**EOC Review by Goal with Essential Vocabulary and Questions**

**Goal 1**

Key Vocabulary: variable (independent / dependent), control, experimental, hypothesis, data, synthesis, transport, excretion, respiration, nutrition, growth/development, reproduction, regulation, homeostasis

1. How do you design an experiment?
2. How living organisms carry out the STERNGRR life process?

**Goal 2**

Key Vocabulary: acid, base, pH, buffer, element, atom, compound, molecule, inorganic, organic, carbon, hydrogen, oxygen, nitrogen, phosphorous, polymer, monomer, carbohydrate, monosaccharide, glucose, polysaccharide, starch, cellulose, glycogen, lipid, glycerol, fatty acid, saturated, unsaturated, phospholipid, steroid, nucleic acid, nucleotide, DNA, RNA, protein, amino acid, R-group, hemoglobin, insulin, enzyme, denature, catalyst, activation energy, substrate, active site, re-usable, specific, indicator

1. How do cells maintain conditions suitable for life in different environments?
2. How are chemicals used in my body?
3. Where does my body get the chemicals it needs?
4. Why are enzymes necessary for life?

**Goal 3**

Key Vocabulary: unicellular, multicellular, prokaryotic, eukaryotic, chromosome, DNA, plasmid, nucleus, cell/plasma membrane, phospholipid bilayer, selectively permeable, cell wall, cytoplasm, organelle, mitochondria, chloroplast, vacuole, ribosome, stem cell, differentiation, specialization, cell communication, junction, synapse, compound light microscope, ocular lens, objective lens, diaphragm, electron microscope, magnification, cell cycle, interphase, Growth1(G1), Synthesis(S), DNA replication, chromatin, chromatid, centromere, doubled chromosome, Growth2(G2), Mitosis, nuclear membrane, spindle fibers, Cytokinesis, asexual reproduction, clone, binary fission, budding, vegetative propagation, regeneration, sporulation

1. What are the parts of a living cell?
2. How do life functions (STERNGRR) occur at a cellular level?
3. How can cells and cell parts be observed?
4. How are the cells of various organisms different?
5. What controls the differentiation and specialization of cells?
6. How are different cell types produced by a multicellular organism?
7. How do cells in a multicellular organism communicate with one another?
8. How are new cells produced?
9. How does reproduction relate to cell division?

**Goal 4**

Key Vocabulary: homeostasis, passive transport, diffusion, osmosis, cell (plasma) membrane, selectively permeable, phospholipid bilayer, pores, transport proteins, concentration gradient, osmotic/turgor pressure, equilibrium, active transport, photosynthesis, cellular respiration, reactant, product, ATP, energy, aerobic, anaerobic, fermentation (lactic acid / alcoholic), chloroplast, mitochondria, homeostasis

1. How do cells maintain conditions suitable for life in different environments?
2. How do materials get in/out of cells?
3. How does energy from the sun become energy for life?
4. Are food and energy the same thing?
5. Why do organisms need energy?

**Goal 5**

Key Vocabulary: DNA, chromosomes, heredity, trait / phenotype, double helix, nucleic acid, nucleotide, deoxyribose sugar, phosphate, nitrogen bases, adenine, guanine, cytosine, thymine, complementary base pairing, hydrogen bonds, DNA replication, protein synthesis, gene, protein, codon, transcription, messenger RNA, ribose, uracil, translation, ribosomal RNA, transfer RNA, anticodon, amino acid, peptide bond, polypeptide, gene expression, differentiation, gene regulation, point mutation (substitution), frameshift mutation (deletion / addition), gamete

1. What controls the differentiation and specialization of cells?
2. How are different cell types produced by a multicellular organism?
3. What is the structure of DNA?
4. How is DNA copied so that newly produced cells have a copy?
5. What makes the DNA of various species (or individuals within a species) different?
6. How does the structure of an organism’s DNA code for that organism’s traits?
7. How are proteins made from the DNA code?
8. Why do proteins determine the traits of an organism?
9. What happens when DNA replication goes wrong?
10. How do mutations affect an organism?
11. How are DNA and proteins related?

