GBCS Curriculum			GRADE:		SUBJECT:			
Topic	**Pacing**	**Unit**	**Standards - Michigan HSCE**	**Enduring Understandings & Essential Questions**	**Learning Targets**	**Vocabulary/Concepts**	**Materials**	**Assessments**
Sustainability	3 weeks	1	B1.1 Scientific Inquiry, B1.1A, B1.1B, B1.1C, B1.1D, B1.1E; B1.2 Scientific Reflection and Social Implications, B1.2A, B1.2B, B1.2C, B1.2D, B1.2E; B1.2 Scientific Reflection and Social Implications, B1.2A, B1.2B, B1.2C, B1.2D, B1.2E	Ecological systems resiliency, resource use and availability, ecological footprint, making sustainable decisions.	What do indicators tell us about regions of the world? What can indicators reveal about the sustainability challenges facing different countries? What steps have communities taken to live in ways that are more sustainable? Can the earth's ecosystems sustain our current use of resources? How can phosphate and nitrate indicators help identify the contamination problem in Jaffrey Lake? How can a sustainability plan be developed for Jaffrey Lake that will balance the interests of all of the stakeholders?	indicator, sustainability, ecological footprint, eutrophication, land degradation, product life cycle, evidence, trade-off, stakeholder, correlation, casual relationship		

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Ecology: Living On Earth	9 weeks	2	B1.1 Scientific Inquiry, B1.1A, B1.1B, B1.1C, B1.1D, B1.1E; B1.2 Scientific Reflection and Social Implications, B1.2A, B1.2B, B1.2C, B1.2D, B1.2E; B2.1 Transformation of Matter and Energy in Cells, B2.1A, B2.1B C; B3.1 Photosynthesis and Respiration, B3.1A, B3.1B, B3.1C, B3.1D; B3.2 Ecosystems, B3.2A, B3.2B, B3.2C; B3.3 Element Recombination, B3.3A; B3.4 Changes in Ecosystems, B3.4A, B3.4B, B3.4C; B3.5 Populations, B3.5A, B3.5B, B3.5C	Flow of energy through ecosystems, global ecosystems, population ecology, photosynthesis and respiration.	How does change affect ecosystems? How quickly can a population grow? How does the size of a population change through time? How do the characteristics of a biome determine the types of organisms found there? How do certain characteristics increase the likelihood that a nonnative species becomes an invasive species? How can the overuse of an ecosystem service be prevented? How do plankton populations affect the sustainability of a fishery? How can we use food webs to predict the short- and long-term effects of particular events on an ecosystem? How does human activity affect the movement of carbon through the carbon cycle? How do carbon and oxygen cycle through the environment? How do various factors affect the rate of cellular respiration? How does changing one variable affect photosynthesis and cellular respiration in plants? How does the rate of cellular respiration affect the oxygen levels available in an aquatic ecosystem? How do organisms gain or lose from their interactions with each other? How do changing variables alter population growth rates and ecosystem carrying capacities? How can the environmental harm from salmon farming be minimized? How does information about relationships among organisms help to determine the sustainability of a species and an ecosystem? What determines if an ecosystem can recover from a major event? How can case studies guide what should be done with the Avril Gulf tuna fishery? Which fishery management strategy is the best choice for the sustainability of the Avril Gulf tuna fishery?	abotic, biodiversity, biome, biotic, community, distrubance, ecological succession, ecology, ecosystem, habitat, organism, primary succession, resilance, resistance, secondary succession, amensalism, commensalism, consumers, dead zone, decomposers, energy pyramid, eutrophication, food web, mutualism, parasitism, photoplankton, producers, symbiosis, zooplankton, carrying capaicty, density-dependent factors, density-independent, limiting factor, population, population growth rate, invasive species, nonnative species		

