

# Four-Year B.Ed. Course Manual

# **Theories in the Learning of 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	English Language	Elizabeth Lani Ashong	Education and
Dr. Sarah Emma Eshun		Michael Tsorgali	Training
Vivian Acquaye 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	bory Dr M. Q. Adjahoe	
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 .....

### **Mathematics Course Manual**

A. Course Information

# Title Page The vision for the New Four-Year B.Ed. Curriculum

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

Course Dataile								
Course Details			h					
Course name         Theories in Learningupper primary mathematics           Pre-requisite         Senior High School Mathematics, Psychological basis of learning								
Pre-requisite		I	ological basis of learnin					
Course Level	200	Course Code		Credit Value	3 Hours			
Table of content	S							
Goal for the Sub								
		t teachers to be competen						
		commitment to equity an		ork, in order to maintai	in acceptable values			
		kills for application in real l	life.					
Course Descripti								
		urse in the upper primary s						
student teachers	should know	about how people think	about mathematics a	nd how children's und	derstanding of how			
mathematics dev	elops. It will p	rovide an overview of phi	losophies of mathemat	tics and how to teach	mathematics in the			
upper primary. It	seeks to prepa	are student teachers to exp	olore the underlying co	nception about mather	matics in the official			
		current views that suppo						
assessment pract	ices. It also cov	ers discussion of theoretica	al perspectives of how o	hildren learn mathema	tics and factors that			
influence learning								
		utors to design strategies f						
	dent teachers	' learning needs, percept	tions and misconcepti	ons in the Theories	in the Learning of			
Mathematics.								
		ill develop awareness of e						
		opmental milestone of chile	_	ney interact with pupils	s during small group			
		aching in schools (NTECF, p	-					
		ort student teachers learn			-			
		ities by reflecting and mak	-					
		e will prepare student tead		growing understanding	g of the requirement			
		nal practice, knowledge, va						
		be assessed through a c			sessments including			
		up assignments/, presentat	tions and mathematics I	nistories.				
Key contextual f								
		e knowledge of the need to						
	-	accessible, safe, secure and			lhood children			
-		educational needs (SEN) to						
		aware of the characteristic						
		plications of the characteri	stics (i.e. cognitive, phy	sical, emotional, psycho	osocial) of middle			
	-	earning mathematics.		1 1 1 1 1 1 1				
		imary school are trained to			-			
		ecessary depth for teaching						
		chanisms to identify and su						
		less knowledgeable and c			n and assessment in			
		, they are less able to prom						
		e familiar with ICT, but the	y are less confident in	integrating ICT in teach	hing and learning of			
mathematics		<b>6</b>						
,		e familiar with how to con		· ·				
		to improve teaching and s	upport learning mathe	matics, an essential ski	III to ensure the full			
participation		1 11 1 1 1 1						
		rk with parents and other s						
exhibit less p	ositive attitude	e and supportive professio	nal relationship with ch	hildren, GES officials, m	entors, parents and			

#### other stakeholders.

Core and transferable skills and cross cutting issues, including equity and inclusion

- Core and transferable skills include: critical thinking, problem solving, social skills, creative thinking and communication skills, use of ICT.
- Cross cutting issues include: assessment literacy and assessing students' progress and professional values and attitudes, reflection and classroom enquiry

**Background of student teachers:** An effort was made in year one to transition student teachers from diverse backgrounds to teacher education programme. They have also been introduced to psychological basis of learning as a course in pedagogy. Student teachers are aware of their own learning styles, interest and individual characteristics as means of learning. However, these experiences were not specifically related to teaching and learning of mathematics, especially how children develop and learn mathematics. Tutors need to engage student teachers to how mathematics should be taught to children in the upper primary. Another major challenge is the lack of qualified upper primary teachers, leading to rote-based learning in Ghanaian basic school settings. *(CLO 4)*.

**Needs of the student teachers:** Student teachers may have different needs (such as hunger, stress, sickness, financial, etc.) that are likely to affect their participation and learning in the mathematics classroom. Conscious efforts should be made to develop skills and competencies to identify and address the various needs of children as they observe, interact and teach small groups of children during (STS).

**Inclusivity**: Student teachers can identify their own beliefs/bias about diversity, inclusion and equity, classroom instructional and assessment practices should consciously be designed to cater for learner diversity to promote learning opportunity for all. This will position them to begin to reflect on how to provide support for all learners in the mathematics classroom, irrespective of their challenges. Also, it will help them to understand that learners learn in different ways and that this can be used to support their own learning and that of their peers. *(CLO 3)*.

**Problem solving**, **critical and creative thinking**: Mathematical critical thinking is based on objective analysis of facts which will lead creative thinking and problem-solving. Problem-solving is the central focus of mathematics instructions as well as an integral component of assessment.

Problem-solving techniques should therefore be consciously employed in the teaching and learning of theories in learning of mathematics. *(CLO 1, 2)* 

**Social and communication skills**: Communication is an important skill in the teaching and learning of mathematics. Presentation of classroom instructions should support student teachers to develop mathematical language, including symbols and vocabulary. There is the need to promote interactive pedagogy in the mathematics classroom to enhance critical thinking and interpersonal relationship among student teachers for extended learning outcome. **(CLO 1)** 

**Use of ICT**: The influence of IT in this 21<sup>st</sup> century cannot be overemphasized. Introduction of technology tools in the teaching and learning of mathematics influence what and how mathematics is to be taught. There is a low competency level of early childhood teachers in integrating ICT into their teaching and learning process. Therefore, student teachers should be supported to learn to integrate ICT in the grade mathematics teaching and learning processes (**NTS, 3**)

**Cultural issues:** The multicultural nature of the Ghanaian child calls for classroom instructional and assessment practices (including examples) shouldaddress socio-cultural issues emerging from the teaching and learning of mathematics (*CLO 4*).

**Gender issues in Mathematics:** Upper primary education is perceived by society as less demanding field and also not regarded as important as JHS and SHS, Discuss to demystify the notion–(*CLO 3*)

Course Learning Outcomes	Learning Indicators
<ul> <li>On successful completion of the course, student-teachers will be able to:</li> <li>1. Demonstrate knowledge and understanding about the characteristics ofmiddle childhood: growth, development and learning mathematics in upper primary(professional values, knowledge &amp; practice) (NTS, 2b)</li> </ul>	<ul> <li>Select and use developmentally appropriate strategies for teaching that emphasize the physical, cognitive, emotional and social development of the child.</li> <li>Use play-based learning strategies that match upper primary children's level of thinking.</li> <li>Make connections between theories of learning mathematics in upper primary and how to apply them in practical teaching.</li> </ul>
Demonstrate knowledge and skills in developing a professional portfolio with evidence from observations (NTS, 1a, e, & f)	Use appropriate ICT tools (audio, braille, embossers) to compile artefacts and reports from observations and other achievements as contents in a professional portfolio and also showing creativity in design

<ol> <li>Demonstrate knowledge of early years pedagogical knowledge and pedagogical content knowledge to deliver the upper primary curriculum (NTS 2c, pg. 13, 3e &amp; 3g, pg. 14) [NTECF P1 (3), pg. 20]</li> <li>Demonstrate competencies in 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 middle childhood classroom, including those with SEN (NTS 3f, pg. 14)</li> </ol>	<ul> <li>Use appropriate pedagogical content knowledge to deliver the upper primary curriculum</li> <li>Reflect on and record their experiences in their professional portfolios during their STS school visits.</li> <li>Write a reflective learning journal that shows progress of student teachers' observation on how children learn mathematics.</li> <li>Plan a lesson using play-based learning strategies that match upper primary children's level of thinking.</li> <li>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 upper primary mathematics. (equity and inclusion)</li> <li>Outline strategies that cater for the needs of all children</li> </ul>
<ol> <li>Demonstrate knowledge of age appropriate assessment strategies and recognise and support children's progress against appropriate developmental milestones and the expectations of the Upper primary mathematics Curriculum (NTS 3k,pg. 14)</li> </ol>	0 11 1 0
Demonstrate skills in identifying traits of professionalismin school (NTS, 1d, 1f, 1g, & 2a)	<ul> <li>Provide SR J recordings of demonstrated professional values and attitudes during engagements with people including pupils, mentors, tutors, and peers</li> </ul>
<ol> <li>Demonstrate the core and transferrable skills such as problem solving and creativity and taking advantage of the affordances of ICT integrating it into teaching and learning of mathematics(NTS 3j)</li> </ol>	<ul> <li>Use knowledge gained from learning theories in mathematics to design appropriate problem-solving tasks.</li> <li>Recognise and use developmentally appropriate and positive behaviour management skills</li> </ul>
<ol> <li>Demonstrate competencies in carrying out classroom inquiry and action research and reflect on their teaching practices for continuous professional development (NTS 1a, 1b,1c 3b, NTECF: crosscutting issues; Core skills, Professional values and attitudes)</li> </ol>	Carry out action research and classroom enquiry to improve practice in the upper primary classroom
Suggested Teaching and Learning Strategies	
<ul> <li>Observation techniques,</li> <li>Designing of reflective journals and portfolios,</li> <li>discussions of concepts and misconceptions,</li> <li>investigations to arrive at generalizations,</li> <li>problem-solving strategies,</li> <li>collaborative activities (think-pair-share),</li> <li>multiple representations (Principle of multiple emble establishing connections between and theory and processes and theory and processes and theory and processes and the strategies and the strategies.</li> </ul>	
<ul> <li>nponent 1: Subject Portfolio Assessment (30% overall)</li> <li>Selected items of students work(2 of them 10% eac</li> <li>Midterm assessment -20%</li> <li>Reflective journal 40%</li> <li>Organization of the subject portfolio-10% (how it is</li> </ul>	
Student teachers to submit the following by the end of the s Group presentation, individual assignment, worksheet exerc project or presentation, etc., for example	semester; cises, reflective papers for peer review, Course work,(collaborative

- a final portfolio in mathematics, with emphasis on Upper primary Curriculum and relative to theories of learning,(Course work)
- journal entries based on their experiences in how children learn mathematics in upper primary. (Assignment)
- report of STS observation and small group teaching in upper primary mathematics classroom. (collaborative project or presentation)

• class/home assignment, class exercise, assessing reflective journals, teacher made short test, etc., for example (NTS 2e)Understands how children develop and learn in diverse contexts and applies this in his or her teaching.

#### Component 2: Subject Project Assessment (30% overall score)

- Introduction; a clear statement of aim and purpose of the project-10%
- Methodology; what the student teacher has done and how achieve the purpose of the project-20%
- Substantive or main section-40%
- Conclusion 30%

**ter/TLM**: student teacher to design and produce developmentally and age-appropriate TLMs from locally available materials for peer teaching upper primary mathematics. This suggests that student teachers are expected to Produce and use a variety of teaching and learning resources including ICT, to enhance learning(NTS 3j): Produces and uses a variety of teaching and learning resources including ICT, to enhance learning

#### Component 3: End of Semester Examination- (40% overall)

#### **Required Reading and Reference List**

Garegae, K. G. (2001). Teachers' beliefs about mathematics, its teaching and learning and the communication of these beliefs to students: A case study in Botswana.Unpublished Doctoral dissertation. University of Manitoba, Canada

Sriraman, B., & English, L. (2005). Theories of mathematics education: A global survey of theoretical frameworks/trends in mathematics education research. ZentralblattfürDidaktik der Mathematik (International Reviews on Mathematical Education), 37(6), 450–456.

Martin, J. et. al. (1993). *Mathematics for teacher training in Ghana: Tutor notes,* Accra: Unimax Publishers.

Martin, J. et. al. (1993). Mathematics for teacher training in Ghana: Students activities. Accra: Unimax Publishers.

Ministry of Education. (2019). *Mathematics curriculum for primary schools (basic 1 - 3)*. Accra: Ministry of Education. Kashefi, H. (2017). Teaching and learning theories applied in Mathematics classroom among Primary school teachers DOI:

10.1109/WEEF.2017.8467070

Sriraman, B., & English, L. (2005). Theories of mathematics education: A global survey of theoretical frameworks/trends in mathematics education research. ZentralblattfürDidaktik der Mathematik (International Reviews on Mathematical Education), 37(6), 450–456.

Anghileri, J. (2006). Scaffolding practices that enhance mathematics learning. Journal of Mathematics Teacher Education, 9,33–52. doi:10.1007/s10857-006-9005-9

https://www.pdfdrive.com/multiple-intelligences-mi-the-theory-its-implications-d4106293.html

https://www.pdfdrive.com/intelligence-reframed-multiple-intelligences-for-the-21st-century-d158133116.html

#### **Teaching and Learning resources**

Maths posters

Manipulatives and visual aids

Computers and other technological tools

Set of Mathematical instruments

Course related professional development for tutors/ lecturers

Ye	ar of B.Ed. 2	Semeste	er 1	Place o	f lesson in	semeste	er 🤶	<b>1</b> 2345678	9 10 11 12
Titl	e of Lesson	Why do	we teach m	athematics	in school?		Lessor	n Duration	3 Hours
Les	son description	This lesson focuses on developing an understanding of what we know about how people think about mathematics and how an understanding of mathematics develops. It provides an overview of philosophies of mathematics and mathematics education and explores student teachers' beliefs about mathematics and philosophies of mathematics implicit in the official mathematics curriculum and current classroom practice(NTECF, p. 21. This course is designed to prepare student teachers to begin thinking about the unique characteristics of learners in our basic schools within the age and grade bracket they will teach. The areas to be covered include children's developmental stages, how children learn mathematics and associated theories, and other psychological factors influencing learning. Another area that is considered is developing awareness of equity and diversity issues. (NTECF, p.45). This first lesson introduces student teachers to the course learning outcomes in the three assessment components of the course.							
kno (ass	vious student teacher wledge, prior learning sumed)	familiar	with concep	ts based or	n child growt	h, develop	ment, a	eaching and lea and maturation;	
	sible barriers to learning					sues, aitter	rent lea	arning needs, m	isconceptions
	he lesson		umber and n			Indonon	40	e leerning	Practicum
	son Delivery – chosen to port students in	Face- to-	Practical Activity	Work- Based	Seminars	Indepen nt Stud		e-learning opportunities	
-	ieving the outcomes	face		Leaning			y .		
mo sup ach	son Delivery – main de of delivery chosen to port student teachers in ieving the learning comes. Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	<ul> <li>discussion, brainstorming, question and answer, etc. This can be tutor and / or state teacher led. It should not usually be the main mode.</li> <li>Work based learning: to allow students to undertake observation, enquiry and/or on development work (mostly TVET)</li> <li>Seminars: to generate group and individual creativity, discussion and reflection: and / or tutor led</li> <li>Independent study: to enable students to engage with relevant and appropriate materials to promote individual and collaborative enquiry, more in-depth analyst development. This can be part of any of the above modes</li> <li>E-learning opportunities – involving the use of interactive packages and virtual le environments. This can be part of any of the above modes of delivery. It is unliked delivery mode in its own right.</li> <li>The purpose of the lesson is to;</li> <li>Introduce student teachers to the upper primary specialism course manual them develop awareness of what they are expected of in this lesson.</li> <li>develop student teachers' understanding of the nature and important teachers' understanding of</li></ul>					or student nd/or hands- ion: student riate alysis and hal learning nlikely to be a ual to enable aportance of arners.		
•	Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome	Demons knowled of obser reportin teaching	trate lge and skills vation and g on class and wider ctivities <b>(in</b>	Inclus • Pi pi sci	Learning Indicators  Inclusion and Equity  Produce well- prepared induction schedule and procedures		Identify       Which       cross-cutting         issues- core and transferable skills,       inclusivity, equity and addressing         diversity.       How will these be         addressed or developed?         Inclusion and Equity         •       Human development         (childhood) and         developmental milestones         •       Transition from 1-class model         to subject-teacher;		

	School) (NTS 3k,pg. 14) (College & School induction by tutors, school heads, lead mentors and mentors) Demonstrate knowledge andunderstanding of the key features of the basic school curriculum (BSC); ar specifically focusing on core subjects and their associated expected learning outcomes (NTS, 2a). Demonstrate skills in preparing and writing a persor teaching philosophy stateme (NTS, 1f)	<ul> <li>Managing transi</li> <li>Show records specific observed from wider scl environment a induction</li> <li>Report on smat group discussi with mentors</li> </ul>	ctivities and	ement/organisation from K-3 tic approaches to being by a class-teacher to subject d subject specialist teaching
Торіс		tage/ Teac ime lear sele	rning outcomes d ected. Teacher-lea	ng to activities to achieve lepending on delivery mode ad collaborative group work
			ndependent. Icher Activity	Student Activity
		teac Cou disc com inclu asse proo Cou	roduces student chers to the urse Manual and cuss the various nponents uding essment cedures <b>(See</b> urse Assessment nponents <b>)</b> ,	Participate in the discussion of various components of the course manual, take opportunity to ask questions about the Course Manual including assessment procedures. Outline their expectations and views about the mathematics course.

