. (2005). Teaching Number Sense. Sausalito: Math Solutions Publications.							
	https://www.pdfdrive.com/teaching-number-sense-grade-1-d184198309.html.							
	Manitoba Education, Citizenship and Youth (2006). Rethinking classroom assessment with purpose							
	in mind: assessment for learning, assessment as learning, assessment of learning.							
	https://www.pdfdrive.com/assessment-for-learning-assessment-as-learning-assessment-of-							
	learning-d6259529.html							
Additional	Lakoff, G. & Núñez, R. E. (2000). Where Mathematics comes from. New York: Basic Books.							
Reading List	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Tutor notes. Accra: Unimax							
	Publishers.							
	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Students activities. Accra:							
	Unimax Publishers.							
CPD Needs	How to design and/or use some innovative materials and ideas for teaching selected							
	concepts (e.g. developing and using ten frames)							
	 Instructional strategies needed to consciously engage student teachers to participate 							
	effectively and to be ready to share their past experiences without fear of ridicule;							
	 How to use tape measure to develop number relationships; 							

Year of B.Ed.	2 S	emester	1 P	Place of lesson ir	n semester	12345678	9 10 11 12
Title of Lesson							
Title of Lesson	Snape, sp	ace and iviea	surement 1	_	Les	son Duration	3 Hours
Lesson description Previous student teacher knowledge, prior	This lesson focuses on developing knowledge and conceptual understanding shape, space and measurementas treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of shape, space and measurement. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include 2-D shapes and 3-D objects; characteristics of 2-D shapes and 3-D objects and relationships among and between 2-D shapes and 3-D objects. Most essentially, they will explore instructional strategies that incorporate principles underlying equity and inclusivity. Student-teachers have been introduced to the nature and structure of curriculum, counting and number relationships, place values as well as addition						
(assumed) Possible barriers	o Prima	iry school tea	chers have	knowledge of the r	need to create	safe, secure and h	happy learning
to learning in the lesson	 environment; but they are less capable in creating accessible, safe, secure and happy learning environments for middle childhood children including those with special educational needs (SEN) to learn successfully. Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in teaching and learning. Primary school teachers are familiar with how to conduct classroom inquiry; however, teachers are less motivated to conduct classroom inquiry to improve teaching and support learning, an 					appy learning onal needs age of middle stics (i.e. I learning. Iy grade ching all disabilities and g differentiated inclusion of all tegrating ICT in wever, teachers ort learning, an	
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to- face	Practical Activity	Work- Based Leaning	Seminars	Independ ent Study	e-learning opportunities	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	 Face-to-face: opportunity for an extended and coherent line of argument. It includes discussion, brainstorming, question and answer, etc. This can be tutor and / or student teacher led. It should not usually be the main mode. Practical Activity: enabling experimentation and the analysis and discussion of issues, documents and materials, as well as physical activities. Independent study: to enable students to engage with relevant and appropriate materials to promote individual and collaborative enquiry, more in-depth analysis and development. This can be part of any of the above modes E-learning opportunities – involving the use of interactive packages and virtual learning environments. This can be part of any of the above modes of delivery. It is unlikely to be a delivery mode in its own right. 						

