**CAHS 9th grade Biology Standards**

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| **Cells**  RELATIONSHIP TO PREVIOUS LEARNING: Building on knowledge from middle school (cell theory), this topic focuses on the cell as a system itself (single-celled organism) and as part of larger systems (multicellular organism), sometimes as part of a multicellular organism, always as part of an ecosystem. The cell is a system that conducts a variety of functions associated with life. Details of cellular processes such as photosynthesis, chemosynthesis, cellular respiration, cell division and differentiation are studied at this grade level. Additionally, cellular organelles studied are cytoskeleton, Golgi complex and endoplasmic reticulum.   * Cell structure and function   + Structure, function and interrelatedness of cell organelles   + Eukaryotic cells and prokaryotic cells * Cellular processes   + Characteristics of life regulated by cellular processes   + Photosynthesis, chemosynthesis, cellular respiration   + Cell division and differentiation   **Heredity**  RELATIONSHIP TO PREVIOUS LEARNING: Building on knowledge from elementary school (plants and animals have life cycles and offspring resemble their parents) and knowledge from middle school (reproduction, Mendelian Genetics, inherited traits and diversity of species), this topic focuses on the explanation of genetic patterns of inheritance. In middle school, students learn that living things are a result of one or two parents, and traits are passed on to the next generation through both asexual and sexual reproduction. In addition, they learn that traits are defined by instructions encoded in many discrete genes and that a gene may come in more than one form called alleles.   * Cellular genetics * Structure and function of DNA in cells * Genetic mechanisms and inheritance * Mutations * Modern genetics   **Evolution**  RELATIONSHIP TO PREVIOUS LEARNING: At the elementary school level, evolution concepts include the relationship between organisms and the environment, parent and offspring, and an introduction to the fossil record and extinction. At the middle school level, concepts include biodiversity (as part of biomes) and speciation, further exploration of the fossil record and Earth history, changing environmental conditions (abiotic factors), natural selection and biological evolution.   * Mechanisms   + Natural selection   + Mutation   + Genetic drift   + Gene flow (immigration, emigration)   + Sexual selection   + History of life on Earth * Diversity of Life   + Speciation and biological classification based on molecular evidence   + Variation of organisms within a species due to population genetics and gene frequency |

**Diversity and Interdependence of Life**

RELATIONSHIP TO PREVIOUS LEARNING: Building on knowledge from elementary school (interactions of organisms within their environment and the law of conservation of matter and energy, food webs) and from middle school (flow of energy through organisms, biomes and biogeochemical cycles), this topic focuses on the study of diversity and similarity at the molecular level of organisms.

* Classification systems are frameworks created by scientists for describing the vast diversity of organisms indicating the degree of relatedness between organisms.
* Ecosystems
  + Homeostasis
    - Carrying capacity
    - Equilibrium and disequilibrium