WEEK 1	Definition and	20 mins	Introduce the	Listen attentively to the tutor
Why do we teach	importance of		lesson by giving a	or lecturer's verbal exposition
mathematics in school?	Mathematics to		historical account	and ask questions for
	the Upper		of how	clarification or provide
	primary teacher		mathematics was	comment(s) to ensure
			used by various	participation and
			generations and	understanding;
			how it has been	_
			used to solve	Engage in a think-pair-share
			problems in	session to outline the
			different parts of	importance of Mathematics to
			the world,	people in various trades and
			generations after	professions in our Ghanaian
			generations;	cultural settings;
			(PD Themes 1 &3)	
		20 min -	Engage student	Search the definition(s) and
		20 mins	teachers in a	meaning of Mathematics on
			discussion based on how	the internet and to discuss their
				findings to their findings in
			mathematics is used currently and	groups of five or six.
			its future prospects	
			(PD Themes 1& 3)	
		20 mins	Assign student	Alert peers of distortions of
			teachers to explore	facts and principles as they
			the meaning and	present their findings;
			definition(s) of Mathematics	Liss appropriate ICT tools to
			through internet	Use appropriate ICT tools to record teacher-pupils'
	How does		search and to	classroom interactions and
	Mathematics	20 mins	discuss their	wider school activities in their
	relate to	20 111113	findings;	SRJs
	society?		(PD Themes 3 & 4)	
			Monitor student	Engage in a group discussion to
			teachers as they	explore the application of
		40 mins	search the internet	Mathematics in the Ghanaian
			for definitions of	society.
			Mathematics and	
	What does it		to refine any	
	mean to learn		potential	This discussion should also
	and teach		distortions or	consider how our cultural
	Mathematics?		misconceptions in	practices and artefacts can be
			their narrations;	used in teaching of school
			(PD Theme 1	mathematics in the Upper
			Poses the question	primary;
		20 mins	"How does	
			Mathematics	
			relate to society?"	Pay attention to and also
			(PD Theme 2)	participate in the discussion of
				their own perception of how
			Use Power point	Mathematical concepts are
			presentation	learned
			interspersed with	
			questioning to	Use appropriate ICT tools to
			discuss opposing	record teacher-pupils'
			views of how	classroom interactions and

	young children wider school activities in SR Js
	learn or develop
	certain
	Mathematical
	concepts; Read further about what it
	(PD Themes 1 & 3) means to reflect on the
	historical development of the
	Assign student numeration system and the
	teachers to write a contributions of different
	reflective paper on civilizations and cultures have
	"What does it made until the emergence of
	mean to learn and the Hindu-Arabic base ten
	teach system
	Mathematics?, as a
	consolidation
	exercise to be
	presented in the
	next lesson.
	(PD Theme 1)
Lesson assessments –	• Student teachers to discuss and begin building their professional teaching portfolios (PTP)
evaluation of learning: of,	to be presented at end of the 10 <sup>th</sup> week of the semester.
for and as learning within	• Student teachers are assigned to write a short reflective paper, maximum one page, on
the lesson	the influence of a teacher's values, importance and philosophy of mathematics on how
	children learn mathematics (Assessment as learning) NTS 1a- Critically and collectively
	reflects to improve teaching and learning. This will be included in the professional
	teaching portfolios (PTP)
	NTS 3j - Produces and uses a variety of teaching and learning resources including ICT, to
	enhance learning.NTS 3h - Sets meaningful tasks that encourages learner collaboration
	and leads to purposeful learningStudent teachers are assigned, in small groups, to do a
	brief internet search on the following: (to be presented for peer review)
Instructional Resources	Posters; video clips; downloads; models, etc.
Required Text (core)	Sriraman, B., & English, L. (2005). Theories of mathematics education: A global survey of
	theoretical frameworks/trends in mathematics education research. ZentralblattfürDidaktik
	der Mathematik (International Reviews on Mathematical Education), 37(6), 450–456.
Additional Reading List	Lakoff, G. &Núñez, R. E. (2000). Where Mathematics comes from. New York: Basic Books.
0.11	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 based on theories of learning in upper primary mathematics.
	<ul> <li>How to manage transition of home to school.</li> </ul>
	• Understand the various characteristics and uniqueness of upper primary learners.
	How to design tasks for assessment procedures for assessment of, as and for
	learning.
	Instructional strategies needed to consciously engage student teachers on how to
	design and produce portfolios, journals and STS reports.

Year of B.Ed.	2	Semester	1	Place of lesson in semester	1 <b>2</b> 3 4 5 6 7 8 9 10	11 12
Title of Lesson       Teacher beliefs about mathematics and their relation to       Lesson Duration       3 Hours						