•	Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	The purpose of the lesson is to; explore assessment strategies that incorporate principles underlying equity, differentiation and inclusivity when designing teacher-made assessment tools to ensure effective learning of mathematics in the early grade.				
•	Learning Outcome for the lesson, picked and developed from the course	Learning Outcomes	Learning	Indicators	Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?	
•	specification Learning indicators for each learning outcome	Demonstrate knowledge of early grade pedagogical knowledge and pedagogical content knowledge to deliver the ECE curriculum (NTS 2c, pg. 13, 3e & 3g, pg. 14) [NTECF P1 (3), pg. 20] Demonstrate skills in identifying traits of professionalism in school using knowledge and experiences gained from interacting with peers during lessons and group work and subsequently make appropriate journal entries (NTS, 1d, 1f, 1g. & 2a	 Use appropriate pedagogical content knowledge to deliver the upper primary curriculum Reflect on and record their experiences in their professional portfolios during their STS school visits. Write a reflective learning journal that shows progress of student teachers' observation on how early adolescents learn mathematics. Provide SRJ recordings of demonstrated professional values and attitudes during engagements with people including pupils, mentors, tutors, and peers 		 Respect and diversity: designing lesson for diverse learners with different learning styles Social and communication skills: consciously develop observation and presentation skills during classroom instructions to support student teachers to transfer this to STS Communication skills: through critiquing and analysing presentations Ethics and values of teaching: through supporting student teachers to understand and demonstrate the ethics of the profession bearing in mind the unique characteristics of the early adolescent learner 	
	Topic Title	Sub-topic(s)	Stage/ Time	Teaching and learnin outcomes depending lead collaborative grou Teacher Activity	ng to activities to achieve learning on delivery mode selected. Teacher- upwork or independent. Student Activity	
Sha	ape, space and easurement 1	2-D shapes and 3-D objects; characteristics of 2- D shapes and 3-D objects	3 Hours	Ask student teachers to discuss in groups and give their past experiences of how the learned concepts based on 2-D and 3-D shapes List some 2-D shapes and have student teachers provide definitions of such shapes in groups and later share their responses.	 Give past experiences about how they were taught concepts based on 2-D and 3-D shapes Provide definitions of such shapes in groups and later share their responses to enable them develop awareness of their current level of understanding of such concepts. 	

Relationships among and between 2-D shapes and 3-D objects;	Identify and address misconceptions that student teachers might have. Assign student teachers to describe the common features or attributes of a collection of 2D and 3D shapes Engage student teachers in an interactive group activity to sort a	Participate in the discussion for addressing potential misconceptions that they may have to enhance conceptual understanding of such concepts. Describe the common features or attributes of a collection of 2D and 3D shapes to begin identifying relationships between some 3-D shapes and the corresponding 2-D shapes that form them:
	collection of 2D shapes by one or two features or attributes and explain the sorting rule used (repeat for 3D); Group student teachers and task them to identify examples of 2D and 3D shapes in the classroom and the community	Sort a collection of 2D shapes by one or two features or attributes and explain the sorting rule used (repeat for 3D);
	Assign student teachers to undertake a mini project to build boxes and design packages e.g., making rectangular prisms to develop the concept of surface area by counting the number	Discuss in groups to outline examples of 2D and 3D shapes in the classroom and the community.
	to wrap a rectangular box Lead a discussion to find the 11 flat patterns made with six squares that can fold into a cubic box using grid sheets and other relevant materials	Participate in a mini project to buildboxes and design packages e.g., making rectangular prisms to develop the concept of surface area by counting the number of unit squares needed to wrap a rectangular box to be presented later;
	Have student teachers discuss their views about the activities outlined for the lesson	Engage in an interactive activity to find the 11 flat patterns made with six squares that can fold into a cubic box
		Participate in the discussion of their views about the activities outlined for the lesson and record the findings in their journals

