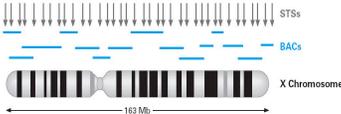


Helping Students Discover Genomics, Proteomics & Bioinformatics

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1 Goals

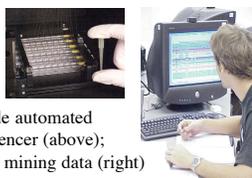
- Terms, concepts and methods
- Increasing genomic complexities
- Effectively use online resources
- Develop analytical skills
- Models for testable predictions



www.bio.davidson.edu/people/macampbell/ASCB/2002.html

4 Web Tools

- Methods
- Sequences
- 3D Structures
- Database Links



Inside automated sequencer (above); John mining data (right)



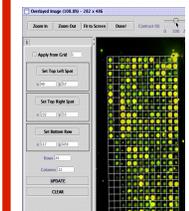
Megan views protein structure using 3D goggles.

Integrated web site provides easy access to tools and resources.

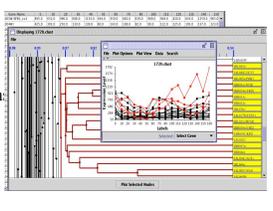
www.aw.com/genomics

7 MAGIC Tool

MicroArray Genome Imaging & Clustering Tool



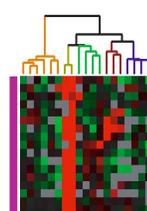
MAGIC Tool works on all platforms, perform: gridding, quantification, and clustering.



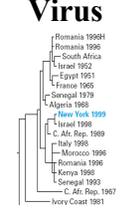
www.bio.davidson.edu/projects/GCAT/MAGICTool.html

2 Case-based Teaching

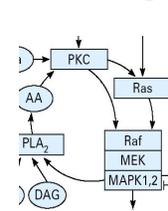
Cancer



West Nile Virus



Learning



Students learn in the context of interesting cases to improve motivation and retention.

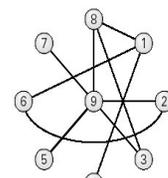
5 Biology and Math

$$\binom{n_1}{k_1} \binom{n_2}{k_2} \binom{n_3}{k_3} \dots \binom{n_M}{k_M}$$

$$\binom{N}{K}$$

i.e., $K = k_1 + k_2 + \dots + k_M$
 each of three different strains (a cell contains exactly 20 cells from

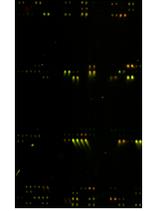
$$\binom{100}{20} \binom{100}{20} \binom{100}{20}$$

$$\binom{300}{60}$$


and 7 have degree 1; nodes 2, 3, node 9 has degree 5. The mean

Math Minutes explain the math behind the biology and increase math awareness.

8 Teaching Chips




Emily prepares her next experiment. Dan prints his custom DNA chip.

Teaching chips require no RNA isolation, have high success rate and are inexpensive.

www.bio.davidson.edu/projects/GCAT/teachingchip.html

3 Discovery Questions

- Focus
- Attention
- Analyze Data
- Mine
- Databases
- Build Models

Which enzymes exhibited the greatest duration of activity after the stimulus was removed?

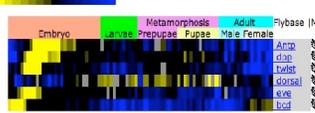
Perform a **BLASTn** search using the IS6110 sequence. Does this piece of DNA match anything besides *M. tuberculosis*?

Discovery Questions are embedded in the cases and help accomplish course goals.

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6 Assessment

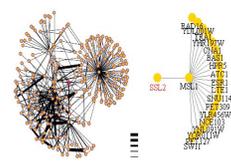
Tests



Test questions emphasize higher order thinking skills.

www.bio.davidson.edu/courses/genomics/Exams/exams.html

Assignments

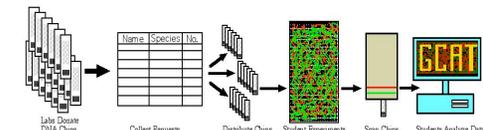


Web assignments improve comprehension and data mining skills.

www.bio.davidson.edu/courses/genomics/studentpages.html

9 GCAT

The Genome Consortium for Active Teaching



GCAT is dedicated to bringing genomics into the undergraduate curriculum.

- Affordable DNA Microarrays
- Student Friendly Protocols
- GCAT-L Listserv
- Free Software and Datasets
- Instant Community of Faculty
- Active Learning Assessment

www.bio.davidson.edu/GCAT

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