Lesson description         This lesson focuses on developing an understanding of what we know about how people think about mathematics and how an understanding of mathematics develops. It provides an overview of philosophies of mathematics develops. It provides an overview of philosophies of mathematics develops. It provides an overview of philosophies of mathematics develops. It provides an overview of philosophies of mathematics develops. It provides an overview of philosophies of mathematics develops. It provides an overview of philosophies of mathematics development. It is used in the teacher's beliefs about mathematics and associated theories, and other psychological factors influencing learning. Student teachers whowed ge, prior learning the teacher's have been introduced to the nature and importance of mathematics (assumed)           Previous         student teachers have been introduced to the nature and importance of mathematics (assumed)           Possible barries to about number and numeration system.         Eason Delivery − is care of particical about number and numeration system.           Lesson Delivery − chosen to support student teachers in delivery, the elarning the elarning the learning outcomes.         Face-to- Practical Vork-Based Learning the main mode.           Lesson Delivery − is the learning outcomes.         Face-to- Practical Vork-Based Seminars Indepen elearning outcomes (most) YTET)           Lesson delivery − is the learning optical to usually be the main mode.         Student teachers in ondes.           Uservison elearning outcomes.         Work based learning: to allow students to undertake observation, enquiry and/or hands-on development. This can be part of any of the above modes of delivery. It is unlikely to be a delivery mode in it	Title of Lesson	Teacher beliefs about mathematics and their relation to Lesson Duration 3 Hours							
<ul> <li>about mathematics and how an understanding of mathematics develops. It provides an overview of philosophies of mathematics and aphilosophies of mathematics in exclusion and explores trained teachers' beliefs about mathematics and aphilosophies of mathematics in the official mathematics duration and explores trained teachers' beliefs about mathematics and aphilosophies of mathematics in the other psychological factors influencing learning. Student teachers will be led to share their viewsof equity and diversity issues in the teachers have been taught psychological basis of teaching and learning and are familiar teacher knowledge.</li> <li>Previous student teachers have been taught psychological basis of teaching and learning and are familiar teachers knowledge.</li> <li>Student-teachers have been introduced to the nature and importance of mathematics (assumed)</li> <li>Possible barriers to learning in the lesson</li> <li>Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.</li> <li>Lesson Delivery – main 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.</li> <li>Vork based earning: to allow students to undertake observation, enquiry and/or hands-on development. This can be part of any of the above modes of delivery. It is unlikely to be a delivery mode in its own right.</li> <li>Purpose for the lesson, what you want the 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 of delivery. It is unlikely to be a delivery mode in its own right.</li> <li>Purpose for the lesson, sito:</li> <li>Learning Outcomes the students to engage with relevant and appropriate materials to promote indivi</li></ul>	Lesson description	teaching	e fecure er	developing on	understand	ing of who	t wa kaow about k		onlo think
overview of philosophies of mathematics and mathematics education and explores trainee teachers' beliefs about mathematics and philosophies of mathematics implicit the official mathematics curriculum and current classroom practice. It also covers children's developmental levels, how children learn mathematics and associated theories, and other psychological factors influencing learning. Student teachers will be led to share their viewsof equity and diversity issues in the teaching of mathematics.         Previous       student-teachers have been taught psychological basis of teaching and learning and are familiar teacher knowledge, prior learning in the lesson       Student teachers have been introduced to the nature and importance of mathematics (assumed)         Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.       Independent teachers is acce-to-face: opportunity for an extended and coherent line of argument. It includes (accussion, brainstorming, question and answer, etc. This can be tutor and / or student teachers is acht should not usually be the main mode.         student teachers in achteving outcomes.       Gace-to-face: opportunity for an extended and coherent line of argument. It includes (accussion, brainstorming, question and answer, etc. This can be tutor and / or student teachers is achteving the tearning outcomes.         victomes.       Work based learning: to allow students to undertake observation, enquiry and/or hands-on development study: to enable students to enage 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 of delivery. It is unlikely to be a delive	Lesson description					-			
teachers' beliefs about mathematics and philosophies of mathematics implicit the official mathematics curriculum and current classroom practice. It also covers children's developmental levels, how children learn mathematics and associated theories, and other psychological factors influencing learning. Student teachers will be led to share their viewsof equity and diversity issues in the teachers have been taught psychological basis of teaching and learning and are familiar with concepts based on child growth, development, and maturation;         Previous       student-teachers have been taught psychological basis of teaching and learning and are familiar with concepts based on child growth, development, and maturation;       Student teachers have been introduced to the nature and importance of mathematics         Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.       Practicum         Lesson Delivery – main mode       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 teachers in achieving the learning to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)         Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor learning outcomes.       Purpose for the lesson, sto;         esson, what you want the students to undertake observation, enquiry and development. This can be part of any of the above modes of delivery in development. This can be part of any of the above modes of delivery in the students to achibe exeresed or development.									
mathematics curriculum and current classroom practice. It also covers children's developmental levels, how children learn mathematics and associated theories, and other psychological factors influencing learning. Student teachers will be led to share their viewsof equity and diversity issues in the teaching of mathematics.         Previous       student       Student teachers have been taught psychological basis of teaching and learning and are familiar with concepts based on child growth, development, and maturation;         Student teachers have been introduced to the nature and importance of mathematics (assumed)       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.         Lesson Delivery - chosen to support       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 learling development work (mostly TVET)         Lesson Delivery - main chieving the learning to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)       Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led 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         • Purpose for the lesson, what you want the student studer: to generate group and individual creativity, discussion and reflection: student teaching on uncreacy, precisions and bey modes       • evelopment. This can be part of any of the above modes of delivery. It is unlikely to be a delivery mode in its									
Ievels, how children learn mathematics and associated theories, and other psychological factors influencing learning. Student teachers will be led to share their viewsof equity and diversity issues in the teaching of mathematics.         Previous       student         Student teachers have been taught psychological basis of teaching and learning and are familiar teacher knowledge.       Student teachers have been taught psychological basis of teaching and learning and are familiar teachers how been introduced to the nature and importance of mathematics (assumed)         Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.         Lesson Delivery - main fue 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 in achieving the learning outcomes.       Practicum development work (mostly TVET)         Seminars: to generate group and individual creativity, discussion and reflection: student and / or rutor led       Independent study: to enable students to undertake observation, enquiry and/or hands-on development work (mostly TVET)         Seminars: to generate group and individual creativity, discussion and reflection: student and / or rutor led       Independent study: to enable students to enage 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 delivery. It is unlikely to be a delivery mode in its own right.         •       Purpose for the lesson is t									
Influencing learning. Student teachers will be led to share their viewsof equity and diversity issues in the teaching of mathematics.         Previous       student         teacher       knowledge, issues in the teaching of mathematics.         Student teachers have been taught psychological basis of teaching and learning and are familiar with concepts based on child growth, development, and maturation;         Prossible barriers to learning       Student teachers have been introduced to the nature and importance of mathematics         Possible barriers to chosen to support students in achieving the outcomes       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.         Lesson Delivery - main mode of delivery discussion, brainstorming, question and answer, etc. This can be tutor and / or student teacher led. It should not usually be the main mode.       Face-to-face: opportunity for an extended and coherent line of argument. It includes development to usually be the main mode.         student teachers in achieving the learning outcomes.       Work based learning: question and answer, etc. This can be tutor and / or student teacher led. It should not usually be the main mode.         student teachers in achieving the learning outcomes.       Work based learning: to allow students to undertake observation, enquiry and/or hands-on development study: to analytic of the above modes.         subtime teachers in a strong opportunities – involving the use of interactive packages and virtual learning environments. This can be part of any of the above modes of delivery. It sunlikely to be a delivery mode in its won right									•
Issues in the teaching of mathematics.         Previous       student         Student-teachers have been taught psychological basis of teaching and learning and are familiar teacher knowledge, prior learning.       Student teachers have been introduced to the nature and importance of mathematics (assumed)         Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.       Indepen e-learning needs, misconceptions about number and numeration system.         Lesson Delivery - main face tractical work. Based face is used in teachers in achieving the earning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)       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 teachers in achieving the learning to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)         Seminars: to generate group and individual creativity, discussion and reflection: student and / or rutor led in dependent study: to enable students to enage 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 and teaching on numeracy in Upper primary         • addit contex knowledge and experiences of student teachers' beliefs about mathematics can influence their teaching         • Purpose for the lesson, pricked and deverige draw gr		levels, how	v children le	arn mathemati	cs and assoc	iated theo	ries, and other psyc	cholog	ical factors
Previous       student       Student-teachers have been taught psychological basis of teaching and learning and are familiar with concepts based on child growth, development, and maturation;         Possible barriers to learning in the lesson       Student teachers have been introduced to the nature and importance of mathematics         Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.         Lesson Delivery – main chosen to support students in achieving the 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.         Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)       Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led 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 outcomes. An expanded version of the description. <ul> <li>audit content knowledge and experiences of student teachers to establish and address their learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary</li> <ul> <li>develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching</li> <li>develop student teachers' awareness of howteachers' be</li></ul></ul>		influencing	g learning. S	Student teache	rs will be le	d to share	e their viewsof equ	iity an	d diversity
teacher       knowledge, prior       with concepts based on child growth, development, and maturation;         fassumed)       Student teachers have been introduced to the nature and importance of mathematics         Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.         Lesson Delivery - main students in achieving the 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.         Very based learning: to allow students to undertake observation, enquiry and/or hands-on achieving the learning outcomes.       Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led 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 student students student students a chieving the students to achieve, serves as basis for the lesson, what you want the students to achieve, serves as basis for the lesson, what you want the students to achieve, serves as basis for the lesson, what you want the students       Learning Outcomes       Learning Indicators       Identify Which cross-cutting issues- core and transferable skills, inclusivity, quity and addressing diversity. How will these be addressed or developed from the course specification         • Learning Outcome for the lesson, picked and understanding of		issues in th	he teaching	of mathematics					
prior       learning (assumed)       Student teachers have been introduced to the nature and importance of mathematics         Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.       Independention       e-learning opportunities         Lesson Delivery – students in achieving the outcomes       Face-to- face       Practical Activity       Work-Based       Seminars       Indepen e-learning opportunities       e-learning opportunities         Lesson Delivery – main mode of delivery chosen to support       Face-to-face: opportunity for an extended and coherent line of argument. It includes       Practicum opportunities         student teachers in achieving the learning outcomes.       Face-to-face: opportunity for an extended and coherent line of argument. It includes         Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)       Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led         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 outcomes. An expanded version of the description.       • audit content knowledge and experiences of student teachers to establish and address their learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary • audit content knowledg	Previous student	Student-te	eachers have	e been taught p	sychological	basis of te	aching and learning	g and a	are familiar
[assumed]       Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.         Lesson Delivery – chosen to support students in achieving the outcomes       Face-to- face       Practical Activity       Work-Based Leaning       Seminars Indepen dent Study       Indepen dent Study       e-learning opportunities       Practicum opportunities         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.         Work based learning; to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)       Work based learning; to allow 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         • 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; • audit content knowledge and experiences of student teachers' beliefs about mathematics can influence their teaching         • Learning Outcome for the lesson, picked and developed from the course specification       Learning Outcomes knowledge and understanding of ifferent perspectives       Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and address	teacher knowledge,	with conce	epts based o	n child growth,	developmen	it, and mat	uration;		
(assumed)       Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.         Lesson Delivery – chosen to support students in achieving the 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.       Practicum       Practicum         Use transmission of delivery – main mode       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.       Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)         Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led       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         • Purpose for the lesson, what you want the students to content. Show 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 learning outcomes as basis for the escription.       Learning Outcomes (addition primary)       • develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching         • develop student teachers' awareness of howteachers' beliefs	prior learning							matics	
Possible barriers to learning in the lesson       Different entry behaviours, Socio-cultural issues, different learning needs, misconceptions about number and numeration system.       Independent dent       e-learning opportunities       Practicul about number and numeration system.         Lesson Delivery – chosen to support       Face-to- face       Practicul Activity       Work-Based Leaning       Seminars       Independent dent       e-learning opportunities       Practicum opportunities         Lesson Delivery – main mode of delivery chosen to support       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.       Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)         Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led       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 a basis for the learning outcomes. An expanded version of the description.       The purpose of the lesson is to; • audit content knowledge and experiences of student teachers' beliefs about mathematics can influence their teaching         • Learning Outcome for the lesson, picked and developed from the course specification       Learning Outcomes knowledge and understanding of       Inclusion and Equity • Outline a							•		
Iearning in the lesson       about number and numeration system.         Lesson Delivery – chosen to support students in achieving the outcomes       Face-to-face       Practical work-Based Leaning       Seminars       Indepen dent       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.       Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)         Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led       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       elevelop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching         • Purpose for the leason, picked and developed from the course as basis 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, equity and addressing diversity. How will these be addressed or developped		Differ	ent entry b	haviours. Socio	p-cultural iss	ues, differ	ent learning needs	. misc	onceptions
Lesson Delivery – chosen to support students in achieving the outcomes       Face-to- face activity       Practical Activity       Work-Based Leaning       Seminars below       Indepen det toudy       e-learning opportunities       Practicum         Lesson Delivery – main mode of delivery       Face-to-face: support       opportunity for an extended and coherent line of argument. It includes         Lesson Delivery – main mode of delivery       Face-to-face: support       opportunity for an extended and coherent line of argument. It includes         student tacchers in achieving the learning outcomes.       Face-to-face: support       opportunity for an extended and answer, etc. This can be tutor and / or student teacher led. It should not usually be the main mode.         Work based learning: to generate group and individual creativity, discussion and reflection: student and / or tutor led       Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led         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 learning outcomes. An expanded version of the description.       Learning Outcomes       Learning Indicators       Independents tudy: learning indicators       Indentify Which cross-cutting issues- core and t						,		,	
chosen to support students in achieving the outcomes       face achieving because       Activity achieving because       Leaning because       dent study because       opportunities because         Lesson Delivery – main mode of delivery chosen to support       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.         Sudent teachers sudent teachers       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.         Work based learning:       to generate group and individual creativity, discussion and reflection: student and / or tutor led         Seminars:       to generate group and individual creativity, discussion and reflection: student and / or tutor led         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 learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary outcomes. An expanded version of the description.       Learning Outcomes       Learning Indicators <th></th> <th></th> <th></th> <th>,</th> <th></th> <th>Indepen</th> <th>e-learning</th> <th>Pract</th> <th>ticum</th>				,		Indepen	e-learning	Pract	ticum
students in achieving the outcomes       Image: Content of the learning outcomes.       Study       Image: Content of the learning outcomes.         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.         Work based learning: outcomes.       Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)         Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led       Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led         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 learning outcomes. An expanded version of the description.       • audit content knowledge and experiences of student teachers' beliefs about mathematics can influence their teaching         • Learning Outcome for the lesson, pricked and developed from the course specification • Learning indicators       Learning Indicators       Identify Which cross-cutting issues- core and transfer					Jenninary	-	-	Trace	licam
the outcomes       Image		lace							
Lesson Delivery – main mode of delivery, chosen to support student teachers in achieving the learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)         student teachers in achieving the learning outcomes.       Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)         Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led       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         Purpose for the lesson, what you want the students to student teachers' as basis for the learning outcomes. An expanded version of the description.       The purpose of the lesson is to;       The purpose of the lesson, picked and develops the reachers' awareness of howteachers' beliefs about mathematics can influence their teaching         • Learning Outcomer for the lesson, picked and developed from the course specification       Learning Indicators       Learning Indicators       Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or development (childhood) and development (childhood)						Study			
Lesson Delivery – main mode of delivery         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.           Sudent teachers in achieving the learning outcomes.         Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)           Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led         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 opportunites – 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.         Learning Outcomes for the lesson, picked and developed from the course specification         Learning Outcomes (Nowledge and understanding of Nowledge and understanding of         Learning Indicators         Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or development (childhood) and developmental milestones	the outcomes								
mode of delivery chosen to supportdiscussion, brainstorming, question and answer, etc. This can be tutor and / or student teacher led. It should not usually be the main mode.work based learning: outcomes.Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led Independent study: to rutor led or tutor led Independent study: to rutor led or tutor led or tutor led 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 E-learning opportunities – involving the use of interactive packages and virtual learning environments. This can be part of any of the above modes to achieve, serves as basis for the learning outcomes. An expanded version of the description.•Purpose for the learning Outcomes for the lesson, picked and developed from the course specification •Learning Outcomes to achieve, serves as basis for the learning outcomes for the lesson, picked and developed from the course specificationLearning Outcomes to achieve, serves as basis of the learning outcomesLearning Indicators•Learning indicatorsInclusion and Equity and addressing diversity. How will these be addressed or developed?•Learning indicatorsInclusion and Equity and addressing diversity. How will t	Lessen Dell'serve statis	<b>5</b>							
chosentosupportstudentteachersinachieving the learningdevelopment work (mostly TVET)outcomes.Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor ledIndependent 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 modesE-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 learning outcomes. An expanded version of the description.•Learning Outcomes for the lesson, picked and developed from the course specification•Learning Outcomes for the lesson, picked and developed from the course specification•Demonstrate knowledge and understanding of•Demonstrate knowledge and 	-			•			-		
studentteachersin achieving the learning outcomes.Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET) Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led 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; • <th></th> <th></th> <th></th> <th></th> <th></th> <th>tc. This car</th> <th>h be tutor and / or s</th> <th>tuden</th> <th>t teacher</th>						tc. This car	h be tutor and / or s	tuden	t teacher
achieving the learning outcomes.development work (mostly TVET)Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led Independent study: to enable students to engage with relevant and appropriate materials to 									
outcomes.Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led 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• 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; • audit content knowledge and experiences of student teachers to establish and address their learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary • develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicatorsLearning IndicatorsIdentify Which cross-cutting issues- core and addressing diversity. How will these be addressed or developed?• Demonstrate knowledge and understanding ofInclusion and Equity • Outline and analyse different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones			-		ts to underta	ake observ	ation, enquiry and/	or han	ds-on
<ul> <li>or tutor led 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</li> <li>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.</li> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Demonstrate knowledge and understanding of</li> <li>Learning indicators</li> <li>Demonstrate knowledge and understanding of</li> <li>Courting indicators</li> </ul>	<b>U U</b>			, ,					
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 modesIndependent 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 modesIndependent 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 modesIndependent study:to enable students to any of the above modesIndependent study:The purpose of the lesson is to;Independent study:The purpose of the lesson is to;Independent study:audit content knowledge and experiences of student teachers to establish and address their learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primaryImage:audit content knowledge and experiences of howteachers' beliefs about mathematics can influence their teachingImage:develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teachingImage:Learning Outcome for the lesson, picked and developed from the course specificationLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?Image:Demonstrate knowledge and understanding ofInclusion and EquityHuman development (childhood) and dev	outcomes.		-	e group and indi	vidual creati	vity, discus	ssion and reflection	: stude	ent and /
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; • audit content knowledge and experiences of student teachers to establish and address their learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary • develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching• Learning Outcome for the lesson, picked and developed from the course specification • Demonstrate knowledge and understanding ofLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Demonstrate knowledge and understanding ofInclusion and Equity • Outline and analyse different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones									
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 perceptions and misconceptions about the learning and teaching of umeracy in Upper primary• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicatorsLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Demonstrate knowledge and understanding ofInclusion and Equity • Outline and analyse different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones		-	-						
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; • audit content knowledge and experiences of student teachers to establish and address their learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary • develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicatorsLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Demonstrate knowledge and understanding ofInclusion and Equity • Outline and analyse different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones					enquiry, moi	re in-depth	analysis and develo	opmer	nt. This can
<ul> <li>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.</li> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Demonstrate knowledge and understanding of</li> <li>Demonstrate knowledge and understanding of</li> <li>Demonstrate knowledge and understanding of</li> </ul>									
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; • audit content knowledge and experiences of student teachers to establish and address their learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary • develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicatorsLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Demonstrate knowledge and understanding ofInclusion and Equity • Outline and analyse different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones		E-learning	opportunit	<b>es</b> – involving tl	ne use of inte	eractive pa	ckages and virtual l	earnin	g
<ul> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary</li> <li>develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators</li> <li>Demonstrate knowledge and understanding of understanding of understanding of influence their teaching</li> </ul>		environme	ents. This ca	n be part of any	of the above	e modes of	delivery. It is unlike	ely to l	be a
<ul> <li>lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators</li> <li>Learning indicators</li> <li>Demonstrate knowledge and experiences of student teachers' beliefs about mathematics can and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?</li> <li>Inclusion and Equity</li> <li>Method and understanding of different perspectives</li> </ul>		delivery m	ode in its ov	vn right.					
want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary • develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching• Learning Outcome for the lesson, picked and developed from the course specificationLearning Outcomes Learning indicatorsLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Demonstrate knowledge and understanding ofInclusion and Equity • Outline and analyse different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones	Purpose for the	The purpo	se of the les	son is to;					
want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.learning needs, perceptions and misconceptions about the learning and teaching of numeracy in Upper primary • develop student teachers' awareness of howteachers' beliefs about mathematics can influence their teaching• Learning Outcome for the lesson, picked and developed from the course specificationLearning Outcomes Learning indicatorsLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Demonstrate knowledge and understanding ofInclusion and Equity • Outline and analyse different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones	lesson, what you	audit	content kno	wledge and exp	eriences of s	student tea	achers to establish a	and ad	ldress their
to achieve, serves as basis for the learning outcomes. An expanded version of the description.numeracy in Upper primary expanded teachers' awareness of howteachers' beliefs about mathematics can influence their teaching• Learning Outcome for the lesson, picked and developed from the course specificationLearning Outcomes Learning outcomesLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Demonstrate knowledge and understanding ofInclusion and Equity • Outline and analyse different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones	_								
<ul> <li>as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators</li> <li>Demonstrate knowledge and understanding of</li> <li>Learning indicators</li> <li>Learning indicators</li> <li>Demonstrate knowledge and understanding of</li> </ul>	to achieve, serves						Ũ		-
learning outcomes. An expanded version of the description.influence their teaching• Learning Outcome for the lesson, picked and developed from the course specificationLearning OutcomesLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Demonstrate knowledge and understanding ofInclusion and Equity • Outline and analyse different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones					reness of h	owteacher	s' beliefs about r	nathe	matics can
outcomes. An expanded version of the description.Learning OutcomesLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Learning indicators• Demonstrate knowledge and understanding ofInclusion and Equity different perspectivesInclusion and Equity • Human development (childhood) and developmental milestones			•						
expanded version of the description.Learning OutcomesLearning IndicatorsIdentify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?• Learning indicators• Demonstrate knowledge and understanding ofInclusion and Equity• Outline and analyse different perspectives• Human development (childhood) and developmental milestones	u u								
of the description.         • Learning Outcome for the lesson, picked and developed from the course specification       Learning Outcomes       Learning Indicators       Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?         • Demonstrate specification       • Demonstrate knowledge and understanding of       Inclusion and Equity       • Inclusion and Equity         • Learning indicators       • Outline and analyse different perspectives       • Human development (childhood) and developmental milestones									
Learning Outcome for the lesson, picked and developed from the course specification         Learning Outcomes         Learning Indicators         Identify Which cross-cutting issues- core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?           • Demonstrate specification         • Demonstrate knowledge and understanding of         Inclusion and Equity • Outline and analyse different perspectives         Inclusion and Equity • Human development (childhood) and developmental milestones									
for the lesson,       picked and       and transferable skills, inclusivity, equity         picked and       developed from       and addressing diversity. How will these         the course       • Demonstrate       Inclusion and Equity         specification       knowledge and       • Outline and analyse         understanding of       understanding of       of the perspectives		Learning (	Outcomes	Learning Inc	licators	Ident	ify Which cross-cut	ting i	ssues- core
picked and developed from the course specification       Demonstrate knowledge and understanding of       Inclusion and Equity       Inclusion and Equity         • Learning indicators       • Demonstrate knowledge and understanding of       • Outline and analyse different perspectives       • Human development (childhood) and developmental milestones	-	Learning C	Jaccomes	Leaning Inc	illutor 5				
developed from the course specification         Demonstrate knowledge and understanding of         Inclusion and Equity         Inclusion and Equity           • Learning indicators         understanding of         Outline and analyse different perspectives         • Human development (childhood) and developmental milestones	,								
the course specificationDemonstrate knowledge and understanding ofInclusion and EquityInclusion and Equity• Learning indicators• Demonstrate knowledge and understanding of• Outline and analyse different perspectives• Human development (childhood) and developmental milestones									win these
specificationknowledge and understanding ofOutline and analyse different perspectivesHuman development (childhood) and developmental milestones	-			In clustere :	بالتبيية الم			eu?	
Learning indicators understanding of different perspectives and developmental milestones									(ala:1 alla1)
	-				,				
for each learning different on mathematics and • Transition from 1-class model to	_								
	for each learning							-class	model to
outcome perspectives discuss their subject-teacher;	outcome								
(beliefs and values) differences and • Establishment of personal bias and				) differen	ces and			ersona	I bias and
of mathematics similarities; stigma		of mat	hematics	similarit	ies;	S	tigma		

