OFFICE OF CURRICULUM, INSTRUCTION, & PROFESSIONAL DEVELOPMENT

MIDDLE SCHOOL COURSE OUTLINE

(Revised September 2011)

Department	Science	**Course Code**	4112
Course Title	Science 7 SDAIE		
Abbreviation	Sci 7 SDA	**Grade Level**	7
Course Length	1 year or 1 sem	**Co-requisites**	ELD English 3
Teacher Certification	BCLAD / BCC or CLAD / LDS / SB 395, 1969		

COURSE DESCRIPTION:

Seventh grade SDAIE science is designed specifically for the needs of English Language Learners (ELLs) who are at the High Intermediate and Early Advanced levels of listening, speaking, reading, and writing proficiency in English. Students in this course cover the same content and utilize the same basic textbook as their Fluent English Speaker counterparts. The course delivery varies in pacing, instructional methodology, and supplemental materials. It is designed to provide depth versus breadth of the content standards, while providing more comprehensible input and literacy development in the content area.

Seventh grade science is a standards and laboratory based program. Students should spend approximately forty percent (40%) of their class time on hands-on activities. Introductory principles of life science will be explored in detail, with some related topics from physical and Earth sciences included. Constructivist methods of teaching are employed to ensure the best possible comprehension and retention or science concepts. Science activities will be based on the California Science Standards as delineated in the California Science Framework and will utilize the skills and techniques outlined in the Investigation and Experimentation Strand of the Content Standards.

GOALS: (Student needs this course is intended to meet)

- Students will learn all of the California State Standards for 7th Grade Science, which emphasize life sciences. The use of well-designed, memorable experiences and the application of scientific knowledge and methodology are essential in helping students achieve appropriate comprehension of the content.
- Students will improve their ability to learn independently by drawing generalizations from science related articles, books, graphs, charts, and diagrams. Regular opportunities are provided for students to clearly communicate their understanding through oral and written explanations of science concepts.
- Students will study the applications of science in everyday life to inspire them to consider pursuing advanced studies in science and explore the wide variety of related career choices available.

ACADEMIC LITERACY IN SDAIE CLASSES FOR ELLs AT LEVEL 3 and LONG-TERM ENGLISH LEARNERS:

The ELD Standards of reading, writing, listening and speaking describe the linguistic pathway that ELLs take to achieve academic literacy in English. SDAIE content area classes play an important role in developing and strengthening students' progress towards this goal. Students should be encouraged to expand their English skills, even though grammatical and vocabulary approximations will occur during this process.

When content-area information and materials have been made comprehensible through instruction in the SDAIE class, ELLs at each level will progress through the following phases of developing academic literacy in English. The students' degrees of literacy in their primary language will significantly affect the pace that students move through these levels.

ELD Level 3

Upon entering ELD Level 3, students are increasing their control of academic English proficiency about topics that have been explicitly taught to them and some topics that may be new to them. There will be wide gaps in vocabulary. ELLs progressing through this level will:

- participate in group/class projects, discussions and presentations with simple sentences and complex sentences (with increasing accuracy and fluency when given modeling and constructive feedback)
- use content area reading strategies (especially pre-reading, KWL, academic participation cards, anticipation guides, Reciprocal Teaching and Question/Answer Relationships) to analyze concepts from taught texts and other course reading materials. By the end of level 3, ELLs are able to comprehend most texts written at 4th grade level. Students continue to need extensive modeling and direct instruction, especially when encountering figurative language and sentences with numerous clauses.
- respond to Curriculum Embedded Assessment prompts (read to them and clarified for
- them as needed) orally and with simple and complex sentence structures
- use writing in a variety of ways such as, but not limited to, class note-taking, learning logs, interactive notebooks, response logs, and completing student handouts, homework, and class projects. Students continue to need extensive modeling and direct instruction, especially when writing at differing formality levels for a variety of audiences.
- understand the need for using test-taking strategies (using taught vocabulary) on the required district/state assessments, such as, End of Course Exams (with alternate presentation and response), CST, and CELDT.

Long-Term English Learners

Long-term English learners demonstrate a significant gap between their oral English fluency (high) and their English literacy proficiency (low), even though they have had many years of instruction in English. ELLs progressing through this level will:

- participate in group/class projects, discussions and presentations with sentences that demonstrate conversational English proficiency
- need to be taught how to use content area reading strategies (especially pre-reading, KWL, academic participation cards, anticipation guides, Reciprocal Teaching and Question/Answer Relationships) to analyze concepts from taught texts and other course reading materials. Students need extensive modeling, direct instruction, and oral discussions before, during and after reading.
- respond to Curriculum Embedded Assessment prompts (clarified orally to them as needed). Students need extensive modeling, direct instruction, and oral discussions to move them beyond writing sentences that reflect only conversational English.
- use writing in a variety of ways such as, but not limited to, class note-taking, learning logs, interactive notebooks, response logs, and completing student handouts, homework, and class projects. Students continue to need extensive modeling and direct instruction, especially when writing at differing formality levels for a variety of audiences.
- understand the need for using test-taking strategies on the required district/state assessments, such as, End of Course Exams, CST, and CELDT.

CONTEXT: CONTENT SCOPE AND SEQUENCE

6th

Physical Sciences

Density (Qualitative) -------- (CA 8)
Energy
Temperature vs. Heat
Heat Transfer

Earth Sciences

Earth's Layers
Plate Tectonics
Mountain Building
Earthquakes, Faults, and Epicenters
Volcanoes
California Geology
Mechanical & Chemical Weathering
Minerals
Rock Cycle (Igneous, Metamorphic, and Sedimentary Rocks)
Sun's Effect on Weather
Convections
Solar Energy
Atmospheric Conditions
Natural Resources
Stratigraphy: Fossil Locations Rock--(CA 7)
Geol. Timeline of Earth's History-------(CA 7)
Formation of Fossils ----------(CA 7)
Methods of Dating Earth's History-----(CA 7)

Life Sciences

Food Chains / Food Webs
Ecosystems
Human Impacts on Ecosystems --------- (LB)

Six Designated Lessons from Project ALERT Health Curriculum

7th

Life Sciences

Cell Similarities & Differentiation
Function of Cell Structures
Energy at the Cellular Level
Photosynthesis / Respiration
Mitosis
Genetics
DNA → RNA → Protein ---------- (LB)
Sexual / Asexual Reproduction
Meiosis ---------- (LB)
DNA, Genes, & Alleles
Dominant & Recessive Traits
Theory of Evolution
Natural Selection
Body Systems
Taxonomic Keys ---------- (LB)
Kingdoms & Major Phyla ---------- (LB)

8th

Physical Sciences

Observing and Defining Motion
Forces and their Effects
Gravity's Larges Scale Effects
Basic Atomic Theory
Periodic Table as a Tool
Metals, Non-metals, Inert Gases
Electrons beyond the Bohr Model
Ions and Isotopes
Physical & Chemical Properties
Element vs. Compound Properties
Chemical Bonding
Atoms and Ions Forming Solids
Phases and Molecular Motion
Chemical Formulas
Chemical Equations & Conservation of Matter
Exothermic vs. Endothermic
Acids, Bases, and pH
Density & Buoyancy
Sound and Light Energy ------ (CA 7)

Earth Sciences

Galaxies and Stars
Life Cycles of Stars (Nebular Theory, Novas, etc.)
Distances in Astronomy
Light Sources and Reflectors in the Universe
Cosmology (Universe Origin)--------- (LB)
Solar System

Life Sciences

Simple Machines and the Human Body ----------(CA 7)
Blood Pressure and Heart Valves---(CA 7)
Organic Chem. / Biochem.

Three Designated Lessons from Project ALERT Health Curriculum

Notes regarding non-aligned content:

(LB) => Long Beach specific content; not found in CA Science Content Standards

(CA 7) => 7th grade content which has been moved to 6th or 8th grade to accommodate reduced science instruction in 7th grade

(CA 8) => 8th grade content which should be presented qualitatively in 6th grade to help explain convections and other Earth science related content

CONTEXT: SKILLS SCOPE AND SEQUENCE

Investigation and Experimentation:

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

6th

7a. Develop a hypothesis.
b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.
d. Communicate the steps and results from an investigation in written reports and oral presentations.
e. Recognize whether evidence is consistent with a proposed explanation.
f. Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.
g. Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions).
h. Identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hillslope).

7th

7a. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
b. Utilize a variety of print and electronic resources (including the World Wide Web) to collect information as evidence as part of a research project.
c. Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.
d. Construct scale models, maps and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).
e. Communicate the steps and results from an investigation in written reports and verbal presentations.

8th

9a. Plan and conduct a scientific investigation to test a hypothesis.
b. Evaluate the accuracy and reproducibility of data.
c. Distinguish between variable and controlled parameters in a test.
d. Recognize the slope of the linear graph as the constant in the relationship y=kx and apply this to interpret graphs constructed from data.
e. Construct appropriate graphs from data and develop quantitative statements about the relationships between variables.
f. Apply simple mathematical relationships to determine one quantity given the other two (including speed = distance/time, density = mass/volume, force = pressure x area, volume=area x height).
g. Distinguish between linear and non-linear relationships on a graph of data.

CA CONTENT STANDARDS

NOTE: **[LS10]** indicates standards that will be assessed on the 10th grade No Child Left Behind Biology/Life Science Test.

Grade 7 Focus On Life Science:

Cell Biology

1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope. As a basis for understanding this concept, students know …
   a. cells function similarly in all living organisms.
   b. the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.
   c. the nucleus is the repository for genetic information in plant and animal cells. [LS10]
   d. that mitochondria liberate energy for the work that cells do, and chloroplasts capture sunlight energy for photosynthesis. [LS10]
   e. cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes. [LS10]
   f. that as multicellular organisms develop, their cells differentiate.

