Unit 3 – Genetics (Revised 2013)

(1) U3 – Purebred
This web page from the American Kennel Club illustrates the traits that are selectively bred for in the breed known as the Newfoundland dog. Remember how Mendel created a purebred line of tall peas.
http://www.akc.org/breeds/newfoundland/
http://ourworldofdogs.com/saluki/

(2) U3 – Monohybrid Cross (Law of Segregation)
This animation illustrates a monohybrid cross. Remember monohybrid crosses illustrate the Law of Segregation Note that some of the Punnett Squares used could be simplified.
http://www.siskiyous.edu/class/bio1/genetics/monohybrid_v2.html

(3) U3 - Test Cross
The following animations illustrate a test cross (also called a back cross).
http://www.cengage.com/biology/discipline_content/animations/test_cross.html
http://www.goldiesroom.org/Shockwave_Pages/REG-18-testcross.htm
http://nhscience.lonestar.edu/biol//monohybr/test.html
http://www.saburchill.com/IBbiology/chapters03/003.html

(4) U3 - Dihybrid Cross (Law of Independent Assortment)
This animation illustrates a dihybrid cross. It points out that the 9:3:3:1 ratio in the F2 generation is proof of the independent assortment of alleles.
http://www.siskiyous.edu/class/bio1/genetics/dihybrid_v2.html

(5) U3 - Incomplete Dominance
This animation explores incomplete dominance. The example used is for snapdragon flower color. Note that the animation uses R1 and R2 instead of R and R'.
https://smartsite.ucdavis.edu/access/content/user/00002950/bis10v/media/ch08/snapdragon_crosses.html

(6) U3 – Codominance
This animation illustrates the codominance inheritance pattern in roan horses (red and white). Note that the format of two different capital letters is in the superscript.
http://www.yteach.co.uk/page.php/resources/view_all?id=dominance_recessivity_alleles_heterozygote_homozygote_genotype_phenotype_co_dominance_multiple_alleles_chromosome_Punnett_square_sickle_cell_anaemia_epistasis_generation__globin_blood_F1_generation_gametes&from=search
http://www.flickr.com/photos/ardenshelton/2353389619/
http://straightfromthehorsesmouth2you.files.wordpress.com/2011/10/red-roan.jpg

(7) U3 - Complete, Incomplete and Codominance Summary
This weblab animation provides an interactive summary of complete dominance, incomplete dominance and codominance.
http://www2.edc.org/weblabs/incompletedom/incompletedominance.html

http://www2.edc.org/weblabs/incompletedom/incompletedominancemenu.html

(8) Multiple Alleles
http://www.youtube.com/watch?v=ROL5ekow-Y4

(9) Polygenic / Multiple Gene Inheritance
This animation examines human skin color which is governed by polygenic inheritance.
http://www.tutorvista.com/content/biology/biology-iii/heredity-and-variation/polygenic-inheritance.php

(10) U3 - Sex Linked Inheritance
This animation illustrates the work of Thomas Morgan and Punnett squares involving sex linked genes.
http://www.dnaftb.org/dnaftb/10/animation/fs.html

(11) U3 - DNA Structure
This animation illustrates the structure of the double helix and the concepts of complimentary and anti-parallel. Click on "DNA Structure".
http://dnamazing.com/wp-content/uploads/2008/02/watson-crick-dna.jpg
http://learn.genetics.utah.edu/content/begin/dna/builddna/
http://student.ccbcmd.edu/courses/bio141/lecguide/unit6/genetics/DNA/DNArep/dnareppr.html
http://www.dnai.org/a/index.html
http://www.hhmi.org/biointeractive/coding-sequences-dna

(12) U3 - Phoebus Levene
This slide show highlights the contribution of Phoebus Levene in searching for the molecule of heredity. Advance 15 clicks into the show to view his work.
http://www.learnerstv.com/animation/biology/con15ani.swf

(13) U3 - Fred Griffith
This animation highlights the work of Fred Griffith in searching for the molecule of heredity. He used mice & 2 types of bacteria and noted some "transforming principle".
http://nortonbooks.com/college/biology/animations/ch12a01.htm
http://www.quia.com/files/quia/users/hlrbiology/Animations/08_DNA_and_Proteins/Griffith_Mouse_Experiment.swf
http://www.dnalc.org/view/16375-Animation-17-A-gene-is-made-of-DNA-.html

(14) U3 - Avery, MacLeod & McCarty
This animation illustrates the work of Avery, MacLeod & McCarty. Their work suggested that DNA was the "transforming principle"...the molecule of inheritance.
http://sites.sinauer.com/cooper5e/animation0401.html
http://www.dnaftb.org/17/animation.html

(15) U3 - Erwin Chargaff
This animation highlights the contribution of Erwin Chargaff: Chargaff's Rule A=T & C=G.

http://www.dnalc.org/view/15495-Chargaff-s-ratios-3D-animation-with-narration.html
http://www.dnalc.org/view/15251-Discovering-the-rules-of-complementary-base-pairing-Erwin-Chargaff.html

(16) U3 - Rosalind Franklin and Maurice Wilkins
This animation illustrates the work of Rosalind Franklin and Maurice Wilkins. They identified the helical structure of DNA.
http://www.pbs.org/wgbh/nova/photo51/anat-flash.html

(17) U3 - Alfred Hersey and Martha Chase
This animation illustrates the experiments of Alfred Hersey and Martha Chase. They used bacteria that attack viruses (phages) to provide the final evidence that DNA was the molecule of inheritance.
http://science.jburroughs.org/mbahe/BioA/starranimations/chapter8/videos_animations/bacteriophage_studies.html
http://highered.mcgraw-hill.com/olc/dl/120076/bio21.swf

(18) U3 - Francis Crick & James Watson
This animation illustrates the double helix model of DNA proposed by Watson & Crick. It begins with a review of the work of other scientists that assisted in their conclusions. Click on "Animation".
http://www.dnaftb.org/dnaftb/19/concept/index.html
http://www.dnalc.org/view/15452-Discovering-the-double-helix-structure-James-Watson-.html
http://www.dnalc.org/view/15492-Discovering-the-double-helix-structure-of-DNA-James-Watson-video-with-3D-animation-and-narration.html
http://en.wikipedia.org/wiki/The_Eagle_(pub)

(19) U3 - DNA Replication
This animation illustrates the process of DNA replication or synthesis (doubling). Note the functions of each enzyme in the process.
http://www.pbs.org/wgbh/aso/tryit/dna/shockwave.html
http://www.bioteach.ubc.ca/TeachingResources/MolecularBiology/DNAReplication.swf

(20) U3 – Protein Synthesis
This animation will provide practice in the process of protein synthesis.
http://learn.genetics.utah.edu/content/begin/dna/transcribe/
http://www.pbs.org/wgbh/aso/tryit/dna/shockwave.html
http://www.learnerstv.com/animation/biology/Proteinsynthesis.swf

(21) U3 – Point Mutations
The following animation provides examples of both types of point mutations (a) substitutions (b) insertions OR deletions.
http://media.wwnorton.com/college/biology/animations/ch13a08.swf
http://highered.mcgraw-hill.com/sites/0072552980/student_view0/chapter9/animation_quiz_5.html

http://ishanwadibiotechnology.blogspot.ca/2008/12/mutation-animation.html

(22) U3 – Chromosomal Mutations
The following animation illustrates the various types of larger chromosome mutations: deletions, inversions, duplications (additions) and translocations.
http://highered.mcgraw-hill.com/sites/0070960526/student_view0/chapter18/animation_quiz_1.html

(23) U3 – Pedigree
This animation provides the basics of understanding a pedigree.
http://www.dnalc.org/view/15990-Making-a-pedigree.html
http://www.dnalc.org/view/16315-Animation-13-Mendelian-laws-apply-to-human-beings-.html
http://www.zerobio.com/drag_gr11/pedigree11_flash.htm
http://www.learnerstv.com/animation/animation.php?ani=13&cat=biology

(24) U3 - Genetic Counselling
This short video discusses the genetic counselling session.
http://www.videojug.com/interview/prenatal-genetic-counseling
http://www.youtube.com/watch?v=DjmVPD0gZWk

(25) U3 – Genetic Markers
These slides show how genetic markers can be sued to trace human origins out of Africa.
http://www.hhmi.org/biointeractive/genomics/Origins/01.html

(26) U3 - Gene Therapy
This animation illustrates the process of gene therapy. Gene therapy has been used to treat some genetic disorder.
http://www.edu365.cat/aulanet/comsoc/Lab_bio/simulacions/GeneTherapy/GeneTherapy.htm
http://learn.genetics.utah.edu/content/tech/genetherapy/cysticfibrosis/build.html

(27) U3 - Genetic Engineering (DNA Cutting - Restriction Enzymes)
The following animation illustrates an example of genetic engineering. Restriction enzymes (biological scissors) make cuts in the DNA molecule leaving sticky ends.
http://sites.sinauer.com/cooper5e/animation0406.html
http://highered.mcgraw-hill.com/olc/dl/120078/bio37.swf
http://www.dnalc.org/resources/animations/restriction.html

(28) U3 - Genetic Engineering (DNA Amplification - Bacterial Vector)
The following animation illustrates how a needed sequence of DNA can be amplified by using a bacterial vector and restriction enzymes.
http://www.rvc.ac.uk/Review/DNA_1/1b_Insertion.cfm
http://sites.sinauer.com/cooper5e/animation0407.html

(29) U3 – Genetic Engineering (DNA Amplification – PCR)
This animation illustrates how a small sample of DNA can be copied many times in an automated mechanical reaction: Polymerase Chain Reaction (DNA Soup).

http://sites.sinauer.com/cooper5e/animation0409.html
http://highered.mcgraw-hill.com/olc/dl/120078/micro15.swf
http://www.dnalc.org/resources/animations/pcr.html

(30) U3 - Genetic Engineering (DNA Sorting - Gel Electrophoresis)
This animated activity allows you to identify the correct suspect based on their unique DNA fingerprint.
http://www.pbs.org/wgbh/nova/sheppard/lab01.html
http://www.dnalc.org/resources/animations/gelelectrophoresis.html
http://www.sumanasinc.com/webcontent/animations/content/gelelectrophoresis.html

(31) U3 – Human Genome Project
This animation provides a summary of this project which provided the sequence of all of the nitrogen bases in human DNA.
http://www.genome.gov/Edkit/flash/intro.html
http://www.dnalc.org/view/15489-Human-Genome-Project-Sequencing-3D-animation-with-basic-narration.html

(32) U3 – Genetically Modified Organisms
This animation provides the typical steps in the genetic engineering of a new plant.
http://cls.casa.colostate.edu/TransgenicCrops/flash/Overview.swf
http://en.wikipedia.org/wiki/Bovine_somatotropin
http://wapedia.mobi/en/Genetically_modified_food
http://en.wikipedia.org/wiki/Insulin#As_a_medication
http://en.wikipedia.org/wiki/Golden_rice