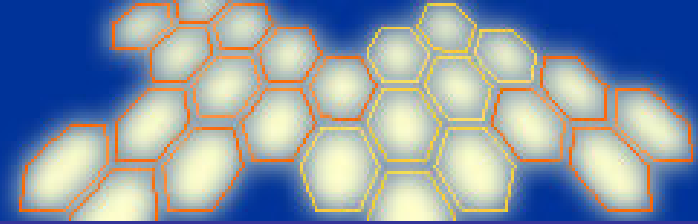




**ltsn**

Learning and Teaching  
Support Network

**Bioscience**

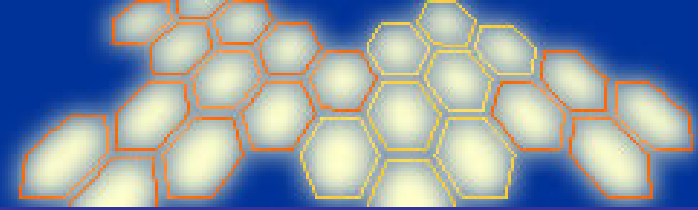


# Why offer final-year projects?

E J Wood

*LTSN Centre for Bioscience*

*University of Leeds*

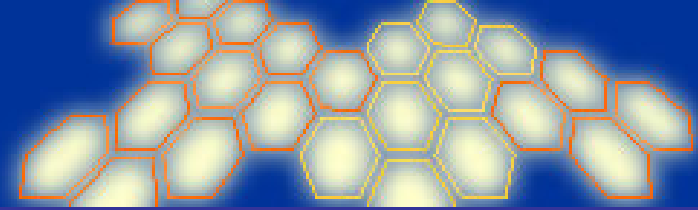


## **Bioscience – as a body of knowledge**

The information that is in textbooks is there as a result of observation, experimentation and analysis . . . .

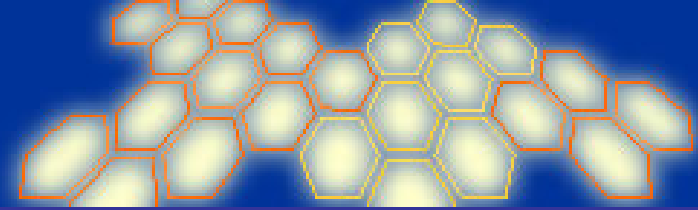
– coupled with interpretation, generalization and consideration of controversy by a multitude of scientists, over many years.

***Not many students know that!***



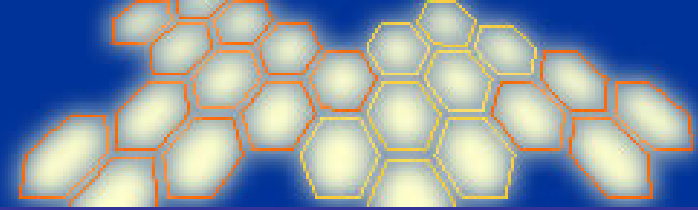
# Training the future Bioscientists

- We have a responsibility for training the next generation of scientists (our replacements) – no one else can do it
- However, many of our students (>50%???) will not go on to careers in science
- Should they be required to do lab projects?
- If not, what are the alternatives?



# Purposes of practical work

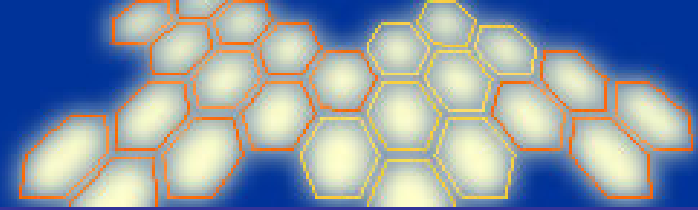
- *Content* – illustration of lecture material
- *Application* – technical skills, use of instrumentation, safety
- *Method* – planning, evaluation, presentation
- *Philosophy* – how scientific enquiry is carried out, criticising



# Laboratory training – progression

## Years 1/2

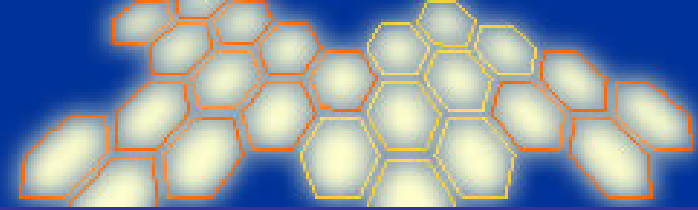
- Illustrate the lecture course – biological phenomena and investigative techniques
- Learn simple manipulative skills, handle biological materials, work safely
- Observe, record, process data, present results



