

Biology Learning Goals

1.

- Process then content
- Design experiment
 - Hypothesis
 - Controls
- Distinguish valid science from “science entertainment”
- Read science in newspaper and distinguish fact and context
 - Reinterpret for grandmother/grandfather
- Read and critique scientific paper in their field
- Taking Material and Applying It
 - Material and energy flow in ecosystems
 - Evolution
 - Central dogma
 - Distinguishing character of “life”
 - Homeostasis
 - Energy production/transformation
 - Limits to population growth
- Content Competencies
 - Ability to:
 - Make connections

2.

- Course
 - SALG
 - Grading can become assessment
- Departmental
 - Beloit Biology survey-seniors
 - After college:
 - Post grad programs within three years
 - Employer responses
 - *Move from anecdotal to structured
 - Secretary, faculty member
 - Senior presentation
 - Rubrics
 - Outside evaluators
 - Satisfaction with major experience
 - Community
 - SALG
 - Salgsite.org

- Satisfaction with advising
 - Courses
 - Future
- Graduate
 - Survey after two years
- All college
 - Critical thinking skills
 - Divisional skills/goals
 - What do students need about science?

3.

- Biology
- Use “perspective” article on Chikungunya Fever to assess critical reading and understanding
- Explain in 1 paragraph to a friend traveling to Indian Ocean
- What are important unanswered research questions?
- Why is this important to study?
 - For health professionals
 - For scientists
- Use short primary research report to assess reading and understanding at level of research biologist

4.

- (First Eliminate Abstract)
- What is the gap in knowledge that this is trying to fill
 - What are research questions?
 - What are competing hypotheses?
- Why is choice of study, programs appropriate to question
- What are the broader implications of this study?
- Need negotiation about “good” answers
- Use these as assignments so that grading does double duty
- Use several times as part of senior experience
- Develop thesis
 - Reflection
- Support with evidence
- Organize
- Set up experiments
- Share and interpret data
 - Format
 - Conclude

- Lab/field as primary analysis

5. Scientific Manuscript

- Intro
 - Stating hypothesis
 - Accessible to well education
- Background
 - Build towards hypothesis
 - Pertinent, not everything
- Methods
 - Describe in detail so that it could be repeated
- Results
 - Learning to collate and present data in meaningful way
 - Organize to tell meaningful story
- Analysis
 - Appropriate statistics
 - Graphical analysis
- Conclusions
 - Clear, scientifically appropriate prose
 - Write for peers
- Format
 - References
 - No Wikipedia

6. Biology Assessments

- Content
- Goals
- Indirect departmental
 - SALG
 - Student Assessment of Learning Gains
 - www.salgsite.org
 - Surveys
 - Satisfaction
- Coordinate with other courses, depths
- Direct measures
 - Good, but easy
 - Checklist/rubrics while grading senior/capstone
 - Critically read primary literature in their field
 - Did student identify gaps in knowledge?
 - What are research questions?
 - Competing hypotheses

- Why is choice of organism, study appropriate?
- What are broader implications?
- Scientific manuscript (lab report) rubric
 - Intro
 - - Stating hypothesis
 - Background
 - Build toward hypotheses
 - Methods
 - Results
 - Analysis
 - Appropriate stats, graphs
 - Conclusions
 - Format

➤ Are the goals more important than the structure of curriculum?