Genetics

2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences. As a basis for understanding this concept, students know…
   a. the differences between the life cycles and reproduction methods of sexual and asexual organisms. [LS10]
   b. sexual reproduction produces offspring that inherit half their genes from each parent.
   c. an inherited trait can be determined by one or more genes. [LS10]
   d. plant and animal cells contain many thousands of different genes and typically have two copies of every gene. The two copies (or alleles) of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive. [LS10]
   e. DNA (deoxyribonucleic acid) is the genetic material of living organisms and is located in the chromosomes of each cell. [LS10]

Evolution

3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept, students know: …
   a. both genetic variation and environmental factors are causes of evolution and diversity of organisms. [LS10]
   b. the reasoning used by Darwin in making his conclusion that natural selection is the mechanism of evolution. [LS10]
   c. how independent lines of evidence from geology, fossils, and comparative anatomy provide a basis for the theory of evolution. [LS10]
   d. how to construct a simple branching diagram to classify living groups of organisms by shared derived characteristics, and how to expand the diagram to include fossil organisms.
   e. that extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient for its survival.

Note: This section has been moved to 6th grade in Long Beach to accommodate single-semester 7th grade science programs.

Earth and Life History (Earth Science)

4. Evidence from rocks allows us to understand the evolution of life on Earth. As the basis for understanding this concept, students know …
   a. Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time.
   b. the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids.
   c. that the rock cycle includes the formation of new sediment and rocks and that rocks are often found in layers, with the oldest generally on the bottom.
   d. that evidence from geologic layers and radioactive dating indicates Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years.

Moved to 6th

e. fossils provide evidence of how life and environmental conditions have changed

f. how movements of the Earth's continental and oceanic plates through time, with associated changes in climate and geographical connections, have affected the past and present distribution of organisms.

g. how to explain significant developments and extinctions of plant and animal life on the geologic time scale.

Structure and Function in Living Systems

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept, students know …

   a. plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism. [LS10]

   b. organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.

   c. how bones and muscles work together to provide a structural framework for movement. [LS10]

   d. how the reproductive organs of the human female and male generate eggs and sperm and how sexual activity may lead to fertilization and pregnancy.

   e. the function of the umbilicus and placenta during pregnancy.

   f. the structures and processes by which flowering plants generate pollen, ovules, seeds, and fruit.

   g. how to relate the structures of the eye and ear to their functions.

Note: This section has been moved to 8th grade in Long Beach to accommodate single-semester 7th grade science programs.

Physical Principles in Living Systems (Physical Science)

6. Physical principles underlie biological structures and functions. As a basis for understanding this concept, students know …

   a. visible light is a small band within a very broad electromagnetic spectrum.

   b. that for an object to be seen, light emitted by or scattered from it must be detected by the eye.

   c. light travels in straight lines if the medium it travels through does not change.

   d. how simple lenses are used in a magnifying glass, the eye, a camera, a telescope, and a microscope.

   e. that white light is a mixture of many wavelengths (colors) and that retinal cells react differently to different wavelengths.

   f. light can be reflected, refracted, transmitted, and absorbed by matter.

   g. the angle of reflection of a light beam is equal to the angle of incidence.

   h. how to compare joints in the body (wrist, shoulder, thigh) with structures used in machines and simple devices (hinge, ball-and-socket, and sliding joints).

   i. how levers confer mechanical advantage and how the application of this principle applies to the musculoskeletal system.

   j. that contractions of the heart generate blood pressure and that heart valves prevent backflow of blood in the circulatory system. [LS10]

Investigation & Experimentation

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will …

   a. select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

   b. use a variety of print and electronic resources (including the World Wide Web) to collect information and evidence as part of a research project.

   c. communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. [LS10]

   d. construct scale models, maps and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).

   e. communicate the steps and results from an investigation in written reports and verbal presentations.

DISTRICT PERFORMANCE STANDARDS:

The Long Beach Unified School District has common assessments and assignments that are required for seventh grade science. The Performance Standard Criteria are shown in the table below. The objective is to have all students achieve at or above the Proficient Level and receive a C or better in the course. Performance level is determined by the average of the assessments or assignments.

Science Performance Standard Criteria

	Not Proficient	Partial Proficient	Proficient	Advanced Proficient
Graded Student Work	Average is a 1 or less than 60%	Average is a 2 or 60% - 69%	Average is a 3 or 70% - 84%	Average is a 4 or 85% - 100%
Standards-Based Classroom Assessments	Less than 60%	60% - 69%	70% - 84%	85% - 100%
Written Response / Lab Report / OES (6 point scale)	1-2	3	4	5-6
Written Response / Lab Report / OES (4 point scale)	1	2	3	4
End-Of-Course Exam	Less than 45%	45% - 59%	60% - 84%	85% - 100%

OUTLINE OF CONTENT AND RECOMMENDED TIME ALLOTMENT:

Content sequencing and time allocations are only suggestions and may be adjusted to suit school site curriculum plans and student needs.

SCIENCE 7

Cell Biology

1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… cells function similarly in all living organisms. **(1,a)** **DISTRICT ASSESSMENTS:** CR: Divide and Conquer **MODIFIED ASSESSMENTS:** In pairs, use cards with illustrations of unicellular and multicellular organisms and separate into appropriate stacks. Match illustrations of cell organelles with illustrations of things with analogous functions.	• Summarize the 3 points of the cell theory. • Differentiate unicellular from multicellular organisms. • Cite significant differences between cells in different environments (the variety of cells in animals and plants, bacteria such as Escherichia bacterium living in an intestine or a Thermophilus bacterium living in a superheated geyser). • Explain the common functions within cells in all living organisms (i.e., all cells contain DNA genome which is expressed by a universal code; cell division and energy production are very similar in all living cells).	**Focus on LS, Ch 1:1,2** *PH FoLS, Ch 1:1-2*	***KEY VOCABULARY:*** cell, unicellular, bacteria, cell theory, multicellular, genome ***GRAPHIC ORGANIZERS:*** Venn diagram or double bubble(compare-contrast) Unicellular vs. multicellular Circle map (brainstorm) of common functions within cells within cells of all living organisms ***SKILLS FOCUS:*** Classifying, comparing, organizing, and contrasting ***LABS / DEMOS / VISUALS:*** • View prepared slide of cork cells, and different kinds of specialized cells (nerve cell, blood cell, muscle cell, Escherichia bacterium, Thermophilus bacterium, etc.) • Focus on LS, 1:2, Conc's in Motion, Interactive Table of cell structures, p. 63 • Focus on LS, 1:2, Mini Lab, "… model a cell", p. 65 • Focus on LS, 4-in-1 Lab, The Compound Light Microscope, pp. 1-4 • Focus on LS, Ch 1 Transparency "Organic compounds" "A Factory Analogy" • **Wikipedia:** Extremophiles http://en.wikipedia.org/wiki/Extremophile	3 Days

Cell Biology (Cont'd)

1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls. **(1,b)** **DISTRICT ASSESSMENTS:** CR: Your Basic Unit **MODIFIED ASSESSMENTS:** In pairs, make a wet mount slide of elodea or human cheek cells (human cells require parental permission). Draw 3-4 cells. Label one cell. Title the diagram. Compare group members' diagrams. In pairs, from a diagram of an animal and plant cell, identify each cell stating the reason and then label the organelles. In pairs, view prepared slides of plant and animal cells. Diagram observations on a lab sheet. Make a poster of one of the diagrams and present it to the class.	• Identify the parts/ function of a compound microscope. • Manipulate the compound microscope. • Differentiate magnification vs. resolution. • Prepare and examine wet mount slides to identify major cell organelles that differentiate plant cells from animal cells. • Explain that plants have rigid cell walls while animal cells have a shape defined by an underlying cytoskeleton. • Explain that many plant cells contain chloroplasts and a central vacuole, which are not found in animal cells. • Compare and contrast plant cells and animal cells using a Venn diagram.	**Focus on LS, Ch 1:2,3** *PH FoLS, Ch 1:1-2*	***KEY VOCABULARY:*** compound microscope wet mount slide cell wall cell membrane cytoplasm cytoskeleton organelle chloroplast central vacuole ***GRAPHIC ORGANIZERS:*** Venn Diagram or double bubble (compare-contrast) and animal and a plant cell. Label a diagram of a compound microscope ***SKILLS FOCUS:*** Comparing, contrasting, organizing Construct scale models and appropriately labeled diagrams to communicate scientific knowledge. **(I&E 7.d)** ***LABS / DEMOS / VISUALS:*** • Demonstrate microscope parts and use • View plant and animal cells under microscope to compare and contrast • Focus on LS, Brain Pop Movies online, "Cell Specialization" • Focus on LS: 1:2, "Conc's In Motion", Visualizing plant cells, p. 58, and animal cells, p. 59 • Focus on LS, 1:2, Demo., Cell Wall, p. 58 • Focus on LS, 1:2, Demo., Fluid in Cells, p. 59 • Cell structure board game and jigsaw activity • Micro-slides (to be used with micro viewer): Plant Cells, Animal Cells (Blood cell, nerve cell, cheek cell etc.) • Model making of a wet mount slide.	6 Days
… the nucleus is the repository for genetic information in plant and animal cells. **(1,c)** [LS10] **DISTRICT ASSESSMENTS:** CR: Your Basic Unit **MODIFIED ASSESSMENTS:** In pairs, build a DNA model using paper or pipe cleaners and beads. Have students give an example of a something else that serves a blueprint function (i.e., building blueprints, instructions for building a toy, recipes, engine schematics, computer programs) Have students create a model to show by analogy why DNA is visible when condensed.	• Explain that DNA molecules contain the code, or "blueprint", for organisms. • Explain that the DNA molecules make up structures called chromosomes. • Identify the nucleus and chromosomes on prepared slides of plant and/or animal cells. • Explain that if cells are not actively dividing, the DNA will be contained within the nucleus, but is not condensed and will therefore not be visible. • Explain that when the cell is actively dividing, the chromosomes will be condensed and visible, but the nuclear membrane will not be present.	**Focus on LS, Ch 1:1,2** *PH FoLS, Ch 1:2*	***KEY VOCABULARY:*** DNA genetic chromosomes nucleus nuclear membrane ***GRAPHIC ORGANIZERS:*** Tree map of Nucleus, chromosomes, DNA, Genes (show relationships) ***SKILLS FOCUS:*** Observe Select and use appropriate tools and technology (including microscopes) to perform tests, collect data, and display data. **(I&E 7.a)** ***LABS / DEMOS / VISUALS:*** • Using a microscope, view a fixed and stained section of onion root tip, focusing on the DNA within the nucleus. (Framework p.104) • Focus on LS, 1:1, Data Lab, "… observe DNA in a cell", p. 54	2 Days

Cell Biology (Cont'd)

1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… that mitochondria liberate energy for the work that cells do and chloroplasts capture sunlight energy for photosynthesis. **(1,d)** [LS10] **DISTRICT ASSESSMENTS:** CR: Your Basic Unit **MODIFIED ASSESSMENTS:** In pairs or small groups, role play the function and structure of mitochondria and chloroplasts, using visual representations of the molecules involved. In pairs, show how CO_2 and H_20 rearrange to form glucose – using molecular model kits or marshmallows. In pairs, construct the balanced equation for photosynthesis. Explain orally to group members why animals depend on plant photosynthesis. In pairs, describe the role of chloroplasts in photosynthesis.	• Explain that an organism's food is broken down by digestion into simple sugar molecules that travel to all of the individual cells. • Demonstrate that chemical energy is stored in the bonds that hold the atoms together in a sugar molecule. • Diagram how mitochondria in every cell efficiently extract the chemical energy from these sugar molecules by breaking the sugars (6-carbon) into carbon dioxide (1-carbon). • Describe how the mitochondria convert the sugar's energy into another form of chemical energy in molecules that are easily used by the cell. • Create an analogy to express mitochondrial function such as, considering the sugar to be like crude oil that a car cannot run on until it is refined into an easily used form – gasoline. • Explain that chloroplasts use pigments to capture the energy of sunlight. • Make a diagram showing how the energy captured in chloroplasts drives a chemical reaction that takes carbon dioxide molecules (1-carbon) from the air and connects them together to form sugar molecules (6-carbon). • Explain that plants are called producers because they produce (synthesize) their own food, in the form of sugar molecules, from light (photo), air, and water. This is why the process is called photosynthesis.	**Focus on LS, Ch 1:3** *PH FoLS, Ch 2:1-2*	***KEY VOCABULARY:*** photosynthesis, sugar, chemical energy, energy captured, stored energy, chlorophyll, cellular respiration, simple, cycle, pigment, stomata, source, nitrogen, consumers ***GRAPHIC ORGANIZERS:*** Circle map of photosynthesis (adding new information in different color) Illustrate the analogy of mitochondrial function to crude oil ***SKILLS FOCUS:*** Analyzing, summarizing Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data. **(I&E 7.a)** Construct scale models, maps and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure). **(I&E 7.d)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, 1:3, Identifying Misconceptions, p. 69 TE • Focus on LS: 1:2, "Conc's In Motion", animation of cell resp, p. 60 • Focus on LS, 1:3, Practice Skills, p. 71 TE • Focus on LS, 1:3, Fig. 25, p. 71 • Focus on LS, 1:3, Mini Lab, "… see photosynthesis", p. 73	7 Days

Cell Biology (Cont'd)

1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes. **(1,e)** [LS10] **DISTRICT ASSESSMENTS:** CR: Divide and Conquer **MODIFIED ASSESSMENTS:** In pairs, put diagrams of the stages of mitosis in proper order. In small groups, put together a mitosis puzzle and explain the process of mitosis.	• Define mitosis as the process by which individual cells reproduce themselves. • Explain that before a cell divides, it must replicate a copy of the DNA in the nucleus and double the number of organelles in the cytoplasm, such as mitochondria and chloroplasts. • Diagram and explain the events that occur during mitosis. • Diagram and explain how replicated DNA chromosomes segregate so that each daughter cell receives the same number of chromosomes (two of each type to make a diploid organism). • Compare and contrast (in a Venn diagram, for instance) the "cell cycle" to the life cycle of an animal.	**Focus on LS, Ch 2:1** *PH FoLS, Ch 2:3*	***KEY VOCABULARY:*** cell division, prophase, chromatin, metaphase, mitosis, anaphase, cell cycle, telophase, cytokinesis, DNA replication, interphase, daughter cells, diploid ***GRAPHIC ORGANIZERS:*** Flow chart of mitosis Venn diagram or double bubble Cell cycle vs. life cycle ***SKILLS FOCUS:*** Predicting, observing, calculating Construct scale models, maps and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure). **(I&E 7.d)** ***LABS / DEMOS / VISUALS:*** • Micro slides: Plant Mitosis • Focus on LS, Brain Pop Movies online, "Mitosis" • Focus on LS, Ch 2 Transparency "Animal Cell Division" • Tissue Slides from SMRC • Stained section of onion root tip showing cells undergoing mitosis with visible, condensed chromosome structures • Class Role Play: DNA replication • **CellsAlive.com:** Mitosis animation http://www.cellsalive.com/mitosis.htm	4 Days

Genetics

2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… DNA (deoxyribo-nucleic acid) is the genetic material of living organisms and is located in the chromosomes of each cell. **(2,e)** [LS10] **DISTRICT ASSESSMENTS:** CR: Mutations **MODIFIED ASSESSMENTS:** Create a tree diagram, "Chromosome Structure", to contrast the functions of proteins and DNA in the chromosomes, including how the proteins are responsible for condensing and moving the chromosomes for replication.	• Explain that the chromosomes in eukaryotes are made of a combination of DNA and protein. • Distinguish between the roles of proteins in a chromosome, which help to support the DNA structure and functions, and DNA, which stores all of the genetic information. • Infer that chromosomes organize genetic information of a cell into discrete units. For instance, sex-linked traits are all located on the X and Y chromosomes. • Recall that humans have 23 pairs of chromosomes that vary in size. • Explain that chromosomes are normally loosely stretched out in the nucleus and are not visible under a microscope until they pull together in condensed form for mitosis.	**Focus on LS, Ch 1:2 and 2:1, 4:2** *PH FoLS, Ch 3:3 and 4:1*	***KEY VOCABULARY:*** chromosomes sex-linked chromatin ***GRAPHIC ORGANIZERS:*** ***SKILLS FOCUS:*** Abstract reasoning Construct scale models, maps and appropriately labeled diagrams to communicate scientific knowledge (e.g., cell structure). **(I&E 7.d)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, 4:2, Critical Thinking, "Infer", p. 186 TE	5 Days

Cell Biology (Cont'd)

1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
* *… DNA serves as the template for all functional (enzyme) and structural proteins in cells.* ***(LBUSD)*** **DISTRICT ASSESSMENTS:** OES: **MODIFIED ASSESSMENTS:** Create a labeled diagram the processes of transcription and translation.	• *Contrast structural proteins from proteins that facilitate chemical reactions in cells called enzymes.* • *Explain that codes from various segments of the DNA molecules are transcribed into a similar molecule called RNA, which in turn is translated into protein molecules needed by the cell.* • *Explain that the mechanism that selects which parts of the DNA are transcribed is the mechanism that determines the cell type.*	**Focus on LS, Ch 1:1 pp. 53-54** *PH FoLS, Ch 3:4*	***KEY VOCABULARY:*** protein code RNA transcription translation ***SKILLS FOCUS:*** Model, correlate Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c** [LS10]**)** ***LABS / DEMOS:*** • **Teachers Domain:** Making Proteins animation http://www.teachersdomain.org/resources/lsps07/sci/life/stru/cellprotein/index.html	4 Days
… that as multicellular organisms develop, their cells differentiate. **(1,f)** **DISTRICT ASSESSMENTS:** CR: Divide and Conquer **MODIFIED ASSESSMENTS:** Create an illustrated timeline showing when different cells begin to differentiate in an embryo. Use Venn diagrams to compare and contrast different types of cells in an organism.	• Examine a variety of tissue samples showing differentiated cells in plants and animals. • Research the variety of cell types in humans. • Explain that all of the different cell types in a multicellular organism began as a single fertilized egg. • Give evidence that a fertilized egg cell goes through several mitosis divisions creating apparently identical cells. • Point out evidence from pictures/diagrams that at very early stages, cells begin to form distinct structures, implying that the cells are no longer identical. • Define cells that have become identifiable types as differentiated cells. • Contrast early differentiation (cells which will become stomach and intestines can be distinguished from those which will become the nervous system) from later, more fine differentiation (retinal cells becoming either rods for dim light vision, or cones for color vision). • Cite evidence that plant cells often retain the ability to differentiate into other tissue types. For example, plants which can root from clippings. • Explain that after differentiation, most animal cells lose the ability to become other types of cells, except for the germ cells that produce sperm and eggs.	**Focus on LS, Ch 2:2** *PH FoLS, Ch 16:1 & 23:3*	***KEY VOCABULARY:*** embryo different fertilized egg **differentiation** differentiated ***GRAPHIC ORGANIZERS:*** Flow chart: Mitosis specialization Refer to flow chart of mitosis made for 1d ***SKILLS FOCUS:*** Observing, classifying, communicating, organizing Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c)** ***LABS / DEMOS / VISUALS:*** • Observe prepared slides of plant and animal tissues. • Focus on LS, Lab, "Exploring the Unknown", p. 74 • Focus on LS, 2:2, Identifying Misconceptions, p. 102 TE • Focus on LS, Brain Pop Movies online, "Cell Specialization" • **Wikipedia:** cellular differentiation http://en.wikipedia.org/wiki/Cellular_differentiation • **NOVA Online:** animation of early embryo development and differentiation http://www.pbs.org/wgbh/nova/odyssey/clips/	3 Days

End District Quarter 1 (or 3) Exam Material

Begin District Quarter 2 (or 4) Exam Material

Genetics

2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
** … meiosis is the process germ cells undergo to produce the haploid cells needed for sexual reproduction.* ***(LBUSD)*** **DISTRICT ASSESSMENTS:** OES: **MODIFIED ASSESSMENTS:** In pairs, demonstrate the process of meiosis using circles for cells and beans for chromosomes. Assign half of the class to be germ cells producing eggs and the other half to be germ cells producing sperm.	• *List organisms whose cells are diploid, having two sets of chromosomes (animals, plants, fungi) and organisms whose cells have only one set of chromosomes (bacteria).* • *Demonstrate that diploid organisms must produce gamete cells with half the normal chromosome number (haploid), in order to produce an offspring with chromosomes from both parents.* • *Diagram and describe the steps of meiosis that germ cells undergo to produce haploid cells (sperm and egg in animals) needed for sexual reproduction.*	**Focus on LS, Ch 3:1** & 13:1 Start w/ Fig 5, p 508 then see Fig 3, p 506 *PH FoLS, Ch 3:3*	***KEY VOCABULARY:*** meiosis haploid germ cell gamete ***GRAPHIC ORGANIZERS:*** Diagram the stages of meiosis ***SKILLS FOCUS:*** Organization Construct appropriately labeled diagrams to communicate scientific knowledge. **(I&E 7.d)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, 3:1, Mini Lab, "What Does Meiosis Look Like?", p. 132 • Focus on LS: 3:1, "Conc's In Motion", animation of meiosis, p. 131 • **Access Excellence:** meiosis diagram http://www.accessexcellence.org/RC/VL/GG/meiosis.php • **Cells Alive:** meiosis animation http://www.cellsalive.com/meiosis.htm	2 Days
… the differences between the life cycles and reproduction methods of sexual and asexual organisms. **(2,a)** [LS10] **DISTRICT ASSESSMENTS:** CR: Mutations **MODIFIED ASSESSMENTS:** In small groups, make a poster or other visual of different types of asexual reproduction, including examples of each and then compare to sexual reproduction. In small groups research common types of vegetative propagation. Each group presents a demonstration of vegetative propagation to the class.	• Diagram and explain fertilization as the key step in sexual reproduction for animals when a haploid egg and sperm cell fuse to form a diploid fertilized egg (zygote). • Diagram the parallel sexual reproduction process in plants where pollination of haploid cells in flowering plants produces diploid seeds. • Explain how sexual reproduction produces new organisms that are genetically related to both parents. • Explain how hermaphroditic sexual reproduction occurs when sperm and egg generated by a single organism fuse. • Define reproduction without fertilization as asexual. • Describe different types of asexual reproduction (i.e., fission, budding, vegetative propagation). • Cite examples of organisms that reproduce asexually. • Give examples of organisms have both sexual and asexual reproduction methods. • Compare and contrast sexual and asexual reproduction. • Explain that growth into a new adult organism involves many cell divisions (mitosis) and developmental stages.	**Focus on LS, Ch 3:1-4** *PH FoLS, Ch 8:2, 11:3, 12:1,3, and 23:2*	***KEY VOCABULARY:*** **fission** **budding** **fertilization** **zygote** pollination gymnosperm angiosperm seed sperm flower egg **hermaphroditic** sexual reproduction **asexual** reproduction **sexual** reproduction **vegetative propagation** ***GRAPHIC ORGANIZERS:*** Triple Venn Diagram Sexual vs. Asexual vs. hermaphroditic reproduction Tree Map (budding, fission, and vegetative propagation Flow chart (each type of reproduction ***SKILLS FOCUS:*** Comparing, contrasting Communicate the steps and results from an investigation in written reports and verbal presentations. **(I&E 7.e)** ***LABS / DEMOS / VISUALS:*** • Flow chart (each type of reproduction) • Focus on LS, Lab, "Plant Propogation", pp. 158-159 • Use microscope (with Flex Cam, if available) to show budding yeast in varying temperatures of water • Focus on LS, 3:4, Mini Lab, "How Do Yeast Reproduce?", p. 153 • Tell Me Why video, "Flowers" • Grow sweet potato plants in class • Focus on LS: Ch 3 Transparencies "It's Raining, It's Sporing" "Fern Life Cycle" "Spuds and Buds" "Asexual Reproduction"	5 Days

Structure and Function in Living Systems (cont'd)

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… the structures and processes by which flowering plants generate pollen, ovules, seeds, and fruit. **(5,f)** **DISTRICT ASSESSMENTS:** CR: Flower Power **MODIFIED ASSESSMENTS:** Divide groups of 4 into partners and have each set of partners become experts of either male or female reproductive parts of flower. Then each set of partners teaches the other using actual flowers.	• Explain how the flower is the reproductive structure of angiosperms, which may contain male, female or both parts. • Describe the male reproductive parts of the flower, including: stamen, anther, pollen granules, filament and receptacle. • Describe the female reproductive parts of the flower, including pistil, stigma, pollen grains, style, pollen tube, ovary, ovules, and ova. • Describe the process after fertilization from seed to fruit.	**Focus on LS, Ch 3:2** *PH FoLS, Ch 11:3*	***KEY VOCABULARY:*** angiosperm, pollen, filament, pollen tube, pistil, ovary, stamen, stigma, ovule, anther, style, ova, receptacle ***GRAPHIC ORGANIZERS:*** Magic Boxes vocabulary format on parts of flower Diagram parts of flower and label and explain function of each part Flow Map: Seed to Fruit ***SKILLS FOCUS:*** Observation Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data. **(I&E 7.a)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, Virtual Lab "The Simple Life: What is the life cycle of a simple plant?" at **ca7.msscience.com** • Focus on LS, 3:2, Demo., "Plant Reproduction", p. 137 TE • Focus on LS, 3:2, Mini Lab "What's in a flower?", p. 138 • Focus on LS, 3:2, Conc's in Motion: animation of the angiosperm life cycle, p. 139 • Focus on LS, 3:2, Demo., "Model Diversity" using fruit, p 140 TE • Focus on LS, Ch 3 Transparency "It's Raining, It's Sporing?"	3 Days

Structure and Function in Living Systems (cont'd)

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
NOTE: This unit requires parent notification. … how the reproductive organs of the human female and male generate eggs and sperm and how sexual activity may lead to fertilization and pregnancy. **(5,d)** **DISTRICT ASSESSMENTS:** CR: Life Begins CR: Can't You See it? **MODIFIED ASSESSMENTS:** Individuals use chart from Focus on LS, "Reading Tip" p. 729, (teacher note: leave out the names of the male and female reproductive systems for the students to complete).	• Describe the male reproduction system, including testes, scrotum, and sperm. • Describe sperm production from immature cells in the walls of the seminiferous tubules to flagellated cells stored in the epididymis. • Explain that during sexual arousal millions of sperm are transported to the urethra and ejaculated through the penis and that some may exit before ejaculation without the man's knowledge. • Explain how sexual activity without ejaculation can release sperm causing fertilization and pregnancy. • Describe the female reproduction system. • Explain ovulation following the path of the egg (oocyte) from a ruptured follicle of the ovaries (ovulation), to the Fallopian tubes, and uterus. • Explain how a sperm can be deposited in or near the vagina and can fertilize the egg. • Describe pregnancy from the implantation and development of the fertilized egg in the uterus tothe delivery of a baby, typically 9 months later. • Explain the physiology of why menstruation occurs noting that when the cycle stops, this can be the first sign of pregnancy.	**Focus on LS, Ch 13:1** *PH FoLS, 23:2,3*	***KEY VOCABULARY:*** penis, testes, scrotum, sperm, urethra, ejaculation, fertilization, pregnancy, embryo, ovaries, ovulation, oocyte, Fallopian tubes, vagina, uterus, menstruation, follicle, fetus ***GRAPHIC ORGANIZERS:*** Label diagrams of male and female reproduction systems Flow chart: path traveled by sperm through male reproduction system Flow Chart: path traveled by egg through female reproduction system ***SKILLS FOCUS:*** Evaluating, predicting, graphing Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c)** ***LABS / DEMOS / VISUALS:*** • **NOVA Video:** "The Miracle of Life", 60 min., (CA standards 5,d and 5,e) • Focus on LS: 13:1 Data Lab, "Which hormones control ovulation?", p. 509 • Focus on LS: Ch 13 Transparencies "Thoughts on Reproduction" "Male and Female Reproductive Systems" "Fertilization"	2 Days

Structure and Function in Living Systems (cont'd)

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
NOTE: This unit requires parent notification. … the function of the umbilicus and placenta during pregnancy. **(5,e)** **DISTRICT ASSESSMENTS:** CR: Life Begins **MODIFIED ASSESSMENTS:** In a small group create a 3-part outline from text: 1) placenta; 2) umbilical cord; 3) list drugs & diseases passed from mother to baby.	• Explain the role of the placenta in a developing fetus. • Explain the role of the umbilical cord (noting that the blood of the mother and fetus do not mix together). • Discuss how drugs, alcohol and infectious viruses, including HIV, can easily pass from the mother's blood to the blood of the fetus.	**Focus on LS, Ch 13:2** *PH FoLS, Ch 23:3*	***KEY VOCABULARY:*** placenta — umbilical cord fetus — amniotic sac ***GRAPHIC ORGANIZERS:*** Tree Maps: Structures and functions of Umbilical cord and of placenta ***SKILLS FOCUS:*** Comparing Utilize a variety of print and electronic resources (including the World Wide Web) to collect information as evidence as part of a research project. **(I&E 7.b)** ***LABS / DEMOS / VISUALS:*** • Focus on LS: 13:2, "Conc's in Motion" Interactive Table about the stages of pregnancy, p. 516 • Focus on LS: 13:2, Data Lab: "folic acid … birth defects?", p. 519 • Focus on LS: 13:2, "Conc's In Motion", Interactive Table on stages of pregnancy, p. 516 • Focus on LS: 13:2, Design Your Own Lab, "A Healthy Pregnancy" , p. 522-523 • Focus on LS: 13:2, Real World Science: Science & Society, p. 525 • Focus on LS, Ch 13 Transparencies "A New Development" "Human Development"	1 Day

Genetics (cont'd)

2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… sexual reproduction produces offspring that inherit half their genes from each parent. **(2,b)** **DISTRICT ASSESSMENTS:** CR: Mutations CR: In the Pink CR: A Very Hairy Problem **MODIFIED ASSESSMENTS:** Create a color-coded diagram to represent chromosomes in a sperm cell and an egg cell. Using a third color, show the DNA in the mitochondria of the egg. Show how the DNA in the nucleus of the zygote is a mixture of DNA from both parents, while the mitochondrial DNA remains the same.	• Illustrate how sexual reproduction combines genetic material from two distinct cells to form a new and unique combination. • Show by models or illustrations that nearly half of the genetic material comes from each parent. • Recall that mitochondrial DNA comes solely from the mother. • Demonstrate how mitochondrial DNA allows for tracing heritage from grandmothers to grandchildren with great certainty.	**Focus on LS, Ch 3:1-3** mitochondrial DNA: p 65 and p 187 "Maternal Inheritance" *PH FoLS, Ch 3:2 and 4:1*	***KEY VOCABULARY:*** offspring — probability genotype — trait ***GRAPHIC ORGANIZERS:*** Diagram of Chromosome Path from parents using illustration of a mother and father. ***SKILLS FOCUS:*** Inferring, classifying Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c)** ***LABS / DEMOS / VISUALS:*** • Use of Blood Type chart(shows which combinations of alleles result in each blood type) • Focus on LS, 3:1, Science Skills, "Make a Table", p. 128 TE • Focus on LS: Ch 3 Transparency "Fertilization"	4 Days

Genetics (cont'd)

2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… an inherited trait can be determined by one or more genes. **(2,c)** [LS10] **DISTRICT ASSESSMENTS:** CR: In the Pink CR: A Very Hairy Problem **MODIFIED ASSESSMENTS:** Have pairs of students sketch an organism pointing out traits which are controlled by single genes and others which are controlled by multiple genes. Cite evidence for each.	• Define genes as portions of the DNA that code for specific traits. • Define inherited traits as physical characteristics that have been passed down through generations by DNA. • Explain that single genes may affect more than one trait or feature. • Cite examples that some traits, like hair and eye color, are the result of multiple genes.	**Focus on LS, Ch 4:2** *PH FoLS, Ch 4:1*	***KEY VOCABULARY:*** gene pedigree ***GRAPHIC ORGANIZERS:*** ***SKILLS FOCUS:*** Observation, logic Utilize a variety of print and electronic resources (including the World Wide Web) to collect information as evidence as part of a research project. **(I&E 7.b)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, 4:2, Science Concepts, "Activity", p. 184 TE • Focus on LS: Ch 4 Transparency "Genetic Inheritance"	4 Days
… plant and animal cells contain many thousands of different genes and typically have two copies of every gene. The two copies (or alleles) of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive. **(2,d)** [LS10] **DISTRICT ASSESSMENTS:** CR: In the Pink CR: A Very Hairy Problem **MODIFIED ASSESSMENTS:** In pairs, create a diagram of a diploid chromosome with areas labeled for various genes. Show how the two resulting gametes will carry different alleles for the same gene trait. Individuals, pairs, and groups work out problems of varying degrees of difficulty on Punnett squares. (Blood type problems are excellent.) In pairs, research an area of interest in genetics and report to class with visuals of choice. In pairs, research genetic disorders and present to class.	• Analyze traits of people to appreciate that there are tens of thousands of traits controlled by genes. • Explain that genes exist in multiple versions, called alleles. • Account for the diversity of individuals by explaining that every person has the same genes as other people, but in a combination of alleles unique to the individual. • Logically show that by definition, diploid organisms will have two copies (or alleles) of every gene, which may be identical or different. • Explain that one of the alleles in a pair may be dominant over the other (recessive allele) so that it is expressed outwardly. • Define phenotype as the outward expression of genes as traits. • Predict phenotypic expression of traits in offspring of sexual reproduction using a 2x2 Punnett square. • Explain that genetic disorders are not caused by the presence of a gene that other individuals lack. They are caused by an abnormal allele being expressed.	**Focus on LS, Ch 4:1,2** *PH FoLS, Ch 3:1,2 and 4:2*	***KEY VOCABULARY:*** **alleles** dominant genotype recessive phenotype expression Punnett square ***GRAPHIC ORGANIZERS:*** Pre-made Punnett square to interpret the phenotype and genotype relationship (CA Framework, p. 108) ***SKILLS FOCUS:*** Diagram, organize Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, 4:1, Practice Skills, "Make a Table", p. 174 TE • Focus on LS, 4:1, Science Concepts, "Use Models", p. 1774 TE • Focus on LS, Ch4 Transparency "Pedigree"	4 Days

Evolution

3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… both genetic variation and environmental factors are causes of evolution and diversity of organisms. **(3,a)** [LS10] **DISTRICT ASSESSMENTS:** CR: Adapt or Die **MODIFIED ASSESSMENTS:** In pairs, collect pictures of various organisms. Have students choose an organism and list as many special adaptations as they can, which enable that organism to survive in its environment. The pair then shares their observations with the class. Extend the previous activity by having students think of an environmental change, which would cause an adaptation they described to be unfavorable to the organism.	• List examples of variations among individuals in a population. • Explain that genetic variability means there are favorable and unfavorable traits in a population. • Discuss how genetic homogeneity (ex. cheetah) makes a population more susceptible to extinction (ex. succumbing to an infectious disease for which there is no natural resistance). • Give reasons why genetic variation is important for survival. • Explain that environmental factors (such as habitat loss, climate change, and the introduction of non-native species) may be a cause of natural selection.	**Focus on Life Science, Ch 5:1,2, 6:1** ***PH FoLS: Ch 5:1***	***KEY VOCABULARY:*** **environmental factors** **genetic variation** evolution species theory variation evidence natural selection populations extinction ancestry **genetic** **selection** ***GRAPHIC ORGANIZERS:*** Multiflow map: organisms/environmental condition change/adaptation ***SKILLS FOCUS:*** Interpreting data, drawing conclusions ***LABS / DEMOS / VISUALS:*** • Focus on LS: 5:1, Launch Lab, "…attracts insects to flowers?" p. 207 • Focus on LS: 5:1, Mini Lab, "…the strongest survivors?", p. 228 • Focus on LS: 4-in-1 Lab, "Differences in Species", pp. 23-24 • Focus on LS: 4-in-1 Lab, "Seed Adaptations", p. 33-36 • Focus on LS: Culturally Responsive Teaching, "… Seeds for a Healthy Planet", p. 19 • Focus on LS: Ch 5 Transparencies "It's a Camel Now" "A Family Reunion"	4 Days
… the reasoning used by Darwin in making his conclusion that natural selection is the mechanism of evolution. **(3,b)** [LS10] **DISTRICT ASSESSMENTS:** CR: Adapt or Die **MODIFIED ASSESSMENTS:** In small groups research and make a list of animals and/or plants that are extinct and those that are endangered. Being guided by the theories of "natural selection" and "struggle for existence" discuss and predict why each of the animals or plants is on this list.	• Define natural selection, noting that it is considered the primary mechanism for evolution. • Provide examples of how differences in offspring occur randomly and may affect an individual's ability to survive and reproduce. • Give examples of environment and ecological conditions that affect the survival and reproduction of species. • State the reasoning and evidence that Darwin gave in forming his law of natural selection. • Explain that scientists' work is based on the ideas and work of other scientists (e.g., the work of Thomas Malthus influenced the development of Charles Darwin's proposal that natural selection is the mechanism for evolution). • Explain how natural selection accounts for the great variety of species seen today, and for the great number of extinct and non-extinct species found in the fossil record.	**Focus on LS, Ch 5:1** *PH FoLS, Ch 5:1,2*	***KEY VOCABULARY:*** natural selection species Charles Darwin offspring fossil record environment adaptation ecological evolution reproduce ***GRAPHIC ORGANIZERS:*** Tree Map or Outline: Darwin and Natural Selection Circle Map: Natural Selection ***SKILLS FOCUS:*** Comparing, observing, interpreting data, inferring Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c)** ***LABS / DEMOS / VISUALS:*** • Focus on LS: 5:1, Mini Lab "… shape of a bird's beak …?", p. 214 • Focus on LS: 4-in-1 Lab, "Bird Beaks and Physical Adaptations", p. 25-28 • Focus on LS: 5:2, Design Your Own Lab, "… apply … natural selection to island species?", p. 230-231 • Focus on LS: 6:4, Real World Science, p. 268-269	3 Days