Lesson assessments –	Component 1: Formative assessment							
evaluation of learning:	Summary Assessment Method: Group assignment							
of, for and as learning	Student teachers are assigned to list some 2-D and 3D shapes and provide definitions of such							
within the lesson	shapes and describe the common features or attributes of a collection of 2D and 3D							
	shapes. (Assessment for learning)							
	Weighting: 20%							
	Related CLOs: 1, 2, 3							
	NTS:							
	2 b) Has comprehensive knowledge of the official school curriculum, including							
	learning outcomes.							
	20) Has completiensive knowledge of the official school curriculum, including							
	an) Identifies and remediates learners' difficulties or misconcentions referring							
	learners whose needs lie							
	Component 2: Formative assessment							
	Summary of assessment Method: (group presentation)							
	Assign student teachers to undertake a mini project to build boxes and design							
	packages e.g., making rectangular prisms to develop the concept of surface area by							
	counting the number of unit squares needed to wrap a rectangular box to be							
	submitted for grading. (Assessment as learning)							
	Weighing: 20%							
	Related CLOs: 1, 2, 3							
	NTS:							
	2f) Demonstrate value as well as respect for equity and inclusion in the							
	mathematics classroom (knowledge)							
	3j) Produces and uses a variety of teaching and learning resources including ICT,							
	to enhance learning							
	Component 3: Formative assessment							
	Summary of assessment Method: (teacher made test)							
	Student teachers to outline and discuss some misconceptions of a collection of 2D and 3D							
	shapes (Assessment of learning)							
	Weighting: 20%							
	Related CLOs: 2, 3,							
	NTS:							
	2b) Has comprehensive knowledge of the official school curriculum, including learning							
	Outcomes.							
	21) Demonstrate value, as well as, respect for equity and inclusion in the mathematics							
	3k) Integrates a variety of assessment modes into teaching to support learning							
	Note: The assessment procedures should make room for differentiation - aender, eauity. SEN.							
	and inclusivity.							
Instructional Resources	Posters, number charts; ten frames, video clips downloaded from the internet; tape							
	measure; ten-structured materials; beads; hundreds frame, place value chart							
Required Text (core)	Arthur, J., Grainger, T. & Wray, D. (2006). Learning to Teach in the Primary School. Canada:							
	Taylor & Francis e-Library. <u>https://www.pdfdrive.com/learning-to-teach-in-the-primary-</u>							
	school-d20209294.html							
	Confer, C. (2005). Teaching Number Sense. Sausalito: Math Solutions Publications.							
	https://www.pdfdrive.com/teaching-number-sense-grade-1-d184198309.html.							
	Manitoba Education, Citizenship and Youth (2006). Rethinking classroom assessment with							
	purpose in mind: assessment for learning, assessment as learning, assessment of learning.							
	https://www.pararive.com/assessment-for-learning-assessment-as-learning-assessment-of-							
Additional Reading List	Lakoff G & Núñez R E (2000) Where Mathematics comes from New York: Basic Books							
raditional fielding List	Martin, J. et. al. (1994). Mathematics for teacher training in Ghang. Tutor notes. Accra: Unimax							
	Publishers.							
	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Students activities. Accra:							
	Unimax Publishers.							
CPD Needs	How to design and/or use some innovative materials and ideas for teaching selected							
	concepts (e.g. developing and using ten frames)							

•	Instructional strategies needed to consciously engage student teachers to participate effectively and to be ready to share their past experiences without fear of ridicule;
•	How to use tape measure to develop number relationships;

