

Grade 5 Correlation of the *2010 Science Sequence* to Core Knowledge Science

This document outlines the content guidelines of the *2010 Core Knowledge Sequence* for science and illustrates how the new units of [Core Knowledge Science](#) compare to those 2010 content and skill guidelines.

2010 Domains in Grade 5 Science:

- I. [Classifying Living Things](#)
- II. [Cells: Structures and Processes](#)
- III. [Plant Structures and Processes](#)
- IV. [Life Cycles and Reproduction](#)
- V. [The Human Body](#)
- VI. [Chemistry: Matter and Change](#)
- VII. [Science Biographies](#)

KEY:

G refers to the grade level of instruction

U refers to the unit number of CKSci instructional materials

For example, **G5U2** = **Grade 5 Unit 2** of the Core Knowledge Science program

CKSci refers to the Core Knowledge Science program

CKLA refers to the Core Knowledge Language Arts program, which includes science and other non-fiction topics

For more information about the CKSci program, or the entire Core Knowledge Curriculum Series, please visit:
<http://www.coreknowledge.org/curriculum/>

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2010 Core Knowledge Sequence Content	CKSci?	Unit(s)
Science - Grade 5		
I. CLASSIFYING LIVING THINGS	✓	Key Idea: This content is approached by CKSci as a cross-cutting concept (Patterns) which is addressed within multiple science units in all three grades 3-5.
<ul style="list-style-type: none"> Scientists classify living things according to the characteristics they share, for example: 	✓	G3U3: Life Cycles, Traits, and Variation G4U3: Structures and Functions of Living Things G5U2: Energy and Matter in Ecosystems (e.g., Part B Plants and Animals)
<p>Some scientists have divided living things into five large groups called kingdoms—</p> <ul style="list-style-type: none"> Plant Animal Fungus (mushrooms, yeast, mold, mildew) Protist (algae, protozoans, amoeba, euglena) Moneran, also called Prokaryote (bacteria, blue-green algae/cyano bacteria) 	*	<i>*Note: The Classification System of Five Kingdoms pre-dates current research using genomic and proteomic sequencing to determine the relatedness of different living things, though the names of each kingdom are often still used in informational texts, such as in the Student Reader for Grade 5 Unit 2 Energy and Matter in Ecosystems.</i>
<ul style="list-style-type: none"> Each kingdom is divided into smaller groupings as follows: <ul style="list-style-type: none"> Kingdom Phylum Class Order Family Genus Species (Variety) 	*	
<ul style="list-style-type: none"> When classifying living things, scientists use special names made up of Latin words (or words made to sound like Latin words), which help scientists around the world understand each other and ensure that they are using the same names for the same living things. 	✓	G3U3: Life Cycles, Traits, and Variation G4U3: Structures and Functions of Living Things G5U2: Energy and Matter in Ecosystems (e.g., Part B Plants and Animals)
<p>Homo sapiens: the scientific name for the species to which human beings belong (genus Homo, species sapiens)</p> <p>Taxonomists: biologists who specialize in classification</p>		

