Unit Title:	**Improving numeracy knowledge, understanding and practice**
OCR unit number:	44
Level:	Level 5
Credit value:	15
Guided learning hours:	40
Unit reference number:	L/503/5014

Unit purpose and aim

The unit aims to enable learners to improve their numeracy knowledge, understanding and practice. Learners will consider fundamental attributes of mathematics and numeracy, the attributes of procedures within mathematics and numeracy and how the origins and status of mathematics impact on numeracy teaching. Learners will evaluate their practice to improve their numeracy teaching.

Learning Outcomes	Assessment Criteria	Teaching Content
The Learner will: 1 Understand fundamental attributes of mathematics and numeracy	**The Learner can:** 1.1 Review the historic and cultural developments of mathematics 1.2 Analyse the language and concepts associated with number systems 1.3 Analyse common errors and misconceptions in mathematics and possible reasons why they occur 1.4 Analyse the techniques used in mathematics and numeracy for conceptual linkages. 1.5 Review the nature of argument in mathematics, explaining • its place in geometry • the role of algebra in generalising	Learners need to show an understanding of how mathematics has developed over time and what has influenced the changes identified. In meeting the assessment criteria it would be useful for learners to consider a range of contexts and purposes where numbers are used. Learners should be introduced to the arguments of mathematics, research and debate would be beneficial to learners in comparing different theories.
2 Understand the attributes of procedures within mathematics and numeracy	2.1 Analyse the activities, processes and stages within mathematical problems and investigations 2.2 Evaluate written, mental and diagrammatic mathematical strategies, analysing the associated metalanguage 2.3 Analyse the use, interpretation	Exposing learners to a range of mathematical activities and problems to work through as part of individual and group work would be beneficial in meeting the assessment criteria. Encouraging learners to be observant and reflective of the differing strategies and

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Learning Outcomes	Assessment Criteria	Teaching Content
	and representation of data 2.4 Evaluate the use of measurement systems within problem solving including • definition • conversion • representation	language used throughout the various stages of solving the mathematical problems would be appropriate to develop their understanding in meeting the learning outcome.
3 Understand how learning theories and the origins and status of mathematics impact on numeracy teaching	3.1 Analyse the effect of the origins and status of mathematics knowledge on mathematics and numeracy curriculum development 3.2 Analyse how learning and teaching theories underpin numeracy learning and teaching	Learners need to understand the origins and status of mathematical knowledge such as absolutist/fallibilist philosophies and their relation to how mathematics/numeracy is taught. Learners could consider how the numeracy curriculum and teaching approaches to numeracy have changed and consider research and theories that have influenced and directed such change.
4 Be able to use evaluation of practice to improve numeracy learning and teaching	4.1 Evaluate current research and information from mathematics and numeracy sources 4.2 Evaluate learner assessment data for improvement needs 4.3 Analyse implementation of improvement action plans within teaching teams 4.4 Engage in training opportunities to improve own practice using a reflective CPD cycle 4.5 Use the outputs from own investigations and the reflective cycle to improve numeracy learning and teaching	Learners need to be exposed to relevant research which they can evaluate and use to inform and improve their own practice. Learners could use national achievement benchmarks as a measure to compare with the assessment data of their own learners. Other data that could be reviewed to measure their own practice includes lesson observation, appraisal targets, departments self assessment reports, inspection reports etc. Learners need to map CPD activities against areas for improvement in own practice. Learners should be obtaining feedback on their own practice from a range of sources such as self reflection, peers, learners, management, external colleagues. Learners should ideally be introduced to a range of self reflection methods and CPD methods and engage in this as part of their normal practice. Learners might like to consider research conducted by IfL on CPD in

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Learning Outcomes	Assessment Criteria	Teaching Content
		deciphering appropriate development opportunities to improve their practice.

Assessment

This unit will be assessed in the centre and externally verified by OCR assessors.

To successfully achieve the unit candidates must produce evidence that meets all of the assessment criteria in the unit.