Year of B.Ed. 2	Semeste	er 1	Place o	f lesson in	semester	1234567891	.0 11 12		
Title of Lesson	Shane sr	ace and Me	asurement	2					
	Lesson Duration 3 Hours								
Lesson description Previous student teacher knowledge, prior learning	This lesson focuses on developing knowledge and conceptual understanding shape, space and measurementas treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of shape, space and measurement. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include measurement of lengths using arbitrary units (or referents) and standard measurements. Most essentially, they will explore instructional strategies that incorporate principles underlying equity and inclusivity. Student-teachers have been introduced to the nature and structure of curriculum, counting and number relationships, place values as well as addition.								
(assumed)					<u>()</u>				
Possible barriers to learning in the lesson	 Prima learn happ educ Prima midd chara teach Curre gradd teach The s disab Prima diffei inclu Prima lCT ir Prima teach supp 	ary school to ing environ y learning e ational need ary school to le childhood acteristics (i hing and lea ently, those e through JH hing all subjo school syste bilities and o ary school rentiated in sion of all ch ary school to teaching a ary school to teaching a ary school to teaching a ary school to teaching a	eachers have ment; but the environment ds (SEN) to le eachers are d; however, .e. cognitive rning. teaching pri dS and gain le ects and abil m lacks mec other SEN. teachers struction an eachers are nd learning. teachers are so motivated , an essentia	e knowledge hey are less of s for middle earn success aware of the they are less , physical, er mary school preadth of kr ities of uppe hanisms to in are less k d assessmer familiar with familiar with d to conduc al skill to ensit	of the need to apable in crea childhood chili fully. characteristic familiar with notional, psych are trained to nowledge with er primary dentify and sup chowledgeable ht; consequent h ICT, but they h how to cond t classroom in ure the full pan	ting accessible, secure ting accessible, safe dren including those s of children within the implications of t hosocial) of middle of teach all classes fro out the necessary d pport pupils with lea e and competent tly, they are less ab y are less confident duct classroom inquing to improve rticipation of all pup	e and happy , secure and e with special the stage of the childhood to m early epth for arning in applying le to promote in integrating tiry; however, teaching and ils.		
Lesson Delivery – chosen	Face-	Practical	Work-	Seminars	Independent	t e-learning	Practicum		
to support students in achieving the outcomes	face		Based Leaning			opportunities			
Lesson Delivery – main	Face-to-f	ace: oppor	tunity for ar	n extended a	nd coherent li	ne of argument. It in	ncludes		
mode of delivery chosen to support student teachers in achieving the learning outcomes.	discussion, brainstorming, question and answer, etc. This can be tutor and / or student teacher led. It should not usually be the main mode. Practical Activity: enabling experimentation and the analysis and discussion of issues, documents and materials, as well as physical activities. Independent study: to enable students to engage with relevant and appropriate materials to promote individual and collaborative enquiry, more in-depth analysis and development. This can be part of any of the above modes E-learning opportunities – involving the use of interactive packages and virtual learning environments. This can be part of any of the above modes of delivery. It is unlikely to be a								
	delivery r	mode in its o	own right.						

•	Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description	The purpose of the lesson is to; explore assessment strategies that incorporate principles underlying equity, differentiation and inclusivity when designing teacher-made assessment tools to ensure effective learning of mathematics in the early grade.						
•	Learning Outcome for the lesson, picked and developed from the course specification	Learning Outcomes	Learning Indicators	Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be				
•	Learning indicators for each learning outcome	Demonstrate knowledge and understanding about how young children develop and learn concepts based on subtraction in early grade (professional values, knowledge & practice) (NTS, 2b) Demonstrate competencies in devising and using differentiated instructional strategies, with a focus on a thematic approach and which promotes play- based learning to cater for the needs of all children in the early years` classroom, including those with	 Select and use developmentally appropriate models and strategies for teaching subtraction that emphasize the physical, cognitive, emotional and social development of the child. Use learner-centred learning strategies that make connections between theories of learning mathematics in upper primary and how to apply them in practical teaching. To match middle childhood learners' level of thinking. 	 addressed or developed? Respect and diversity: designing lesson for diverse learners with different learning styles Social and communication skills: consciously develop presentation skills during classroom instructions to support student teachers to develop mathematical language Respect and diversity: designing lesson for diverse learners with different learning styles 				
		SEN (NTS 3f, pg. 14) Demonstrate the core and transferrable skills like problem solving and creativity and taking advantage of the affordances of ICT integrating it into teaching and learning (NTS	 Outline and analyse strategies young children use in developing subtraction concepts such as the expanded notation algorithm, the standard subtraction algorithm, etc., Use knowledge gained from earning theories in mathematics to design appropriate problem-solving tasks. Recognise and use developmentally appropriate and positive behaviour management skills 	 Personal development: Through presentation and developing of arguments Problem solving, critical and creative thinking: through objective analysis of facts and concept that will lead to creative thinking and assessment strategies appropriate for upper primary Problem solving, critical and creative thinking: through objective analysis of problems (tasks) that will lead to creative thinking and assessment strategies appropriate for upper primarylearners 				