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Cell Biology: World Health	8 weeks	3	B1.1 Scientific Inquiry, B1.1A, B1.1B, B1.1C, B1.1D, B1.1E; B1.2 Scientific Reflection and Social Implications, B1.2A, B1.2B, B1.2C, B1.2D, B1.2E; B2.4 Cell Specialization, B2.4A, B2.4B, B2.4C; B2.5 Living Organism Composition, B2.5A, B2.5B, B2.5C, B2.5D; B4.3 Cell Division — Mitosis and Meiosis, B4.3A, B4.3B, B4.3C; B2.2 Organic Molecules, B2.2A, B2.2B, B2.2C, B2.2D, B2.2E	Structure and function of animal and plant cells, cell specialization, basic biochemistry, disease-causing microbes.	What do health indicators show about world health and sustainability? How do observations of cells help doctors and scientists diagnose and study diseases? What are the similarities and differences in cells from various living organisms? What are the functions of the structures in cells? What are the specialized structures and functions of cells? What are the fundamental structures and functions of cells? What structures and characteristics help the cell membrane perform its functions? What factors determine whether a substance moves across a model of the cell membrane? How do the structures of the cell membrane help it function? What are the functions of proteins in cells and viruses? How do pH and temperature affect the function of the enzyme lactase? How do photosynthesis and cellular respiration meet the energy needs of all organisms? What happens during each phase of the cell cycle, and how are the phases regulated? How do stem cells produce specialized cells? What are the current scientific understandings and social debates about stem cell research? How does HIV take over a cell's structures and organelles during infection and use them to reproduce? What are the benefits, drawbacks, and trade-offs of some disease interventions? How should funding be allocated to address sustainability problems related to world health?	antibiotic, cancer, diabetes, disease, disease intervention, HIV/AIDS, indicator, infectous disease, intervention, latent, macrophage, malaria, microbe, mutation, noninfectious disease, protist, rotavirus, sickle cell, sustainability, trade-off, tuberculosis, vector, bacteria, cell, cell biology, cell membrane, cell principle, cell wall, cilium, cilia, cytoplasm, cytoskelton, deoxyribonucleic acid, endoplasmic reticulum, eukaryote, eukaryotic cell, flagellum, Golgi apparatus, homeostasis, lysosome, membrane, metabolism, multicellular organism, nucleus, phospholipid, prokaryote, prokaryotic cell, ribosone, single-celled organism, vacuole, active transport, diffusion, endocytosis, exocytosis, facilitated diffusion, fluid mosaic model, lipid, macromolecule, osmosis, transport, phospholipid bilayer, selectively permeable, semipermeable, thansprot protein, vesicle, binding site, catalyze, enzyme, lactase, lactose, motor protein, pH, protein, receptor, receptor protein, signaling protein, adenosine triphosphase, aerobic respiration, anaerobic respiration, Calvin cycle, cellular respiration, cholorplast, cristae, electron transport chain, glycolysis, Krebs cycle, light-dependent reactions, light-independent reactions, matrix, mitochondria, mitochondrion, organelle, photosynthesis, pigment, stroma, thylakoids		

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Genetics: Feeding the world	9 weeks	4	B1.1 Scientific Inquiry, B1.1A, B1.1B, B1.1C, B1.1D, B1.1E; B1.2 Scientific Reflection and Social Implications, B1.2A, B1.2B, B1.2C, B1.2D, B1.2E; B4.1 Genetics and Inherited Traits, B4.1A, B4.1B; B4.2 DNA, B4.2A, B4.2B, B4.2C, B4.2D, B4.2E	Phenotype, genotype, traits, DN A replication, mutations, protein synthesis, gene expression, mitosis, meiosis, genetic engineering.	Should your country allow farmers to grow genetically modified corn? How do scientists genetically modify an organism? If a genetically modified cell undergoes mitosis, how likely is it that the daughter cells will contain the inserted gene? How can information about the genetic makeup of plants help farmers breed plants for desirable traits? What can we infer about genes and traits based on heredity patterns? How do scientists predict the results of crossing corn for two kernel characteristics: color and texture? What trade-offs are involved in selectively breeding a desirable strain of rice? What information can geneticists obtain by analyzing a pedigree? How is DNA isolated from an organism? What is the molecular structure of DNA? How has genomics contributed to