

# Retrieving Numeracy: Disparity between 16+ and HE

Dr Steve Lane  
Lancaster Environment Centre  
Lancaster University

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## Mathematics compulsory to GCSE

- Foundation tier: grades 1 to 5.
- Higher tier: grades 4 to 9 (grade 3 allowed).
  - surds and multiples of ,
  - simplify surd expressions involving squares (e.g.  $\sqrt{12} = 2\sqrt{3}$ ) and rationalise denominators,
  - quadratic equations,
  - algebraic fractions, etc. etc.
  - Grade 4 is university minimum entry (*could be foundation?*).

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## Mathematics AS

- Provided some progression on GCSE.
- Now gone.

## Mathematics A-level

- Reduction of choice at 16+.
- Much greater commitment than AS.
- More expensive for resource-poor schools.

## A-level numeracy

- Physics (no calculus)
- Chemistry ...

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## A-level numeracy

- Physics (no calculus)
- Chemistry
- Biology
- Geology
- Psychology
- Geography
- Computing
- Environmental Science/studies
- Etc.

*With these subjects numeracy skills decline from GCSE.*

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## The Earth/Environmental Science Problem

- *Lancaster Env. Sci.* one science from the following; Biology, Chemistry, Computing, Environmental Science, Geography, Geology, Human Biology, Mathematics, Physics or Psychology.
- *Durham Earth Sci.* two sciences from Mathematics, Further Mathematics, Physics, Chemistry, Geology, Geography, Economics, and Biology or Psychology.
- *UEA Env. Sci.* ...including either Geography, Geology, Mathematics, Economics, Biology, Chemistry, Environmental Science or Physics.

*Better than grade 4 GCSE cannot be stipulated without serious negative impact on recruitment nationwide.*

*Oxford Earth Sci.* Including Mathematics and either Chemistry or Physics.

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LEC response (similar nationally) to achieve basic numeracy skills

- 70% of students without A-level maths; numeracy age ~ 14.
- LEC.181 – students taking ES units with grade 4-6 GCSE.
- LEC.183 – LEC.181 + students taking ES units with grade 7-9 GCSE.
- 160 learning hours, 50 contact.

Big issues

- Algebra
- Algebra
- Formulating expressions from scenarios
- Drawing conceptual sketches
- Following instructions
- Carefulness (silly mistakes)