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<ul style="list-style-type: none"> Different classes of vertebrates and major characteristics: fish, amphibians, reptiles, birds, mammals (review from grade 3) 	✓	<p>G3U3: Life Cycles, Traits, and Variation</p> <p>G4U3: Structures and Functions of Living Things</p>
<p>Teachers: Introduce an example of how an animal is classified, in order for students to become familiar with this system of classification, <i>not to memorize specific names</i>. For example, a collie dog is classified as follows:</p> <p style="padding-left: 20px;">Kingdom: Animalia</p> <p style="padding-left: 20px;">Phylum: Chordata (Subphylum: Vertebrata)</p> <p style="padding-left: 20px;">Class: Mammalia (mammal)</p> <p style="padding-left: 20px;">Order: Carnivora (eats meat)</p> <p style="padding-left: 20px;">Family: Canidae (a group with doglike characteristics)</p> <p style="padding-left: 20px;">Genus: Canis (a coyote, wolf, or dog)</p> <p style="padding-left: 20px;">Species: familiaris (a domestic dog)</p> <p style="padding-left: 20px;">Variety: Collie</p>	*	<p><i>*Note: The Linnaean Classification System is discussed during the Science Biography of Carl Linnaeus, who codified the system, however this system is no longer used by scientists to organize and classify organisms. For additional resources to teach about classification, please consider visiting www.tolweb.org as a supplemental resource.</i></p>
II. CELLS: STRUCTURES AND PROCESSES		
<ul style="list-style-type: none"> All living things are made up of cells. Structure of cells (both plant and animal) 	✓	<p>Key Idea: CKSci instructional materials address this content in both grades 4 and 5.</p> <p>G4U3: Structures and Functions of Living Things</p> <p>G5U2: Energy and Matter in Ecosystems (e.g., Part B Plants and Animals)</p>
<p>Cell membrane: selectively allows substances in and out</p> <p>Nucleus: surrounded by nuclear membrane, contains genetic material, divides for reproduction</p> <p>Cytoplasm contains organelles, small structures that carry out the chemical activities of the cell, including mitochondria (which produce the cell's energy) and vacuoles (which store food, water, or wastes).</p>		
<ul style="list-style-type: none"> Plant cells, unlike animal cells, have cell walls and chloroplasts. Cells without nuclei: monerans (bacteria) Some organisms consist of only a single cell: for example, amoeba, protozoans, and some algae. Cells are shaped differently in order to perform different functions. 	✓	<p>G4U3: Structures and Functions of Living Things</p> <p>G5U2: Energy and Matter in Ecosystems (e.g., Part B Plants and Animals)</p>

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Science - Grade 5		
<p>• Organization of cells into tissues, organs, and systems:</p> <p>In complex organisms, groups of cells form tissues (for example, in animals, skin tissue or muscle tissue; in plants, the skin of an onion or the bark of a tree).</p> <p>Tissues with similar functions form organs (for example, in some animals, the heart, stomach, or brain; in some plants, the root or flower).</p> <p>In complex organisms, organs work together in a system (recall, for example, from earlier studies of the human body, the digestive, circulatory, and respiratory systems).</p>	✓	<p>G4U3: Structures and Functions of Living Things</p>
<p>III. PLANT STRUCTURES AND PROCESSES</p>		
<p>Key Idea: CKSci instructional materials address this content in all grades 3-5.</p>		
<p>A. Structure: Non-Vascular And Vascular Plants</p> <p>Non-vascular plants (for example, algae)</p> <p>Vascular plants:</p> <p style="padding-left: 20px;">Vascular plants have tube-like structures that allow water and dissolved nutrients to move through the plant.</p> <p style="padding-left: 20px;">Parts and functions of vascular plants: roots, stems and buds, leaves</p>	✓	<p>G4U3: Structures and Functions of Living Things</p> <p>G5U2: Energy and Matter in Ecosystems (e.g., Part B Plants and Animals)</p>
<p>B. Photosynthesis</p> <p>Photosynthesis is an important life process that occurs in plant cells, but not animal cells (photo = light; synthesis = putting together). Unlike animals, plants make their own food, through the process of photosynthesis.</p> <p>Role in photosynthesis of: energy from sunlight, chlorophyll, carbon dioxide and water, xylem and phloem, stomata, oxygen, sugar (glucose)</p>	✓	<p>G5U2: Energy and Matter in Ecosystems</p>

