Numeracy problems faced by Biology undergraduates - how do we identify and address these issues?

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Presented at the Centre for Bioscience's
Scottish HE Biology Teachers' Meeting, Aug 07

What's the problem?

Do Biology students have genuine numeracy problems or is it more a case of……

"I'm sure we all knew how to do that when I was a student in 19**"

- **“Universities forced to offer maths help to new science students”**

James Meikle, education correspondent
Wednesday April 25, 2007

Most universities have to offer remedial maths courses for new science undergraduates because they are giving up the subject after GCSE, it was claimed yesterday. Many chemistry students have not opened a maths textbook for two years because A-level maths is regarded as too difficult by students and schools, the Royal Society of Chemistry said …….

http://education.guardian.co.uk/higher/news/story/0,,2064904,00.html

- **“B-grade maths students are so bad, they may as well guess the answers.”**
  Phil Baty, 27 August 2004

  A-level maths standards have dropped to the point where B-grade students score little better in a basic university test than they would if they were randomly guessing, according to a new study. The study, which monitored the performance of first-year electronics students at York University in maths tests over the past 15 years, also shows that if today's A-grade students had sat the test 15 years ago, they would have come bottom of the class. The researchers said their findings were replicated in York's physics department.

  http://www.thes.co.uk/search/story.aspx?story_id=2015367

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- Quantitative subjects were reported as having lower completion rates.
- Concerns about student numeracy were raised by FBLS, Psychology, Physics & Astronomy amongst others
- Other Universities (inc Loughborough and St Andrews) had established Mathematical Support units

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- Maths support unit established to support school and Level-1 University material.

- NUMBER

  NUmeracy and Mathematical Basics Education Resource unit

NUMBER unit

- Electronic and paper-based support material, using material already available if possible
- Short courses, with “popular” topics identified during session
- One-to-one tuition
- Help for revision, but not with summative assessments

Mathematics Dept intend to introduce a diagnostic test

How can we help Biology Students?

- We can often identify “problem” areas from previous sessions, and there may be resources already available.
- Should numeracy be isolated from other study skills?
- Do we have the staff resources ?
- Do students know where to look for help?

Location of resources

- At present, all resources within MOODLE sites are limited to staff/students enrolled on that course.
- Should there be a central resource that can be accessed by all? This may encourage students to revisit material from previous courses / years. Staff could also see material that is already available

Current examples in Level-2

- Estimating sizes and values
- Dilution of stock solutions
- Graph drawing
- Pre-lab preparation

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Cells & Tissues in Health and Disease - Microsoft Internet Explorer

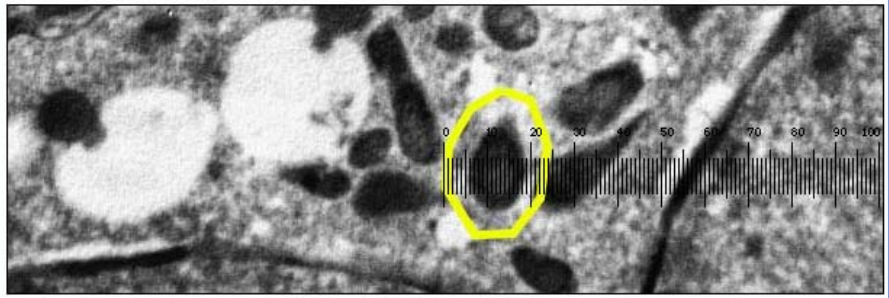
File Edit View Favorites Tools Help

Back Search Favorites

Address http://moodle2.gla.ac.uk/ibls/moodle/file.php/23/microscopy/8b/index.html

Go Links

Cells & Tissues
Module 8b



2 µm

Drag the ruler to the cellular structure encircled in yellow, and measure it at its widest point. Then measure the scale to find the convertion factor between ruler units and µm, and use this to calculate the width of the structure in µm.

Width: 1.6 µm Check your answer Need a worked example?

The correct answer is 1.53 µm (to 3 significant figures).

New Question

http://moodle2.gla.ac.uk - Help - Microso...

Microscope Measurements

Here is worked example for some hypothetical measurements:

- The cellular structure measures 25 ruler units at its widest point.
- The scale is 2 µm and measures 40 ruler units.
- The cellular structure is therefore (25/40) x 2 = 1.25 µm wide.