# Laboratory training – progression

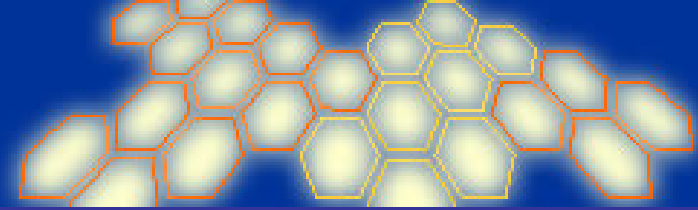
## Year 3(/4)

- Plan experiments, write protocols, be critical of data (own and those of others)
- Find information, read the literature
- Pose worthwhile questions, hypotheses, reason logically, problem-solve
- Communicate results (orally, in writing)
- Function as a member of a team



# Final-year projects

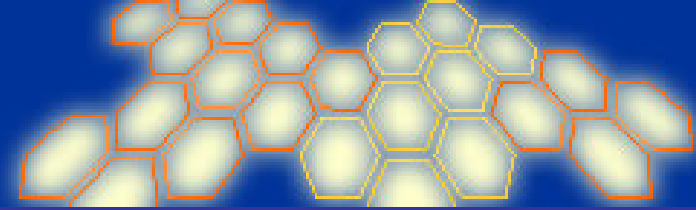
- Enable students to get a real feel for research
- Enable the student to be both self-reliant and to work as a team member
- Develop a number of skills in addition to lab-based skills: reading the literature, criticizing data, planning experiments/ writing protocols, presenting data, spreadsheets, statistics, etc, etc.



# Formats of projects

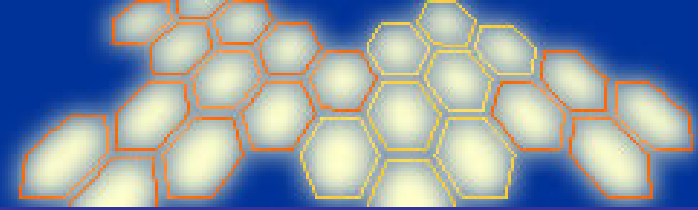
- 12–20 weeks, number of lab days or lab hours specified
- Initial discussion with supervisor to agree work, literature survey, initial aims
- Supervision by post-docs/PhD students
- Final report in style of scientific paper
- Oral presentation, poster, viva





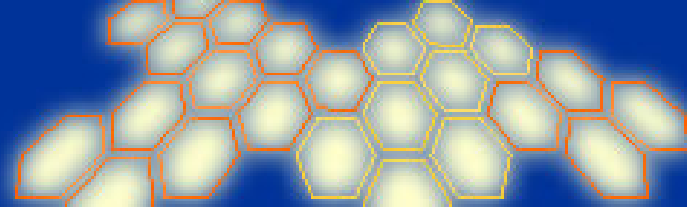
# Some observations

- How long it takes to make up one solution!
- Experiments need repeating, and how do you know when you have the right answer?
- Laboratory activity – frustration but also rewards and satisfaction (+ decision about career)
- Writing up – hard task, data incomplete, learning how to write, satisfaction, rewards



# Benchmark statements

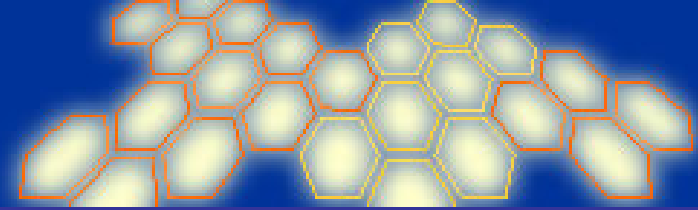
- The QAA Benchmark Statements for both Bioscience and Agriculture etc. emphasize the importance and desirability of offering projects
- "All honours degree students are expected to have some personal experience of the approach, practice and evaluation of scientific research (e.g. within a project or a research-based assignment). [Bioscience benchmark]"*



# Projects are expensive

- Projects are expensive in time and money
- Few departments provide the full economic cost for reagents, etc.
- Poor or poorly motivated students may just be throwing expensive chemicals down the sink

*Is what they learn useful in spheres other than science?*



## What to do about students who do not wish to continue with a career in science

- Offer taught courses instead?
- Offer “literature projects”?
- Offer “computer projects”
- Offer “community projects”
- Are there other “research-based assignments” that might be used?