	<ul> <li>Demonstrate an understanding of relevant professional values and attitudes in teaching Upper primary mathematics</li> </ul>	<ul> <li>Describe conceptions about mathematics implicit in their own beliefs;</li> <li>Develop short personal beliefs about the teaching and learning of mathematics;</li> <li>Reflect critically on their own learning experiences and use the skills gained to plan for continuous personal and professional development</li> <li>Ethics and values of teaching</li> <li>Outline relevant professional Values, as well as, show how respect for equity and inclusivity can promote effective learning in the Upper primary mathematics classroom</li> </ul>		<ul> <li>Opportunities to explore diversity within the class/subject and potential barriers to inclusion (including personal bias, stereotypes and institutional discrimination)</li> <li>Identify/screen students, within a class, who might need: group, targeted, of intensive interventions and plan accordingly (identify support HR)</li> <li>Work with families and external professionals to ensure barriers to leaning are identified, addressed and overcome</li> <li>Ethics and values of teaching:         <ul> <li>know, understand and demonstrate the ethics of the profession bearing in mind the unique characteristics of early adolescent child</li> <li>know Teachers' Standards, child's rights, laws protecting children</li> <li>Communication</li> <li>Use English as the medium of instruction</li> <li>Support learners to make the transition from L1 as a medium of instruction at lower primary to L2 as medium of instruction from upper primary</li> </ul> </li> </ul>		
Торіс	Sub-topic(s)	Stage/ Time	learning o	utcomes dep eacher-lead	to activities to achieve bending on delivery mode collaborative groupwork or	
			Teacher Act		Student Activity	
	Definitions and interpretations of the concepts: beliefs attitudes and values	10 mins	Review the lesson by as student tea present the paper on th importance mathematic (PD Theme	king chers to ir reflective e of sto society;	Participate in the discussion to review the previous lesson;	
Teacher beliefs about mathematics and how this influences learning and teaching of mathematics in Upper primary.	Implications of teacher attitude on pupils'	20 mins	Give an exposition based on the concepts, attitudes, beliefs, and values (PD Theme 3) Engage student teachers in a discussion on how teachers' attitudes influence Upper primarylearner's learning of mathematical concepts; (PD Theme 1& 3)		Listen attentively to the tutor or lecturer's verbal exposition on the concepts; attitudes, beliefs, and values and ask questions for clarification or provide comment(s) to ensure participation and understanding;	
	learning ofmathematics in the Upper primary	60 mins			Engage in a think-pair-share session to outline and discuss the effect of teachers' attitudes on the learning and teaching of mathematicsat the Upper primary;	

	1	1	1	
			Assign student	Create a table that
		40 mins	teachers to use a table	illustrates the similarities
			to illustrate the	and differences among
			differences and	values, attitudes, and
			similarities among the	beliefs and how these
			concepts:values,	impact learning in Upper
			attitudes, and beliefs;	primary;
			(PD Theme 1)	
				Discuss the importance of
			Use Power point	Mathematics to people in
			presentation,	various trades and
		30 mins	interspersed with	professions in our Ghanaian
			questioning, to discuss	cultural settings;
			how learners' attitude	
	Making connections		and beliefs influence	Pay attention to and also
	between teacher		their own learning of	participate in the discussion
	beliefs and practice		Mathematical	of how young children's
	and developing		concepts;	attitude, beliefs, and values
	mathematical task		(PD Themes 1 & 3)	affect their learning of
			And an at the second	Mathematical concepts.
		ac :	Assign student teachers	
		20 mins	to write a reflective	
			paper on "What does it	
			mean to learn and	Deed further shout what the
			teach Mathematics?"as	Read further about what it
			a consolidation exercise	means to Reflect on how
			to be presented in the	learners' attitude and
			next lesson.	beliefs influence their own
			(PD Theme 1)	learning of Mathematical
Lesson assessments –	Church and the set have a set			concepts
evaluation of learning:			ling important ideas and ex periences of mathematics a	
of, for and as learning			atics curriculum (Assessme	
within the lesson				ing. This is to be included in
within the lesson	their professional te			ing. This is to be included in
				esources including ICT, to be
				instructional strategies that
	encourages student			instructional strucegies that
	_		e paper on how respect for	equity and inclusivity can
			participation in the Upper p	
				onal strategies appropriate
	for mixed ability, mu			5 11 1
Instructional Resources				clips downloaded from the
	internet; journal ar	rticles based on	beliefs, attitudes, and v	alues within the context of
	mathematics teaching			
Required Text (core)	Garegae, K. G. (2001). T	eachers' beliefs a	about mathematics, its tead	ching and learning and the
			nts: A case study in Botswa	na.Unpublished Doctoral
	dissertation. University of			
Additional Reading List				their Conceptual Differences
		Mathematics for	teacher training in Ghana:	Tutor notes. Accra: Unimax
	Publishers.			
		Mathematics for	teacher training in Ghana:	Students activities. Accra:
	Unimax Publishers.	. /		
CPD Needs	-		innovative materials and in	-
			sing the "Read my mind" w	ord games to reinforce
	concept develo			
				ent teachers to participate
	-		are their past experiences	
			eristics and uniqueness of u	
	-	-	y grade and preparing for a	dolescence) as suggested by
	various perspec	ctives		

•	How to design tasks for assessment procedure for assessment of, as and for learning to
	satisfy upper primary learning experiences
•	Instructional strategies needed to consciously engage student teachers on how to
	design and produce portfolios, journals and STS reports.

Ye	ar of B.Ed. 2	Semeste	e <b>r</b> 1	Place of	lesson in s	semeste	er 1	2 <b>3</b> 4 5 6 7 8	9 10 11 12
Titl	e of Lesson	Beliefs underlying the current Upper primary official curriculum and inclusive classroomLesson Duration3 Hours						3 Hours	
Les	son description	practiceThis lesson focuses on beliefs underlying the current Upper primary official curriculum and inclusive classroom practice. Areas of concentration include the Nature of Upper primary mathematics curriculum and Implications of this for classroom practice with emphasis on inclusion and equity from a reflective perspective. Student teachers will be required to participate in interactive activities including independent study to develop an understanding of what the curriculum they will use to teach entails. Thus, the lesson provides an overview of philosophies of mathematics and mathematics education and explores the beliefs implicit in the official mathematics curriculum and current classroom practice. The lesson has the tendency to develop student teachers' awareness of equity and diversity issues.							
Pre	vious student teacher								earning and are
kno	owledge, prior learning					-		nd maturation;	0
	sumed)							ortance of math	ematics
Pos	ssible barriers to								, misconceptions
lea	rning in the lesson	abou	ıt curriculum	ı					
	son Delivery – chosen	Face-	Practical	Work-	Seminars	Indepe	ndent	e-learning	Practicum
	support students in	to-face	Activity	BasedLe		Stu		opportunities	
	son Delivery – main	$\square$		aning					
to tea	de of delivery chosen support student there in achieving the rning outcomes. Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	discussion, brainstorming, question and answer, etc. This can be tutor and / or student							
•	Learning Outcome for the lesson, picked and developed from the course specification	Learning	Outcomes	Learning	Indicators	an an	d trans	ferable skills, i	ting issues- core Inclusivity, equity . How will these ed?
•	Learning indicators for each learning outcome	Demonst understar different underlyin current U primary c curriculur inclusive practice	nding of beliefs g the pper official	analy philo in the belief or ot those the c	ne, describe a se different sophies impli eir personal fs that coincio nerwise with e embedded i urrent Upper ary curriculun	nnd <b>Cc</b> cit Su de fro lo n ins	Use Use instru pport le om L <sub>1</sub> a wer pr	cation English as the action earners to male as a medium of	ne medium of the transition of instruction at as medium of

Topic Title	Demonstrate an understanding of relevant professional values and attitudes in teaching Upper primary mathematics			<ul> <li>Inclusion and Equity</li> <li>Human development (childhood) and developmental milestones</li> <li>Transition from 1-class model to subject-teacher;</li> <li>Establishment of personal bias and stigma</li> <li>Opportunities to explore diversity within the class/subject and potential barriers to inclusion (including personal bias, stereotypes and institutional discrimination)</li> <li>Ethics and values of teaching: <ul> <li>know, understand and demonstrate the ethics of the profession bearing in mind the unique characteristics of early adolescent child</li> <li>Teachers' Standards, child's rights, laws protecting children</li> </ul> </li> <li>nd learning to activities to achieve learning depending on delivery mode selected.</li> </ul>		
			Teacher-lea independer Teacher Act	nt.	orative groupwork or Student Activity	
Beliefs underlying the current Upper primary official curriculum and	Nature of Upper primary mathematics curriculum	10 mins 20 mins	Project the learning outcomes and indicators for student teachers to know what is expected of them. Review the previous lesson by asking student teachers to present their reflective papers on the importance of mathematics to society; (PD Theme 1)		Read the learning outcomes and indicators to help monitor what they are going through. Participate in the discussion to review the previous lesson;	
inclusive classroom practice	Implications for classroom practice relating to the concepts of inclusion and equity from a reflective perspective	60 mins 50 mins	Give an exposition based on inclusion and equity (PD Theme 3) Engage student teachers in a discussion on how teachers' knowledge and understanding of		Listen attentively to the tutor or lecturer's verbal exposition on the concepts attitudes, beliefs, and values and ask questions for clarification or provide comment(s) to ensure participation and understanding; Engage in a think-pair-share	

	Making connections between teacher beliefs and practice and developing mathematical task	40 mins	can influence their interpretation of the beliefs underlying Upper primary mathematics curriculum (PD Theme 1& 3) Assign student teachers to write a reflective paper on "What does it mean to learn and teach Mathematics as a consolidation exercise to be presented in the next lesson. (PD Theme 1)	discuss the effect of teachers' attitudes on the learning and teaching of mathematics at the Upper primary; Read further about what it means to reflect on the historical development of the numeration system and the contributions of different civilizations and cultures have made until the emergence of the Hindu-Arabic base ten system		
Lesson assessments – evaluation of learning: of,				use the skills gained to plan and to record this in their SRJ		
for and as learning within		•	5 1a- Critically and collectiv			
the lesson	teaching and			, .		
		0 1 1	, .	h respect to upper primary		
	-		-	r learning) NTS 3a - Plans and		
		d and challengin their teaching	g lessons, showing a clear	grasp of the intended		
Instructional Resources			nematics in the jobs; vide	o clips downloaded from the		
	internet;	, 0	<b>3</b> <i>7</i>			
Required Text (core)				eaching and learning and the		
			,	wana.Unpublished Doctoral		
Additional Reading List	dissertation. University			to their Concentual		
Additional Reading List	Differences		ducation: A Brief Inquiry in			
		). Mathematics f	for teacher training in Ghan	a: Tutor notes. Accra: Unimax		
	Publishers.	-	-			
	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Students activities. Accra:					
CPD Needs	Unimax Publishers.					
Cr D Neeus	<ul> <li>How to design and/or use some innovative materials and ideas for teaching selected concepts based on theories of learning in upper primary mathematics.</li> </ul>					
	<ul> <li>Understand the various characteristics and uniqueness of upper primary learners and</li> </ul>					
	how to use th	how to use this in planning to teach.				
	-	n tasks for asses	sment procedures for asses	ssment of, as and for		
	learning.	tor the runner	of student too show a set	lies journals and CTC rements		
	How to monitor the progress of student teachers' portfolios, journals and STS reports.					

Year of B.Ed. 2	Semester	1 Place of	of lesson ir	semester	12345678	39101112
Title of Lesson	Beliefs underlying official curriculum			ctice Lesson D	Ouration	3 Hours
Lesson description	2 This lesson focuses on developing an understanding of what we know about how people think about mathematics and how an understanding of mathematics develops. It provides an overview of philosophies of mathematics and mathematics education and explores trainee teachers' beliefs about mathematics and philosophies of mathematics implicit the official mathematics curriculum and current classroom practice. It also covers children's developmental levels, how children learn mathematics and associated theories, and other psychological factors influencing learning. The lesson has the tendency to develop student teachers' awareness of equity and diversity issues.					
Previous student teacher knowledge, prior learning (assumed)	Student-teachers familiar with conc Student teachers	epts based on cl	hild growth, o	development, ar	nd maturation;	-
Possible barriers to learning in the lesson	Different entry b about number and			ues, different	learning needs,	misconceptions
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to- facePractic ActivitImage: Construction of the second s	al Work-	Seminars	Independent Study	e-learning opportunities	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	<ul> <li>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.</li> <li>Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)</li> <li>Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led</li> <li>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</li> <li>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</li> </ul>					
<ul> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> </ul>	delivery mode in its own right. The purpose of the lesson is to; develop student teachers' understanding of underlying beliefs, attitudes, and values within the context of teaching and learning mathematics and their implications for classroom practice relative to understanding learning difficulties in mathematics e.g. dyscalculia					
Learning Outcome for the lesson, picked and developed from the	Learning Learning Indicators Identify Which cross-cutting issues- or Outcomes and transferable skills, inclusivity, eq and addressing diversity. How will these addressed or developed?					clusivity, equity
course specification <ul> <li>Learning indicators for each learning outcome</li> </ul>	Demonstrate secure knowledge and understanding of relevant professional values and attitudes	to plan fo	eflect on learning	<ul> <li>ability t</li> <li>subject:</li> <li>Recogn</li> <li>interrel</li> <li>childrer</li> <li>Guide e</li> </ul>	to teach and assist izing and atedness of sub n's learning early adolescent	standing of and ess the range of using the jects to support child to acquire nt learning skills