Topic Title	Sub-topic(s)	Stage/ Time	e/ Teaching and learning to activities to achieve learning outcomes depending on delivery mode selected. Teacher-lead collaborative groupwork or independent.		
			Teacher Activity	Student Activity	
Shape, space and Measurement	Measure lengths using arbitrary units (or referents) and standard measurements	3 Hours	Lead student teachers in a review of their previous knowledge of 2-D shapes and 3-D objects for traces of misconceptions Distribute models of everyday objects including designs in fabrics, tiles, as well as generalized geometric shapes for them to explore 2-D shapes and their characteristics Engage student teachers in an interactive activity to draw shapes and use their skills and experiences to construct solids from paper or cards Engage student teachers to look at packets and boxes to explore how they have been constructed and what their nets are, and to make 3-D geometrical models by linking faces or edges Task student teachers to d raw 2-D shapes in different orientations on grids and to think of the relationship of solids to their nets; <i>(PD Themes 1 & 3)</i> Assign student teachers to use designs from fabrics and pictures of houses and other structures from the environment to create albums in groups to be included in their portfolios	Participate in the review by asking questions and commenting on relevant issues including the correction of their misconceptions about given concepts to ensure effective participation and learning by all. Sort a collection of 2-D shapes by one or two features or attributes and to explore the sorting rule used. This should be repeated for 3-D shapes Use assorted models and other outdoor materials to explore 2- D shapes and their characteristics and to describe the common features or attributes of a collection of 2-D and 3-D shapes Draw shapes and use their skills and experiences to construct solids from paper or cards. This and other activities are done with a focus on the standards-based curriculum. Student teachers should therefore examine the official KG-P3 curriculum (NACCA), analyse critically how concepts based on shape and space has been structured and are designed to be taught; Look at packets and boxes to explore how they have been constructed and what their nets are and to make 3-D geometrical models by linking faces or edges	
			Introduce student teachers to the	present their work in class	

	concepts and principles of measurement as found in the upper primary official mathematics curriculum to be submitted for peer review	Engage in a nature walk to the market and other places to take pictures of houses, designs in fabrics, and other relevant materials to create albums for practical instructional activities and to be included in their portfolios
	Engage student teachers in an interactive activity to develop further the concept of length using geodot paper. Introduce the concept of perimeter as an application of measurement of length Lead student teachers in the closure of the lesson	Discuss the attribute of length, in small groups, and write on how to plan and teach this attribute with emphasis on (i) comparingand ordering objects according to the attribute (ii) outlining how to measure using non- standard and standard units (iii) selecting an appropriate unit and tool for the attribute of length The write-up should include application of appropriate techniques, tools, and means of determining the measurement of the attribute. For example, the report should include how to (i) measure with multiple copies of units of the same size (ii) use repetition of a single unit to measure anything larger than the unit (iii) use appropriate tools to measure (iv) develop common referents for measures to make estimates and comparisons
		Participate in the activity to explore the concept of length using geodot paper. Explore further the concept of

