Curriculum Map 2019-20 Living Environment

Time/Month approximate	Unit	Content	Standard(s)	Skills
17 days	1-Characteristics of Life	**High priority content** -Characteristics of life -Cell Theory -History of life on Earth Mid-priority -Common Ancestry (Evolution of Species) -DNA -Respiration and photosynthesis Low priority -Dynamic equilibrium	**Key Idea 1: Living things are both similar to and different from each other and from nonliving things.** PI 1.2 Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles). PI 1.3 Explain how a one-celled organism is able to function despite lacking the levels of organization present in more complex organisms. **Key Idea 3: Individual organisms and species change over time** **Key Idea 5: Organisms maintain a dynamic equilibrium that sustains life** PI 5.1 - Explain the basic biochemical processes in living organisms and their importance in maintaining dynamic equilibrium.	-
23 days	2-Nutrients, Energy, +Biochemical Processes	**High priority content -** -Macronutrients assembly, breakdown, and transport -Respiration and photosynthesis -Human digestive Mid-priority -Cycles of matter and energy flowsystem; enzymes -Low-priority -Cell Theory and organelles (review)	**Key Idea 1: Living things are both similar to and different from each other and from nonliving things.** PI 1.1 Explain how diversity of populations within ecosystems relates to the stability of ecosystems. PI 1.2 Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles). **Key Idea 5: Organisms maintain a dynamic equilibrium that sustains life.** PI 5.1 - Explain the basic biochemical processes in living organisms and their importance in maintaining dynamic equilibrium. **Key Idea 6: Plants and animals depend on each other and their physical environment** PI 6.1 - Explain factors that limit growth of individuals and populations.	
21 days	3- Homeostasis in Human Body Systems	**High priority content -** -Interaction of all human body systems	**Key Idea 1: Living things are both similar to and different from each other and from nonliving things.** PI 1.2 Describe and explain the structures and functions of the human body at	-

		-Dynamic equilibrium and feedback **Mid-priority** -levels of organization in humans -human adaptations and comparison to other species (thermoregulation, water regulation, etc.) **Low-priority** **-**toxins vs. pathogens causing disease	different organizational levels (e.g., systems, tissues, cells, organelles). **Key Idea 5: Organisms maintain a dynamic equilibrium that sustains life.** PI 5.2 Explain disease as a failure of homeostasis PI 5.3 Relate processes at the system level to the cellular level in order to explain dynamic equilibrium in multicelled organisms.	
22 days	4- Disease + Disruption of Homeostasis	**High priority** -Causes of disease: pathogenic genetic, exposure to toxins, lifestyle -Treatment/prevention: vaccines, antibiotics, healthy choices -Dynamic equilibrium feedback **Mid-priority** **-**Mitosis and cell division/ replication -Antibiotic resistance and disease **Low-priority** **-**Interaction of all human body systems	**Key Idea 1: Living things are both similar to and different from each other and from nonliving things.** PI 1.2 Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles). **Key Idea 3: Individual organisms and species change over time.** PI 3.1 Explain the mechanisms and patterns of evolution **Key Idea 4: The continuity of life is sustained through reproduction and development** PI 4.1 Explain how organisms, including humans, reproduce their own kind **Key Idea 5: Organisms maintain a dynamic equilibrium that sustains life.** PI 5.2 - Explain disease as a failure of homeostasis. PI 5.3 - Relate processes at the system level to the cellular level in order to explain dynamic equilibrium in multicellular organisms.	-
18 days	5- Comparative Reproduction	**High priority content -** **-**Mitosis and cell division/replication	**PI 2.1 Explain how the structure and replication of genetic material result in offspring that resemble their parents** 2.1d In asexually reproducing organisms, all the genes come from a single parent. Asexually produced offspring are normally genetically	-