Evolution (cont'd)

3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… how independent lines of evidence from geology, fossils, and comparative anatomy provide a basis for the theory of evolution. **(3,c)** [LS10] **DISTRICT ASSESSMENTS:** CR: The Leg Bon's Connected to the … **MODIFIED ASSESSMENTS:** Graph a curve to show half-life decay of a radioactive isotope. Use this graph to predict the age of a given sample. In pairs, orally explain radioactive dating and relative dating evidences and how they support the theory of evolution.	• Describe the process of fossilization and explain how fossils preserve evidence of ancient life. • Describe how paleontologists use radioactive dating methods and geologic interpretation of the organisms in rock layers to provide evidence for evolution. • Cite evidence from comparative anatomy (homologous structures) that can be seen as evidence that all vertebrates descended from a common ancestor. • Cite evidence from geology, the fossil record, molecular biology, and studies of comparative anatomy that supports the theory of evolution.	**Focus on LS, Ch 6:1,2 7:1,2** *PH FoLS: Ch 5:2-3 & 6:1-4*	***KEY VOCABULARY:*** evolution theory homologous structures absolute age dating radioactive dating relative age dating comparative anatomy preserve index fossil fossil record variation fossil fossilization anatomy paleontologist population geology vertebrates protein Law of Superposition ***GRAPHIC ORGANIZERS:*** Flow Chart: Change in plants/animals over time Circle Map: Fossils ***SKILLS FOCUS:*** Classifying, organizing, inferring, drawing conclusions, comparing, contrasting Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c)** ***LABS / DEMOS / VISUALS:*** • Focus on LS: 6:1, Mini Lab, "How do fossils form,?" p. 249 • Focus on LS: 6:2, Data Lab, "… proteins tell us about evolution" p. 255 • Focus on LS: Ch 6 Transparencies "Fossil Formation" "Guess Again" "Ancient Geography"	6 Days

Evolution (cont'd)

3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
…how to construct a simple branching diagram to classify living groups of organisms by shared derived characteristics and how to expand the diagram to include fossil organisms. **(3,d)** **DISTRICT ASSESSMENTS:** PT: A Leafy Situation **MODIFIED ASSESSMENTS:** In small groups, create a poster on one Kingdom from students' Tree Maps. Display the posters for a Carousel activity, where groups move from poster from poster, either writing or illustrating what they are learning.	• Define systematics as the classification of organisms according to their characteristics. • Discuss how classification groups organisms together based on shared characteristics (using the system developed by Carolus Linnaeus). • Create a branching tree diagram that shows the probable evolutionary relationships among living organisms and their ancestors.	**Focus on LS, Ch 6:4** *PH FoLS, 5:2 7:3*	***KEY VOCABULARY:*** systematics classification branching tree diagram ancestors evolutionary relationships ***GRAPHIC ORGANIZERS:*** Tree map: 6 Kingdoms ***SKILLS FOCUS:*** Comparing, contrasting, inferring, interpreting data, diagraming, organizing, classifying Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c)** ***LABS / DEMOS / VISUALS:*** • Focus on LS: 6:4, "Conc's In Motion", Interactive Table of levels of classification, p. 263 • Focus on LS: 6:4, Mini Lab, "… create a dichotomous key?", p. 264 • Focus on LS: 6:4, Lab "Classifying the Students in your Class", p. 266-267 • Focus on LS: 4-in-1 Lab, "Classification", p. 29-31 • Focus on LS: 4-in-1 Lab, "Designing a Classification System" , p. 97-98 • Focus on LS: Ch 6 Transparencies "It's a Bird! It's a Plane! It's all of the Above!" "Modern Classification" "Bear Evolution" • Focus on LS: Ch 8 Transparencies "Geologic Time" "Geologic Time Scale" • **Berkeley/NSF:** Cladistics "T-Rex" http://www.ucmp.berkeley.edu/education/explorations/tours/Trex/index.html	4 Days
…use a taxonomic key to classify organisms, recognizing the microscopic and macroscopic differences between the taxonomic groups. ***(LBUSD)*** **DISTRICT ASSESSMENTS:** OES: **MODIFIED ASSESSMENTS:** In small groups, gather various types of leaves. Each student in the group devises a dichotomous key to sort the leaves. The group then compares keys and chooses the best one to share with the class. If leaves are not possible, use students' pens and pencils from their backpacks.	• *Learn and practice the use of taxonomic dichotomous keys.* • *Develop and use dichotomous keys for a set of non-living objects.* • *List the seven levels of classification.* • *Describe the similarities in body shape and function (morphological similarities) among organisms of one taxonomic group.* • *Compare and contrast prokaryotic and eukaryotic cells.*	**Focus on LS, Ch 6:4, Ch 1:2, p. 64-66 Ch 2:2, p.98-100** *PH FoLS, 7:3,4 and 9:1*	***KEY VOCABULARY:*** taxonomy morphology dichotomous key prokaryotic classification eukaryotic ***GRAPHIC ORGANIZERS:*** Tree map: Seven Levels of Classification Create Dichotomous Key for a leaf ***SKILLS FOCUS:*** Comparing, contrasting, inferring, interpreting data, organizing, classifying Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c)** ***LABS / DEMOS / VISUALS:*** • Focus on LS: 6:4, Mini Lab, "…dichotomous key?", p. 264 • Focus on LS: Ch 6 Transparency "Modern Classification"	10 Days

Evolution (cont'd)

3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… that extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient for its survival. **(3,e)** **DISTRICT ASSESSMENTS:** CR: Adapt or Die **MODIFIED ASSESSMENTS:** In pairs, write an explanation of the "fossil record", making sure to cover that most species on Earth are now extinct. In pairs, list extinct species and research specific factors that contributed to the extinction and report findings to class. In small groups list ways an environment might change for its organisms. Then, list ways an organism might adapt in order to survive in that changing environment. Refer to American Field Guide activity from 3c.	• Explain how the fossil record indicates that most of the species that once lived on Earth are now extinct. • Enumerate specific factors that contribute to species extinction. • Describe how extinction of a species occurs when adaptive characteristics of the species are no longer sufficient to allow the species to survive under changing environmental conditions. • Discuss how random mutations may result in variations of traits that give some organisms advantages to survive changing environmental conditions. • Cite examples of factors that affect the process of natural selection (overproduction, competition, and variations). • Describe how natural selection will ultimately lead to the existence of populations better able to survive and reproduce in the current environmental conditions.	**Focus on LS, Ch 5:2, 6:3, Ch 8:2,3 p. 324-343** *PH FoLS, 5:1,2 3:4*	***KEY VOCABULARY:*** extinction, species, mutations, competition, geographic isolation, populations, fossil record, environment, overproduction, variation ***GRAPHIC ORGANIZERS:*** Multiflow Map: Extinction is the event with names of Organisms listed on left and the reasons for extinction listed on right. Multiflow Map: Survival is the event with examples of environmental changes on left and the adaptations listed on right. ***SKILLS FOCUS:*** Comparing, contrasting, inferring, interpreting data, making models, classifying Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7c)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, 5;2, "Conc's In Motion", Interactive Table on causes of extinction, p. 226 • Focus in LS, 5:2, Science & Society, "Habitat Degradation …", p. 233 • Focus on LS, 8:3, Lab, "…CA Change over geologic time", p. 342-343 • Focus on LS, Ch 5 Transparency "Skull Shape and the Brain" • Focus on LS, Ch 6 Transparency "Ancient Geography" "Mountain Building and Evolution"	4 Days

Structure and Function in Living Systems

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism. **(5,a)** [LS10] **DISTRICT ASSESSMENTS:** CR: Organized Organisms **MODIFIED ASSESSMENTS:** In small groups, using diagrams of amoeba, explain and write how it performs all functions necessary to live. In small groups, make an analogy from a student's life to compare to the organization of structure of an organism (see examples in task analysis). In pairs, research mitochondria in athletics and the importance of mitochondria in muscle contraction. Have pairs present to small groups.	• Explain how a one-celled organism (such as an amoeba) performs all of the functions necessary for life. • Explain that plants and animals are multicellular organisms. • Cite specific examples of cellular specialization (differentiation). • Give several examples of cells which function together as tissue, which is part of an organ within an organ system, which is necessary for the life of an organism. • Provide analogies from the community or school of similar organizational structures. For instance, an athlete (cell) works as part of a team (tissue), which represents its school (organ) and school district (organ system) providing healthy activity and attitudes that benefit the nation (organism). • Describe how the musculoskeletal system of animals is made up of many muscle groups. • Explain the organization of a muscle, starting with its organelles (such as mitochondria that provide energy for muscle contraction), to groups of muscle cells to bundles of muscle fibers that together enable the organism to move.	**Focus on LS, Ch 2:2, Ch 9:1, p. 364-365** *PH FoLS, 16:1, 7:1, 17:2, and 22:1,2*	***KEY VOCABULARY:*** multicellular, tissue, organ, organ system, musculoskeletal, bundle, fiber ***GRAPHIC ORGANIZERS:*** Flow map: Show the organization of structure of an organism (from cell to whole organism) Flow map: Organization of structure of a plant Review from 1a Venn diagrams: unicellular vs. multicellular Diagram and label parts of amoeba Diagram cell, emphasize mitochrondria; label and describe function Flow map: cells of musculoskeletal system ***SKILLS FOCUS:*** Organizing, analyzing Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. **(I&E 7.c)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, 2:2, Mini Lab, "What is a Tissue?", p. 103 • Focus on LS: 5;2, "Conc's In Motion", Interactive Table on human organ systems, p. 105 • Focus on LS, 2:2, Demo., Bone Tissues, p. 106 • Focus on LS, 2:2, Design your own lab, "Design an Organ", p. 108-109 • Focus on LS, 2:2, Virtual Lab "Cell, How do animal and plant cells work?", p. 106 TE • Focus on LS, Ch 2 Transparency "At Home in the Salt" • Focus on LS, Ch 9 Transparency "Human Bones"	6 Days

