

Fast Paced High School Biology CTY Course Syllabus

Day 1 Monday Science and what it means to be alive	Morning	Introduction to class Scientific method Rising Temps c.s.	
	Afternoon	Scientific Inquiry lab	Scientific inquiry lab: - Nutrient Agar, Prepared Media Plates 100 x 15 mm, Pack 10 (Carolina 821862) - Sterile cotton tipped applicators (Wards 14 V 5502) - Incubator - Wax pencils/sharpies - Liquid hand soaps with Triclosan and without Triclosan - Sterilized water
	Evening	Unifying themes of life Nanobacteria c.s.	
Day 2 Tuesday Biochemistry	Morning	Inorganic Chemistry Peer teaching: Students will be broken into groups and assigned a chemistry topic. Using textbooks, students will investigate the topic and then present to their peers. The topics include: 1. Atomic Structure 2. Periodic Table 3. Bonding 4. pH 5. Water and its properties	Poster/large paper and markers
	Afternoon	Organic chemistry and macromolecules	Molecular models
	Evening	Scientific method Finish lab exercise from Day 1	Computers
Day 3 Wednesday Cell Structure and Function	Morning	Little Mito c.s. Cell Lecture: - Cell theory and size - Structures, functions, and interactions of cellular organelles - Cell types Observation of cell types	Colored pencils Microscopes; slides of bacteria and eukaryotes
	Afternoon	Plasma membrane and membrane transport Lecture: 1. Fluid mosaic model 2. Passive transport (diffusion, osmosis, and facilitated diffusion) 3. Tonicity 4. Active transport (NA/K pumps, endocytosis, and exocytosis) Diffusion lab	Osmosis lab: - Electronic balance, Sucrose or glucose, Dialysis tubing (Wards 14 V 4519), String, Graduated cylinder, Flasks, (36) 250ml beakers Diffusion kit from Wards (36 V 1241)
	Evening	Review: cell structure and movement across the membrane	

Day 4 Thursday How we use food – Enzymes and nutrition	Morning	Nutrients in food lab Food label discussion	Multiple food labels for discussion; overhead projector
	Afternoon	Enzyme regulation lab activity	What influences enzyme activity? Lab kit, Ward's 36 W 1216
	Evening	Nutrition Activity: Food pyramid comparison (www.mypyramid.gov) Review for quiz	Computers
Day 5 Friday How we use food – thermodynamics and cellular respiration Sunday	Morning	Quiz Lecture: Thermodynamics and cellular respiration 1. Laws of thermodynamics and reactions 2. Anabolic and catabolic pathways 3. Endosymbiotic theory 4. Glycolysis, Krebs cycle, ETC, and chemiosmosis 5. Anaerobic pathways	
	Afternoon	Respiration lab	- Janus Green B, 0.1% Aqueous, Laboratory Grade, 120 mL (Carolina, 869573) - Bromothymol Blue, 0.04% Aqueous, Laboratory Grade, 100 mL (Carolina, 849164) - Microscopes - Slides of prokaryotes and protists
	Evening	Review of respiration Photosynthesis reading	Paper/colored pencils
Day 6 Monday How food is made – photosynthesis and agriculture	Morning	Photosynthesis lab activity	- Plant Pigments and Photosynthesis Lab Investigation Kit (Carolina, 206011)
	Afternoon	Lecture: Photosynthesis 1. Autotrophs 2. Light and Dark Reactions 3. Alternate pathways 4. Comparison of mitochondria and chloroplasts	
	Evening	Sustainable agriculture/Biodiversity	
Day 7 Tuesday Cellular reproduction – DNA synthesis and meiosis and mitosis	Morning	DNA and chromosomes lecture: 1. DNA structure 2. Autosomes v. sex chromosomes 3. Karyotype 4. Types of reproduction 5. Cell cycle and DNA synthesis	DNA replication activity - DNA kits
	Afternoon	Lecture: Mitosis and Meiosis Mitosis and Meiosis Modeling	Mitosis slides; microscopes Pipe cleaners and beads
	Evening	Mistakes in cellular reproduction a) Cancer e) Genetic variation b) Non-disjunction f) Polyploidism c) Mutations d) DNA synthesis	