	perimeter using practical
	activity
	Participate in the closure of the lesson by pointing out the core points in the lesson as well as asking questions for clarification of concepts not well captured
Lesson assessments –	Component 1: Formative assessment
evaluation of learning: of,	Summary Assessment Method: Group assignment
for and as learning within	Student teachers are assigned to use designs from fabrics and pictures of houses
the lesson	and other structures from the environment to create albums in groups to be
	submitted for grading.(Assessment for learning)
	Weighting: 20%
	Related CLUS: 1, 2, 3
	NIS: 2 h) Has comprehensive knowledge of the official school surriculum including
	2 b) has completensive knowledge of the official school curriculum, including
	2h) Has comprehensive knowledge of the official school curriculum, including
	learning outcomes
	3m) Identifies and remediates learners' difficulties or misconceptions, referring
	learners whose needs lie outside the competency of the teacher.
	Component 2: Formative assessment
	Summary of assessment Method:(group presentation)
	 Assign student teachers to explore the concept of length using geodot paper and
	discuss the concept of perimeter using practical activity. (Assessment as learning)
	Weighing: 20%
	Related CLOs: 1, 2, 3
	NIS: 2f) Demonstrate value as well as respect for equity and inclusion in the
	mathematics classroom (knowledge)
	3i) Produces and uses a variety of teaching and learning resources including
	ICT, to enhance learning
	Component 3: Formative assessment
	Summary of assessment Method: (teacher made test)
	student teachers to discuss the measurement of length comparingand ordering of
	objects using non-standard and standard units. (Assessment of learning)
	Weighting: 20%
	Related CLOs: 2, 3,
	NIS: 2h) Has comprehensive knowledge of the official school curriculum including learning
	2f) Demonstrate value, as well as, respect for equity and inclusion in the mathematics
	classroom (knowledge)
	3k) Integrates a variety of assessment modes into teaching to support learning.
	Note: The assessment procedures should make room for differentiation - gender,
	equity, SEN, and inclusivity.
Instructional Resources	Posters, number charts; ten frames, video clips downloaded from the internet; tape
	measure; ten-structured materials; beads; hundreds frame, place value chart
Required Text (core)	Artnur, J., Grainger, I. & Wray, D. (2006). Learning to Teach in the Primary School. Canada:
	rayion & Francis e-Library. <u>https://www.pdfdrive.com/learning-to-teach-in-the-primary-</u>
	Confer C (2005) Teaching Number Sense Sausalito: Math Solutions Publications
	https://www.pdfdrive.com/teaching-number-sense-grade-1-d184198309 html
	Manitoba Education, Citizenship and Youth (2006). Rethinking classroom assessment with
	purpose in mind: assessment for learning, assessment as learning, assessment of learning.
	https://www.pdfdrive.com/assessment-for-learning-assessment-as-learning-assessment-of-
	learning-d6259529.html

Additional Reading List	 Lakoff, G. &Núñez, R. E. (2000). Where Mathematics comes from. New York: Basic Books. Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Tutor notes. Accra: Unimax Publishers. Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Students activities.Accra: Unimax Publishers.
CPD Needs	 How to design and/or use some innovative materials and ideas for teaching selected concepts Instructional strategies needed to consciously engage student teachers to participate effectively and to be ready to share their past experiences without fear of ridicule; How to use tape measure to develop number relationships;