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<p>C. Plant Reproduction</p> <p>Asexual reproduction— Example of algae Vegetative reproduction: runners (for example, strawberries) and bulbs (for example, onions), growing plants from eyes, buds, leaves, roots, and stems</p> <p>Sexual reproduction by spore-bearing plants (for example, mosses and ferns)</p> <p>Sexual reproduction of non-flowering seed plants: conifers (for example, pines), male and female cones, wind pollination</p> <p>Sexual reproduction of flowering plants (for example, peas)— Functions of sepals and petals, stamen (male), anther, pistil (female), ovary (or ovule) Process of seed and fruit production: pollen, wind, insect and bird pollination, fertilization, growth of ovary, mature fruit Seed germination and plant growth: seed coat, embryo and endosperm, germination (sprouting of new plant), monocots (for example, corn) and dicots (for example, beans).</p>	*	<p><i>*Note: Examples of reproduction, in both plants and animals, is addressed by Grade 3 CKSci instructional materials, with the focus on its importance to the life cycle of all organisms. Differentiation between sexual and asexual reproduction is not part of the CKSci learning objectives, however examples of ferns, conifers, and flowering plants are explored as students develop models of these life cycles during G3U3 Life Cycles, Traits, and Variation</i></p> <p><i>*Also see below IV. Life Cycles and Reproduction</i></p>
IV. LIFE CYCLES AND REPRODUCTION		
<p>A. The Life Cycle</p> <p>Life cycles: development of an organism from birth to growth, reproduction, death; for example: Growth stages of a human: embryo, fetus, newborn, infancy, childhood, adolescence, adulthood, old age All living things reproduce themselves: Reproduction may be asexual or sexual.</p>	✓	<p>Key Idea: The CKSci instructional materials address Life Cycles in grade 3, however details about reproduction are not part of the learning objectives beyond a recognition that reproduction is an important part of the life cycle for all organisms, including plants and animals.</p> <p>G3U3: Life Cycles, Traits, and Variation</p>

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<p>Examples of asexual reproduction: fission (splitting) of bacteria, spores from mildews, molds, and mushrooms, budding of yeast cells, regeneration and cloning</p> <p>Sexual reproduction requires the joining of special male and female cells, called gametes, to form a fertilized egg.</p>		
<p>B. Reproduction in Animals</p>	*	<p><i>*Note: Examples of reproduction, in both plants and animals, is addressed by Grade 3 CKSci instructional materials, with the focus on its importance to the life cycle of all organisms. Differentiation between sexual and asexual reproduction is not part of the CKSci learning objectives, however examples of various animals, including fish and mammals, are explored as students develop models of these life cycles during G3U3 Life Cycles, Traits, and Variation</i></p>
<p>Reproductive organs: testes (sperm) and ovaries (eggs) External fertilization: spawning Internal fertilization: birds, mammals Development of the embryo: egg, zygote, embryo, growth in uterus, fetus, newborn</p>		
<p>V. THE HUMAN BODY</p>	*	<p>Key Idea: Pending philanthropic funding, future development for CKSci will include a series of "Health and Human Body" units that reinforce and extend CKLA instruction up to grade 6, and which will align to the 2010 CK Sequence.</p>
<p>A. Changes in Human Adolescence</p> <p>Puberty: Glands and hormones (see below, Endocrine System), growth spurt, hair growth, breasts, voice change</p>	*	
<p>B. The Endocrine System</p> <p>The human body has two types of glands: Duct glands (such as the salivary glands), and ductless glands, also known as endocrine glands. Endocrine glands secrete (give off) chemicals called hormones. Different hormones control different body processes. Pituitary gland: Located at the bottom of the brain; secretes hormones that control other glands, and hormones that regulate growth Thyroid gland: Located below the voice box; secretes a hormone that controls the rate at which the body burns and uses food</p>	*	<p><i>*Note: Core Knowledge teachers are encouraged to use the instructional resources that they already have to continue teaching The Human Body. The Teacher Handbook series, as well as the What Your Fifth Grader Needs to Know chapters may still be used alongside teacher-created units to address this content.</i></p>

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<p>Pancreas: Both a duct and ductless gland; secretes a hormone called insulin that regulates how the body uses and stores sugar; when the pancreas does not produce enough insulin, a person has a sickness called diabetes (which can be controlled)</p> <p>Adrenal glands: Secrete a hormone called adrenaline, especially when a person is frightened or angry, causing rapid heartbeat and breathing</p>		
C. The Reproductive System	*	
<p>Females: ovaries, fallopian tubes, uterus, vagina, menstruation Males: testes, scrotum, penis, urethra, semen Sexual reproduction: intercourse, fertilization, zygote, implantation of zygote in the uterus, pregnancy, embryo, fetus, newborn</p>		
VI. CHEMISTRY: MATTER AND CHANGE		
A. Atoms, Molecules, and Compounds	✓	G5U1: Investigating Matter—Part E Introduction to the Language of Chemistry
<p>Basics of atomic structure: nucleus, protons (positive charge), neutrons (neutral), electrons (negative charge) Atoms are constantly in motion, electrons move around the nucleus in paths called shells (or energy levels). Atoms may join together to form molecules and compounds. Common compounds and their formulas: water H₂O salt NaCl carbon dioxide CO₂</p>	✓	<p><i>Note: The grade 4 domain, Chemistry: Basic Terms and Concepts, is also addressed directly by the CKSci unit G5U1 Investigating Matter.</i></p>
B. Elements	✓	G5U1: Investigating Matter—Part B Structure of Matter and Part E Introduction to the Language of Chemistry
<p>Elements have atoms of only one kind, having the same number of protons. There are a little more than 100 different elements. The Periodic Table: organizes elements with common properties Atomic symbol and atomic number Some well-known elements and their symbols: Hydrogen H Helium He Carbon C Iron Fe Nitrogen N Oxygen O Sodium Na Gold Au Aluminum Al Silicon Si Chlorine Cl Silver Ag</p>		

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<p>Two important categories of elements: metals and non-metals Metals comprise about 2/3 of the known elements. Properties of metals: most are shiny, ductile, malleable, conductive</p>		
<p>C. Chemical and Physical Change</p>	✓	<p>G5U1: Investigating Matter—Part C Physical Changes in Matter and Part D Interactions of Matter</p>
<p>Chemical change changes what a molecule is made up of and results in a new substance with a new molecular structure. Examples of chemical change: rusting of iron, burning of wood, milk turning sour</p> <p>Physical change changes only the properties or appearance of the substance, but does not change what the substance is made up of. Examples of physical change: cutting wood or paper, breaking glass, freezing water</p>		
<p>VII. SCIENCE BIOGRAPHIES</p>	*	<p>Key Idea: CKSci instructional materials include stories of certain individuals from the history of science and as a way for students to explore science and engineering as human endeavors. Teachers are encouraged to continue using their Grade 5 Teacher Handbooks, as well as the <i>What Your Fifth Grader Needs to Know</i> chapters to support learning about particular scientists in Grade 5. Below are opportunities in CKSci to supplement the core program with learning about these individuals in the context of a science domain.</p>
<ul style="list-style-type: none"> Galileo (“Father of modern science” who provided scientific support for Copernicus’s sun-centered universe) 	*	<p>G5U5: Astronomy—Space Systems (e.g., to supplement Part B regarding models of our solar system)</p>
<ul style="list-style-type: none"> Percy Lavon Julian (biologist and inventor who developed synthetic cortisone to treat arthritis pain) 	*	<p>G5U1: Investigating Matter</p>
<ul style="list-style-type: none"> Ernest Just (biologist and medical pioneer who specialized in studying cells and reproduction in marine animals) 	*	<p>G4U3: Structures and Functions of Living Things G5U2: Energy and Matter in Ecosystems (e.g., to supplement Part B Plants and Animals)</p>
<ul style="list-style-type: none"> Carl Linnaeus (botanist and “Father of taxonomy” who standardized the classification system) 	*	<p>G3U3: Life Cycles, Traits, and Variation G4U3: Structures and Functions of Living Things G5U2: Energy and Matter in Ecosystems (e.g., Part B Plants and Animals)</p>