our understanding of heredity? How does DNA replicate? How do chromosomes divide during the formation of egg and sperm cells? How do genes and chromosomes behave during meiosis and sexual reproduction? What are the benefits and trade-offs of using genetically modified organisms? How does a cell make proteins with the information from DNA? How does the same set of genes direct the activities of 220 human cell types? Which samples contain genetically modified corn? What are the benefits and trade-offs of genetically modifying crops to contain edible vaccines? Should the government Panel on Genetic Modification approve the planting of genetically modified soybeans?	biofuel, DNA construct, genetic engeering, genetic modification, genetically modified organism, trade-off, vaccine, genome, genomics, amino acid, base pair, cell, chromosome, deoxyribonucleic acid, double helix, gel electrophoresis, gene, hydrogen bond, isolation, nucleotide, replication, sugar-phosphate backbone, asexual reproduction, centrioles, centromere, chromatid, crossing over, cytokinesis, daughter cell, diploid, gamate, haploid, heredity, karyotype, law of independent assortment, meiosis, mitosis, nondisjunction, parent cell, selective breeding, sexual reproduction, somatic cell, allele, carrier, codominant, dihybrid cross, expressed, gene expression, genotype, heterozygous, homozygous, incomplete dominance, mRNA, mutation, pedigree, phenotype, protein, protein synthesis, Punnett square, recessive, replication, repressed, RNA, sex-linked sex-linked recessive, trait, transcription, transcription factor, translation, tRNA		

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Evolution: Maintaing Biodiversity	7 weeks	5	B1.1 Scientific Inquiry, B1.1A, B1.1B, B1.1C, B1.1D, B1.1E; B1.2 Scientific Reflection and Social Implications, B1.2A, B1.2B, B1.2C, B1.2D, B1.2E; B5.1 Theory of Evolution, B5.1A, B5.1B; B5.3 Natural Selection, B5.3A, B5.3B, B4.3C	Levels of biodiversity, introduction to phylogeny, evolutionary processes and natural selection, speciation, evidence for natural selection.	How are the biodiversity of an ecosystem and the sustainability of human communities related? How do humans alter the biodiversity of groups of taxa? What are the key events of geologic time? How did Darwin build on his and others' work to develop his ideas about natural selection and evolution? How does fossil evidence determine the relationships of whale ancestors and their descendents? How do scientists interpret evidence in the fossil record? How do you test a tree hypothesis for a group of taxa? How do biologists study the evolutionary relationships of hominids? How does evidence about phylogenetic relationships assist evolutionary biologists and conservationists in making sustainable conservation decisions? How do new species separate from existing species? How does natural selection lead to speciation? How did a change in the environment lead to genetic changes in populations of the rock pocket mouse? How do evolutionary processes lead to changes in biodiversity? What scientific evidence and reasoning supports ideas about evolution? Which of four areas should receive priority for conservation?	biodiversity, biological diversity, ecosystem diversity, ecosystem services, endemic, genetic diversity, hotspot, indicator, species diversity, sustainability, trade-off, co-opted features, deep time, extinct, extinction, fossil, fossil record, geological time, geological time scale, geologic timeline, radiometric dating, strata, stratigraphic dating, stratigraphy, terrestrial tetrapods, transitional features, transitional fossils, adaptive radiation, mutation, natural selection, sexual selection, character, clade, evolutationary tree, hominid, homologous character, homology, lineage, node, phylogenetic diversity, phylogeny, shared derived character, taxa, taxon, adaptation, adaptive character, allele, biological adaptation, biological evolution, biological species, biological species concept, evolution, evolve, extinct, extinction, fit, fitness, gene, gene flow, gene pool, geographic isolation, macroevolution, mass extinction, microevolution, reproductive isolation, speciation, species, evidence, hypothesis, theory		