Guidance on assessment and evidence requirements

Evidence that could be produced to demonstrating the meeting of the assessment criteria could consist of the following:

- Written assignment
- Case studies
- Research projects
- Scheme of Work / Lesson plans
- Observation of group activities carrying out mathematical problems
- Self Reflective Account
- Professional Discussion
- Observed presentations to peers
- CPD log and action plan

National Occupational Standards (NOS) mapping/signposting

This unit is underpinned by:

- New overarching professional standards for teaching, tutors and trainers in the lifelong learning sector (2007)
- Application of the professional standards for teachers of Mathematics (Numeracy)

Functional skills signposting

This section indicates where candidates may have an opportunity to develop their functional skills.

Functional Skills Standards					
English		**Mathematics**		**ICT**	
Speaking and Listening	√	Representing	√	Use ICT systems	√
Reading	√	Analysing	√	Find and select information	√
Writing	√	Interpreting	√	Develop, present and communicate information	√

Resources

Askew, M. et al. (1997) *Effective Teachers of Numeracy* London: Kings College.
Atkinson, T. and Claxton, G. (2000) *The Intuitive Practitioner: On the Value of Not Always Knowing What One is Doing* Maidenhead: OUP.
Benn, R. (1997) *Adults Count Too – Mathematics and Empowerment.* London: NIACE.
Casey, H. et al. (2006) "You wouldn't expect a maths teacher to teach plastering…" *Embedding Literacy, Language and Numeracy in Post-16 Vocational Programmes – the Impact on Learning and Achievement* London: NRDC.
Coben, D. (2003) *Adult Numeracy: Review of Research and Related Literature.* London: NRDC.
Coben, D., O'Donaghue, J. and Fitzsimons, G. (eds) (2000) *Perspectives on Adults Learning Mathematics: Research and Practice.* London: KAP.
Cohen, L. and Manion, L. (2002) *Research Methods in Education* (5th ed) London: Routledge.
Gates, P. (2001) Issues in Mathematical Teaching (Issues in Subject Teaching) Routledge 1st Edition
Harris, M. (1997) *Common Threads – Women, Work and Mathematics.* Stoke: Trentham.
Hillier, Y. (2005) *Reflective Teaching in Further and Adult Education* (2nd ed)London: Continuum.
Miles, T.R. and Miles, E. (eds) (2004) *Dyslexia and mathematics.* London: Routledge.
Newmarch, B et al. (2007) Numeracy (Developing Adult Teaching and Learning) Practitioner Guide. National Institute of Adult Continuing Education
Nickson, M (2004) Teaching and Learning Mathematics. Continuum International Publication Group Ltd.
Roberts, C. et al. (2005) *Embedded Case Studies. Embedded Teaching and Learning of Adult Literacy, Numeracy and ESOL* London: NRDC.
Serra, M. (1989) *Discovering Geometry: An Inductive Approach* London: Key Curriculum Press.
Sierpinska, A. (1996) *Understanding in Mathematics.* London: Macmillan.
Swan, M. (2006) Collaborative Learning in Mathematics, A Challenge to our Beliefs and Practices. Leicester: NIACE.

Websites

www.ocr.org.uk OCR web site
www.ofsted.gov.uk The Office for Standards in Education.
www.hmie.gov.uk Her Majesty's Inspectorate of Education (Scotland)
www.ifl.ac.uk The Institute for Learning
www.**lsis**.org.uk The Learning and Skills Improvement Services
http://www.excellencegateway.org.uk/ The Excellence Gateway
www.niace.org.uk The National Institute of Adult Continuing Education
www.qia.org.uk The Quality Improvement Agency
www.ukces.org.uk UK Commission for Employment and Skills
www.ncetm.org.uk/ The National Centre for Excellence in Teaching of Mathematics (NCETM) – excellent resource which includes a professional development portal
www.nrdc.org.uk National Research and Development Centre for research into all areas of adult numeracy (and literacy and ESOL)
Adult Numeracty Core Curriculum – http://www.excellencegateway.org.uk
Access for All – *Guidance on Making the Adult Literacy and Numeracy Core Curricula Accessible* London: http://archive.excellencegateway.org.uk

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Additional information

For further information regarding administration for this qualification, please refer to the OCR document '*Admin Guide: Vocational Qualifications' (A850)* on the OCR website www.ocr.org.uk .

This unit is a shared unit. It is located within the subject/sector classification system:

1.3 Education and training
13.1 Teaching and lecturing