	Demonstrate an understanding of relevant professional values and attitudes in teaching Upper primary mathematics	perspect the need developi professio values a attitude	eed for alues as mote quity and the <b>lues of</b> g: different tives on d for ing onal nd s	learni critica Inclusion : Huma devel Trans subje Estab stigm Oppo within barrie bias, discri Ethics and know ethics the adole Teachers' protecting	rtunities to explore diversity in the class/subject and potential ers to inclusion (including personal stereotypes and institutional mination) I values of teaching: , understand and demonstrate the s of the profession bearing in mind unique characteristics of early scent child Standards, child's rights, laws g children
Topic Title	Sub-topic(s)			dependin ead col ent.	g to activities to achieve learning g on delivery mode selected. llaborative groupwork or Student Activity
Beliefs underlying the current Upper primary official curriculum and inclusive classroom practice 2	Underlying assumptions of beliefs, attitudes, and values within the context of teaching and learning mathematics Implications for classroom practice relative to understanding learning difficulties in mathematics e.g. dyscalculia	10 mins 20 mins 60 mins	Teacher A Project the outcomes indicators student te know wha expected of Review the previous le asking stu- teachers t their reflee paper on t importance mathemat society; (PD Themo Give an ex based on t concepts, beliefs, an with respect they influe implemen any currice (PD Themo	e learning and for vachers to t is of them. e esson by dent o present ctive the e of ctics to e 1) eposition the attitudes, d values ect to how ence the tation of ulum	Read the learning outcomes and indicators to help monitor what they are going through. Participate in the discussion to review the previous lesson; Pay attention to the verbal exposition on the concepts, attitudes, beliefs, and values and how they influence the implementation of a curriculum Reflect on the implications of the discussions held above on their classroom observation

	1		1	1 1	
	Making connections between teacher beliefs and practice and developing mathematical tasks	40 mins 30 mins	Engage student teachers in a discussion on how teachers' attitudes influence upper primary learner's learning of mathematical concepts; (PD Theme 1& 3) Assign student teachers to use a table to illustrate the differences and similarities among the concepts, values, attitudes, and baliefe:	Engage in a think-pair-share session to outline and discuss the effect of teachers' attitudes on the learning and teaching of mathematics at the Upper primary; Create a table that illustrates the similarities and differences among values, attitudes, and beliefs and how these impact learning in Upper primary; the importance of Mathematics to people in various trades and preferences	
			and beliefs; (PD Theme 1) Use Power point	professions in our Ghanaian cultural settings; Pay attention to and also	
		20 mins	presentation, interspersed with questioning, to discuss how learners' attitude and beliefs	participate in the discussion of how early adolescent learners' attitude, beliefs, and values affect their learning of Mathematical concepts.	
			influence their own learning of Mathematical concepts; (PD Themes 1 & 3)	Read further about what it means to Reflect on the historical development of the numeration system and the contributions of different civilizations and cultures have made until the emergence of the	
				Hindu-Arabic base ten system	
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	commitment, flexit (such as respect, di	oility in ideas, tole versity, equity, tea	rance, respect for evide	ptions of beliefs, attitudes (such as ence, reflection, etc), and values grity) within the context of	
	<ul> <li>Assign student teachers, in their small groups to: <ul> <li>Design and produce developmentally and age-appropriate TLMs from locally available materials that can be used to teach number, shape and patterns in the Upper primary mathematics. (NTS 3j, pg. 14)</li> <li>Write an accompanying guide for each of the TLM explaining how to use them and which aspects of teaching Upper primary mathematics they are designed to address.</li> <li>Identify the learning outcomes that likely to be achieved N/B: consider Upper primary learners' cultural, linguistic, socio-economic and educational backgrounds in designing the TLMs as well as theoretical</li> </ul> </li> </ul>				
	Deadline for submi	ssion: 11 <sup>th</sup> week o	f the semester	rial and they were produced.	
Instructional Resources				video clips downloaded from the	
Required Text (core)	Garegae, K. G. (2001). Teachers' beliefs about mathematics, its teaching and learning and the communication of these beliefs to students: A case study in Botswana.Unpublished Doctoral dissertation. University of Manitoba, Canada				
Additional Reading List	Accra: Mir	nistry of Education 194). <i>Mathematics</i>	, Science and Sports.	thematics (Senior High School). Ghana: Tutor notes. Accra: Unimax	

	Martin, J. et. al. (1994). <i>Mathematics for teacher training in Ghana: Students activities</i> . Accra: Unimax Publishers.				
CPD Needs	<ul> <li>How to design and/or use some innovative materials and ideas for teaching selected concepts (e.g. developing and using the "Read my mind" number and word games to reinforce concept developed)</li> <li>Instructional strategies needed to consciously connect mathematical ideas, as well as, connect mathematics to other curriculum areas and to the world outside</li> </ul>				

Year of B.Ed. 2	Seme	ster 1	Place	e of lesson	in semeste	er 12 3 4 <b>5</b> 6	789101112
Title of Lesson	-		-	pper primary	mathematic	ts in Lesson Duration	3 Hours
Lesson description	childrei mather teachin activity	This lesson focuses on developing an understanding of major theories of how upper primary children develop and learn mathematics. It provides an overview of theories of learning mathematics in upper primary. Emphasises will be placed on major theories of learning and teaching of Upper primary mathematics in inclusive classrooms. Specifically, socio-cultural, activity theory and situated cognition perspectives will be discussed to enable student teachers develop appropriate knowledge and competencies for handling children in upper					
Previous student teacher knowledge, prior learning (assumed) Possible barriers to	familia Studen	r with conce t teachers h	ptsbased ch ave been in	ild growth, d troduced to t	evelopment, he nature an	and maturation; Id importance of n	d learning and are nathematics eds, misconceptions
learning in the lesson		number and			issues, unie		eus, misconceptions
Lesson Delivery – chosen to support students in achieving the outcomes	Face- to- face	Practical Activity	Work- BasedLe aning	Seminars	Independ ent Study	e-learning opportunities	Practicum
<ul> <li>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</li> <li>Purpose for the lesson, what you want the students to achieve, serves as</li> </ul>	<ul> <li>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.</li> <li>Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)</li> <li>Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led</li> <li>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</li> <li>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.</li> <li>The purpose of the lesson is to;</li> <li>develop student teachers' understanding of socio-cultural, activity theory and situated cognition perspectives and their implications for practice</li> </ul>						
<ul> <li>basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked</li> </ul>	Learnir Outcor	-	Learning	ndicators			oss-cutting issues- le skills, inclusivity,
and developed from the course	Cutton	1103			equ wil	uity and address I these be address	ing diversity. How sed or developed?
specification <ul> <li>Learning indicators for each learning outcome</li> </ul>	kno and of t the bas lear mat in u	lerstanding	<ul> <li>Gener childre differe their r</li> </ul>	sion and Equ ate examples en's individua ences based c nembership i is subcultures	s of • al on n •	adolescence) a milestones Transition from subject-teacher; Establishment o stigma Opportunities to within the potential barri	elopment (early nd developmental 1-class model to

	Teaching	stereotypes and institutional
Demonstra knowledge and understan of and appreciation for the contribution made by some theorists whose wo	<ul> <li>Suggest age-appropriate strategies for learning and teaching mathematics to upper primary children</li> <li>Outline similarities and differences among socio- cultural, activity, and situated cognition theories and to indicate their relevance in learning and teaching mathematics in Upper primary classrooms</li> </ul>	<ul> <li>discrimination)</li> <li>Teaching</li> <li>Knowledge and understanding of and ability to teach and assess the range of subjects</li> <li>Recognizing and using the interrelatedness of subjects to support children's learning</li> <li>Guide early adolescent child to acquire life-long and independent learning skills</li> <li>Building foundations for life and later learning in literacy, numeracy and critical thinking and creativity</li> </ul>
are releva	nt Characteristics of early	, , , , , , , , , , , , , , , , , , ,
to Upper	adolescence:	
primary profession	Write short notes	<ul> <li>Characteristics of early adolescence:</li> <li>Possessing the ability to understand and manage the characteristics and behaviour of early adolescent learners and tap into those characteristics to promote learning</li> <li>Assessment for as and of learning:</li> <li>know, understand and guide early adolescent child to engage in self-</li> </ul>
	support the teaching of mathematics in the Upper primary Assessment for, as and of learning: • Reflect critically on	assessment and • use other age-appropriate and learner-friendly assessment formats
	their own learning experiences are influenced by the theorists listed above.	

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		
	<ul> <li>Socio- cultural perspectives</li> <li>Activity theory perspectives</li> <li>A situated cognition perspective</li> </ul>	10 mins	Review the previous lesson through questioning technique and to connect key issues that are emerging to the new lesson (PD Theme 1)	Participate in the discussion to review the previously learned material lesson		
	perspective	20 mins	Project the learning outcomes and indicators for student teachers to know what is expected of them. (PD Theme 1)	Read the learning outcomes and indicators to help monitor what they are going through.		
		50 mins	Give a short exposition based on socio-cultural, activity theory and a situated cognition perspectives (PD Theme 3)	Listen attentively to the tutor or lecturer's verbal exposition on the different theoretical perspectives under review.		
Major theories of learning and teaching of Upper primary mathematics in inclusive classrooms		40 mins	Engage student teachers in a discussion on the similarities and differences of the theoretical perspectives mentioned above. (PD Theme 3)	Engage in a think-pair-share session to outline and hold a discussion on how similar or different the three theoretical perspectives mentioned are;		
	Making connections between the theoretical perspectives and learning of mathematics in upper primary	30 mins	Provide guided practice opportunities for student teachers to search for information about Johann Heinrich Pestalozzi, Friedrich Froebel, Maria Montessori, Jean Piaget, and Jerome Bruner using cooperative learning techniques (each group will search for information about one	Participate in the guided practice session to search for information about Johann Heinrich Pestalozzi, Friedrich Froebel, Maria Montessori, Jean Piaget, and Jerome Bruner using cooperative learning technique and demand corrective feedback.		
		20 mins	of the theorists). (PD Theme 1& 3) Relate the various theories to how they explain the way upper primary children learn mathematics	Take note of the assignment given; Read further about other relevant theoretical perspectives		

	10						
	10 mins	Assign student teachers					
		to read further on the					
		topic treated to					
		prepare for the next					
		lesson					
		(PD Themes 1 & 3)					
Lesson assessments –	1. As a student teacher how	would you use the ideas of any of the following theorists:					
evaluation of learning:of,	Friedrich Froebel, Maria N	Iontessori, Jean Piaget, and Jerome Bruner in teaching a					
for and as learning within	named concept in the Upp	per Primary mathematics classroom?					
the lesson	2. Outline four (4) cultural pr	ractices and artefacts from your locality and explain how					
		sed in the teaching a named concept in the Upper Primary					
		example, using draught board for teaching fractions. NTS					
	-	respects learners' cultural, linguistic, socio-economic and					
	educational backgrounds i						
	-	ate strategies for learning and teaching mathematics to					
		esent. NTS 3g - Employs instructional strategies					
		nultilingual and multi-age classes.					
	To be submitted in the eleventh week						
Instructional Resources		Posters illustrating people using mathematics in the jobs; video clips downloaded from the					
	internet;						
Required Text (core)	Kashefi, H. (2017). Teaching and lea	arning theories applied in Mathematics classroom among					
	Primary school teachers DOI: 10.11	.09/WEEF.2017.8467070					
Additional Reading List	Brunner, J. Jerome Bruner's Theory	of Education: From Early Bruner to Later Bruner.					
	Wilson, S. M., & Peterson, P. L. (200	06). Theories of Learning and Teaching: What Do They					
	Mean for Educators? Washington,	DC 20036-3290					
	Martin, J. et. al. (1994). Mathemati	ics for teacher training in Ghana: Tutor notes. Accra:					
	Unimax Publishers.						
	Martin, J. et. al. (1994). Mathemati	ics for teacher training in Ghana: Students activities. Accra:					
	Unimax Publishers.						
CPD Needs	• How to design and/or use son						
	concepts (e.g. developing and	using the "Read my mind" number and word games to					
	reinforce concept developed)						
	Instructional strategies neede	d to consciously connect mathematical ideas, as well as,					
	-	r curriculum areas and to the world outside					

Year of B.Ed. 2	Semeste	er 1	Place of les	son in sen	nester 1	2 3 4 5 <b>6</b> 7 8	9 10 11 12	
Title of Lesson			ing and teaching n inclusive classro	Lesson Dur	ation	3 Hours		
Lesson description Previous student teacher knowledge,	primary mathematics in inclusive classrooms 2This lesson focuses on developing an understanding of what we know about how people think about mathematics and how an understanding of mathematics develops. It provides an overview of philosophies of mathematics and mathematics education and explores trainee teachers' beliefs about mathematics and philosophies of mathematics implicit the official mathematics curriculum and current classroom practice. It also covers children's developmental levels, how children learn mathematics and associated theories, and other psychological factors influencing learning.Student-teachers have been taught psychological basis of teaching and learning and are familiar with concepts based child growth, development, and maturation;							
prior learning (assumed) Possible barriers to			been introduced haviours, Socio-c					
learning in the lesson			numeration syst		-	Ç -,	•	
Lesson Delivery – chosen to support students in achieving the outcomes	Face-to- face	Practical Activity	Work- BasedLeaning	Seminars	Independ ent Study	e-learning opportunities \	Practicum	
<ul> <li>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</li> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> </ul>	<ul> <li>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.</li> <li>Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)</li> <li>Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led</li> <li>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</li> <li>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.</li> <li>The purpose of the lesson is to;</li> <li>develop student teachers' understanding of theories of learning e.g., cognitive, constructivist and behaviourist perspectives and their implications for practice</li> </ul>							
Learning Outcome for the lesson, picked and developed from the	Learning Ou		Learning Indic		Identify Which cross-cutting issues- con and transferable skills, inclusivity, equi- and addressing diversity. How will the be addressed or developed?			
course specification <ul> <li>Learning indicators for each learning outcome</li> </ul>	<ul> <li>Demons knowled underst: Constru Behavio Cognitiv theoreti perspec learning</li> </ul>	lge and anding of ctivism urism, ism cal tives of	<ul> <li>Teachi</li> <li>Outline th facets of Constructi</li> <li>Behaviour</li> <li>Cognitivistic discuss the on learnin</li> <li>Compare a contrast the</li> </ul>	e different ivism, iism, m and eir views g and	<ul> <li>ability</li> <li>of subj</li> <li>Recogr</li> <li>interre</li> <li>suppor</li> <li>Guide</li> </ul>	to teach and a ects hizing and latedness of t children's lear early adoles e life-long an	ning	

	<ul> <li>Demonstrate knowledge and understanding of the implication of Constructivism Behaviourism and Cognitivism theoretical perspectives of learning Upper primary mathematics</li> </ul>	constructivis Behaviouris Cognitivism learning the Characteristics adolescence: • Reflect critic the implicat the above- mentioned theoretical perspectives learning of mathematic upper prima	m, learning i as critical thin ories of early Characteristics • Possessing and mana behaviour and tap in promote le s on the s at the ary level	learning in literacy, numeracy and critical thinking and creativity Characteristics of early adolescence:		
Topic Title	Sub-topic(s)	Stage/ Time	learning outcomes dep	and learning to activities to achieve outcomes depending on delivery mode Teacher-lead collaborative groupwork or		
			independent.	dent.		
Major theories of learning and teaching of Upper primary mathematics in inclusive classrooms 2	<ul> <li>A cognitive perspective</li> <li>Constructivism</li> <li>Behaviourism</li> <li>Implications for practice</li> </ul>	10 mins	Teacher Activity Review the previous lesson through questioning technique (PD Theme 1)	Participate in the discussion to review the previous lesson;		
		20 mins	Project learning outcomes and indicators on a screen for student teachers to read and be aware of what is ahead.	Read the learning outcomes and indicators to develop awareness of the expectations in the lessons		
		60 mins	Give an exposition based on cognitive, behaviourism constructivism and their implications on the learning of mathematics in upper primary (PD Theme 3)	Pay attention to the verbal exposition on the on cognitive, constructivism and their implications on the learning of mathematics in upper primary;		
		60 mins	Engage student teachers in a discussion cognitivist, constructivist, behaviourism and other theoretical perspectives and how they explain the way upper primary children learn mathematical concepts; (PD Theme 1 & 3)	Engage in a think-pair- share session to outline and discuss the effect of cognitivist, constructivist and other theoretical perspectives on the learning and teaching of mathematics in the Upper primary;		
		30 mins	Assign student teachers to read on the theorists such as Lev Vygotsky,	Search on the internet for information about Lev Vygotsky, Skemp and		