**Goal 6**

Key Vocabulary: DNA fingerprint, gel electrophoresis, restriction enzyme, restriction digestion, genetic engineering, bacterial transformation transgenic organism / GMO (genetically modified organism), recombinant DNA, plasmid, vector, host,Human Genome Project, genetic screening, gene therapy, stem cell

1. How is a DNA fingerprint different from an actual fingerprint?
2. How is a DNA fingerprint made and used?
3. How can the DNA of an organism be modified to change its traits?
4. How is changing DNA of plants and other organisms useful to humans?
5. How do we know where human genes are located on chromosomes?
6. Will scientists ever be able to develop “cures” for genetic disorders?
7. Should we (humanity) be manipulating the natural DNA of organisms?
8. How are different cell types produced by a multicellular organism?

**Goal 7**

Key Vocabulary: Sexual reproduction, gamete, zygote, meiosis, diploid, haploid, reduction division, genetic variation, mutation, crossing over, random/ independent assortment, nondisjunction, random fertilization, homologous chromosome pairs, allele, dominant, recessive, genotype, phenotype, homozygous/pure breeding, heterozygous/hybrid, Mendel’s laws [dominance, segregation, independent assortment], Punnett square, monohybrid cross, intermediate inheritance [codominance, incomplete dominance], multiple alleles, polygenic, autosomal, sex-linked

1. Why is there a different mechanism to produce sex cells (gametes) vs. body (somatic) cells?
2. How does meiosis reduce the chromosome number by one half?
3. How does sexual reproduction lead to genetic variation?
4. How can I predict the outcome of a cross between parents with a particular trait?
5. Are different traits inherited differently?
6. How do environmental factors play a role in the expression of traits?
7. Why are identical twins not always “identical”?

**Goal 8**

Key Vocabulary: karyotype, trisomy, aneuploidy, Down syndrome, Turner syndrome, Klinefelter syndrome, pedigree, cystic fibrosis, Huntington’s disease, sickle-cell anemia, color blindness, hemophilia, PKU, nature vs. nurture

1. Are different traits inherited differently?
2. How are genetic disorders inherited?
3. What tools do genetic counselors use to advise patients?
4. How do environmental factors play a role in the expression of traits?

**Goal 9**

Key Vocabulary: Abiogenesis, spontaneous generation, primordial soup, heterotroph hypothesis, endosymbiont hypothesis, biogenesis, natural selection, variation, overproduction, competition, survival of the fittest (best adapted), adaptation, gene pool, mutations, selection forces, stabilizing/directional/disruptive selection, speciation, geographic isolation, reproductive isolation, gradualism, punctuated equilibrium, fossil, relative dating, radioactive dating, biochemical evidence, homologous structures, vestigial structures, resistance, passive/active immunity, vaccine

1. How did the first cells come to be?
2. How do we know that evolution (change in organisms) has occurred?
3. How did all life on Earth come from a few cells?
4. Why do organisms change over time?
5. Does evolution still happen today?

**Goal 10**

Key Vocabulary: Domain, kingdom, phylum, class, order, family, genus, species, taxa, binominal nomenclature, dichotomous key, phylogeny, phylogenetic tree, cladogram, shared trait/character

1. Is every living thing a plant or an animal?
2. How are living things organized?
3. How are known organisms identified?
4. How are unknown organisms classified?

**Goal 11**

Key Vocabulary:

Protists: unicellular, adaptation, contractile vacuole, cilia, flagella, pseudopodia, eyespots, behavior, chemotaxis, phototaxis,

Plants: (Synthesis/Nutrition): photosynthesis, leaves, succulent, roots, taproot, fibrous roots, root hairs (Transport/Excretion): non-vascular, osmosis, stem, vascular, xylem, phloem, stomata, guard cells, diffusion, transpiration, cuticle (Regulation): hormone, auxin, cytokinen, ethylene, tropism, phototropism, geo/gravitotropism, thigmotropism, tendrils (Reproduction): vegetative propagation, runners, spores, seed, gymnosperm, angiosperm, cone, stamen, anther, filament, pollen, pistil/carpel, stigma, style, ovary, ovule, pollination, pollen tube, fertilization, fruit (Growth/Development): germination, dormancy, deciduous

Animals: (Synthesis) protein synthesis, (Transport) closed/open circulatory system, blood, 4-chambered heart (Excretion) waste, nephridia, Malpighian tubules, kidneys, nephrons, urine, homeostasis (Respiration) diffusion, spiracles, gills, lungs, alveoli (Nutrition) mandibles, jaws, teeth, digestion, esophagus, stomach, enzyme, intestine, microvilli (Reproduction) fragmentation, regeneration, external vs. internal fertilizationhermaphroditism (Growth/Development) egg, incomplete vs. complete metamorphosis, amniotic egg, pouch, placenta (Regulation) nervous system, neuron, sensory structure, brain, endocrine system, hormone (Behavior) stimulus, response, adaptive value, innate, learned, reflex, fight-or-flight, instinct, suckling, courtship, territoriality, aggression, dominance hierarchy, orientation, taxis, circadian rhythm, migration, hibernation, estivation, motivation, habituation, classical conditioning, trial and error, insight/reasoning, imprinting, society, communication, pheromone

1. What adaptations do single-celled organisms have for survival?
2. How do organisms from each kingdom of life accomplish the STERNGRR life processes?
3. What adaptations do living organisms have that allow them to respond to environmental stimuli?
4. How do adaptations of plants and animals lead to survival and reproductive success?
5. In what ways are living organisms able to communicate with one another?

**Goal 12**

Key Vocabulary Biosphere, biomes ecosystem, biotic, abiotic, communities, populations, niche, trophic level, producer, autotroph, consumer, heterotroph, herbivore/primary consumer, carnivore/secondary or tertiary consumer, omnivore, scavenger, decomposer, recycling, food web, radiant/solar energy, chemical energy, energy pyramid, ecological efficiency, 10% rule, entropy/disorder, water/hydrologic cycle, precipitation, infiltration, run-off, evaporation, transpiration, carbon cycle, photosynthesis, cellular respiration, greenhouse effect, fossil fuel, climate change, nitrogen cycle, nitrogen fixation, competition, predation, predator, prey, symbiosis, mutualism, parasitism, commensalism, biotic potential, J-curve, exponential growth, limiting factors, S-curve, carrying capacity, dynamic equilibrium, density-dependent factors, density-independent factors

1. How is matter reused in an ecosystem?
2. Where does the energy needed for life processes originate and how is it transferred in an ecosystem?
3. How do living organisms interact / depend on one another in a community?
4. How do communities change over time?
5. What limits the size of a population of organisms?

**Goal 13**

Key Vocabulary: Agricultural revolution, industrial revolution, urbanization, technology, natural resources, conservation, stewardship, reduce, reuse, recycle, sustainability, global warming / climate change, greenhouse gases, thermal expansion, beach erosion, air pollution, acid precipitation, NOx and SOx, water pollution, waste lagoons, Pfisteria, biodiversity, habitat destruction, deforestation, fragmentation, impervious surface, invasive species, kudzu, dutch elm disease, bioaccumulation, biomagnifications, endangered species, extinction

1. How is Earth’s climate regulated by the cycling of matter?
2. How do communities change over time?
3. Why is human population growth an environmental problem?
4. What evidence do we have that humans are contributing to climate change?
5. How are North Carolina ecosystems affected by human activity?
6. How do humans impact other species?
7. What can you do to protect the environment?