Day 8 Wednesday Gene expression	Morning	DNA extraction lab Building the perfect protein	Gene in a bottle (DNA extraction module, BIORAD 166-2000EDU), 95% ethanol, hot water bath, microtestube rack Building the perfect protein kit
	Afternoon	Molecular genetics lecture: 1. Transcription/translation 2. Mutations 3. Gene regulation 4. Reverse transcription	
	Evening	Computer tutorial AIDS video and discussion	
Day 9 Thursday Genetics	Morning	Mendelian genetics lecture: 1. Mendelian genetics 2. Monohybrid and dihybrid crosses Human genetics lab activity	
	Afternoon	Genetics lecture continued: 3. Pedigrees and crosses 4. Non-mendelian genetics ABO lab activity	ABO-Rh Blood typing with synthetic blood kit (Carolina 700101)
	Evening	Genetic disorders Review for quiz	Computers, access to the internet
Day 10 Friday Genetic engineering	Morning	Quiz Genetic engineering lecture: 1. GMOs/Transgenic organisms 2. Recombination 3. RFLPs 4. DNA fingerprinting 5. PCR Genetic engineering activity	Paper plasmids activity Scissors, tape, paper
	Afternoon	Identification of Genetic Diseases Lab	Ward's Identification of Genetic Diseases Lab Activity (Ward's 36 V 5374)
	Evening	Finish lab activity Bioethics discussion	
Sunday (1)			
Day 11 Monday Evolution	Morning	Natural selection activity Lecture: 1. History and Darwin 2. Microevolution 3. Evidence	Colored patterned (non-checked) table clothes or sheets (5), paper clips (blue, black, white, pink, green, red – 400 of each), 5 of each of the following: petri dishes, chopsticks, plastic spoon, plastic knife, plastic knife
	Afternoon	Lecture: 1. Macroevolution 2. Phylogeny and taxonomy 3. 6 kingdoms?	Wards's Classification lab activity
	Evening	Human evolution	

Day 12 Tuesday Biodiversity	Morning	Discussion of 6 kingdoms Observations of kingdoms	Microscopes, dissecting scopes, slides (bacteria, protist, monocot, dicot, animal cell, fungus), whole specimens (fungus, lichen, flatworms, fern, moss, angiosperm, gymnosperm, bacterial culture, daphnia or hydra, invert and vert)
	Afternoon	Survey of Animals	Animal kingdom survey set (Carolina, 261112)
	Evening	Prepare for Invertebrate and Vertebrate Dissections	Dissection handouts
Day 13 Wednesday Animals and systems	Morning	Invertebrates - Earthworm and starfish	Dissecting kits, trays, pins, laminated diagrams, photo atlases, earthworms (Carolina 225012), starfish complete lab (Carolina 226012)
	Afternoon	Vertebrates - Rats	Dissecting kits, trays, pins, laminated diagrams, photo atlases, rat dissection biokit (Carolina, 2214847)
	Evening	Wrap up rat dissection Peer teaching systems – groups will research assigned body system in invertebrates and vertebrates using observations and text.	Poster board and markers
Day 14 Thursday Ecology	Morning	Present Body Systems Posters to class Ecology lecture: - Population ecology 1. Density and distribution 2. Demography, growth, and survivorship 3. Regulation - Community ecology 4. Interactions 5. Diversity 6. Structure: invasive and keystone - Ecosystem ecology 7. Energy flow and pyramids Invasive species c.s.	
	Afternoon	Ecology Activity	Tape measures, marking flags (20)
	Evening	Post-test	
Day 15 Friday	Morning	Movie, awards, etc...	