Year of B.Ed. 2	Semeste	r 1	123456789	10 11 12						
Title of Lesson	Problems s	olving and lo	gical reasor	ning						
	Lesson Duration 3 Hours									
Lesson description	This lesson focuses on developing knowledge and conceptual understanding problems solving and logical reasoningas treated in the current Upper Primary mathematics curriculum. Basically, the lesson seeks to equip student teachers with the knowledge, skills and strategies for promoting understanding of problems solving and logical reasoning. Student teachers will devise possible strategies to model how to pose questions that encourage thinking about numbers and create classroom environment that nurtures number sense. Specific areas to be covered include Solve problems, and engage in logical reasoning. Most essentially, they will explore instructional strategies that incorporate principles underlying equity and inclusivity.									
Previous student teacher	Student-tea	achers have l	been introd	uced to the	nature and s	tructure of curricu	ulum, counting			
knowledge, prior	and numbe	er relationshij	ps, place va	lues as well	as addition					
Possible barriers to learning in the lesson	 Primary school teachers have knowledge of the need to create safe, secure and happy learning environment; but they are less capable in creating accessible, safe, secure and happy learning environments for middle childhood children including those with special educational needs (SEN) to learn successfully. Primary school teachers are aware of the characteristics of children within the stage of middle childhood; however, they are less familiar with the implications of the characteristics (i.e. cognitive, physical, emotional, psychosocial) of middle childhood to teaching and learning. Currently, those teaching primary school are trained to teach all classes from early grade through JHS and gain breadth of knowledge without the necessary depth for teaching all subjects and abilities of upper primary The school system lacks mechanisms to identify and support pupils with learning disabilities and other SEN. Primary school teachers are less knowledgeable and competent in applying differentiated instruction and assessment; consequently, they are less able to promote inclusion of all children. Primary school teachers are familiar with ICT, but they are less confident in integrating ICT in teaching and learning. 									
Lesson Delivery – chosen	Face-to-	Practical	Work-	Seminars	Independ	e-learning	Practicum			
achieving the outcomes			Leaning							
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	 Face-to-face: opportunity for an extended and coherent line of argument. It includes discussion, brainstorming, question and answer, etc. This can be tutor and / or student teacher led. It should not usually be the main mode. Practical Activity: enabling experimentation and the analysis and discussion of issues, documents and materials, as well as physical activities. Independent study: to enable students to engage with relevant and appropriate materials to promote individual and collaborative enquiry, more in-depth analysis and development. This can be part of any of the above modes E-learning opportunities – involving the use of interactive packages and virtual learning environments. This can be part of any of the above modes of delivery. It is unlikely to be a delivery mode in its own right 									
• Purpose for the lesson, what you want the students to achieve, serves as basis for the learning	The purpos explored differed effectiv educedousline	e of the lesso e assessme ntiation and ve learning o p the requi	on is to help nt strateg inclusivity v f mathemat red expert	o student tea ies that i when design tics in the ea ise to asse	ichers ncorporate ing teacher-n rly grade. ss early grad	principles unde nade assessment t de learners base	rlying equity, cools to ensure d on what is			

	outcomes. An expanded version of the description.	 happening in the classroom use observations and samples of children's work 							
•	Learning Outcome for the lesson, picked and developed from the course specification Learning indicators	Learning Outcomes	Le	earning Indicators	Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?				
for each learning outcome		Demonstrate the core and transferrable skills like problem solving and creativity and taking advantage of the affordances of ICT integrating it into teaching and learning (NTS	•	Outline and analyse strategies young children use in developing subtraction concepts such as the expanded notation algorithm, the standard subtraction algorithm, etc.,	 Problem solving, critical and creative thinking: through objective analysis of facts and concept that will lead to creative thinking and assessment strategies appropriate for upper primary 				
		Demonstrate knowledge of age appropriate instructional strategies for teaching shape and space and how to recognise and support children's progress against appropriate developmental milestones and the expectations of the Early	•	Select and use developmentally appropriate models and strategies for teaching subtraction that emphasize the physical, cognitive, emotional and social development of the child.	 Ethics and values of teaching: through supporting student teachers to understand and demonstrate the ethics of the profession bearing in mind the unique characteristics of the early adolescent learner 				
		Grade mathematics Curriculum (NTS 3k,pg. 14)	•	Use learner-centred learning strategies that make connections between theories of learning mathematics in upper primary and how to apply them in practical teaching. To match middle childhood learners' level of thinking.	 Respect and diversity: designing lesson for diverse learners with different learning styles 				
	Demonstrate the core and transferrable skills like problem solving and creativity and taking advantage of the		•	Outline and analyse strategies young children use in developing subtraction concepts such as the expanded notation algorithm, the standard subtraction algorithm, etc., Use knowledge gained	 Problem solving, critical and creative thinking: through objective analysis of facts and concept that will lead to creative thinking and assessment strategies appropriate for upper primary 				
		affordances of ICT integrating it into teaching and learning (NTS	•	trom learning theories in mathematics to design appropriate problem- solving tasks. Recognise and use developmentally appropriate and positive behaviour management skills	Background of student teachers:by making conscious efforts to include them in the teaching and learning situation, as well as, engage them in reflective thinking about how mathematics was taught in their basic and high school days				

