

BIOL 230: Cell & Molecular Biology

Laboratory Internet Activities

<http://vcell.ndsu.nodak.edu/animations/>

UNIT I: CELLS & BIOMOLECULES:

1. **Expt. 1: Microscopy and Cellular Structure**

- a. <http://micro.magnet.fsu.edu/primer/anatomy/kohler.html>
- b. <http://sun.menloschool.org/~cweaver/cells/index.html>
- c. <http://www.cellsalive.com/>
- d. <http://vcell.ndsu.nodak.edu/>
- e. <http://www.smccd.edu/accounts/staplesn/biol230/>

2. **Expt. 2: Identification & Separation of Cellular Biomolecules**

- a. <http://www.chemsoc.org/networks/learnnet/cfb/>
- b. <http://www.wiley.com/college/fob/quiz/quiz05/5-6.html>
- c. <http://mit.edu/7.02/resources/PBCresources.shtml>
- d. <http://employees.csbsju.edu/hjakubowski/classes/ch331/Techniques/TechChroma.htm>

3. **Expt. 3: Cellular Transport: Diffusion and Osmosis**

- a. http://www.wisc-online.com/objects/index_tj.asp?objID=AP11403
- b. <http://bcs.whfreeman.com/thelifewire/pages/bcs-main.asp?v=category&s=00020>
- c. http://www.wiley.com/legacy/college/boyer/0470003790/animations/membrane_transport/membrane_transport.htm
- d. <http://programs.northlandcollege.edu/biology/Biology1111/animations/transport1.html>
- e. <http://www.johnkyrk.com/>
(Explore the "Cell Membranes" and "Diffusion" topics.)
- f. <http://www.tvdsb.on.ca/westmin/science/sbi3a1/Cells/Osmosis.htm>
- g. http://www.wisc-online.com/objects/index_tj.asp?objid=AP1101
- h. http://www.wisc-online.com/objects/index_tj.asp?objID=AP11003

4. **Expt. 4: Spectrophotometry for Protein Quantitation & Micropipetting**

- a. <http://www.chm.davidson.edu/java/spec/spec.html>
- b. <http://www.wiley.com/legacy/college/boyer/0470003790/animations/animations.htm>
- c. <http://www.ruf.rice.edu/~bioslabs/methods/protein/spectrophotometer.html>
- d. <http://homepages.gac.edu/~cellab/appds/appd-g.html>
- e. ** <http://daniellegeorge.net/finished/play.html>
- f. http://www.biotech.iastate.edu/publications/ppt_presentations/html/DNAMicropipetteUseage/default.html

UNIT II: ENZYMES & METABOLISM:

5. Expt. 5: Quantitation and Regulation of Enzyme Activity

- a. <http://www.lewport.wnyric.org/JWANAMAKER/animations/Enzyme%20activity.html>
- b. <http://www.northland.cc.mn.us/biology/biology1111/animations/enzyme.html>
- c. http://highered.mcgraw-hill.com/sites/0072437316/student_view0/chapter8/animations.html#
- d. <http://www.stolaf.edu/people/giannini/flashanimat/enzymes/enzyme.swf>
- e. <http://www.tutorvista.com/content/chemistry/chemistry-iv/surface-chemistry/enzyme.php>
- f. <http://bcs.whfreeman.com/thelifewire/content/chp06/0602002.html>
- g. http://www.wiley.com/college/pratt/0471393878/student/animations/enzyme_inhibition/index.html

6. Expt. 6: Enzyme Separation and Identification by Native PAGE

- a. <http://www.vivo.colostate.edu/hbooks/genetics/biotech/gels/principles.html>
- b. http://people.rit.edu/pac8612/electro/Electro_Sim.html
- c. http://www.ap-lab.com/native_gels.htm
- d. <http://lifesciences.envmed.rochester.edu/animation.html>
(see Protein Electrophoresis)
- e. http://www.biotechlearn.org.nz/themes/from_genes_to_genomes/gel_electrophoresis