It is important to realize that, as you have only made measurements to two significant figures, a value of 1.3 µm would be equally (indeed, more) acceptable. Quoting four or more significant figures would be incorrect, and would lose you marks in an exam. It is up to you to edit the output of your calculator!

Done Internet

Internet

start Microsoft Pow... Cells & Tissue... Orange UK Ho... http://moodle... EN 22:18

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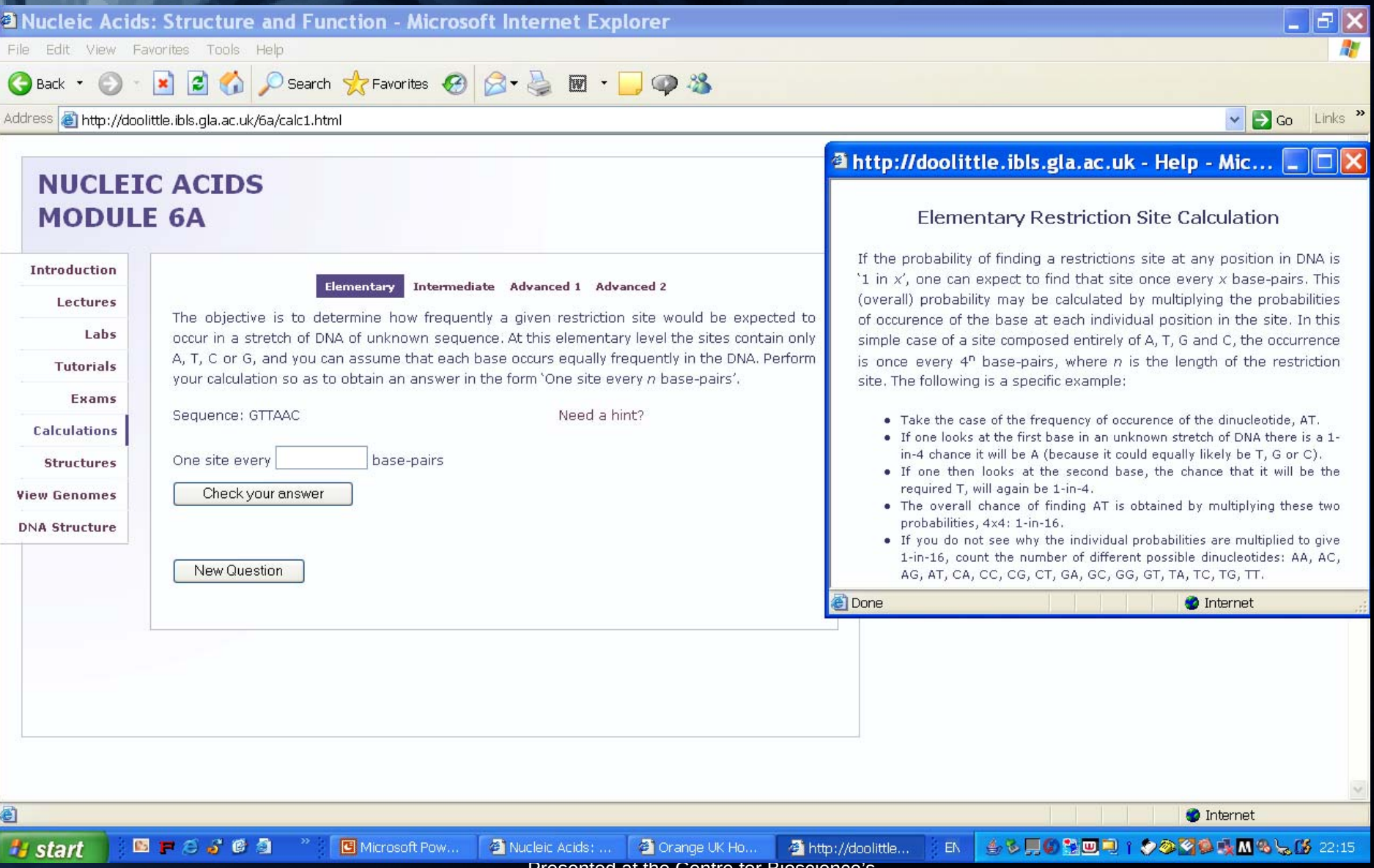

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Potential Benefits vs Costs

- Development of resources may initially be time consuming.
- Logging site visits will identify topics where students lack confidence.
- Staff can view resources developed by other staff.
- Will give students a “one stop shop”

- My thanks to Professor Graeme Ruxton for his help in preparing this presentation