		-Factors affecting reproduction and development -Asexual and sexual reproduction -Human adaptations and comparison to other species (asexual vs. sexual reproduction) **Mid-priority** -Genetics of asexual vs. sexual reproduction	identical to the parent. 2.1e In sexually reproducing organisms, the new individual receives half of the genetic information from its mother (via the egg) and half from its father (via the sperm). Sexually produced offspring often resemble, but are not identical to, either of their parents. 2.1j Offspring resemble their parents because they inherit similar genes that code for the production of proteins that form similar structures and perform similar functions. 2.1k The many body cells in an individual can be very different from one another, even though they are all descended from a single cell and thus have essentially identical genetic instructions. This is because different parts of these instructions are used in different types of cells, and are influenced by the cell's environment and past history. **PI 4.1 - Explain how organisms, including humans, reproduce their own kind.** 4.1a Reproduction and development are necessary for the continuation of any species. 4.1b Some organisms reproduce asexually with all the genetic information coming from one parent. Other organisms reproduce sexually with half the genetic information typically contributed by each parent. Cloning is the production of identical genetic copies. 4.1d The zygote may divide by mitosis and differentiate to form the specialized cells, tissues, and organs of multicellular organisms. 4.1e Human reproduction and development are influenced by factors such as gene expression, hormones, and the environment. The reproductive cycle in both males and females is regulated by hormones such as testosterone, estrogen, and progesterone. 4.1f The structures and functions of the human female reproductive system, as in almost all other mammals, are designed to produce gametes in ovaries, allow for internal fertilization, support the internal development of the embryo and fetus in the uterus, and provide essential materials through the placenta, and nutrition through milk for the newborn. 4.1g The structures and functions of the human male reproductive system, as in other mammals, are designed to produce gametes in testes and make possible the delivery of these gametes for fertilization. 4.1h In humans, the embryonic development of essential organs occurs in early stages of pregnancy. The embryo may encounter risks from faults in its genes and from its mother's exposure to environmental factors such as inadequate diet, use of alcohol/drugs/tobacco, other toxins, or infections throughout her	

			pregnancy. **PI 3.1 - Explain the mechanisms and patterns of evolution** 3.1g Some characteristics give individuals an advantage over others in surviving and reproducing, and the advantaged offspring, in turn, are more likely than others to survive and reproduce. The proportion of individuals that have advantageous characteristics will increase.	
22 Days	6- Genetics, Biotech,+ decision Making	**High priority content** - -structures and mechanisms of genetics -protein synthesis -biotechnology -mutations; natural selection and selective breeding **Mid-priority** -Preserving diversity and habitats -Human decision-making and environment -Mitosis and cell division/replication	**PI 2.1 - Explain how the structure and replication of genetic material result in offspring that resemble their parents.** 2.1a Genes are inherited, but their expression can be modified by interactions with the environment. 2.1b Every organism requires a set of coded instructions for specifying its traits. For offspring to resemble their parents, there must be a reliable way to transfer information from one generation to the next. Heredity is the passage of these instructions from one generation to another. 2.1c Hereditary information is contained in genes, located in the chromosomes of each cell. An inherited trait of an individual can be determined by one or by many genes, and a single gene can influence more than one trait. A human cell contains many thousands of different genes in its nucleus. 2.1d In asexually reproducing organisms, all the genes come from a single parent. Asexually produced offspring are normally genetically identical to the parent. 2.1f In all organisms, the coded instructions for specifying the characteristics of the organism are carried in DNA, a large molecule formed from subunits arranged in a sequence with bases of four kinds (represented by A, G, C, and T). The chemical and structural properties of DNA are the basis for how the genetic information that underlies heredity is both encoded in genes (as a string of molecular "bases") and replicated by means of a template. 2.1g Cells store and use coded information. The genetic information stored in DNA is used to direct the synthesis of the thousands of proteins that each cell requires. 2.1h Genes are segments of DNA molecules. Any alteration of the DNA sequence is a mutation. Usually, an altered gene will be passed on to every cell that develops from it. 2.1i The work of the cell is carried out by the many different types of molecules it assembles, mostly proteins. Protein molecules are long, usually folded chains made from 20 different kinds of amino acids in a specific sequence. This sequence influences the shape of the protein.	

			The shape of the protein, in turn, determines its function. 2.1j Offspring resemble their parents because they inherit similar genes that code for the production of proteins that form similar structures and perform similar functions. 2.1k The many body cells in an individual can be very different from one another, even though they are all descended from a single cell and thus have essentially identical genetic instructions. This is because different parts of these instructions are used in different types of cells, and are influenced by the cell's environment and past history. PI 2.2 - Explain how the technology of genetic engineering allows humans to alter genetic makeup of organisms. 2.2a For thousands of years new varieties of cultivated plants and domestic animals have resulted from selective breeding for particular traits. 2.2b In recent years new varieties of farm plants and animals have been engineered by manipulating their genetic instructions to produce new characteristics. 2.2c Different enzymes can be used to cut, copy, and move segments of DNA. Characteristics produced by the segments of DNA may be expressed when these segments are inserted into new organisms, such as bacteria. 2.2d Inserting, deleting, or substituting DNA segments can alter genes. An altered gene may be passed on to every cell that develops from it. 2.2e Knowledge of genetics is making possible new fields of health care; for example, finding genes which may have mutations that can cause disease will aid in the development of preventive measures to fight disease. Substances, such as hormones and enzymes, from genetically engineered organisms may reduce the cost and side effects of replacing missing body chemicals. **PI 3.1 - Explain the mechanisms and patterns of evolution** 3.1a The basic theory of biological evolution states that the Earth's present-day species developed from earlier, distinctly different species. 3.1b New inheritable characteristics can result from new combinations of existing genes or from mutations of genes in reproductive cells. 3.1c Mutation and the sorting and recombining of genes during meiosis and fertilization result in a great variety of possible gene combinations. 3.1d Mutations occur as random chance events. Gene mutations can also be caused by such agents as radiation and chemicals. When they occur in sex cells, the mutations can be passed on to offspring; if	

			they occur in other cells, they can be passed on to other body cells only. 3.1e Natural selection and its evolutionary consequences provide a scientific explanation for the fossil record of ancient life-forms, as well as for the molecular and structural similarities observed among the diverse species of living organisms. 3.1f Species evolve over time. Evolution is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) the ensuing selection by the environment of those offspring better able to survive and leave offspring. 3.1g Some characteristics give individuals an advantage over others in surviving and reproducing, and the advantaged offspring, in turn, are more likely than others to survive and reproduce. The proportion of individuals that have advantageous characteristics will increase. 3.1h The variation of organisms within a species increases the likelihood that at least some members of the species will survive under changed environmental conditions. 3.1j Billions of years ago, life on Earth is thought by many scientists to have begun as simple, single-celled organisms. About a billion years ago, increasingly complex multicellular organisms began to evolve. **PI 6.2 - Explain the importance of preserving diversity of species and habitats.** 6.2a As a result of evolutionary processes, there is a diversity of organisms and roles in ecosystems. This diversity of species increases the chance that at least some will survive in the face of large environmental changes. Biodiversity increases the stability of the ecosystem. 6.2b Biodiversity also ensures the availability of a rich variety of genetic material that may lead to future agricultural or medical discoveries with significant value to humankind. As diversity is lost, potential sources of these materials may be lost with it. **PI 7.3 - Explain how individual choices and societal actions can contribute to improving the environment.** 7.3a Societies must decide on proposals which involve the introduction of new technologies. Individuals need to make decisions which will assess risks, costs, benefits, and trade-offs. 7.3b The decisions of one generation both provide and limit the range of possibilities open to the next generation.	

24 Days	7- Ecosystems and Invasive Species	**High priority content** -Components of ecosystem -Interdependence of species -Cycles of matter and energy transformations -Relationships between species and their environment -Ecological succession **Mid-priority** -Dynamic equilibrium -Respiration and photosynthesis -Characteristics of life -Cell Theory	**Key Idea 1: Living things are both similar to and different from each other and from nonliving things** PI 1.1 - Explain how diversity of populations within ecosystems relates to the stability of ecosystems. **Key Idea 6: Plants and animals depend on each other and their physical environment.** PI 6.1 - Explain factors that limit growth of individuals and populations. PI 6.2 - Explain the importance of preserving diversity of species and habitats. PI 6.3 - Explain how the living and nonliving environments change over time and respond to disturbances.	
17 Days	8- Climate Change and Human Impact	**High priority content** -human impact: climate change human impact on ecosystems Evolution **Mid-priority** -Carbon cycle Cycling of matter and flow of energy through ecosystems	**ey Idea 1: Living things are both similar to and different from each other and from nonliving things** PI 1.1 - Explain how diversity of populations within ecosystems relates to the stability of ecosystems. **Key Idea 2: Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring** PI 2.1 - Explain how the structure and replication of genetic material result in offspring that resemble their parents **Key Idea 3: Individual organisms and species change over time** PI 3.1 - Explain the mechanisms and patterns of evolution **Key Idea 6: Plants and animals depend on each other and their physical environment.** PI 6.2 - Explain the importance of preserving diversity of species and habitats **Key Idea 7: Human decisions and activities have had a profound impact on the physical and living environment**	

			PI 7.1 - Describe the range of interrelationships of humans with the living and nonliving environment PI 7.2 - Explain the impact of technological development and growth in the human population on the living and nonliving environment PI 7.3 - Explain how individual choices and societal actions can contribute to improving the environment	
12 days	9 Review of Major Topics			