7. Expt. 7: Cellular Fermentation and Respiration

- a. ** <http://vcell.ndsu.nodak.edu/animations/etc/index.htm>
- b. ** <http://vcell.ndsu.nodak.edu/animations/atpgradient/index.htm>
- c. ** <http://www.johnkyrk.com/> -- Excellent animations for this whole course!!
 - i. Be sure to view and take notes on the [Glycolysis](#), [Krebs Cycle](#), and [Mitochondria](#) links.
 - ii. Also review any other links you like: such as [Cell Membranes](#), [Water](#), [Cell Function](#).
- d. <http://www.sp.uconn.edu/~terry/Common/respiration.html>
- e. <http://www.qcc.cuny.edu/BiologicalSciences/Faculty/DMeyer/respiration.html>

8. Expt. 8: Photosynthetic Pigments and the Light Reactions

- a. ** <http://www.sumanasinc.com/webcontent/anisamples/majorsbiology/harvestinglight.swf>
- b. ** <http://vcell.ndsu.nodak.edu/animations/photosystemII/index.htm>
- c. ** <http://vcell.ndsu.nodak.edu/animations/photosynthesis/index.htm>
- d. ** <http://www.science.smith.edu/departments/Biology/Bio231/ltrxn.html>
- e. ** <http://www.science.smith.edu/departments/Biology/Bio231/calvin.html>
- f. ** <http://www.taylor.edu/academics/acadDepts/biology/energetics/photo.htm>
 - Complete all Photosynthesis and Calvin Cycle learning modules.
- g. ** http://www.web.virginia.edu/gg_demo/movies/figure18_12b.html
- h. <http://www.johnkyrk.com/> -- Excellent animations for this whole course!!
 - Be sure to view and take notes on both the [Light Reactions](#), and [Dark Reactions](#) links.

UNIT III: MOLECULAR TECHNIQUES & BIOTECHNOLOGY:

9. Expt. 9: Extraction and Quantitation of Eukaryotic DNA

- a. <http://www.accessexcellence.org/RC/AB/BC/casestudy2.html>
- b. ** Interactive DNA extraction from the Genetic Science Learning Center!! :
 - <http://learn.genetics.utah.edu/units/biotech/extraction/>
- c. ** <http://207.207.4.198/pub/flash/24/menu.swf>
- d. <http://learn.genetics.utah.edu/units/basics/tour/dna.swf>
- e. PCR (see Techniques → Amplifying): <http://www.dnai.org/b/index.html>
- f. <http://www.johnkyrk.com/DNAanatomy.html>
- g. <http://www.dnai.org/a/index.html>
- h. http://academy.d20.co.edu/kadets/lundberg/DNA_animations/dna-structure.mov
- i. <http://www.stolaf.edu/people/giannini/flashanimat/molgenetics/dna-rna2.swf>
 - http://www.biotechnologyonline.gov.au/popups/int_splicing.cfm

10. Expt. 10: DNA Fingerprinting I: Restriction Enzymes & Agarose GE

- a. <http://www.dnai.org/d/index.html>
 - “Recovering the Romanovs” (complete all 3 sections)
- b. <http://www.royalty.nu/Europe/Russia/Anastasia.html>
- c. <http://www.wiley.com/legacy/college/boyer/0470003790/animations/agarose/agarose.htm>
- d. ** <http://www.dnai.org/b/index.html>
- e. ** <http://learn.genetics.utah.edu/units/biotech/gel/>
- f. <http://207.207.4.198/pub/flash/4/4.html>
- g. <http://www.tvdsb.on.ca/westmin/science/sbioac/genetics/Electro.htm>
- h. <http://www.dnalc.org/ddnalc/resources/electrophoresis.html>
- i. ** <http://www.dnalc.org/ddnalc/resources/shockwave/dnadetective.html>
- j. http://www.phschool.com/science/biology_place/biocoach/red/intro.html
- k. <http://www.dnalc.org/ddnalc/resources/restriction.html>
- l. <http://www.dnai.org/text/mediashowcase/index2.html?id=549>
- m. <http://bcs.whfreeman.com/thelifewire/content/chp17/1702001.html>

11. Expt. 11: DNA Fingerprinting II: The Polymerase Chain Reaction

- a. <http://learn.genetics.utah.edu/units/biotech/extraction/>
- b. <http://www.dnalc.org/resources/BiologyAnimationLibrary.htm>
- c. <http://www.dnalc.org/ddnalc/resources/shockwave/pcranwhole.html>
- d. <http://www.dnalc.org/ddnalc/resources/pcr.html>
- e. ** <http://www.dnai.org/b/index.html> → Manipulation → Techniques → Amplifying.
- f. <http://www.sumanasinc.com/webcontent/animations/content/pcr.html>
- g. <http://www.dnalc.org/ddnalc/resources/electrophoresis.html>
- h. <http://arbl.cvmbs.colostate.edu/hbooks/genetics/biotech/gels/>
- i. <http://www.dnai.org/b/index.html> → Manipulation → Techniques → Sorting & Sequencing – GEL ELECTROPHORESIS.

UNIT IV: MOLECULAR & MENDELIAN GENETICS (& GENE REGULATION):

12. Expt. 12: Prokaryotic Genetics: Transformation and Operon Regulation

- a. <http://www.dnalc.org/ddnalc/resources/transformation1.html>
- b. http://www.phschool.com/science/biology_place/labbench/lab6/intro.html
 - Complete all Transformation exercises. Read all background material.
- c. http://www.learner.org/channel/courses/biology/archive/animations/hires/a_infect3_h.html
- d. <http://www.sinauer.com/cooper/4e/animations0402.html>
- e. <http://vcell.ndsu.nodak.edu/animations/lacOperon/index.htm>
- f. <http://pagesperso-orange.fr/jean-jacques.auclair/pglo/animation.htm>
- g. <http://faculty.buffalostate.edu/mcmillam/problem%20spaces/Arabinose/arabindex.htm>

13. Expt. 13: Recombinant Expression & Purification of Protein

- a. Hydrophobic Interaction chromatography:
 - i. <http://employees.csbsju.edu/hjakubowski/classes/ch331/Techniques/TechChroma.htm>
 - ii. <http://askabiologist.asu.edu/expstuff/mamajis/chromatography/chromatography.html>
 - iii. http://www6.gelifesciences.com/aptrix/upp00919.nsf/Content/LabSep_EduC-LC_tech-HIC-HICBas
- b. <http://www.sciencelauncher.com/SDS-PAGE.html>
- c. <http://www.cofc.edu/~delliss/virtuallabbook/AcrylGelElect/AcrylGel1.html>
- d. <http://www.cofc.edu/~delliss/virtuallabbook/AcrylGelElect/AcrylGel2.html>
- e. http://people.rit.edu/pac8612/electro/Electro_Sim.html

14. Expt. 14: Mitosis, Meiosis, & Cytokinesis ** (Required in Pre-Lab!!)

- a. http://www.biology.arizona.edu/Cell_bio/tutorials/cell_cycle/main.html
- b. http://highered.mcgraw-hill.com/sites/0073031216/student_view0/exercise13/mitosis_movie.html
- c. http://highered.mcgraw-hill.com/sites/0073031216/student_view0/exercise14/meiosis_movie.html
- d. <http://www.cellsalive.com/>
- e. <http://tutor.lscf.ucsb.edu/mcdb/tutorial/meiosis/>
- f. http://www.biologyinmotion.com/cell_division/index.html
- g. <http://qslc.genetics.utah.edu/>

15. Expt. 15: Fertilization & Human Genetics ** (Required in Pre-Lab!!)

- a. <http://sonic.net/~nbs/projects/anthro201/>
- b. ** <http://sonic.net/~nbs/projects/anthro201/exper/>
- c. http://biologica.concord.org/webtest1/web_labs.htm
- d. ** <http://molo.concord.org/database/activities/30.html>
- e. <http://science.nhmccd.edu/biol/genetics.html>
- f. http://www.biology.arizona.edu/mendelian_genetics/mendelian_genetics.html
 - <http://www.ndsu.nodak.edu/instruct/mcclean/plsc431/mendel/mendel1.htm>

<http://www.learner.org/channel/courses/biology/archive/animations.html>