# Everett Public Schools

## Human Body Systems (7th Grade)

| Health Sciences | |
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| **CIP Code:** 510000 | **Total Framework Hours:** 90 hrs |
| **Course:** Human Body Systems (7th Grade) – Introduction to Health Sciences | **Exploratory** |
| **Career Cluster:** STEM Cluster **Pathway:** Health Sciences | **Date Last Modified:** 4/2/12 |

**Resources and Standards used in Framework Development:**

**Curriculum:**

*Carolina Biological STCMS "Human Body Systems"*
*FOSS: Populations and Ecosystems*

**Standards and Frameworks**

OSPI Career and Technical Education Sample Frameworks for 'Intro to Health Science Careers', 'Pre-Allied Health Careers', 'Biomedical Sciences Option 1'; Washington State Learning Standards .

## COMPONENTS AND COMPETENCIES

This introductory course in Health Sciences is designed to:

a. give students a general background in the structure and functions of the human body;
b. to provide students with information that will aid them in making sound choices about their health well-being;
c. determine similarities in structure and function of systems between humans and other organisms;
d. become aware of the interactions betweens humans and their environment;
e. introduce students to a variety of careers related to the health sciences;
f. provide students the opportunity to familiarize themselves with associated technologies;
g. explore basic principles of science and engineering as they relate to the health sciences.

**Performance Assessment:**

a. Students will successfully complete a cell journal that compares and contrasts different types of cells in the body. Emphasis will be placed on the relationship between structure and function. Entries will occur after each biological systems section.

b. Students will successfully complete a district assessment on biology and health science.

***STANDARDS AND COMPETENCIES***

**C-1 Standard: Introduction to cell structure and function**

| **Competencies C=Core A=Advanced** | | **Total Learning Hours for Unit:** 15 hrs |
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| C-1.1 | Recognize different types of microscopes (simple, compound, electron), and identify the appropriate usage for that microscope. | |
| C-1.2 | Learn how to properly use a compound light microscope. | |
| C-1.3 | Understand the concept of 'Cell Theory'. | |
| C-1.4 | Recognize the contributions of early scientists in the development of Cell Theory. | |
| C-1.5 | Identify key organelles of animal cells (nucleus, cytoplasm, cell membrane, nuclear membrane, mitochondria, ribosomes, endoplasmic reticulum, vesicles/vacuoles, golgi bodies, lysosomes). | |
| C-1.6 | Identify key organelles of plant cells (nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, nuclear membrane, mitochondria, ribosomes, endoplasmic reticulum, vacuoles, golgi bodies). | |
| C-1.7 | Learn the basic functions of the identified organelles. | |
| C-1.8 | Identify differences in one-celled and many-celled organisms. | |
| C-1.9 | Know that the bodies of complex organisms are organized. Cells with similar functions form tissues, tissues with similar functions form organs, organs with similar functions form organ systems, and all the organ systems working together from an organism. | |
| C-1.10 | Become familiar with and use the metric system of measurement. | |
| C-1.11 | Become familiar with and use methods of scientific problem solving and communication. | |

| *EALRs, GLEs, and Standards (Taught & Assessed in Standards)* | |
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| **Reading** | |
| 2.1 | Demonstrate evidence of reading comprehension. |
| 3.1 | Read to learn new information |
| 3.2 | Read to perform a task. |
| **Communications** | |
| 1.1.1 | Applies a variety of listening strategies to accommodate the listening situation. |
| 1.1.2 | Applies a variety of listening and observation skills/strategies to interpret information. |
| **Social Studies** | |
| 7-4.2.1 | Understands and analyzes how individuals and movements have shaped world history. |
| 7-4.2.3 | Understands and analyzes how technology and ideas have impacted world history. |
| **Writing** | |
| 2.1 | Adapts writing for a variety of audiences. |
| 3.1 | Develops ideas and organizes writing. |
| 3.1.1 | Analyzes ideas, selects a manageable topic, and elaborates using specific, relevant details and/or examples. |
| 3.3 | Knows and applies writing conventions appropriate for the grade level. |
| **Art** | |
| 3.2.1 | *Applies, analyzes, and creates visual artworks that communicate for a specific purpose.* |
| **Science** | |
| 6-8 SYSA | Any *system* may be thought of as containing *subsystems* and as being a *subsystem* of a larger *system*. |
| 6-8 SYSF | The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as 'systems'. |
| 6-8 INQA | Scientific *inquiry* involves asking and answering *questions* and comparing the answer with what scientists already know about the world. |
| 6-8 INQB | Different kinds of *questions* suggest different kinds of scientific *investigations*. |
| 6-8 INQD | For an *experiment* to be valid, all (*controlled*) *variables* must be kept the same whenever possible, except for the *manipulated* (*independent*) *variable* being tested and the *responding (dependent) variable* being measured and recorded. If a *variable* cannot be *controlled*, it must be reported and accounted for. |
| 6-8 INQE | *Models* are used to represent objects, events, *systems*, and processes. *Models* can be used to test *hypotheses* and better understand *phenomena*, but they have limitations. |
| 6-8 INQG | Scientific reports should enable another investigator to repeat the study to check the results. |
| 6-8 INQI | Scientists and engineers have ethical codes governing animal *experiments*, research in natural *ecosystem*s, and studies that involve human subjects. |
| 6-8 APPA | People have always used *technology* to solve problems. Advances in human civilization are linked to advances in *technology*. |
| 6-8 APPC | *Science* and *technology* are interdependent. *Science* drives *technology* by demanding better instruments and suggesting *ideas* for new designs. *Technology* drives *science* by providing instruments and research methods. |
| 6-8 APPG | The benefits of science and *technology* are not available to all the people in the world. |
| 6-8 APPH | People in all *cultures* have made and continue to make contributions to society through *science* and *technology.* |

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| 6-8 LS1A | All *organisms* are composed of cells, which carry on the many *functions* needed to sustain life. |
| 6-8 LS1B | One-celled *organisms* must contain parts to carry out all life *functions*. |
| 6-8 LS1 C | Multicellular *organisms* have specialized cells that perform different *functions*. These cells join together to *form* tissues that give organs their structure and enable the organs to perform specialized *functions* within organ *systems*. |
| 6-8 LS1D | Both plant and animal cells must carry on life *functions*, so they have parts in *common*, such as *nuclei*, cytoplasm, *cell membranes*, and *mitochondria*. But plants have specialized cell parts, such as *chloroplasts* for photosynthesis and cell walls, which provide plants their overall structure. |
| 6-8 LS1F | Lifestyle choices and living *environments* can damage structures at any level of organization of the human body and can significantly harm the whole *organism*. |
| **Integrated Environmental and Sustainability Standards** | |
| 6-8 ESE 1 | Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels. |
| 6-8 ESE 2 | The Natural and Built Environment: Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-build environments. |
| **Health and Fitness Standards** | |
| 7-HF 2.2.1 | Understands structure and function of body systems. |
| **Mathematics Standards** | |
| 7.1.G | Solve single and multi-step word problems involving rational numbers, and verify the solutions. |
| 7.2.I | Solve single and multi-step problems involving conversions within or between measurement systems and verify the solutions. |
| **21st Century SKILLS** | |
| Implement Innovations<br>Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur | |
| Reason Effectively<br>2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation | |
| Use Systems Thinking<br>2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems | |
| Make Judgments and Decisions<br>2.C.1 Effectively analyze and evaluate evidence, arguments, claims and beliefs<br>2.C.2 Analyze and evaluate major alternative points of view<br>2.C.3 Synthesize and make connections between information and arguments<br>2.C.4 Interpret information and draw conclusions based on the best analysis<br>2.C.5 Reflect critically on learning experiences and processes | |
| Communicate Clearly<br>3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts<br>3.A.2 Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions<br>3.A.3 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)<br>3.A.4 Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact<br>3.A.5 Communicate effectively in diverse environments (including multi-lingual) | |
| Collaborate with Others<br>3.B.1 Demonstrate ability to work effectively and respectfully with diverse teams<br>3.B.2 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal | |

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| 3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member |
| Access and Evaluate Information<br>4.A.1 Access information efficiently (time) and effectively (sources)<br>4.A.2 Evaluate information critically and competently |
| Use and Manage Information<br>4.B.1 Use information accurately and creatively for the issue or problem at hand<br>4.B.2 Manage the flow of information from a wide variety of sources<br>4.B.3 Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information |
| Apply Technology Effectively<br>6.A.1 Use technology as a tool to research, organize, evaluate and communicate information<br>6.A.2 Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy<br>Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies |
| Adapt to Change<br>7.A.1 Adapt to varied roles, jobs responsibilities, schedules and contexts<br>7.A.2 Work effectively in a climate of ambiguity and changing priorities |
| Be Flexible<br>7.B.1 Incorporate feedback effectively<br>7.B.2 Deal positively with praise, setbacks and criticism<br>7.B.3 Understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments |
| Manage Goals and Time<br>8.A.1 Set goals with tangible and intangible success criteria<br>8.A.2 Balance tactical (short-term) and strategic (long-term) goals<br>8.A.3 Utilize time and manage workload efficiently |
| Work Independently<br>8.B.1 Monitor, define, prioritize and complete tasks without direct oversight |
| Be Self-Directed Learners<br>8.C.1 Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise<br>8.C.2 Demonstrate initiative to advance skill levels towards a professional level<br>8.C.3 Demonstrate commitment to learning as a lifelong process<br>8.C.4 Reflect critically on past experiences in order to inform future progress |
| Interact Effectively with Others<br>9.A.1 Know when it is appropriate to listen and when to speak<br>9.A.2 Conduct themselves in a respectable, professional manner |
| Work Effectively in Diverse Teams<br>9.B.1 Respect cultural differences and work effectively with people from a range of social and cultural backgrounds<br>9.B.2 Respond open-mindedly to different ideas and values<br>9.B.3 Leverage social and cultural differences to create new ideas and increase both innovation and quality of work |
| Produce Results<br>10.B.1 Demonstrate additional attributes associated with producing high quality products including the abilities to:<br>10.B.1.a Work positively and ethically<br>10.B.1.b Manage time and projects effectively<br>10.B.1.c Multi-task<br>10.B.1.d Participate actively, as well as be reliable and punctual<br>10.B.1.e Present oneself professionally and with proper etiquette<br>10.B.1.f Collaborate and cooperate effectively with teams |

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| 10.B.1.g Respect and appreciate team diversity<br>10.B.1.h Be accountable for results |
| Be Responsible to Others<br>11.B.1 Act responsibly with the interests of the larger community in mind |

# COMPONENTS AND COMPETENCIES

**Performance Assessments:**

a. Students will successfully investigate the underlying mechanisms of change in populations by breeding an imaginary animal called a larkey. They learn how organisms inherit traits from their parents and how dominant and recessive alleles interact to produce traits in a population. Students will successfully use a punnett square to facilitate understanding.

b. Students will successfully complete a district assessment on biology and health science.

## *STANDARDS AND COMPETENCIES*

### C-2 Standard: Genetics and Inheritance

| **Competencies C=Core A=Advanced** | **Total Learning Hours for Unit:** 15 hrs |
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| C-2.1 | Understands how traits are inherited. |
| C-2.2 | Describes the relationship between genes, chromosomes and DNA. |
| C-2.3 | Recognizes the contributions of Gregor Mendel in the history of genetics. |
| C-2.4 | Understands the role of DNA in genetic heritability. |
| C-2.5 | Understands the difference between genotype and phenotype. |
| C-2.6 | Describes the difference between homozygous and heterozygous traits. |
| C-2.7 | Uses and builds Punnett Squares to predict the results of simple genetic crosses. |
| C-2.8 | Understands dominant and recessive traits as well as incomplete dominance. |
| C-2.9 | Describes polygenic inheritance and inheritance by multiple alleles and can identify examples of each. |
| C-2.10 | Describes human genetic disorders as well as sex-linked traits and how they are inherited. |
| C-2.11 | Explores the importance of genetic engineering as well as implications of its application. |

## *EALRs, GLEs, and Standards (Taught & Assessed in Standards)*

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|---|---|
| **Reading** | |
| 2.1 | Demonstrate evidence of reading comprehension. |
| 3.1 | Read to learn new information |
| 3.2 | Read to perform a task. |
| **Communications** | |
| 1.1.1 | Applies a variety of listening strategies to accommodate the listening situation. |
| 1.1.2 | Applies a variety of listening and observation skills/strategies to interpret information. |
| **Social Studies** | |
| 7-3.2.1 | Understands and analyzes how the environment has affected people and how people have affected the environment in Washington State in the past or present. |
| 7-4.2.1 | Understands and analyzes how individuals and movements have shaped world history. |
| 7-4.2.3 | Understands and analyzes how technology and ideas have impacted world history. |
| 7-5.3.1 | Analyzes and responds to multiple viewpoints on public issues brought forth in the context of a discussion. |
| **Writing** | |
| 2.1 | Adapts writing for a variety of audiences. |
| 3.1 | Develops ideas and organizes writing. |
| 3.1.1 | Analyzes ideas, selects a manageable topic, and elaborates using specific, relevant details and/or examples. |
| 3.3 | Knows and applies writing conventions appropriate for the grade level. |
| 3.3.6 | Uses complete sentences in writing. |
| **Art** | |
| 3.2.1 | *Applies, analyzes, and creates visual artworks that communicate for a specific purpose.* |
| **Science** | |
| 6-8 INQC | Collecting, analyzing, and displaying data are essential aspects of all *investigations*. |
| 6-8 INQF | It is important to distinguish between the results of a particular *investigation* and general conclusions drawn from these results. |
| 6-8 INQG | Scientific reports should enable another investigator to repeat the study to check the results. |
| 6-8 INQI | Scientists and engineers have ethical codes governing animal *experiments*, research in natural *ecosystem*s, and studies that involve human subjects. |
| 6-8 APPA | People have always used *technology* to solve problems. Advances in human civilization are linked to advances in *technology*. |
| 6-8 APPC | *Science* and *technology* are interdependent. *Science* drives *technology* by demanding better instruments and suggesting *ideas* for new designs. *Technology* drives *science* by providing instruments and research methods. |
| 6-8 APPG | The benefits of science and *technology* are not available to all the people in the world. |
| 6-8 APPH | People in all *cultures* have made and continue to make contributions to society through *science* and *technology.* |
| 6-8 SYSF | The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as 'systems'. |
| 6-8 LS3B | Every *organism* contains a set of *genetic information* (instructions) to specify its traits. This information is contained within *genes* in the *chromosomes* in the *nucleus* of each cell. |
| 6-8 LS3C | Reproduction is essential for every *species* to continue to exist. Some plants and animals reproduce sexually while others reproduce *asexually*. *Sexual reproduction* leads to greater *diversity* of *characteristics* because offspring inherit *genes* from both parents. |
| 6-8 LS3D | In *sexual reproduction* the new *organism* receives half of its *genetic information* from each parent, resulting in offspring that are similar but not identical |

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| | to either parent.<br>In *asexual reproduction* just one parent is involved, and *genetic information* is passed on *nearly unchanged.* |
| 6-8 LS3E | *Adaptations* are physical or behavioral changes that are inherited and enhance the ability of an *organism* to survive and reproduce in a particular *environment*. |
| **Integrated Environmental and Sustainability Standards** | |
| 6-8 ESE 2 | The Natural and Built Environment: Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-build environments. |
| **Health and Fitness Standards** | |
| 7-HF 2.2.3 | Understands hereditary factors affecting growth, development, and health. |
| 7-HF 2.3.2 | Understands skills that prevent and control non-communicable diseases. |
| 7-HF 3.1.2 | Understands how environmental factors impact health. |
| **Mathematics** | |
| 7.2.E | Represent proportional relationships using graphs, tables, and make connections among the representations. |
| 7.4.B | Determine the theoretical probability of a particular event and use theoretical probability to predict experimental outcomes. |
| 7.6.A | Analyze a problem situation to determine the question(s) to be answered. |
| 7.6.G | Extract and organize mathematical information from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning. |
| ***21 Century SKILLS*** | |
| Reason Effectively<br>2.A.2 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation | |
| Use Systems Thinking<br>2.B.2 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems | |
| Make Judgments and Decisions<br>2.C.6 Effectively analyze and evaluate evidence, arguments, claims and beliefs<br>2.C.7 Analyze and evaluate major alternative points of view<br>2.C.8 Synthesize and make connections between information and arguments<br>2.C.9 Interpret information and draw conclusions based on the best analysis<br>2.C.10 Reflect critically on learning experiences and processes | |
| Solve Problems<br>2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways<br>2.D.2 Identify and ask significant questions that clarify various points of view and lead to better solutions | |
| Communicate Clearly<br>3.A.6 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts<br>3.A.7 Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions<br>3.A.8 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)<br>3.A.9 Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact<br>3.A.10 Communicate effectively in diverse environments (including multi-lingual) | |
| Collaborate with Others<br>3.B.4 Demonstrate ability to work effectively and respectfully with diverse teams<br>3.B.5 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal<br>3.B.6 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member | |
| Access and Evaluate Information<br>4.A.3 Access information efficiently (time) and effectively (sources) | |

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| 4.A.4 Evaluate information critically and competently |
| Use and Manage Information<br>4.B.4 Use information accurately and creatively for the issue or problem at hand<br>4.B.5 Manage the flow of information from a wide variety of sources<br>4.B.6 Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information |
| Analyze Media<br>5.A.1 Understand both how and why media messages are constructed, and for what purposes<br>5.A.2 Examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors<br>5.A.3 Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of media |
| Create Media Products<br>5.B.1 Understand and utilize the most appropriate media creation tools, characteristics and conventions<br>5.B.2 Understand and effectively utilize the most appropriate expressions and interpretations in diverse, multi-cultural environments |
| Apply Technology Effectively<br>6.A.3 Use technology as a tool to research, organize, evaluate and communicate information<br>6.A.4 Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy<br>Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies |
| Adapt to Change<br>7.A.3 Adapt to varied roles, jobs responsibilities, schedules and contexts<br>7.A.4 Work effectively in a climate of ambiguity and changing priorities |
| Be Flexible<br>7.B.4 Incorporate feedback effectively<br>7.B.5 Deal positively with praise, setbacks and criticism<br>7.B.6 Understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments |
| Work Independently<br>8.B.1 Monitor, define, prioritize and complete tasks without direct oversight |
| Be Self-Directed Learners<br>8.C.5 Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise<br>8.C.6 Demonstrate initiative to advance skill levels towards a professional level<br>8.C.7 Demonstrate commitment to learning as a lifelong process<br>8.C.8 Reflect critically on past experiences in order to inform future progress |
| Interact Effectively with Others<br>9.A.3 Know when it is appropriate to listen and when to speak<br>9.A.4 Conduct themselves in a respectable, professional manner |
| Work Effectively in Diverse Teams<br>9.B.4 Respect cultural differences and work effectively with people from a range of social and cultural backgrounds<br>9.B.5 Respond open-mindedly to different ideas and values<br>9.B.6 Leverage social and cultural differences to create new ideas and increase both innovation and quality of work |
| Produce Results<br>10.B.2 Demonstrate additional attributes associated with producing high quality products including the abilities to:<br>10.B.1.i Work positively and ethically<br>10.B.1.j Manage time and projects effectively<br>10.B.1.k Multi-task<br>10.B.1.l Participate actively, as well as be reliable and punctual<br>10.B.1.m Present oneself professionally and with proper etiquette |

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| 10.B.1.n | Collaborate and cooperate effectively with teams |
| 10.B.1.o | Respect and appreciate team diversity |
| 10.B.1.p | Be accountable for results |

# COMPONENTS AND COMPETENCIES

**Performance Assessments**:

a. Student will successfully build a model and explain all the parts of the digestive system; conduct laboratory investigations that determine the nutritional components of various food sources; analyze the components of a healthy diet; investigate the role of enzymes in the digestive process.

b. Students will successfully complete a district assessment on biology and health science.

## *STANDARDS AND COMPETENCIES*

### C-3 Standard: Nutrition and the Digestive System

| **Competencies C=Core A=Advanced** | | **Total Learning Hours for Unit:** 25 hrs |
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| C-3.1 | Identify the six main classes of nutrients and describe their importance. | |
| C-3.2 | Identify major food sources for each class of nutrient. | |
| C-3.3 | Identify the similarities and differences between mechanical and chemical digestion. | |
| C-3.4 | Identify, in order, the organs of the digestive system. | |
| C-3.5 | Describe the type of digestion that occurs in the organs of the digestive system. | |
| C-3.6 | Conduct and interpret tests for sugars and starches (carbohydrates). | |
| C-3.7 | Describe the role of indicators when testing for nutrients. | |
| C-3.8 | Explain the importance of enzymes in the digestion of carbohydrates, proteins and fats. | |
| C-3.9 | Explain the differences between diffusion and active transport. | |
| C-3.10 | Describe the process of absorption of nutrients in the digestive system. | |
| C-3.11 | Explain the role of surface area in the absorption of nutrients. | |
| C-3.12 | Describe how villi/microvilli aid in the absorption of nutrients. | |
| C-3.13 | Describe the relationship between diet and health. | |

### *EALRs, GLEs, and Standards (Taught & Assessed in Standards)*

| **Reading** | |
|---|---|
| 2.1 | Demonstrate evidence of reading comprehension. |
| 3.1 | Read to learn new information |
| 3.2 | Read to perform a task. |

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| **Communications** | |
| 1.1.1 | Applies a variety of listening strategies to accommodate the listening situation. |
| 1.2.1 | Evaluates effectiveness of and creates a personal response to visual and auditory information. |
| **Social Studies - Civics** | |
| 7-1.2.3 | Understands various forms of government and their affects on the lives of people in the past or present. |
| 7-4.2.1 | Understands and analyzes how individuals and movements have shaped world history. |
| 7-4.2.3 | Understands and analyzes how technology and ideas have impacted world history. |
| **Writing** | |
| 2.1 | Adapts writing for a variety of audiences. |
| 3.1 | Develops ideas and organizes writing. |
| 3.1.1 | Analyzes ideas, selects a manageable topic, and elaborates using specific, relevant details and/or examples. |
| 3.3 | Knows and applies writing conventions appropriate for the grade level. |
| 3.3.6 | Uses complete sentences in writing. |
| **Art** | |
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| **Science** | |
| 6-8 SYSA | Any *system* may be thought of as containing *subsystems* and as being a *subsystem* of a larger *system*. |
| 6-8 SYSC | The output of one system can become the input of another system. |
| 6-8 SYSF | The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as 'systems'. |
| 6-8 INQA | Scientific *inquiry* involves asking and answering *questions* and comparing the answer with what scientists already know about the world. |
| 6-8 INQB | Different kinds of *questions* suggest different kinds of scientific *investigations*. |
| 6-8 INQC | Collecting, analyzing, and displaying data are essential aspects of all *investigations*. |
| 6-8 INQE | *Models* are used to represent objects, events, *systems*, and processes. *Models* can be used to test *hypotheses* and better understand *phenomena*, but they have limitations. |
| 6-8 INQF | It is important to distinguish between the results of a particular *investigation* and general conclusions drawn from these results. |
| 6-8 INQG | Scientific reports should enable another investigator to repeat the study to check the results. |
| 6-8 APPH | People in all *cultures* have made and continue to make contributions to society through *science* and *technology.* |
| 6-8 PS2A | Substances have *characteristic intrinsic properties* such as *density*, *solubility*, *boiling point*, and *melting point*, all of which are independent of the amount of the sample. |
| 6-8 PS2B | *Mixtures* are combinations of substances whose *chemical properties* are preserved. *Compounds* are substances that are chemically formed and have different physical and *chemical properties* from the reacting substances. |
| 6-8 LS1C | Multicellular *organisms* have specialized cells that perform different *functions*. These cells join together to *form* tissues that give organs their structure and enable the organs to perform specialized *functions* within organ *systems*. |
| 6-8 LS1F | Lifestyle choices and living *environments* can damage structures at any level of organization of the human body and can significantly harm the whole *organism*. |
| **Integrated Environmental and Sustainability Standards** | |

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|---|---|
| 6-8 ESE 2 | The Natural and Built Environment: Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-build environments. |
| **Health and Fitness Standards** | |
| 1.5.1 | Applies nutrition goals based on dietary guidelines and individual activity needs. |
| 7-HF1.5.2 | Understands the effects of activity, fitness, and nutrition practices. |
| 7-HF1.5.4 | Understands healthy and unhealthy eating patterns. |
| 7-HF2.2.1 | Understands structure and functions of body systems. |
| 7-HF3.1.1 | Understands how family and cultural factors impact health. |
| **Mathematics** | |
| 7.1.G | Solve single and multi-step word problems involving rational numbers, and verify the solutions. |
| 7.2.I | Solve single and multi-step problems involving conversions within or between measurement systems and verify the solutions. |
| 7.3.B | Solve single and multi-step word problems involving surface area or volume and verify the solutions. |
| 7.6.A | Analyze a problem situation to determine the question(s) to be answered. |
| 7.6.H | Make and test conjectures based on data (or information) collected from explorations and experiments. |

## *21 Century SKILLS*

**Reason Effectively**

2.A.3 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

**Use Systems Thinking**

2.B.3 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems

**Make Judgments and Decisions**

2.C.11 Effectively analyze and evaluate evidence, arguments, claims and beliefs
2.C.12 Analyze and evaluate major alternative points of view
2.C.13 Synthesize and make connections between information and arguments
2.C.14 Interpret information and draw conclusions based on the best analysis
2.C.15 Reflect critically on learning experiences and processes

**Solve Problems**

2.D.3 Solve different kinds of non-familiar problems in both conventional and innovative ways
2.D.4 Identify and ask significant questions that clarify various points of view and lead to better solutions

**Communicate Clearly**

3.A.11 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
3.A.12 Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
3.A.13 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
3.A.14 Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact
3.A.15 Communicate effectively in diverse environments (including multi-lingual)

**Collaborate with Others**

3.B.7 Demonstrate ability to work effectively and respectfully with diverse teams
3.B.8 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal
3.B.9 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

**Create Media Products**

5.B.3 Understand and utilize the most appropriate media creation tools, characteristics and conventions

5.B.4 Understand and effectively utilize the most appropriate expressions and interpretations in diverse, multi-cultural environments

**Apply Technology Effectively**

6.A.5 Use technology as a tool to research, organize, evaluate and communicate information

6.A.6 Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy

Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies

**Adapt to Change**

7.A.5 Adapt to varied roles, jobs responsibilities, schedules and contexts

7.A.6 Work effectively in a climate of ambiguity and changing priorities

**Be Flexible**

7.B.7 Incorporate feedback effectively

7.B.8 Deal positively with praise, setbacks and criticism

7.B.9 Understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments

**Manage Goals and Time**

8.A.4 Set goals with tangible and intangible success criteria

8.A.5 Balance tactical (short-term) and strategic (long-term) goals

8.A.6 Utilize time and manage workload efficiently

**Work Independently**

8.B.1 Monitor, define, prioritize and complete tasks without direct oversight

**Be Self-Directed Learners**

8.C.9 Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise

8.C.10 Demonstrate initiative to advance skill levels towards a professional level

8.C.11 Demonstrate commitment to learning as a lifelong process

8.C.12 Reflect critically on past experiences in order to inform future progress

**Interact Effectively with Others**

9.A.5 Know when it is appropriate to listen and when to speak

9.A.6 Conduct themselves in a respectable, professional manner

**Work Effectively in Diverse Teams**

9.B.7 Respect cultural differences and work effectively with people from a range of social and cultural backgrounds

9.B.8 Respond open-mindedly to different ideas and values

9.B.9 Leverage social and cultural differences to create new ideas and increase both innovation and quality of work

**Guide and Lead Others**

11.A.1 Use interpersonal and problem-solving skills to influence and guide others toward a goal

11.A.2 Leverage strengths of others to accomplish a common goal

11.A.3 Inspire others to reach their very best via example and selflessness

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| 11.A.4 Demonstrate integrity and ethical behavior in using influence and power |
| **Be Responsible to Others**<br>11.B.1 Act responsibly with the interests of the larger community in mind |

# COMPONENTS AND COMPETENCIES

**Performance Assessments:**

a. Using three models, students will identify the critical parts of the respiratory system

b. Students will design an experiment that investigates lung capacity.

c. Students will use an indicator to investigate the body's use of oxygen.

d. Students will successfully complete a district assessment on biology and health science.

## *STANDARDS AND COMPETENCIES*

**C-4 The Respiratory System**

| **Competencies C=Core A=Advanced** | **Total Learning Hours for Unit:** 15 hrs |
|---|---|
| C-4.1 | Identify structures and functions of the respiratory system |
| C-4.2 | Discuss the advantages and disadvantages of using models to illustrate breathing. |
| C-4.3 | Explain the exchange of oxygen and carbon dioxide in the lungs and in cells. |
| C-4.4 | Know that oxygen is only a portion of the air we breathe, and that nitrogen is the most prevalent gas in air. |
| C-4.5 | Describe lung capacity it terms of tidal volume, residual volume and vital capacity. |
| C-4.6 | Explain the physiological processes and air pressure differences occurring during inhalation and exhalation. |
| C-4.7 | Understand the difference between breathing and respiration. |
| C-4.8 | Identify the similarities and differences between the oxidation reactions of combustion and cellular respiration. |
| C-4.9 | Describe how the alveoli increase the surface area and increase gas exchange in the lungs. |
| C-4.10 | Identify and describe diseases and disorders of the respiratory system. |
| C-4.11 | Explain the formula for cellular respiration in terms of reactants and products. |
| C-4.12 | Describe the role of indicators in testing for the presence of carbon dioxide. |
| C-4.13 | Develop an understanding of the concept of 'calories' both small and large and the effect calories have on your body. |

## *EALRs, GLEs, and Standards (Taught & Assessed in Standards)*

| | |
|---|---|
| **Reading** | |
| 2.1 | Demonstrate evidence of reading comprehension. |
| 3.1 | Read to learn new information |
| 3.2 | Read to perform a task. |
| **Communications** | |
| 1.1.1 | Applies a variety of listening strategies to accommodate the listening situation. |
| 1.2.1 | Evaluates effectiveness of and creates a personal response to visual and auditory information. |
| **Social Studies** | |
| 7-1.2.3 | Understands various forms of government and their affects on the lives of people in the past or present. |
| 7-4.2.1 | Understands and analyzes how individuals and movements have shaped world history. |
| 7-4.2.3 | Understands and analyzes how technology and ideas have impacted world history. |
| **Writing** | |
| 2.1 | Adapts writing for a variety of audiences. |
| 3.1 | Develops ideas and organizes writing. |
| 3.1.1 | Analyzes ideas, selects a manageable topic, and elaborates using specific, relevant details and/or examples. |
| 3.3 | Knows and applies writing conventions appropriate for the grade level. |
| 3.3.6 | Uses complete sentences in writing. |
| **Art** | |
| 3.2.1 | *Applies, analyzes, and creates visual artworks that communicate for a specific purpose.* |
| **Science** | |
| 6-8 SYSA | Any *system* may be thought of as containing *subsystems* and as being a *subsystem* of a larger *system*. |
| 6-8 SYSC | The output of one system can become the input of another system. |
| 6-8 SYSF | The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as 'systems'. |
| 6-8 INQA | Scientific *inquiry* involves asking and answering *questions* and comparing the answer with what scientists already know about the world. |
| 6-8 INQB | Different kinds of *questions* suggest different kinds of scientific *investigations*. |
| 6-8 INQC | Collecting, analyzing, and displaying data are essential aspects of all *investigations*. |
| 6-8 INQE | *Models* are used to represent objects, events, *systems*, and processes. *Models* can be used to test *hypotheses* and better understand *phenomena*, but they have limitations. |
| 6-8 INQF | It is important to distinguish between the results of a particular *investigation* and general conclusions drawn from these results. |
| 6-8 INQG | Scientific reports should enable another investigator to repeat the study to check the results. |
| 6-8 APPH | People in all *cultures* have made and continue to make contributions to society through *science* and *technology.* |
| 6-8 PS2A | Substances have *characteristic intrinsic properties* such as *density*, *solubility*, *boiling point*, and *melting point*, all of which are independent of the amount of the sample. |
| 6-8 PS2B | *Mixtures* are combinations of substances whose *chemical properties* are preserved. *Compounds* are substances that are chemically formed and have different physical and *chemical properties* from the reacting substances. |

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|---|---|
| 6-8 PS3A | *Energy* exists in many forms which include: *heat*, light, chemical, electrical, *motion* of objects, and sound. *Energy* can be *transformed* from one *form* to another and *transferred* from one place to another. |
| 6-8 LS1C | Multicellular *organisms* have specialized cells that perform different *functions*. These cells join together to *form* tissues that give organs their structure and enable the organs to perform specialized *functions* within organ *systems*. |
| 6-8 LS1F | Lifestyle choices and living *environments* can damage structures at any level of organization of the human body and can significantly harm the whole *organism*. |
| **Integrated Environmental and Sustainability Standards** | |
| 6-8 ESE 2 | The Natural and Built Environment: Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-build environments. |
| **Health and Fitness Standards** | |
| 1.5.1 | Applies nutrition goals based on dietary guidelines and individual activity needs. |
| 7-HF1.5.2 | Understands the effects of activity, fitness, and nutrition practices. |
| 7-HF1.5.4 | Understands healthy and unhealthy eating patterns. |
| 7-HF2.2.1 | Understands structure and functions of body systems. |
| 7-HF3.1.1 | Understands how family and cultural factors impact health. |
| **Mathematics** | |
| 7.1.G | Solve single and multi-step word problems involving rational numbers, and verify the solutions. |
| 7.2.I | Solve single and multi-step problems involving conversions within or between measurement systems and verify the solutions. |
| 7.3.B | Solve single and multi-step word problems involving surface area or volume and verify the solutions. |
| 7.6.A | Analyze a problem situation to determine the question(s) to be answered. |
| 7.6.H | Make and test conjectures based on data (or information) collected from explorations and experiments. |
| ***21 Century Skills*** | |
| Think Creatively<br>1.A.1 Use a wide range of idea creation techniques (such as brainstorming)<br>1.A.2 Create new and worthwhile ideas (both incremental and radical concepts)<br>1.A.3 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts | |
| Work Creatively with Others<br>1.B.1 Develop, implement and communicate new ideas to others effectively<br>1.B.2 Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work<br>1.B.3 Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas<br>1.B.4 View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes | |
| Implement Innovations<br>Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur | |
| Reason Effectively<br>2.A.4 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation | |
| Use Systems Thinking<br>2.B.4 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems | |
| Make Judgments and Decisions<br>2.C.16 Effectively analyze and evaluate evidence, arguments, claims and beliefs | |

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| 2.C.17 Analyze and evaluate major alternative points of view<br>2.C.18 Synthesize and make connections between information and arguments<br>2.C.19 Interpret information and draw conclusions based on the best analysis<br>2.C.20 Reflect critically on learning experiences and processes |
| Solve Problems<br>2.D.5 Solve different kinds of non-familiar problems in both conventional and innovative ways<br>2.D.6 Identify and ask significant questions that clarify various points of view and lead to better solutions |
| Communicate Clearly<br>3.A.16 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts<br>3.A.17 Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions<br>3.A.18 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)<br>3.A.19 Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact<br>3.A.20 Communicate effectively in diverse environments (including multi-lingual) |
| Collaborate with Others<br>3.B.10 Demonstrate ability to work effectively and respectfully with diverse teams<br>3.B.11 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal<br>3.B.12 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member |
| Be Flexible<br>7.B.10 Incorporate feedback effectively<br>7.B.11 Deal positively with praise, setbacks and criticism<br>7.B.12 Understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments |
| Manage Goals and Time<br>8.A.7 Set goals with tangible and intangible success criteria<br>8.A.8 Balance tactical (short-term) and strategic (long-term) goals<br>8.A.9 Utilize time and manage workload efficiently |
| Work Independently<br>8.B.1 Monitor, define, prioritize and complete tasks without direct oversight |
| Be Self-Directed Learners<br>8.C.13 Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise<br>8.C.14 Demonstrate initiative to advance skill levels towards a professional level<br>8.C.15 Demonstrate commitment to learning as a lifelong process<br>8.C.16 Reflect critically on past experiences in order to inform future progress |
| Interact Effectively with Others<br>9.A.7 Know when it is appropriate to listen and when to speak<br>9.A.8 Conduct themselves in a respectable, professional manner |
| Work Effectively in Diverse Teams<br>9.B.10 Respect cultural differences and work effectively with people from a range of social and cultural backgrounds<br>9.B.11 Respond open-mindedly to different ideas and values<br>9.B.12 Leverage social and cultural differences to create new ideas and increase both innovation and quality of work |
| Manage Projects<br>10.A.1 Set and meet goals, even in the face of obstacles and competing pressures<br>10.A.2 Prioritize, plan and manage work to achieve the intended result |
| Produce Results<br>10.B.3 Demonstrate additional attributes associated with producing high quality products including the abilities to:<br>10.B.1.q Work positively and ethically<br>10.B.1.r Manage time and projects effectively |

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| 10.B.1.s Multi-task<br>10.B.1.t Participate actively, as well as be reliable and punctual<br>10.B.1.u Present oneself professionally and with proper etiquette<br>10.B.1.v Collaborate and cooperate effectively with teams<br>10.B.1.w Respect and appreciate team diversity<br>10.B.1.x Be accountable for results |
| Guide and Lead Others<br>11.A.5 Use interpersonal and problem-solving skills to influence and guide others toward a goal<br>11.A.6 Leverage strengths of others to accomplish a common goal<br>11.A.7 Inspire others to reach their very best via example and selflessness<br>11.A.8 Demonstrate integrity and ethical behavior in using influence and power |
| Be Responsible to Others<br>11.B.1 Act responsibly with the interests of the larger community in mind |

# COMPONENTS AND COMPETENCIES

**Performance Assessments:**

Student s will:

a. Use a double pump model to explain the structure and function of the heart.

b. Design a model that demonstrates the effects of cardiovascular disease.

c. Design an experiment that explore the effects of increased heart rate.

d. Provide a comprehensive explanation that relates the digestive, circulatory, and respiration system to cellular respiration.

e. Students will successfully complete a district assessment on biology and health science.

## *STANDARDS AND COMPETENCIES*

**C-5 The Circulatory System**

| **Competencies C=Core A=Advanced** | **Total Learning Hours for Unit:** 15 hrs |
|---|---|
| C-5.1 | Identify the structures and functions of the circulatory system. |
| C-5.2 | Understand the three types of circulation, ie. coronary, pulmonary and systemic. |
| C-5.3 | Identify the pathway of blood through the chambers of the heart. |
| C-5.4 | Identify the pathway of blood between the heart and lungs. |
| C-5.5 | Identify the pathway of blood between the heart and the body. |
| C-5.6 | Explain the differences between arteries, veins and capillaries. |
| C-5.7 | Describe the ‘double pump action’ of the heart, moving blood between the atria and ventricles, then out of the heart. |

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| C-5.8 | Design and conduct an investigation that explores a factor that may affect heart rate. |
| C-5.9 | Describe the components and functions of parts of the blood, ie. red blood cells, white blood cells, platelets and plasma. |
| C-5.10 | Describe blood pressure and its connection to the health of the cardiovascular system.. |
| C-5.11 | Understand the basic principles of ABO blood typing. Introduce the concept of Rh factor. |
| | |
| ***EALRs, GLEs, Math and Science Standards (Taught & Assessed in Standards)*** | |
| **Reading** | |
| 2.1 | Demonstrate evidence of reading comprehension. |
| 3.1 | Read to learn new information |
| 3.2 | Read to perform a task. |
| **Communications** | |
| 1.1.1 | Applies a variety of listening strategies to accommodate the listening situation. |
| 1.2.1 | Evaluates effectiveness of and creates a personal response to visual and auditory information. |
| **Social Studies** | |
| 7-1.2.3 | Understands various forms of government and their affects on the lives of people in the past or present. |
| 7-4.2.1 | Understands and analyzes how individuals and movements have shaped world history. |
| 7-4.2.3 | Understands and analyzes how technology and ideas have impacted world history. |
| **Writing** | |
| 7-1.2.3 | Understands various forms of government and their affects on the lives of people in the past or present. |
| 7-4.2.1 | Understands and analyzes how individuals and movements have shaped world history. |
| 7-4.2.3 | Understands and analyzes how technology and ideas have impacted world history. |
| 7-1.2.3 | Understands various forms of government and their affects on the lives of people in the past or present. |
| 7-4.2.1 | Understands and analyzes how individuals and movements have shaped world history. |
| **Art** | |
| 3.2.1 | *Applies, analyzes, and creates visual artworks that communicate for a specific purpose.* |
| **Science** | |
| 6-8 SYSA | Any *system* may be thought of as containing *subsystems* and as being a *subsystem* of a larger *system*. |
| 6-8 SYSC | The output of one system can become the input of another system. |
| 6-8 SYSF | The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as 'systems'. |
| 6-8 INQA | Scientific *inquiry* involves asking and answering *questions* and comparing the answer with what scientists already know about the world. |
| 6-8 INQB | Different kinds of *questions* suggest different kinds of scientific *investigations*. |
| 6-8 INQC | Collecting, analyzing, and displaying data are essential aspects of all *investigations*. |
| 6-8 INQE | *Models* are used to represent objects, events, *systems*, and processes. *Models* can be used to test *hypotheses* and better understand *phenomena*, but they have limitations. |
| 6-8 INQF | It is important to distinguish between the results of a particular *investigation* and general conclusions drawn from these results. |

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|---|---|
| 6-8 INQG | Scientific reports should enable another investigator to repeat the study to check the results. |
| 6-8 APPH | People in all *cultures* have made and continue to make contributions to society through *science* and *technology.* |
| 6-8 PS2B | *Mixtures* are combinations of substances whose *chemical properties* are preserved. *Compounds* are substances that are chemically formed and have different physical and *chemical properties* from the reacting substances. |
| 6-8 LS1C | Multicellular *organisms* have specialized cells that perform different *functions*. These cells join together to *form* tissues that give organs their structure and enable the organs to perform specialized *functions* within organ *systems*. |
| 6-8 LS1F | Lifestyle choices and living *environments* can damage structures at any level of organization of the human body and can significantly harm the whole *organism*. |
| **Mathematics** | |
| 7.1.G | Solve single and multi-step word problems involving rational numbers, and verify the solutions. |
| 7.2.I | Solve single and multi-step problems involving conversions within or between measurement systems and verify the solutions. |
| 7.4.C | Describe a data set using measures of center (median, mean, and mode) and variability (maximum, minimum, and range) and evaluate the suitability and limitations of using each measure for different situations. |
| 7.6.A | Analyze a problem situation to determine the question(s) to be answered. |
| 7.6.H | Make and test conjectures based on data (or information) collected from explorations and experiments. |
| ***21st Century SKILLS*** | |
| Think Creatively<br>1.A.4 Use a wide range of idea creation techniques (such as brainstorming)<br>1.A.5 Create new and worthwhile ideas (both incremental and radical concepts)<br>1.A.6 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts | |
| Work Creatively with Others<br>1.B.5 Develop, implement and communicate new ideas to others effectively<br>1.B.6 Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work<br>1.B.7 Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas<br>1.B.8 View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes | |
| Implement Innovations<br>Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur | |
| Reason Effectively<br>2.A.5 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation | |
| Use Systems Thinking<br>2.B.5 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems | |
| Make Judgments and Decisions<br>2.C.21 Effectively analyze and evaluate evidence, arguments, claims and beliefs<br>2.C.22 Analyze and evaluate major alternative points of view<br>2.C.23 Synthesize and make connections between information and arguments<br>2.C.24 Interpret information and draw conclusions based on the best analysis<br>2.C.25 Reflect critically on learning experiences and processes | |
| Solve Problems<br>2.D.7 Solve different kinds of non-familiar problems in both conventional and innovative ways<br>2.D.8 Identify and ask significant questions that clarify various points of view and lead to better solutions | |
| Communicate Clearly | |

| |
|---|
| 3.A.21 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts<br>3.A.22 Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions<br>3.A.23 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)<br>3.A.24 Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact<br>3.A.25 Communicate effectively in diverse environments (including multi-lingual) |
| Collaborate with Others<br>3.B.13 Demonstrate ability to work effectively and respectfully with diverse teams<br>3.B.14 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal<br>3.B.15 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member |
| Adapt to Change<br>7.A.7 Adapt to varied roles, jobs responsibilities, schedules and contexts<br>7.A.8 Work effectively in a climate of ambiguity and changing priorities |
| Be Flexible<br>7.B.13 Incorporate feedback effectively<br>7.B.14 Deal positively with praise, setbacks and criticism<br>7.B.15 Understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments |
| Manage Goals and Time<br>8.A.10 Set goals with tangible and intangible success criteria<br>8.A.11 Balance tactical (short-term) and strategic (long-term) goals<br>8.A.12 Utilize time and manage workload efficiently |
| Work Independently<br>8.B.1 Monitor, define, prioritize and complete tasks without direct oversight |
| Be Self-Directed Learners<br>8.C.17 Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise<br>8.C.18 Demonstrate initiative to advance skill levels towards a professional level<br>8.C.19 Demonstrate commitment to learning as a lifelong process<br>8.C.20 Reflect critically on past experiences in order to inform future progress |
| Interact Effectively with Others<br>9.A.9 Know when it is appropriate to listen and when to speak<br>9.A.10 Conduct themselves in a respectable, professional manner |
| Work Effectively in Diverse Teams<br>9.B.13 Respect cultural differences and work effectively with people from a range of social and cultural backgrounds<br>9.B.14 Respond open-mindedly to different ideas and values<br>9.B.15 Leverage social and cultural differences to create new ideas and increase both innovation and quality of work |
| Manage Projects<br>10.A.3 Set and meet goals, even in the face of obstacles and competing pressures<br>10.A.4 Prioritize, plan and manage work to achieve the intended result |
| Produce Results<br>10.B.4 Demonstrate additional attributes associated with producing high quality products including the abilities to:<br>10.B.1.y Work positively and ethically<br>10.B.1.z Manage time and projects effectively<br>10.B.1.aa Multi-task<br>10.B.1.bb Participate actively, as well as be reliable and punctual<br>10.B.1.cc Present oneself professionally and with proper etiquette<br>10.B.1.dd Collaborate and cooperate effectively with teams<br>10.B.1.ee Respect and appreciate team diversity |

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| 10.B.1.ff Be accountable for results |
| Guide and Lead Others<br>11.A.9 Use interpersonal and problem-solving skills to influence and guide others toward a goal<br>11.A.10 Leverage strengths of others to accomplish a common goal<br>11.A.11 Inspire others to reach their very best via example and selflessness<br>11.A.12 Demonstrate integrity and ethical behavior in using influence and power |
| Be Responsible to Others<br>11.B.1 Act responsibly with the interests of the larger community in mind |

# COMPONENTS AND COMPETENCIES

**Performance Assessments: :**

Students will complete a project-Investigate diseases and disorders of human body systems. Develop a multimedia presentation focusing on one disease or disorder each, affecting the digestive, respiratory and circulatory system. At least one disease will be caused or aggravated by environmental distress. Investigate and include one career where you would deal with some aspect of human health.

Culminating project: Students give advice to a small river town about how to deal with a new industry that wants to set up in the area. Using some of the practices and skills employed by ecologists, students study a challenge faced by a town that must determine how to save itself economically without destroying the quality of its land and water. Connections will be made to the negative effects on human health. The students work in groups, and assume the role of four individuals, all of whom have interests in the town. Students should be able to present evidence to the town council that would explain what will or might happen to the town's water and land resources if a new manufacturing facility is built along the river.

## *STANDARDS AND COMPETENCIES*

### C-6 Environmental Health and Engineering

| **Competencies C=Core A=Advanced** | **Total Learning Hours for Unit:** 5 hrs |
|---|---|
| C-6.1 | Describe how human health may be affected as a result of changes in the environment. |
| C-6.2 | Explain how humans may impact an environment both positively and negatively. |
| C-6.3 | Explain how changes in the environment of other organisms can affect their health and well-being. |
| C-6.4 | Describe a situation where engineering principles can/should be applied to clean contaminated water. |
| C-6.5 | Understand the workings of turbines in a dam to generate electricity. |

***EALRs, GLEs, Math and Science Standards (Taught & Assessed in Standards)***

| **Reading** | |
|---|---|
| 2.1 | Demonstrate evidence of reading comprehension. |
| 3.1 | Read to learn new information |
| 3.2 | Read to perform a task. |

| | |
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| **Communications** | |
| 1.1.1 | Applies a variety of listening strategies to accommodate the listening situation. |
| 1.2.1 | Evaluates effectiveness of and creates a personal response to visual and auditory information. |
| **Social Studies** | |
| 7-1.2.3 | Understands various forms of government and their affects on the lives of people in the past or present. |
| 7-4.2.1 | Understands and analyzes how individuals and movements have shaped world history. |
| 7-4.2.3 | Understands and analyzes how technology and ideas have impacted world history. |
| **Writing** | |
| 7-4.2.3 | Understands and analyzes how technology and ideas have impacted world history. |
| 7-1.2.3 | Understands various forms of government and their affects on the lives of people in the past or present. |
| 7-4.2.1 | Understands and analyzes how individuals and movements have shaped world history. |
| **Art** | |
| 3.2.1 | *Applies, analyzes, and creates visual artworks that communicate for a specific purpose.* |
| **Science** | |
| 6-8 SYSA | Any *system* may be thought of as containing *subsystems* and as being a *subsystem* of a larger *system*. |
| 6-8 SYSC | The output of one system can become the input of another system. |
| 6-8 SYSF | The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as 'systems'. |
| 6-8 INQA | Scientific *inquiry* involves asking and answering *questions* and comparing the answer with what scientists already know about the world. |
| 6-8 INQE | *Models* are used to represent objects, events, *systems*, and processes. *Models* can be used to test *hypotheses* and better understand *phenomena*, but they have limitations. |
| 6-8 INQI | Scientists and engineers have ethical codes governing animal *experiments*, research in natural *ecosystems*, and studies that involve human subjects. |
| 6-8 APPH | People in all *cultures* have made and continue to make contributions to society through *science* and *technology*. |
| 6-8 LS1F | Lifestyle choices and living *environments* can damage structures at any level of organization of the human body and can significantly harm the whole *organism*. |
| **Mathematics** | |
| 7.6.A | Analyze a problem situation to determine the question(s) to be answered. |
| 7.6.H | Make and test conjectures based on data (or information) collected from explorations and experiments. |
| **21st Century SKILLS** | |
| Think Creatively<br>1.A.7 Use a wide range of idea creation techniques (such as brainstorming)<br>1.A.8 Create new and worthwhile ideas (both incremental and radical concepts)<br>1.A.9 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts | |
| Work Creatively with Others<br>1.B.9 Develop, implement and communicate new ideas to others effectively<br>1.B.10 Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work<br>1.B.11 Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas<br>1.B.12 View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes | |

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| Implement Innovations<br>Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur |
| Reason Effectively<br>2.A.6 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation |
| Use Systems Thinking<br>2.B.6 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems |
| