KAP Biology
Instructor: Ms. Nord
Independence High School
2016-2017 Course Syllabus

UNIT 1

Day	Topic	Reading and Work (to be read by the day it is covered in class)
1	Introduction Go over summer assignment:	Do: Set up plant seeds Cabbage white collection data Review: The Pillars of Life Chp 1 through 1.4
2	Isopods	Do: Make isopod environment and discuss project
3	What is life?	Biology and Tree of Life pwrpt Do: Bioskills 3 (found in back of book)
4	Phylogenetic Tree	Do: Cladogram activity
5	Prokaryotic Cell Structure Classification	Read: Chp 7.1 Chp 28 (pp. 496-497 including Table 28.1) Pg 280 "Dissecting the Central Dogma" Do: Prokaryote W.S.
6	Poster creations	Discuss posters for Yorktown and content
7	Atoms and basic chemistry review	Read: Chp 2 (sec. 2.1, 2.2, 2.4) Chemistry Basics pwrpt slides 1-11 HW: Bioskills 6
8	Water, acids and bases, pH	Chemistry Basics pwrpt slides 12-30 Do: Acid and Base lab from PowerPoint
9	Water	Do: Drop in Bucket Lab
10	Functional Groups	Functional Group pwrpt HW: Functional Group Flashcards
11	Free Energy	Read: Chp 2 (sec. 3) Do: Energy Lab (Gibbs free-energy)
12	Origin of Life, amino acids *Quiz #1- take home* Due: Wednesday	Read: Chp 3 pp. 38-45, 51 (enzymes: an introduction to catalysis)-56 Read: Grey hair article (abstract and results) How does this relate to our unit of study in Chapter 3? Due: Monday Protein pwrpt (slides 1-16) Do: wire protein model as a class
13	Proteins	Do: Go through catalase lab set up on LabBench site; set up equipment
14	Enzymes	Do: Complete catalase lab
15	Enzymes continued	Protein pwrpt (slides 15-38)
16	Nucleic Acids	Read: Chp 4 Nucleic Acid pwrpt HW: Work through website: http://www.dnaftb.org/15/animation.html Do: Extracting student DNA
17	Membranes	Read: Chp 6 through p. 93

		Do: Bubble Membrane Lab and Milk Lab
18	Diffusion and Osmosis	Do: Set up Egg and Corn Starch labs; Complete Cell Size Lab
19	Diffusion and Osmosis	Do: Diffusion (tea) and Osmosis (sucrose) Lab
20	Water Potential and Osmosis	Do: Set up Water Potential Lab Complete Onion Plasmolysis Lab
21	Eukaryotic Cell	Read: Chp 7.2 – 7.3; Chp 29 pp. 526-533 Do: Endosymbiosis bag activity HW: Cell Coloring
22	Cell Cytoskeleton	Read: Chp 7.6 Do: Watch as class begins: https://www.youtube.com/watch?v=5rqbmLiSkpk Work through website in class: http://www.wiley.com/college/pratt/0471393878/stumations/actin_myosin/actin_myosin.swf
23	Completion Day	Do: Complete any undone work or labs Begin preparing "cheat sheet"
24	Exam Unit 1	Bring: 1-sided notebook paper "cheat sheet"

UNIT 2

Day	Topic	Reading and Work (to be read by the day it is covered in class)
1	Cell respiration overview; Carbohydrates; ATP; Redox	Read: Chp 5 Chp 9 (pp. 148-154 = start through section 9.2) https://education-portal.com/academy/lesson/cellular-respiration-energy-transfer-in-cells.html#lesson Do: Carbohydrate PowerPoint
2	ATP; Redox	Do: ATP models https://www.youtube.com/watch?v=3y1dO4nNaKY Redox demonstration / team https://education-portal.com/academy/lesson/redox-oxidation-reductoin-reactions-and-electron-carriers.html#lesson http://www.calgaryacademy.com/ICT/rr/redox4.html
3	Redox Problems Quiz #2 Due: 2 days	http://www.occc.edu/kmbailey/chem1115tutorials/oxidation_numbers.htm (as a class) Do: Redox problems HW: Any left over problems
4	Metabolic pathways; Enzymes; Protein folding	Read: Chp 3 (sections 3.4 and 3.5) Review pH pg. 25-26 Do: Enzyme Catalysis Lab HW: BioSkills 7 (using logarithms)
5	Enzymes	Do: Finish Enzyme Catalysis Lab
6	Protein folding	Do: Protein folding with toobers
7	Glycolysis	Read: Chp 9 (sections 9.3, 9.7) https://education-

		portal.com/academy/lesson/anaerobic-respiration-glycolysis.html#lesson Overview: http://highered.mheducation.com/sites/0072507470/student_view0/chapter25/animation__how_glycolysis_works.html In detail: http://vcell.ndsu.nodak.edu/animations/glycolysis_reactions/index.htm HW: Finish worksheet if not completed in class
8	Fermentation Citric Acid Cycle	Read: Chp 9 (sections 9.4, 9.5, 9.7) https://education-portal.com/academy/lesson/aerobic-respiration-i-the-citric-acid-kreb-cycle.html#lesson
9	Oxidative phosphorylation Quiz #3 Due: tomorrow	https://education-portal.com/academy/lesson/aerobic-respiration-ii-the-electron-transport-chain.html#lesson
10	Respiration in action	Do: Yeast and Sucrose Concentration Lab
11	Respiration Recap	Do: Cellular Respiration PowerPoint https://www.youtube.com/watch?v=xbJ0nbzt5Kw
12	Respiration vs Photosynthesis	Do: Respiration vs Photosynthesis Lab
13	Photosynthesis overview	Read: Chp 10 (pages 172-174) Do: Photosynthesis Overview WS as a class
14	Light reactions	Read: Chp 10 (sections 10.2, 10.3) Do: Go to computer lab and work through site, taking notes and answering quiz questions http://www.wiley.com/college/boyer/0470003790/animations/photosynthesis/photosynthesis.htm
15	Calvin Cycle C3 and C4 plants	Read: Chp 10 (section 10.4 to end) http://www.cengage.com/biology/discipline_content/animations/carbon_fixing.html Do: Complete worksheet along with website
16	Photosynthesis Wrap-up	Do: Photosynthesis PowerPoint
17	Plant nutrition Nitrogen fixation	Read: Chapter 38 Do: Bring in plants you have been growing and discuss nutritional steps you have taken
18	Biogeochemical Cycles Summary of Metabolism	Read: Chp 54 (section 54.2 focusing on N cycle) Chp 9 (section 9.8) Global change (pages 509-512) Do: Go to computer lab and begin creating a group PowerPoint presentation. Be sure to include the roll of nitrogen fixation, nitrogen cycle, biogeochemical cycles, and the importance to metabolism within the cell.
19	Wrap-up of Cycles and	Do: Complete your presentations

	Metabolism	
20	Cycles and Metabolism	Do: Present your PowerPoint presentations
21	Exam Unit 2	Bring: 1-sided notebook paper "cheat sheet"

UNIT 3

Day	Topic	Reading and Work (to be read by the day it is covered in class)
1	Multicellularity; Adjacent cell signaling overview	Read: Chp 8 (sections 8.2-8.3) Do: Cell to Cell Interactions PowerPoint HW: Work your way through the quizzes on website: http://www.biology.arizona.edu/cell_bio/problem_sets/signaling/Index.html
2	Distant cell signaling	-https://education-portal.com/academy/lesson/signal-reception-and-transduction-in-cells.html#lesson -https://education-portal.com/academy/lesson/signal-transduction-pathways-of-cells.html#lesson -https://education-portal.com/academy/lesson/cellular-responses-to-signals.html#lesson Do: Fill in note sheet
3	Chemical signals in animals	Read: Chp 47 (pp. 929-935, 937-938) Do: Chemical Signal PowerPoint Hormone WS (finish for HW if not complete)
4	Hormones and the endocrine system	Read: Chp 47 (section 47.4) Do: Watch animation http://sites.sinauer.com/psychopharm2e/animations03.03.html HW: Go to website and read through all 3 core concepts http://www.vivo.colostate.edu/hbooks/pathphys/endocrine/moaction/index.html
5	Protein targeting	Read: Chp 7 (sections 7.4 – 7.5) Do: Work through website in class; step through http://sites.sinauer.com/cooper6e/animation0901.html HW: Bioskills 9
6	Protein targeting continued	Do: Discuss endomembrane system Work through website on Pulse-Chase http://www.sumanasinc.com/webcontent/animations/content/pulsechase/pulsechase.html (pre and post quiz) Discuss Signal Hypothesis (diagram)
7	Animal hormones – glucose regulation	Read: Chp 43 (section 43.4) Chp 47 (section 47.3) Do: Go through websites http://bcs.whfreeman.com/thelifewire/content/chp50/5002s.swf http://bcs.whfreeman.com/thelifewire/content/chp42/4202s.swf

		http://bcs.whfreeman.com/thelifewire/content/chp42/4202a.swf
8	Plant light sensing Quiz #4	Read: Chp 39 (pp. 755-762) Do: Set up geotropism and phototropism labs Discuss phytochrome signaling http://highered.mheducation.com/sites/9834092339/student_view0/chapter41/animation__-_phytochrome_signaling.html Bring in your plants and results from your experiments with your partners
9	Membranes Electrical signals	Read: Chp 6 (section 6.3, pp. 94-99…review) Chp 45 (section 45.1) https://education-portal.com/academy/lesson/neurons.html#lesson Do: Neuron WS along with website and take notes https://education-portal.com/academy/lesson/neurotransmitters.html#lesson
10	Action Potentials	http://highered.mheducation.com/sites/0072495855/student_view0/chapter14/animation__the_nerve_impulse.html Do: Resting and Action Potential of a Neuron WS in groups and share
11	Neurons Nervous system	Read: Chp 45 (sections 45.2-45.4) Do: The Central Nervous System WS HW: Brain Labeling WS
12	Neuron recap	Do: Connect the Neurons activity
13	Sensory systems	Read: Chp 46 (sections 46.1, 46.4) Do: Make Sense of Your Senses Lab
14	Taste and Smell	Do: Did You Smell What I Tasted Lab
15	Animal behavior Thermoregulation	Read: Chp 51 (pp. 1019-1020) Chp 41 (pp. 803-804; sections 41.3-41.5) Do: There Is No Place Like Homeostasis activity
16	Muscles	Do: Work through website http://www.wiley.com/college/pratt/0471393878/student/animations/actin_myosin/actin_myosin.swf HW: Review websites: http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter10/animation__myofilament_contraction.html http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter10/animation__sarcomere_contraction.html
17	Exam 3	Bring: Notebook paper “cheat sheet”

UNIT 4

Day	Topic	Reading and Work (to be read by the day it is covered in class)
1	Plant diversity and structure	Read: Chp 30 (pages 546-555) Do: Plant Part Placement
2	Plant cells and tissues	Read: Chp 36 (section 3) Do: Go over in class: http://www.phschool.com/science/biology_place/biocoach/plants/intro.html (through concept 6) https://education-portal.com/academy/lesson/structure-of-plant-stems-vascular-and-ground-tissue.html#lesson
3	Plant cells and tissues	Do: Let's Root Out the Truth Lab Root of the Problem slides HW: Finish Root of the Problem W.S.
4	Transport, water balance in plants	Read: Chp 37 Do: What Stems from this Investigation http://www.uic.edu/classes/bios/bios100/f06pm/transport.htm HW: Go to website and read the entire page. Click on all blue terms to see diagrams
5	Water and electrolyte balance in animals	Read: Chp 42 (sections 42.1-42.3) Do: PowerPoint slides 1-18
6	Water and electrolyte balance in animals	Do: PowerPoint slides 19-35 Hand out Water and Electrolyte note sheet
7	Ecology – introduction, population ecology Quiz #5	Read: Chp 50 (intro and 5.1); Chp 52.1 Do: Encountering Ecology activity HW: Life Expectancy and Diabetes Article
8	Limits to populations, population dynamics	Read: Chp 52 (section 52.2-52.4) Do: Population Dynamics PowerPoint
9	Community ecology – species interactions	Read: Chp 53 (52.1) Do: Community Ecology PowerPoint with guided notes
10	Community ecology – structure and dynamics	Read: Chp 53 (section 53.2-53.3) Do: Work through website scenarios as a class http://www.mrphome.net/mrp/succession.swf Complete Ecological Succession worksheet
11	Ecosystems – energy flow, human impacts	Read: Chp 54 (sections 54.1 & 54.3) and Chp 50.3 Do: PowerPoint Go to website and work through experiment: http://www.phschool.com/science/biology_place/labbench/lab12/intro.html HW: Dissolved Oxygen lab sheet
12	Biodiversity	Read: Chp 55 (sections 55.1-2) Do: Modified NOW activity
13	Extinction and species conservation	Read: Chp 55 (sections 55.3-4) Do: Complete NOW activity
14	EXAM 4	Bring: Notebook paper "cheat sheet"

UNIT 5

Day	Topic	Reading and Work (to be read by the day it is covered in class)
1	DNA Structure	Read: Chp 4 (sections 4.1-2) Do: PowerPoint slides 1-12
2	DNA Structure continued: chromatin	Read: Chp 18.2 Chp 14 (sections 1-3) Do: Finish PowerPoint slides 13-23 HW: Bioskills 10
3	DNA Structure lecture review and telomeres	Read: Chp 14.4 Do: MIT notes video as review https://www.youtube.com/watch?v=DRBREvFL19g HW: Write a synopsis of Chp 14-4
4	Electrophoresis Quiz	Do: virtual labs (DNA extraction and gel electrophoresis) http://learn.genetics.utah.edu/content/labs/extraction/ http://learn.genetics.utah.edu/content/labs/gel/ HW: Finish questions for the labs Complete "Crime DNA" virtual lab https://www.classzone.com/books/hs/ca/sc/bio_07/virtual_labs/virtualLabs.html
5	Mitosis	Read: Chp 11 (sections beginning -11.2) Do: Go through website http://bcs.whfreeman.com/thelifewire/content/chp09/0902001.html Complete "Mitosis in my Shoes" WS
6	Meiosis	Read: Chp 12 (all except section 12.3) Do: Go through website http://bcs.whfreeman.com/thelifewire/content/chp09/0902002.html View meiosis slide show
7	Mendelian inheritance	Read: Chp 13 (pp. 230-240) Do: Review Punnet Squares M&M and Chi Square activity HW: Bioskills 13
8	Sex-linked traits, recombination	Read: Chp 13 (pp. 241-244) and box on pg. 246 Do: Drosophila simulation http://www.sciencecourseware.org/vcise/
9	Sex-linked and lethal traits	Do: Complete Drosophila simulation
10	EXAM 5	Bring: Notebook paper "cheat sheet"

UNIT 6

Day	Topic	Reading and Work (to be read by the day it is covered in class)
1	Gene mapping, Pedigrees, Non-Mendelian genetics	Read: Chp 13 (sections 5-6) Chp 19.4 Do: On SmartBoard as a class: http://teach.genetics.utah.edu/content/begin/dna/findagene.pdf How to make a linkage map based on phenotype of Offspring HW: Genetic Mapping WS
2	How genes work	Read: Chp 15 (intro – 15.3) Do: As a class: http://wps.prenhall.com/wps/media/objects/1552/1589869/web_tut/21_04/21_04_01a.swf HW: Work through: http://www.dnalc.org/view/16360-Animation-16-One-gene-makes-one-protein-.html
3	RNA, Transcription	Read: Chp 4.3 Chp 16 (intro – 16.1) Do: Watch protein synthesis movie clip DNA vs RNA PowerPoint http://www.professorcrista.com/files/animations/posted_animations/transcription_process.swf HW: Work through site through Transcription tab http://www.wiley.com/college/test/0471787159/biology_basics/animations/fromGeneToProtein.swf
4	Eukaryotic transcription and splicing	Read: Chp 16.2, pp. 368-369 (Why do humans have so few genes?), pg. 328 (alternative splicing of mRNAs) Do: Work through sites as a class http://www.phschool.com/science/biology_place/biocoach/transcription/intro.html http://bcs.whfreeman.com/thelifewire/content/chp12/1202001.html HW: Work through RNA Processing tab http://www.wiley.com/college/test/0471787159/biology_basics/animations/fromGeneToProtein.swf
5	Translation	Read: Chp 16 (sections 3-5) Do: From Gene to Protein HW: Work through Translation to Summary to Quiz http://www.wiley.com/college/test/0471787159/biology_basics/animations/fromGeneToProtein.swf
6	DNA Mutation and repair	Read: Chp 14.5 Chp 15.4 Do: Mutation types PowerPoint HW: Gene and Chromosome Mutations WS
7	DNA Sequencing	Read: Chp 19 (intro – 19.3)

	and Plasmid cloning	Do: Cloning a paper plasmid Work through bacteria reproduction WS HW: Learn Summary Table 19.1, pp. 352-353
8	DNA Sequencing Cont'd	Do: Restriction Enzyme Simulation HW: DNA Sequencing Article
9	EXAM 6	Bring: Notebook paper "cheat sheet"

UNIT 7

Day	Topic	Reading and Work (to be read by the day it is covered in class)
1	Darwin and evidence for evolution	Read: Chp 1.3 Chp 24 (intro, sections 1-3) Do: Darwinian View of Life Activity HW: Sea Louse article
2	Natural selection	Read: Chp 24 (sections 4-5) Do: As a class: http://evolution.berkeley.edu/evolibrary/article/similarity_hs_01 HW: Write synopsis of 2 case studies (pp. 424-428)
3	Natural selection	Read: Chp 24 (sections 4-5) Do: Work through Bozeman site on Hardy-Weinberg https://www.youtube.com/watch?v=xPkOAnK20kw HW: Hardy-Weinberg problems
4	Natural selection	Read: Chp 25.1 Do: Teddy Grahams Lab HW: Completely go through website to familiarize yourself with tomorrow's lab: http://www.phschool.com/science/biology_place/labbench/lab8/intro.html
5	Evolutionary processes	Read: Chp 25 (sections 1 and 3) Do: Population genetics lab (AP lab #8) HW: Complete lab computations and questions
6	Evolutionary processes	Read: Chp 25 (sections 2,4,5) Do: Drift Worm activity (genetic drift)
7	Evolutionary processes	Read: Chp 25.6 Do: Speciation PwrPt HW: Sexual selection / speciation WS
8	Speciation	Read: Chp 26 (intro, sections 1-2) Do: Finish PwrPt
9	Speciation	Read: Chp 26 (sections 3-4) Do: As a class: http://wps.prenhall.com/esm_freeman_biosci_1/0,6452,499573-,00.html
10	Phylogenies	Read: Chp 1.4 Chp 27 (intro, sections 1-2) Do: Review of geologic timeline: http://www.ucmp.berkeley.edu/education/explorations/tours/geotime/index.html

		Who's on First? part A
11	Phylogenies	Read: Chp 27 (sections 3-4) Do: Who's on First? part B http://evolution.berkeley.edu/evolibrary/article/phylogenetics_01 HW: Begin research on kingdom phylogeny assigned
12	Phylogenies	Do: Go to computer lab and work through site: http://archive.peabody.yale.edu/exhibits/treeoflife/learn.html
13	Phylogenies	Do: Create phylogeny poster HW: Complete poster
14	EXAM 7	Bring: Notebook paper "cheat sheet"