			Skemp etc. and their contributions to the learning of mathematics in the upper primary (PD Theme 1)	other relevant theorists whose works explain how upper primary children develop and learn mathematical concepts Read further about the importance of learning theories in the learning and teaching of mathematics in the upper			
				primary. (to be presented in the next class)			
Lesson assessments – evaluation of learning:of, for and as learning within the lesson	<ul> <li>Student teachers are assigned to present a paper on the similarities and differences among socio-cultural, activity, and situated cognition theories and to indicate their relevance in learning and teaching mathematics in Upper primary classrooms to be submitted the following week for peer review</li> <li>Student teachers tocomplete worksheet based on comparing and contrasting the Constructivism, Behaviourism, and Cognitivism as learning theories in class. (Assessment as Learning) (NTS3g) Employs instructional strategies appropriate for mixed ability, multilingual and multi-age classes.to be discussed in class</li> </ul>						
Instructional Resources	Posters illustrating people using mathematics in the jobs; video clips downloaded from the internet;						
Required Text (core)	Sriraman, B., & English, L. (2005). Theories of mathematics education: A global survey of theoretical frameworks/trends in mathematics education research. ZentralblattfürDidaktik der Mathematik (International Reviews on Mathematical Education), 37(6), 450–456.						
Additional Reading List	<ul> <li>Radford, L. Theories in Mathematics Education: A Brief Inquiry into their Conceptual Differences</li> <li>Martin, J. et. al. (1994). <i>Mathematics for teacher training in Ghana: Tutor notes</i>. Accra: Unimax Publishers.</li> <li>Martin, J. et. al. (1994). <i>Mathematics for teacher training in Ghana: Students activities</i>. Accra: Unimax Publishers.</li> </ul>						
CPD Needs	<ul> <li>How to design worksheets as tools for assessment.</li> <li>How to design and/or use some innovative materials and ideas for teaching selected concepts (e.g. developing and using the "Read my mind" number and word games to reinforce concept developed)</li> <li>Instructional strategies needed to consciously connect mathematical ideas, as well as, connect mathematics to other curriculum areas and to the world outside</li> </ul>						

Year of B.Ed.

Semester

1

2

Place of lesson in semester

123456789101112

Title of Lesson	Childre	en and Math	nematics	Lesson Duration	3 Hours			
Lesson description	This lesson focuses on developing knowledge and understanding of what we know about how children in Upper primary think about mathematics and how their understanding of mathematics develops. It provides an overview of psychological principles that explain what mathematics children are capable of learning and how they think as they go through given activities. It also highlights children's developmental levels, how children learn mathematics and associated theories, and other psychological factors influencing learning. The lesson has the tendency to deepen student teachers' awareness of equity and diversity issues.							
Previous student teacher			have bee	n taught psych	nological basis (	of teaching and l	earning and are	
knowledge, prior learning (assumed)	familia Studer mathe	Student-teachers have been taught psychological basis of teaching and learning and are familiar with concepts based on child growth, development, and maturation; Student teachers have been introduced to some major theories in the learning of mathematics in the upper primary						
Possible barriers to learning					o-cultural issu		earning needs,	
in the lesson					umeration syste			
Lesson Delivery – chosen to support students in achieving the outcomes	Face- to- face	Practical Activity	Work- BasedLo aning	Seminars	Independent Study	e-learning opportunities	Practicum	
<ul> <li>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</li> <li>Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> </ul>	<ul> <li>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.</li> <li>Work based learning: to allow students to undertake observation, enquiry and/or handson development work (mostly TVET)</li> <li>Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led</li> <li>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</li> <li>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.</li> <li>The purpose of the lesson is to;</li> <li>develop student teachers' understanding of how children learn mathematics at the upper primary level</li> </ul>							
<ul> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators for each learning outcome</li> </ul>	Learni	ng Outcome	es Lo	arning Indicat	ors	developed?	nd transferable y, equity and rsity. How will addressed or	
	kno uno difi Up chi ma	monstrate owledge and derstanding ferent ways per primary Idren learn othematical ncepts as	of	gender, equ inclusivity ir mathematic	w respect for ity and the	Transition     model to sul	development and atal milestones from 1-class bject-teacher; nt of personal	

Children and Mathematics	Children's Number readiness experiences	10 mins	Review the previous lesson on major theories of learning mathematics in Upp primary	to review the previously learned material;
		Time	learning outcomes	depending on delivery mode ead collaborative groupwork or Student Activity
Topic Title	Demonstrate knowledge and understanding of th influence of learner characteristics on classroom teaching and learning	he prima rs' stude obse child math and t impli effec instru- math child • Refle own expe as a l analy theo of lea impli	ct critically on their learning riences and use this pasis for risingrelevant ries and principles arning and their cations for teaching er primary rematics	<ul> <li>Teaching</li> <li>Knowledge and understanding of and ability to teach and assess the range of subjects</li> <li>Recognizing and using the interrelatedness of subjects to support children's learning</li> <li>Guide early adolescent child to acquire life-long and independent learning skills</li> <li>Building foundations for life and later learning in literacy, numeracy and critical thinking and creativity</li> </ul>
	<ul> <li>proposed by theorists and the relevance</li> <li>Demonstrate ar understanding of relevant theorie and principles of learning and the implications for teaching Upper primary mathematics</li> </ul>	n <b>Characte</b> of <b>adolesce</b> es Ident of theo eir that learn math Uppe class • Analy Uppe math to ide theo form		<ul> <li>Opportunities to explore diversity within the class/subject and potential barriers to inclusion (including personal bias, stereotypes and institutional discrimination)</li> <li>Characteristics of early adolescence:</li> <li>Possessing the ability to understand and manage the characteristics and behaviour of early adolescent learners and tap into those characteristics to promote learning</li> </ul>

		1	
Concepts for Number Readiness • Understandi ng size, shape and patterns • Ability to count verbally (first forward, then backward) • Recognizing numerals • Identifying	30 mins 60 mins	Engage student teachers to outline theorists whose work are relevant to the development of young children and how they learn mathematics	List from memory theoretical perspectives and principles of learning that are relevant to Upper primary children Listen attentively to the tutor or lecturer's verbal exposition on the concepts attitudes, beliefs, and values and ask questions for clarification or provide comment(s) to ensure participation and understanding; Engage in a think-pair-share session to outline and
more and less of a quantity • Understandi ng one-to- one corresponde nce (for example, matching sets or knowing		how children develop number readiness such Understanding size, shape and patterns; Ability to count verbally; Recognizing numerals; Understanding one- to-one correspondence (PD Theme 3)	discuss on logical and psychological approaches to learning mathematics. Discuss theoretical principles that explain how children learn given mathematics concepts in Upper primary
which group has four and which has five) Logical and psychological approaches to learning mathematics	40 mins	Engage student teachers in a discussion based on logical and psychological approaches to learning mathematics. (PD Theme 1& 3) Assign student teachers to discuss different theoretical principles that explain	Read further about how early children learn mathematics
	40 mins	Upper primary children's learning of mathematics. (PD Theme 1) Analyse portions of the Upper primary official mathematics curriculum to identify which theoretical perspectives form the bases of the curriculum. (PD Theme 1)	

Lesson assessments –	PROJECT 2 (10%)
evaluation of learning: of, for	Analyse portions of the Upper primary official mathematics curriculum to identify which
and as learning within the	theoretical perspectives form the bases of the curriculum. Write a report on how Upper
lesson	primary children (each student teacher will observe a couple of children) learn given
	mathematics concepts and to outline the implications of this for effective classroom
	instruction of mathematics for young children. (Assessment of Learning) (NTS
	30)Demonstrates awareness of national and school learning outcomes of learners')Uses
	objective criterion referencing to assess learners
	To be submitted in the eleventh week
Instructional Resources	Posters illustrating people using mathematics in the jobs; video clips downloaded from the
	internet;
Required Text (core)	Kashefi, H. (2017). Teaching and learning theories applied in Mathematics classroom among
	Primary school teachers DOI: 10.1109/WEEF.2017.8467070
Additional Reading List	Anghileri, J. (2006). Scaffolding practices that enhance mathematics learning. Journal of
	Mathematics Teacher Education, 9,33–52. doi:10.1007/s10857-006-9005-9
	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" number and word games to
	reinforce concept developed)
	<ul> <li>Instructional strategies needed to consciously connect mathematical ideas, as well</li> </ul>
	as, connect mathematics to other curriculum areas and to the world outside

Year of B.Ed.	2 Semester	1 Place of less	on in semest	er 1234567	<b>8</b> 9101112					
Title of Lesson	Characteristics of child	dren's developmental s	tages L	esson Duration	3 Hours					
Lesson description	stages. It provides an on children's develop	This lesson focuses on developing an understanding of characteristics of children's developmental stages. It provides an overview of some theories on how children develop.Emphasis will be placed on children's developmental levels, how children learn mathematics, and other psychological factors influencing learning. The lesson has the tendency to deepen student teachers' awareness of equity and diversity issues.								
Previous studer teacher knowledge prior learnin (assumed) Possible barriers to	, with concepts based of Student teachers have	e been taught psycho child growth, developm e been introduced to th viours, Socio-cultural i	ent, and matur ne nature and in	ation; nportance of mathe	ematics					
learning in the lesso	-			i learning fields, f						
Lesson Delivery – chosen to support students in achieving the outcomes	-to- Activity Ba	/ork- Seminars asedLea ing ]	Independent Study	e-learning opportunities	Practicum					
Lesson Delivery main mode of delivery chosen t support studer teachers in achievin the learnin outcomes.	<ul> <li>f brainstorming, questi</li> <li>not usually be the mathematical to the the the mathematical to the the the the the the the the the the</li></ul>	to allow students to unostly TVET) e group and individual to enable students to end collaborative enquir we modes ties – involving the use on be part of any of the	is can be tutor a ndertake observ creativity, discu ngage with relev , more in-depth of interactive pa above modes o tanding of char	nd / or student tea vation, enquiry and ssion and reflection vant and appropria n analysis and deve ackages and virtual f delivery. It is unlik racteristics of child primary level	Icher led. It should /or hands-on n: student and / or te materials to lopment. This can be learning kely to be a delivery dren's developmental					
<ul> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators for each learning outcome</li> </ul>	Demonstrate     understanding of     characteristics of     children's     developmental     stages		dren's stages and ns for ning and	core and transfera equity and addre will these be addr Characteristics of • Possessing understand characteristics	cross-cutting issues- able skills, inclusivity, assing diversity. How essed or developed? early adolescence: the ability to and manage the s and behaviour of ent learners and tap characteristics to hing					

	language, speech, social, emotional, and cognitive and intellectual development			<ul> <li>Teaching</li> <li>Knowledge and understanding of and ability to teach and assess the range of subjects</li> <li>Recognizing and using the interrelatedness of subjects to support children's learning</li> <li>Guide early adolescent child to acquire life-long and independent learning skills</li> <li>Building foundations for life and later learning in literacy, numeracy and critical thinking and creativity</li> <li>Communication</li> <li>Use English as the medium of instruction</li> <li>Support learners to make the transition from L1 as a medium of instruction from upper primary</li> </ul>		
Topic Title	Sub-topic(s)	Stage/ Time	outcomes dep	earning to ending or	activities to achieve learning delivery mode selected. groupwork or independent.	
			Teacher Activity	,	Student Activity	
	Meaning and types of development e.g. Physical, language and speech, social and emotional, and cognitive development within the context of Upper primary teaching and loarning of	10 mins 50 mins	Review the previous lesson through questioning based on how early children learn mathematics (PD d on Theme 1) Give a verbal exposition on the meaning and types		Participate in the discussion to review the previous lesson; Pay attention to the verbal exposition on theories of learning mathematics in	
Characteristics of children's developmental stages	and learning of numeracy resistics of n's		emphasis on physical, U language and speech, q social and emotional, e and cognitive u		Upper primary and ask questions for clarification to ensure effective understanding; Discuss how	
		120 mins	Assign student to (in small groups) search for inform the internet abo contributions of of the following: • Johann Hei Pestalozzi, • Friedrich F • Maria Mor	to nation on ut the any one inrich roebel,	Engage in a small group session to outline and discuss the contributions offered by given theorists to the learning of mathematics in Upper primary (each group will look for information on one theorist); Present information	

	Jean Piaget, and     obtained briefly in class and     Jerome Bruner's     in to understanding     learning of mathematics     in Upper primary     (PD Theme 3)     obtained briefly in class and     to intensify the search     outside class hours to write     a paper on children's     number readiness
Lesson assessments –	Student teachers to discuss their mathematics related STS reports in class for colleagues to
evaluation of	critique and give feedback for improvement. (Assessment of learning) NTS 3f - Pays attention
learning:of, for and	to all learners, especially girls and students with Special Educational Needs, ensuring their
as learning within	progress.
the lesson	
Instructional	Posters illustrating people using mathematics in the jobs; video clips downloaded from the internet;
Resources	
Required Text (core)	Walshaw, M. (2017). Understanding mathematical development through Vygotsky, Research in
	Mathematics Education, 19:3, 293-309, DOI:10.1080/14794802.2017.1379728
Additional Reading	Martin, J. et. al. (1994). Mathematics for teacher training in Ghana: Tutor notes. Accra: Unimax
List	Publishers.
	Martin, J. et. al. (1994). <i>Mathematics for teacher training in Ghana: Students activities</i> . Accra:
	Unimax Publishers.
CPD Needs	<ul> <li>How to design and/or use some innovative materials and ideas for teaching selected</li> </ul>
	concepts (e.g. developing and using the "Read my mind" number and word games to
	reinforce concept developed)
	<ul> <li>Instructional strategies needed to consciously connect mathematical ideas, as well as,</li> </ul>
	connect mathematics to other curriculum areas and to the world outside