Structure and Function in Living Systems (cont'd)

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system. **(5,b)** **DISTRICT ASSESSMENTS:** CR: Organized Organisms **MODIFIED ASSESSMENTS:** In small groups, draw, color and build the pulmonary and circulatory systems – *or* – use pre-made diagrams to color and cut. In small groups, write an explanation of the function of each of these systems and post with their colorful diagrams. Add an extra diagram to show what causes one of the problems listed in the last section of the task analysis.	• Review (from grade 5) how oxygen and carbon dioxide are exchanged in the lungs and body tissues. • Explain how the pulmonary – circulatory system functions as a whole. • Describe how heart attacks, suffocation, pneumonia, and strokes are each caused by a particular failure of the pulmonary-circulatory system.	**Focus on LS, Ch 2:2, and 10:1,2** *PH FoLS, 15:3, 19:1-4, and 20:1*	***KEY VOCABULARY:*** pulmonary, lungs, diaphragm, pneumonia, alveoli, heart attack, stroke, circulatory, artery, vein, capillaries, atherosclerosis, suffocation, shock ***GRAPHIC ORGANIZERS:*** Tree Maps: Pulmonary and Circulatory Systems, include consequences of systems breakdown and/or failure. ***SKILLS FOCUS:*** Modeling Utilize a variety of print and electronic resources (including the World Wide Web) to collect information as evidence as part of a research project.. **(I&E 7.b)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, 10:1, Launch Lab: "Does your pulse change?", p. 389 • Focus on LS, 10:1, Science Concepts, Activity, p. 394 • Focus on LS, 10:1, Demo., "Air Pressure", p. 397 • Focus on LS, 10:1, Conc's in Motion, Interactive Table on components of whole blood, p. 397 • Focus on LS, 10:1, Data Lab, "… illness affect the cardiopulmonary system?", p. 404 • Focus on LS, 10:1, Virtual Lab "Hypertension", p 389 • Focus on LS, 10:2, Demo., "Model a Diaphragm" , p. 407 • Focus on LS, 10:2, Science Concepts Activity, "Heart Rate", p. 408 • Focus on LS, 10:2, Conc's in Motion: animation of blood flow through the heart, p. 409 • Focus on LS, 10:2, Mini Lab "… cardiopulmonary system", p. 412 • Focus on LS, 10:2, Applying Math "Blood Pressure Variations", p. 413 • Focus on LS, 10:2, Design Your Own Lab "Model and Invent", p. 414-415 • Focus on LS, 10:2, Real World Science: Science &Career, p. 416 • Focus on LS, Ch 10 Transparencies "A friend in need" "Circulation" "How to Relax in Traffic" • Focus on LS, Ch 1 Transparency "Oxygen and the Body"	2 Days

Structure and Function in Living Systems (cont'd)

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… how bones and muscles work together to provide a structural framework for movement. **(5,c)** [LS10] **DISTRICT ASSESSMENTS:** CR: Cooperative Movement **MODIFIED ASSESSMENTS:** In small groups, do Focus on LS, p. 539, "Check Your Progress": Allow students to sketch each other moving slowly, particularly arm movements of flexion, extension and curling. Individually, explain and write how skeletal muscles work in pairs and give examples.	• Describe how the skeletal system provides support and protection to the body. • Describe the relationships between muscles, tendons and bones with the nervous system. • Explain how contraction and relaxation of different muscle groups cause movement. • Demonstrate examples of flexion and extension, such as with the biceps and triceps, describing what happens to the angle between the humerus and ulna during these coordinated movements. • Discuss the roles of opposing muscle groups. • Demonstrate how one muscle group can be a prime mover of bone, while the opposing muscle group can be involved in controlling the motion and protecting the joint, as during a lifting motion.	**Focus on LS, Ch 9:1** *PH FoLS, 17:1-3*	***KEY VOCABULARY:*** tendon, ligament, contraction, relaxation, flexion, extension, biceps, triceps, humerus, ulna, opposing muscles, skeletal system ***GRAPHIC ORGANIZERS:*** Tee Map: Skeletal and Muscular Systems Flow map: one movement of arm Diagram and label bones, muscles and tendons of the arm, explain the relationship of each. ***SKILLS FOCUS:*** Observe, experiment Communicate the steps and results from an investigation in written reports and verbal presentations. **(I&E 7.e)** ***LABS / DEMOS / VISUALS:*** • Focus on LS, Virtual Labs, "Bones", p. 357 • Focus on LS, 9:1, Demo., "Flexion", p. 364 TE • Focus on LS, 9:1, Mini Lab "How do bones and muscles interact?", p. 366 • Focus on LS, 9:1, Real World Science: Career and Society, p. 380-381 • Focus on LS, Ch 9 Transparency "No Sweat"	4 Days

Structure and Function in Living Systems (cont'd)

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function.

Standards and Assessments "Students know…"	Task Analysis "Students are able to …"	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
… how to relate the structures of the eye and ear to their functions. **(5,g)** **DISTRICT ASSESSMENTS:** CR: The Eyes Have it **MODIFIED ASSESSMENTS:** In pairs, trace the path of a sound wave as it passes through the parts of the ear, naming each part, use Fig. 23, p.707, Focus on LS. In pairs, explain and write what happens when sound waves reach the eardrum. See Focus on LS p. 707, "Using Visuals", Fig. 23. In pairs, explain and write what happens to vibrations as they pass through the ear. Fig. 23 In small groups, role-play the parts of the ear with each person assigned a part of the ear. Then the part is described, pointed out on a visual and then its function is explained in relation to the other parts. In small groups, role-play the parts of the eye (using the same format as the ear) and identify each part and explain its function.	• Identify and explain the function of the different parts of the eye, including: retina, iris, pupil, lens, cone cells and rod cells. • Explain the structure and function of the different parts of the human ear, including external ear (of humans and other mammals), middle ear, tympanic membrane, malleus, incus, stapes, inner ear. • Identify the different parts of the ear and explain how those parts work together to transmit sensory information through sound waves.	**Focus on LS, Ch 11:4, and 12:1,2** *PH FoLS, Ch 22:4*	***KEY VOCABULARY:*** lens, iris, pupil, retina, cone cell, rod cell, tympanic membrane, malleus, incus, stapes, inner ear ***GRAPHIC ORGANIZERS:*** Diagram, label and explain the function of the ear and the eye Brace Maps of the eye and ear ***SKILLS FOCUS:*** Analyzing, making models Construct scale models and appropriately labeled diagrams to communicate scientific knowledge. **(I&E 7.d)** ***LABS / DEMOS / VISUALS:*** • Focus on LS: 11:4, p. 451 Identifying Misconceptions: seeing in the dark; have students test iris response to light and dark • Focus on LS: 11:4, "Conc's in Motion" animation of lens and light through eye, p. 452 • Focus on LS: 11:4, "Conc's in Motion" Interactive table on structures and functions of the eye, p. 453 • Focus on LS: 11:4, Lab, "Can a cow teach you about your eyes?", p. 458-459 • Focus on LS: 11:4, Real World Science: Science & Technology, p. 460 • Focus on LS: 12:1, Launch Lab: "How many sounds can you make?", p. 469 • Focus on LS: 12:1, Demo., "Vibrations Cause Sound", p. 472 • Focus on LS: 12:2, Mini Lab "How does the ear hear?", p. 489 • Focus on LS: 12:2, Lab "Animal Hearing", p. 490-491 • Focus on LS: 12:2, Real World Science: Science & Technology, p. 492 • Focus on LS: Ch 11 Transparency "The Eye" • Focus on LS: Ch 12 Transparency "The Ear" "Sound"	3 Days

APPLICATION OF COURSE CONTENT:

Career Connection:

Related Major Skills & Characteristics – objective observation, careful measurement, curiosity, problem solving, organizational skills, numerical reasoning, ability to analyze & interpret data, critical thinking, reading comprehension, concise and accurate communication skills, computer literacy, logical thinking, team skills, testing skills, practical safety awareness, evidence evaluating

Related Careers – Students who continue in the sciences can prepare for the following careers:

Aeronautical Engineer *(Rocket Scientist)*	Chemical Engineer	Mining Geologist	Physiologist
	Electrical Engineer	National Park Ranger	Professor
Agricultural Ecologist	Energy	Neurobiologist	Quality Control Specialist
Analytical Chemist	Fire Fighter	Nuclear Physicist	Radiologist
Aquatic Microbial Ecologist	Geologist	Nurse	Refrigeration Technician
Astronomer	Geneticist	Paleontologist	Science Fiction Writer
Automotive Engineer	Immunologist	Pathologist	Seismologist
Biochemist	Marine Biologist	Pediatrician	Teacher
Biologist	Materials Scientist	Petroleum Geologist	Technical Editor
Biotechnologist	Medical Researcher	Pharmacist	Veterinarian
Botanist	Meteorologist	Physician	Virologist
Cell Biologist	Microbiologist	Physicist	Wildlife Ecologist

METHODS:

Lesson Design & Delivery: Teachers will incorporate these components of lesson design during direct instruction and inquiry activities. The order of components is flexible, depending on the teacher's vision for the individual lesson. For instance, the objective and purpose, while present in the teacher's lesson plan, are not made known to the students at the beginning of an inquiry lesson.

Essential **E**lements of **E**ffective **I**nstruction Model for Lesson Design Using Task Analysis	Anticipatory Set Objective Standard Reference Purpose Input Modeling Check for Understanding Guided Practice Closure Independent Practice

Some components may occur once in a lesson, but others will recur many times. Checking for understanding occurs continually; input, modeling, guided practice and closure may occur several times. There may even be more than one anticipatory set when more than one content piece is introduced.

Active Participation: Teachers will incorporate the principles of active participation and specific strategies to ensure consistent, simultaneous involvement of the minds of all learners in the classroom. Teachers should include both covert and overt active participation strategies, incorporating cooperative learning structures and brain research. Some of the possible active participation strategies include:

COVERT	OVERT (Oral)	OVERT (Written)	OVERT (Gestures)
• Recall • Imagine • Observe • Consider	• Pair/Share • Idea Wave • Choral Response • Give One, Get One • Socratic Seminar • Cooperative Discussion Groups (i.e.Talking Chips, Gambit Chips)	• Restate in Journals / Notes • Response Boards • Graphic Organizers • Folded Paper • Ticket Out of Class	• Hand Signals • Model with Manipulatives • Stand up/ Sit down • Point to Examples

Baldridge Quality Tools: Students can become more positively involved in their education through goal setting, self-assessment, and data tracking and analysis by making use of the following strategies:

BALDRIDGE TOOL	PURPOSES
Affinity Diagram	– finding consensus, organizing complex information
Flowchart	– describing a process, planning a project, identifying problem steps in a process
Force Field Diagram	– identifying obstacles, finding causes and solutions to problems
Issues / Ideas Bin	– handling individual questions/requests without stopping a group activity, providing anonymous input, obtaining diverse input in specific areas.
Data Folder	– tracking goals and actual results
Plus / Delta	– tracking improvement efforts, identifying opportunities for change, finding out what's working and what's not working in a process, procedure, activity, etc.
Class Data Graphs	– displaying trends for goal setting

Learning styles and learning challenges of your students may be addressed by implementing combinations of the following:

Reading Strategies in Science
- ❑ Learning Logs
- ❑ Pre-teaching
- ❑ Vocabulary
- ❑ Pre-reading
- ❑ Text Structures
- ❑ Trail Markers
- ❑ Reciprocal Teaching
- ❑ Functional Text

SDAIE Strategies for English Learners
- ❑ Tapping/Building Prior Knowledge (Graphic Organizers, Schema)
- ❑ Grouping Strategies
- ❑ Multiple Intelligences
- ❑ Adapt the Text
- ❑ Interactive Learning (Manipulatives, Visuals)
- ❑ Acquisition Levels
- ❑ Language Sensitivity
- ❑ Lower the Affective Filter (including Processing Time)
- ❑ Home/School Connection (including Cultural Aspects)

Differentiation for Advanced Learners
- ❑ Curriculum Compacting
- ❑ Tiered Assignments
- ❑ Flexible Grouping
- ❑ Acceleration
- ❑ Depth and Complexity
- ❑ Independent Study

Significant, Proven Science Strategies for ALL Science Students
- ❑ Hands-On Labs
- ❑ Inquiry Activities
- ❑ Written/Oral Presentations
- ❑ Short/Long-term projects
- ❑ Essential Questions
- ❑ Summarization
- ❑ Current Events
- ❑ Peer Teaching
- ❑ Guest Speakers

Please note that these strategies often overlap and should not be limited to specifically defined courses or student populations.

MATERIALS:

Basic Textbook and Supplementary Materials: Glencoe Science: Focus on Life Science, McGraw-Hill Glencoe, 2007

Science Online: ca7.msscience.com
- Study Tools, Extensions, For Teachers

safety equipment: goggles, latex gloves, fire extinguisher
glassware: flasks, beakers, test tubes, etc.
measuring devices: triple beam balance, rulers, volumetric containers
chemical reagents
microscopes, microviewers, hand lenses, dissection equipment
appropriate technology

❖ Many items are available through Science/Math Resource Center (SMRC).

SUPPORT FOR ENGLISH LANGUAGE LEARNERS:

Resources Accompanying the Basic Text:

Printed Study Guide (chapter summaries) available in five languages
Student workbooks available in Spanish
Text chapters on audiocassette available in English and Spanish
Unit review videos available in English and Spanish
Suggested alternate/supplemental activities geared for ELL's

- Hands-on activities and projects
- Supplemental audio/visual content materials
- Computer resources available through software and the internet
- Newspapers and magazines
- Guest speakers
- Posters and models
- Graphs and data tables
- Music and songs

RESOURCES:

Documents

- Science Framework: ..... http://www.cde.ca.gov/re/pn/fd/documents/scienceframework.pdf
  [or find it posted in sections at the LBUSD Science Office website]
- CST / NCLB Test Blueprints: ..... http://www.cde.ca.gov/ta/tg/sr/blueprints.asp
- CST Reference Sheets: ..... http://www.cde.ca.gov/ta/tg/sr/cstsciref.asp
- CST Released Test Questions http://www.cde.ca.gov/ta/tg/sr/css05rtq.asp
- National Science Standards: ..... http://www.nap.edu/readingroom/books/nses/html/
- Science Safety Handbook for CA Public Schools (1999)
  can be ordered from the CDE at ..... http://www.cde.ca.gov/re/pn/rc/
- LBUSD Approved Chemicals List, Chemical Hygiene Plan, and Science Fair Resources:
  http://www.lbusd.k12.ca.us/Main_Offices/Curriculum/Areas/Science/teacher_resources.cfm

District Offices

- Science Curriculum Office (562) 997-8000 (ext. 2963)
  - K-12 science standards, curriculum, professional development, science fair
- Science / Math Resource Center (SMRC) (562) 997-8000 (ext. 2964)
  - hands-on materials, consumable material orders, alternative standards-based curriculum packets
- Instructional Materials Workshop (IMW) (562) 997-8000 (ext. 2965)
  - standards-based instructional materials
  - content integrated instructional materials
  - monthly theme-based literacy supplements for science
  - wood shop / lumber room
  - copying, enlarging, and laminating
- Office of Multimedia Services (OMS) (562) 997-8000 (ext. 7145)
  - videos for check out to fit the curriculum (see your librarian for current catalogs)
  - district TV channels programming
- PALMS Office Program Assistance for Language Minority Students (562) 997-8000 (ext. 8031)
  - technical assistance and professional development for English Language Development (ELD) and Specially Designed Academic Instruction In English (SDAIE)
  - assistance in the implementation and maintenance of programs addressing the needs of English Language Learners (ELLs)
- Health Curriculum Office (562) 997-8000 (ext. 2967)
  - curriculum and training for mandated health content

EVALUATION: Student achievement in this course will be measured using multiple assessment tools. Assessments will be used for diagnosing student understanding before instruction, monitoring student learning during instruction, and evaluating student understanding after instruction.

SUGGESTED EVALUATION TOOLS:

Source	Diagnose	Monitor	Evaluate
District Developed Assessments	Grade Level Pretest	Open-Ended Science Performance Task	End of Course Exam
Glencoe Science: Focus on Life Science	Reading Essentials: Before You Read Launch Labs New Vocabulary	Reading Check questions Science Notebook, "Summarize It" Lesson Review: Summarize, Using Vocabulary, Understanding Main Ideas, Applying Science Reading Essentials: Think it Over, Reading Check, Picture This Applying Math Foldables Active Folders Mini Lab and Lab Standards Review	Standards Assessment Performance Assessment Sci Activities for Adv. Learners Chapter & Unit Tests Rubric Scored Projects, Labs, and Writings
Teacher Developed Assessments	Pre-quiz Pre-Test Vocab. Knowledge Rating	Warm-Up Quiz Proving Behavior Lab	Chapter / Unit Test Practicum Semester Final Exam

SUGGESTED GRADE WEIGHTING:

(with some possible examples)

1. Assessment ~30%
   - o objective tests including comprehensive finals
   - o performance tasks (rubric scored)
   - o open-ended questions (rubric scored)
   - o portfolios
   - o student self-evaluations
2. Homework not more than 10%
   - o discovery assignments
   - o assignments reinforcing class lesson
   - o essays
   - o organization
   - o research
3. Labs ~20%
   - o lab reports
   - o active participation
4. Projects ~20%
   - o science fair projects
   - o research-based reports and projects
5. Classwork ~20%
   - o note taking skills
   - o organization skills
   - o oral presentations
   - o individual and group projects and assessments

STANDARD GRADING SCALE:

Advanced Proficient	A	90 – 100%
Proficient	B	80 – 89%
Partial Proficient	C	70 – 79%
Not Proficient	D	60 – 69%
	F	0 – 59%

Submitted by: Eric Brundin (S. Garcia)
School: Science Office
Date: 5/16/08
Revised Board Date: 10/4/11