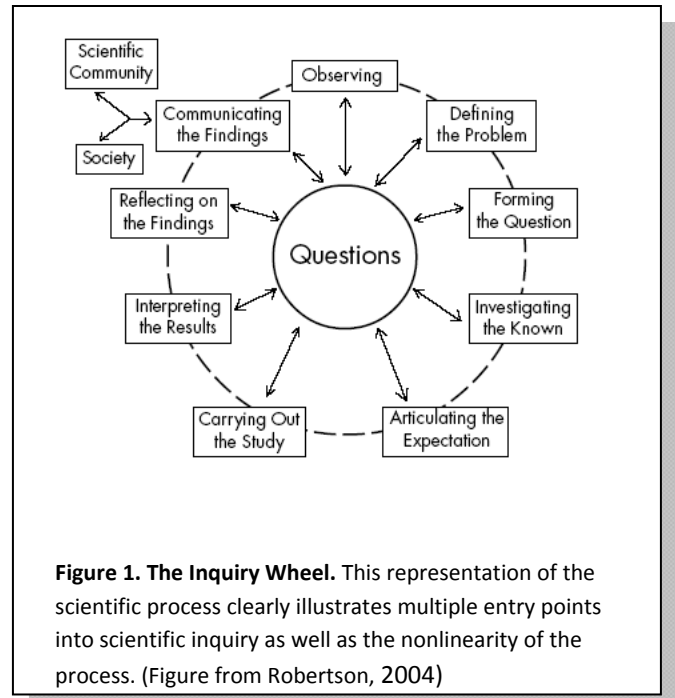


BIOQUEST FINAL PROJECT

Goals: 1) create a developmentally designed inquiry experience culminating in my BI375 course; 2) create a better designed (more focused) bioinformatics component to BI375; 3) add a stronger inquiry component to BI375 to meet SI expectations; and 4) develop summer research options utilizing bioinformatics.

Becoming Biologists Seminar (1st Year)

- Introduce inquiry wheel
- Introduce the basic of suitable literature searches



Zoology (2nd year)

- Bioinformatics exercise:
 - Building phylogenetic trees using (need resource)

Cell Biology (2nd year)

- Introduce lab techniques of spectrophotometry, dilutions, micro-volume measurements, agarose gel electrophoresis
- Introduce bioinformatics
 - [KEGG pathway](#) (see B. Goodner's project "Ammonifex degensii genome Annotation Project" in BioQuest resource book)
 - Bedrock [Enolase Problem Space](#) (ConSurf Server, PDB)
 - [Biology Esteem](#) module (e.g., BLAST)

Genetics (3rd year)

- Introduce techniques such as transformation, PCR, enzyme digestion
- Add bioinformatics

- [Biology Workbench](#) – Globin exercise (see Tools of HIV Problem Space)
- Biology Workbench - [Bedrock HIV Problem Space](#)

Future: the “adopt a bacterial genome” project described by C. Kerfeld in Undergraduate Genomics Research Initiative

Molecular Genetics/Senior Inquiry Experience (4th year)

- Develop confidence with limited number of lab techniques (PCR, enzyme digestion, agarose gel electrophoresis, DNA sequencing, DNA purification, cloning and transformation, micro-volume measurements, dilutions, spectrophotometry, basic microbial techniques)
 - Isolate yeast genomic DNA
 - Identify a suitable uncharacterized ORF using SGD
 - Clone the gene using PCR and standard cloning strategies
 - Confirm a putative clone through DNA sequencing
- Bioinformatics
 - Ask a set of meaningful questions regarding their chosen ORF
 - Use different bioinformatics resources to study their chosen ORF (*resources used in previous courses)
 - [Biology Workbench](#)*
 - Alignment tools (e.g., Boxshade)
 - Tree Building (e.g., ClustalW)
 - [NCBI](#)
 - [Taxbrowser](#)
 - [Genomic Biology](#) (includes tree building resource)
 - PubMed*
 - [SGB](#)
 - Cloning component (Primer design, Chromosome maps)
 - Annotation studies (e.g., Analysis and Tools, Homology & Comparison: PDB homologs, Protein Domains/Motifs)
 - Other limited bioinformatics resources for additional annotation studies
 - Blast*
 - KEGG*
 - ConSurf Server*
 - Follow their inquiry process through the inquiry wheel

Research beyond Molecular Genetics

- Consider extending projects from BI375
 - Knockout studies using cloned ORFs
 - Additional annotation studies on cloned ORFs
- New projects