				•	Respect and diversity: designing lesson for diverse learners with different learning styles
Topic Title	Sub-topic(s)	Stage Time	e/	Teaching and learnin learning outcomes de selected. Teacher-lead independent.	g to activities to achieve epending on delivery mode collaborative groupwork or
				Teacher Activity	Student Activity
	Solve problems, and engage in logical reasoning			Engage student teachers in a review of previous lessons based on addition, subtraction, and shapes, space, and measurement by asking different groups to focus on selected aspects	Participate in the review of previous lessons based on addition, subtraction, and shapes, space, and measurement by asking different groups to focus on selected aspects
				Have the various groups present what they have outlined for their peers to provide feedback;	Participate in the group presentation and to provide feedback to ensure participation by all
Problems solving and logical reasoning		31	Hours	Comment on individual and group participation and to link the activity to the need for problem solving in the teaching and learning of mathematics at all level, and most especially, at the upper primary level	Pay attention to feedback and give comments or ask questions for further clarification
				Give a verbal exposition and interspersed with questioning and discussion (supported with video clips)on how children solve problems in mathematics	Pay attention to the verbal exposition and discussions (supported with video clips)on how children solve problems
				Lead a discussion on what problem solving in mathematics means, first by eliciting the views of student teachers and then providing information about models of problem solving suggested by experts such as Polya Engage student	Participate in the discussion on what problem solving in mathematics means, first by eliciting the views of student teachers and then providing information about models of problem solving suggested by experts such as Polya

			teachers in practical activities to act out or role play children's problem solving activities on the topics in Units 2-6.	Participate in practical activities to act out or role play children's problem solving activities on the topics in Units 2-6.			
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	 Component 1: For Summary Assessment Student teachers to a Component 2: For Summary of assess Student teachers di 	mative as: nt Method review the mative as: ment Met scuss and	sessment I: Review of the year 2 ser semester one course with sessment hod:(whole class activity) submit their learning journ	nester 2 lessons n tutor. nals for considerations			
	 Component 3: Summative assessment Summary of assessment Method: (whole class activity) Student teachers to discuss end of semester examination issues with tutor, submit projects Note: The assessment procedures should make room for differentiation - gender, and industry 						
Instructional Resources	Posters, number charts measure; ten-structure	; ten fram d materia	es, video clips downloade ls; beads; hundreds frame	d from the internet; tape , place value chart			
Required Text (core)	Arthur, J., Grainger, T. & W. Taylor & Francis e-Libra school-d20209294.html Confer, C. (2005). Teach https://www.pdfdrive.com Manitoba Education, Citize purpose in mind: assessme https://www.pdfdrive.com learning-d6259529.html	/ray, D. (2 ry. <u>https:</u> ning Num <u>/teaching-</u> nship and nt for lear /assessme	006). Learning to Teach ir //www.pdfdrive.com/lear ber Sense. Sausalito: M number-sense-grade-1-d1 Youth (2006). Rethinking ning, assessment as learni nt-for-learning-assessmer	the Primary School. Canada: ning-to-teach-in-the-primary- Math Solutions Publications. <u>184198309.html</u> . classroom assessment with ng, assessment of learning. <u>nt-as-learning-assessment-of-</u>			
Additional Reading List	Lakoff, G. &Núñez, R. E. (20 Martin, J. et. al. (1994). <i>Ma</i> Unimax Publishers Martin, J. et. al. (1994). <i>Ma</i> Unimax Publishers.	00). Wher thematics 5. thematics	e Mathematics comes from for teacher training in Gh for teacher training in Gh	m. New York: Basic Books. ana: Tutor notes. Accra: ana: Students activities.Accra:			
CPD Needs	 How to design and selected concepts Instructional strate participate effective of ridicule; 	l/or use so (e.g. deve egies need vely and to	me innovative materials a loping and using ten frame ed to consciously engage b be ready to share their p	and ideas for teaching es) student teachers to ast experiences without fear			
www.t-tel.org