Year of B.Ed. 2	Semester	1 Plac	e of lesso	n in ser	nester	12 3 4 5 6 7	8 <b>9</b> 10 11 12	
Title of Lesson	Multiple intelligence	es			Lesson	Duration	3 Hours	
Lesson description	This lesson focuses on developing an understanding of the foundations of multiple intelligence theory and the influence of this on personal development. The lesson will focus on the foundations of multiple intelligence theory, multiple intelligences theory and implications for teaching numeracy in the Upper primary. It provides an overview of principles of multiple intelligences, description of the dimensions of Howard Gardner's multiple intelligences and how it relates to learning styles							
Previous student teacher knowledge, prior learning (assumed) Possible barriers to	Student-teachers h familiar with concep Student teachers h stages Different entry bel	ave been ta ots-based chi ave been ir	ld growth, d itroduced to	evelopm o the ch	ent, and aracteri	d maturation; stics of children	's developmental	
learning in the lesson	about number and i			155005,	unicient	t learning needs	, misconceptions	
Lesson Delivery – chosen to support students in achieving the outcomes	Face-   Practical     to-   Activity     face       Image: Second	Work- BasedLe aning	Seminar s	Indepe Stu		e-learning opportunities	Practicum	
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	learning needs,	rming, quest ually be the i g: to allow st (mostly TVET ate group an to enable st and collabors f the above r hities – involv can be part co own right. lesson is to; ge and expe perceptions for teaching	ion and ansy main mode. tudents to u d individual tudents to e ative enquir modes ving the use of any of the eriences of and miscon	ver, etc. ndertake creativit ngage wi y, more i of intera above m student ceptions	This can observation y, discuss ith relev n-depth ctive pa nodes of teacher in multi	a be tutor and / o ation, enquiry an ssion and reflection ant and appropri analysis and dev ckages and virtua delivery. It is unl rs to establish a ple intelligences.	r student teacher d/or hands-on on: student and / ate materials to elopment. This al learning ikely to be a nd address their	
outcomes. An expanded version of the description.								
Learning Outcome for the lesson, picked and developed from	Learning Outcomes	Learning In			core a equity will th	and transferable y and addressin nese be addresse	s-cutting issues- skills, inclusivity, g diversity. How d or developed?	
the course specification • Learning indicators for each learning outcome	<ul> <li>Demonstrate understandin g of the meaning and principles of multiple intelligences</li> </ul>	princip intellig Describ of How multip Compa	e and analys les of multig	ole nsions r's ces	• Po ai bi le	nd manage the c ehaviour of e earners and t	lity to understand haracteristics and	

	implications of multip intelligences in classroo practice	own lear and how multiple • Outline h dimension Gardner' of intelliger in teachi children som	ons of Howard and 's multiple rar nces can be used • Re int supper primary • Gu acc lea • Bu lat an	Teaching owledge and understanding of d ability to teach and assess the nge of subjects cognizing and using the errelatedness of subjects to oport children's learning ide early adolescent child to quire life-long and independent irning skills ilding foundations for life and er learning in literacy, numeracy d critical thinking and creativity
Topic Title	Sub-topic(s)	Stage/ Time		to activities to achieve learning delivery mode selected. Teacher-
			lead collaborative group	vork or independent.
			Teacher Activity	Student Activity
	The foundations of multiple intelligence theory	10 mins 50 mins	Review the previously learned material; (PD Theme 1) State the learning outcomes for the lesson (PD Theme 1) Use a short exposition to present a highlight of Gardner's principles of multiple intelligences	Participate in the discussion to review the previous lesson; React to the statement of the learning outcomes through giving comments or questioning. Listen attentively to the tutor or lecturer's verbal exposition on the foundations of multiple intelligences and ask questions for
Multiple intelligences		50 mins	(PD Theme 3) Assign student teachers to do internet search on the theme "foundations of multiple intelligences" and to write short notes for group discussion (PD Theme 1 & 3)	clarification or provide comment(s) to ensure participation and understanding; Search on the theme "foundations of multiple intelligences and prepare short notes and to present the findings in groups
	Multiple intelligences theory and	40 mins	Engages student teachers in a discussion based on multiple intelligences theory and personal development <i>(PD Theme 1)</i>	Participate actively in the discussion of multiple intelligences theory and to identify the need to understand its implications in the Upper primary mathematics classroom
	personal development	30mins	Use Power point presentation, interspersed with questioning, to discuss the implications of the multiple intelligence in the teaching and learning (PD Themes 1 & 3)	Engage in a think-pair-share session to outline and discuss the implications of the multiple intelligence in the teaching and learning

	Implications			
	for teaching		Assign student teachers	Read further on why they have to
	numeracy in		to read further on why	develop understanding of multiple
	the Upper		student teachers have to	intelligences theory.
	primary		develop understanding	
			of multiple intelligences	
			theory.	
Lesson assessments –	Compare m	ultiple intelligence	s withdifferent learning style	es (eg. Kinaesthetic, auditory and
evaluation of learning:	visual) and ι	ise this knowledge	e to plan a lesson in upper pr	rimary mathematics in class
of, for and as learning	(Assessment	as Learning) (NTS	5 2f)Takes accounts of and re	spects learners' cultural, linguistic,
within the lesson	socio-econo	mic and education	al backgrounds in planning o	and teaching.
Instructional	Posters illustrati	ng people using	mathematics in the jobs;	video clips downloaded from the
Resources	internet;			
Required Text (core)	https://www.pd	fdrive.com/multip	le-intelligences-in-the-classr	<u>oom-e888894.html</u>
Additional Reading List	Martin, J. et. al.	1994). Mathemat	ics for teacher training in Gh	nana: Tutor notes. Accra: Unimax
	Publish	ers.		
	Martin, J. et. al.	1994). Mathemat	ics for teacher training in Gh	ana: Students activities. Accra:
	Unimax Publishe			
				ry-its-implications-d4106293.html
		-	ence-reframed-multiple-inte	elligences-for-the-21st-century-
	d158133116.htn			
CPD Needs				and ideas for teaching selected
				nd" number and word games to
	reinford	e concept develop	oed)	
		0	,	t mathematical ideas, as well as,
	connect	mathematics to c	other curriculum areas and to	o the world outside

Year of B.Ed. 2	Semester 1	Place o	f lesson in	semester 1	23456789	10 11 12
Title of Lesson	Factors that affect t	eaching and	d learning of	numeracy in	Lesson	3 Hours
	Upper primary				Duration	
Lesson description	This lesson focuses		-	-		
	learning of mathem					
	Upper primary Num					
	to knowledge and u			-		
	strategies for learni	-		-	•	
	children learn math					
	influencing learning			i. Student teache	ers will also devel	op
Previous student teacher	awareness of equity Student-teachers h			logical basis of t	eaching and lear	ning and are
knowledge, prior learning	familiar with conce			-	-	
(assumed)	Student teachers ha		-			ices
Possible barriers to learning				cultural issues,		
in the lesson				neration system.		
Lesson Delivery – chosen to	Face- Practical	Work-	Seminars	Independent	e-learning	Practicum
support students in	to- Activity	BasedLe		Study	opportunities	
achieving the outcomes	face	aning				
Lesson Delivery – main	Face-to-face: oppo				-	
mode of delivery chosen to	discussion, brainsto	- · ·			n be tutor and / c	or student
support student teachers in	teacher led. It shou					
achieving the learning	Work based learnin	-		undertake observ	vation, enquiry ar	nd/or hands-
outcomes.	on development wo			Lauranti da caltaren		a secondaria da secondaria d
	Seminars: to gener	ate group a	na individua	i creativity, discu	ssion and reflecti	on: student
	and / or tutor led Independent study	to onable	students to	angage with relev	vant and appropr	iato
	materials to promo					
	development. This				iore in depth die	
	E-learning opportu				ackages and virtu	al learning
	environments. This		-		-	-
	delivery mode in its	own right.				
• Purpose for the lesson,	The purpose of the	lesson is to	);			
what you want the	Create awaren	ess of the v	arious factor	s that affect upp	er primary childr	en's learning
students to achieve,	of mathematics	and how t	hese can info	orm their teachin	g practices	
serves as basis for the						
learning outcomes. An						
expanded version of						
<ul><li>the description.</li><li>Learning Outcome for</li></ul>	Learning	Loaming	Indicators	Ident	tify Which	cross-cutting
• Learning Outcome for the lesson, picked and	Outcomes	Leanning	mulcators	issue	•	transferable
developed from the	Cuttonics			skills		equity and
course specification					essing diversity	
Learning indicators for				these		ressed or
each learning outcome					loped?	
0	Demonstrate		Teaching		Teaching	
	understanding		ne and analy		Knowledge and u	
	of factors that	differ	ent broad		of and ability to	
	affect upper		osition of fa		assess the range of	of subjects
	primary		her-based, h		Recognizing and	-
	children'		d, school-bas	,	nterrelatedness of	
	learning and		al and stude	-	support children's	-
1	teaching of	based	d-factors) tha	it affect 🛛 🔹 🤇	Guide early ado	lescent child

	upper primary numeracy Demonstrate knowledge and understanding of the Principles of teaching and learning in Upper primary Numeracy based on teacher- student factors	<ul> <li>learning an upper prim</li> <li>Describe coabout teaching an upper prim</li> <li>Discuss the about the part of teaching an upper prin</li> <li>Discuss the about the part of teaching an upper prin based on the factors</li> <li>Characteristics adolescence:</li> <li>Outline (so of teaching mathematic current upper the mathematic and analys effectiveneed)</li> </ul>	her-student e-requisites of nd learning of nary Numeracy e conceptions orinciples of nd learning in nary Numeracy eacher-student of early me) principles g and learning ics in the per primary ics curriculum e their	<ul> <li>to acquire life-long and independent learning skills</li> <li>Building foundations for life and later learning in literacy, numeracy and critical thinking and creativity</li> <li>Characteristics of early adolescence:         <ul> <li>Possessing the ability to understand and manage the characteristics and behaviour of early adolescent learners and tap into those characteristics to promote learning</li> </ul> </li> </ul>		
Topic Title	Sub-topic(s)	Stage/ Time	learning outco	mes depen	o activities to achieve ding on delivery mode aborative groupwork or Student Activity	
	Principles of teaching and learning in Upper primary Numeracy	10 mins	Teacher Activity Review the previous lesson by asking student teachers to present their work on the implications of multiple intelligences on teaching and students' learning. (PD Theme 1)		Participate in the discussion to review the previous lesson;	
Factors that affect teaching and learning of numeracy in Upper primary		50 mins	Give an exposit factors that affe teaching and le numeracy in Up primary to high principles of tea learning of upp numeracy (PD	ect arning of oper light some aching and er primary	Pay attention to the tutor or lecturer's verbal exposition on the principles of teaching and learning and ask questions for clarification to ensure understanding;	
	Teachers' knowledge of the major factors (that affect upper primary children's learning of mathematics)	50 mins	Engage student in a discussion teachers' know major factors a children's learn influence their practice (PD Th 3) Provide studen	on how ledge of ffecting ing can classroom <b>eme 1 &amp;</b>	Participate in a think- pair-share session to outline and discuss the factors that affect children's learning of mathematics and implications of this on teachers' classroom practice Outline the principles	

			with selected pages of	of learning and
		30 mins	the Upper primary	teaching mathematics
			mathematics curriculum	in Upper primary and
			to outline some specific	to describe how they
			learner-teacher ratio	will use such
			factors learning and	knowledge and
	Teachers'		teaching of numeracy in	understanding to
	knowledge of		Upper primary (PD Theme 1)	support their activities in their school visits.
	learner-teacher			In their school visits.
	ratio factor		Use Power point	Participate in the
			presentation,	discussion of how
			interspersed with	knowing the factors
		40 mins	questioning, to discuss	that affect children's
			how knowledge of factors	learning of
			can influence the choices	Mathematical
			teachers make in their	concepts can
			instructional practices.	influence teachers'
			(PD Themes 1 & 3)	teaching of
				mathematics.
			Assign student teachers	Write a brief report
			to read further on why	based on the
			student teachers have to	interview conducted
			develop understanding of	for presentation in
			factors affecting upper	class.
			primary children teaching	
			and learning and write a	
			reflective paper to be	
			presented in the next	
			class meeting. (PD Theme 1)	
Lesson assessments –			eir small groups) to Identify a	
evaluation of learning:of, for			ractions, decimal number, pla	ace, shape and space,
and as learning within the lesson	etc.) using locally ava	allable material	S	
Instructional Resources	Posters illustrating p	eople using ma	athematics in the jobs; video	clips downloaded from
	the internet;			
Required Text (core)	Jim C. (2003). An Ove	erview of Theor	ies of Learning in Mathemati	cs Education Research.
Additional Reading List			ies to practice in the teaching	
		•	cs for teacher training in Ghar	na: Tutor notes. Accra:
	Unimax Pub			
			cs for teacher training in Ghar	na: Students
CPD Needs	activities.Accra: Unin		some innovative materials an	d ideas for teaching
CFD Neeus		0 .	reloping and using the "Read	0
			oncept developed)	my minu number and
	_		eded to consciously connect n	nathematical ideas as
		-	ics to other curriculum areas	
	outside			
	Juisiac			

Year of B.Ed. 2 Se	mester	1	Place of le	sson in sei	mester	12 3 4 5 6 7	891	0 11 12	
Title of Lesson	Factors the	t affect te	eaching and	learning nur	neracy in	Lesson		3 Hours	
	Upper prim		U	U	,	Duratio	n		
Lesson description	This lesson	focuses of	on developii	ng knowledg	e and unde	erstanding of f	actor	s that affect	
	children's	learning	of mathema	atics. Specifi	c areas of	interest inclu	ide So	ocio-cultural	
	factors, at	titude, an	id anxiety a	ind the Imp	lications of	these for cla	assroc	om practice.	
						strategies to			
					-	developmen			
	-					velopmental l			
						tasks will foc			
						eories, and ot k at the nee			
		-	-			ial factors th			
			f mathemat		as potent			in innucliee	
Previous student teacher		-			ogical basi	s of teaching	and I	earning and	
knowledge, prior learning					-	ment, and mat		-	
(assumed)				-		of factors that			
	learning of								
Possible barriers to learning in	Different	entry b	ehaviours,	Socio-cultu	ral issues	, different	learn	ing needs,	
the lesson	misconcep	tions abo	ut number a	nd numerati	on system.				
Lesson Delivery – chosen to		Practical	Work-	Seminars	Independ		-	Practicum	
support students in achieving		Activity	BasedL		nt Study		ities		
the outcomes			eaning						
Lesson Delivery – main mode	Face-to-fac	e: 0000	rtunity for a	n extended a	and cohere	nt line of argu	ment.	It includes	
of delivery chosen to support						is can be tutor			
student teachers in achieving				be the mair					
the learning outcomes.	Work base	d learning	g: to allow s	tudents to u	ndertake ol	oservation, en	quiry	and/or	
			ent work (m						
				d individual	creativity, o	discussion and	reflea	ction:	
	student an								
	-	-				relevant and a			
		•		and collabor f any of the a		ry, more in-de	epth a	nalysis and	
						es ve packages a	nd vir	leut	
	-			-					
	-		ery mode in		learning environments. This can be part of any of the above modes of delivery. It is				
• Purpose for the lesson,	The purpor	o of the l		i its own rign	t.				
		se or the i	esson is to;	its own righ	t.				
what you want the	develo	p in stu	dent teache	ers an awar	eness and	understandir			
students to achieve,	develo     cultura	p in stud al factors,	dent teache attitudes,	ers an awar	eness and	understandir in influence t			
students to achieve, serves as basis for the	develo     cultura	p in stud al factors,	dent teache	ers an awar	eness and				
students to achieve, serves as basis for the learning outcomes. An	develo     cultura	p in stud al factors,	dent teache attitudes,	ers an awar	eness and				
students to achieve, serves as basis for the learning outcomes. An expanded version of the	develo     cultura	p in stud al factors,	dent teache attitudes,	ers an awar	eness and				
students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	develo     cultura     teachin	p in stud al factors,	dent teache attitudes, hematics;	ers an awar beliefs, and	eness and anxiety ca	n influence t	heir l	earning and	
students to achieve, serves as basis for the learning outcomes. An expanded version of the description. • Learning Outcome for the	develo cultura teachin	p in stud al factors,	dent teache attitudes,	ers an awar beliefs, and	eness and anxiety ca	n influence t entify Whice	heir lo	earning and ross-cutting	
students to achieve, serves as basis for the learning outcomes. An expanded version of the description. • Learning Outcome for the lesson, picked and	develo     cultura     teachin	p in stud al factors,	dent teache attitudes, hematics;	ers an awar beliefs, and	eness and anxiety ca	n influence t entify Whice sues- core a	heir lo ch c and 1	earning and ross-cutting transferable	
students to achieve, serves as basis for the learning outcomes. An expanded version of the description. • Learning Outcome for the lesson, picked and developed from the	develo cultura teachin	p in stud al factors,	dent teache attitudes, hematics;	ers an awar beliefs, and	eness and anxiety ca Id ise sk	n influence t entify Whice sues- core a iills, inclusivi	heir la heir l	earning and ross-cutting transferable equity and	
<ul> <li>students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> </ul>	develo cultura teachin	p in stud al factors,	dent teache attitudes, hematics;	ers an awar beliefs, and	eness and anxiety ca Id is: sk ac	entify Whic sues- core a ills, inclusivi idressing div	heir la heir la and t ity, a ersity	ross-cutting transferable equity and . How will	
<ul> <li>students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators for</li> </ul>	develo cultura teachin	p in stud al factors,	dent teache attitudes, hematics;	ers an awar beliefs, and	eness and anxiety ca Id is: sk ac th	entify Whic sues- core a ills, inclusivi Idressing div ese be	heir la heir la and t ity, a ersity	earning and ross-cutting transferable equity and	
<ul> <li>students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> </ul>	develo cultura teachin	p in stud al factors, ng of mat	dent teache attitudes, hematics;	ers an awar beliefs, and ndicators	eness and anxiety ca Id is: sk ac th de	entify Whic sues- core a ills, inclusivi idressing div	heir la and t ity, e ersity addr	ross-cutting transferable equity and . How will	
<ul> <li>students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators for</li> </ul>	develo cultura teachin	p in stud al factors, ng of mat	dent teache attitudes, hematics; Learning Ir	ers an awar beliefs, and ndicators stics of	eness and anxiety ca Id iss sk ac th de early Ch	entify Whic sues- core a ills, inclusivi idressing div ese be eveloped?	heir la and t ity, e ersity addr	earning and ross-cutting transferable equity and . How will essed or	
<ul> <li>students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators for</li> </ul>	develo cultura teachin     Learning     Outcomes     Outcomes	p in stud al factors, ng of mat	dent teache attitudes, hematics; Learning Ir Characteri adolescent • Outline	ers an awar beliefs, and ndicators stics of ce: e and analyse	eness and anxiety ca Id iss sk ac th de early Ch ac e	entify Whic sues- core a ills, inclusivi dressing div ese be eveloped? naracteristics dolescence:	heir lá and 1 ity, e ersity addr	earning and ross-cutting transferable equity and . How will essed or	
<ul> <li>students to achieve, serves as basis for the learning outcomes. An expanded version of the description.</li> <li>Learning Outcome for the lesson, picked and developed from the course specification</li> <li>Learning indicators for</li> </ul>	develo cultura teachin     Learning     Outcomes     Demon     knowle	p in stud al factors, ng of mat	dent teache attitudes, hematics; Learning Ir Characteri adolescene • Outline differe	ers an awar beliefs, and ndicators stics of ce:	eness and anxiety ca Id iss sk ac th de early Ch ac e at	entify Whic sues- core a ills, inclusivi dressing div ese be eveloped? naracteristics folescence: Possessing	heir la and t ity, e ersity addr c the	earning and ross-cutting transferable equity and . How will essed or of early	

	factors that affect Upper primary children's learning of mathematics and implications of this for classroom practice	children's lea mathematics Describe thei about how te content know pedagogical k and pedagogi knowledge th children's lea mathematics primary.	r views in acher p vledge, knowledge, ical content hat affect rning of in Upper	Phaviour of early dolescent learners and tap to those characteristics to romote learning
	knowledge and understanding socio-cultural factors; attitude; anxiety that influence learning and teaching of Upper primary mathematics	<ul> <li>Outline and au socio-cultural attitude and a influence lear teaching of Up primary math.</li> <li>Reflect critica impact of soci factors; attitu on classroom</li> <li>Discuss how the dimensions H (1980) can be teaching upper children</li> </ul>	factors; (c inxiety that di ning and • Ti oper m ematics; • Es ally on the bi io-cultural • O ide; anxiety di practices cl the cultural bi lofstede (i e used in st er primary di	uman development hildhood) and evelopmental milestones ansition from 1-class odel to subject-teacher; itablishment of personal as and stigma pportunities to explore versity within the ass/subject and potential arriers to inclusion including personal bias, ereotypes and institutional scrimination)
Topic Title	Sub-topic(s)	Stage/ Time		ing to activities to achieve depending on delivery
			mode selected. T groupwork or inde	eacher-lead collaborative
			Teacher Activity	Student Activity
	Socio-cultural factors; attitude; anxiety; Implications for	10 mins 50 mins	Review the previou lesson by asking student teachers to present an outcome of the short interview with about two children on school visit (PD Theme 1)	and participate in the discussion to review
Classroom practice Factors <i>that</i> affect teaching and learning numeracy in Upper primary		60 mins	Give an exposition based on socio- cultural factors, attitudes, beliefs, values and anxiety. (PD Theme 3)	Listen attentively to the tutor or lecturer's verbal exposition on the concept's attitudes, beliefs, values and anxiety. and ask questions for clarification or provide comment(s) to ensure participation and understanding;
		40 mins	Engage student teachers in a discussion on how teacher content knowledge, pedagogical	Engage in a think-pair- share session to outline and discuss the effect of teachers' teacher content knowledge, pedagogical

		20 mins	knowledge, and	knowledge, and		
		20 111113	pedagogical content	pedagogical content		
			knowledge that	knowledge that affect		
			affect children's	children's learning of		
			learning of	mathematics in Upper		
			mathematics in	primary		
			Upper primary			
			(PD Theme 1& 3)			
			(	Create a table that		
				illustrates the		
				similarities and		
			Use Power point	differences among		
			presentation,	values, attitudes, and		
			interspersed with	beliefs and how these		
			questioning, to	impact learning in		
			discuss how	Upper primary;		
			teachers'	opper primary,		
			professionalvalues	Pay attention to and		
			and attitudes	also participate in the		
			remain important	discussion of how		
			factors in their	teachers' professional		
			teaching of Upper	values and attitudes		
			primary	remain important		
			mathematics	factors in their		
			(PD Themes 1 & 3)	teaching of Upper		
			Assign student	primary mathematics		
			teachers to write a			
			reflective paper on			
			the topic "The role			
			of the teacher in			
			promoting effective			
			learning of			
			mathematics in			
			Upper primary "to			
			be submitted the			
			following week			
			(PD Theme 1)			
Lesson assessments –	Student teachers to	submit the follow		1		
evaluation of learning: of, for	1. a final port	folio in mathemat	tics, with emphasis on up	per primary		
and as learning within the	mathematics Curriculum and relative to theories of learning, (Course					
lesson	work)(Assessment as learning) NTS 3k - Integrates a variety of assessment					
	modes into teaching to support learning. (30%)					
	2. Project work report on designing TLMs for teaching in upper primary.					
	(Project) (Assessment as learning) NTS 3h - Sets meaningful tasks that					
	encourages	s learner collabora	ation and leads to purpos	seful learning. (30%)		
Instructional Resources	Posters illustrating people using mathematics in the jobs; video clips downloaded from					
Required Text (core)	the internet;	-ffective Learning	of Mathematics: From T	heory to Practice		
	Tsafe, A. K. (2012). Effective Learning of Mathematics: From Theory to Practice. Volume 13 (2)					
Additional Reading List				Cognitive Developmental		
	Theory: Implications	s of James Fowler	's Epistemological Paradi	gm for Basic Writers		
	Martin, J. et. al. (199	94). Mathematics	for teacher training in Gl	hana: Tutor notes. Accra:		
	Unimax Pu	blishers.				
			for teacher training in Gl	hana: Students activities.		
	Accra: Unimax Publi					
CPD Needs		-	me innovative materials	_		
				ad my mind" number and		
	-	es to reinforce con				
		-		t mathematical ideas, as		
		nnect mathematic	s to other curriculum are	eas and to the world		
	outside					

Year of B.Ed. 2	Semester	1 P	ace o	of lesson in	semest	er	12 3 4 5 6	789	10 11 12	
Title of Lesson		affect learning Upper primar		eaching of	Lesso	n Durat	ion	3 Ho	urs	
Lesson description	numeracy in Upper primaryThis lesson focuses on developing knowledge and understanding of factors that affect children's learning of mathematics. Specific areas of interest include Social and emotional intelligence and how these influence upper primary children's learning of mathematics and its Implications for classroom practice. Student teachers will be engaged using a variety of 									
Previous student teacher knowledge, prior learning (assumed)	Student-teac familiar with	Student-teachers have been taught psychological basis of teaching and learning and are familiar with concepts based on child growth, development, and maturation; Student teachers have been introduced to socio-cultural factors; attitude and anxiety								
Possible barriers to learning in the lesson	Different	t entry be eptions about	haviou	ırs, Socio-cı	ultural in ration sys	ssues, tem.	different	learn	ing need	ls,
Lesson Delivery – chosen to support students in achieving the outcomes		tivity Bas	ork- edLe ing	Seminars	Indeper Stud	dy	e-learn opportur ⊠	-	Practicum	n
<ul> <li>Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.</li> <li>Purpose for the losson what you</li> </ul>	<ul> <li>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.</li> <li>Work based learning: to allow students to undertake observation, enquiry and/or hands-on development work (mostly TVET)</li> <li>Seminars: to generate group and individual creativity, discussion and reflection: student and / or tutor led</li> <li>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</li> <li>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.</li> </ul>									
lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.	<ul> <li>develop in student teachers an awareness and understanding of how social and emotional intelligence, among other factors, like attitudes, beliefs, and anxiety can influence their learning and teaching of mathematics;</li> </ul>									
Learning Outcome for the lesson, picked and developed from the course specification	Learning Out			arning Indicat	c ir d a	ore a nclusivit iversity ddresse	and tra y, equity . How d or devel	nsferal and will oped?	addressin these b	ls, ng be
Learning indicators for each learning outcome	intelliger this infl	anding o nd emotiona nce and how uences upper children's o	eai •	aracteristics 'ly adolescend Outline and analyse different ro that teacher play in developing children's emotional intelligence	les	Poss unde char early into	essing erstand a acteristics vadolescer	the and m and b nt learn charac	lolescence: ability t hanage th hehaviour c hers and ta teristics t	to he of ap

<ul> <li>Demonstrate knowledge and understanding of how to validate the feelings of others in a busy classroom.</li> </ul>	TeachingTeachingDescribe teachers' concerns for teaching• Knowledge and understanding of and ability to teach and assess the range of subjectsemotional intelligence;• Recognizing and using the interrelatedness of subjects to support children's learningDiscuss the basic ingredients of emotional and social intelligences (e.g. self- awareness, self- control, 
	skills)  Develop a short personal strategies for identifying interpersonal and intrapersonal intelligences and to discuss how these influence classroom practice  Inclusion and Equity Deflect critically
	<ul> <li>Reflect critically on how upper primary children feel about</li> <li>Dutline and analyse how Social and emotional influences the promotion of equity and inclusivity in the mathematics</li> <li>Human development (childhood) and developmental milestones</li> <li>Transition from 1-class model to subject-teacher;</li> <li>Establishment of personal bias and stigma</li> <li>Opportunities to explore diversity within the class/subject and potential barriers to inclusion (including personal bias, stereotypes and institutional discrimination)</li> </ul>

ode selected. ndependent. ivity the discussion previous g outcomes
<b>ivity</b> the discussion previous
the discussion previous
e previous
7 outcomes
7 outcomes
s to become
at is expected
to the verbal
ased on social
al intelligence s learning of
s learning of
the discussion
f acceptance,
operation,
ne common,
lues in
assroom successful life
successiume
the discussion
ners'
f learners'
notional
nfluence group d effective
es
internet for
es that children
be effective
the learning of
findings briefly
roups on the
of these for
classroom
practices.
about what 't
about what it develop social
nd to reflect
iting on the
of this on their
to become
chers.
some social y consider very
r r r

	emotional and social development and how this can influence children's learning of mathematics (through independent study and to present later for grading). Write a reflective paper on how teachers' knowledge of children's social and emotional intelligence can affect their classroom practices (to be submitted for grading)			
Lesson assessments	Review of previous lessons and preparation for end of the semester examination based			
- evaluation of	on learning theories in upper primary mathematics. (End of semester examination 40%)			
learning: of, for and as learning within				
the lesson				
Instructional	Posters illustrating people using mathematics in the jobs; video clips downloaded from the			
Resources	internet;			
Required Text (core)	Tsafe, A. K. (2012). Effective Learning of Mathematics: From Theory to Practice. Volume 13 (2)			
Additional Reading List	Joan, M. E. & Katharine R. S. Integrating Social, Moral, and Cognitive Developmental Theory:			
LIST	Implications of James Fowler's Epistemological Paradigm for Basic Writers Martin, J. et. al. (1994). <i>Mathematics for teacher training in Ghana: Tutor notes</i> . 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     accepts (a g daughering and using the "Dead must id" must be and used to be a set of the set of			
	concepts (e.g. developing and using the "Read my mind" number and word games to reinforce concept developed)			
	<ul> <li>Instructional strategies needed to consciously apply the knowledge gained as guidelines</li> </ul>			
	for forming groups and promoting effective group work to ensure inclusion.			
<sup>1</sup> Component 1: Subject	Portfolio Assessment (30% overall)			
<ul> <li>Selected items of students work(2 of them 10% each)-30%</li> </ul>				
Midterm assessment -20%				
Reflective journal 40%				
Organization of the subject portfolio-10% (how it is presented /organized				
<sup>2</sup> Component 2: Subject Project Assessment (30% overall score)				
<ul> <li>Introduction; a clear statement of aim and purpose of the project-10%</li> </ul>				
• Methodology; what the student teacher has done and how achieve the purpose of the project-20%				
Substantive or main section-40%				
Conclusion – 30%				
Component 3: End of S	emester Examination- (40% overall)			

<sup>&</sup>lt;sup>1</sup>See rubrics on Subject Portfolio Assessment in Annex 6 of NTEAP <sup>2</sup>See rubrics on Subject Project Assessment in Annex 6 of NTEAP

www.t-tel.org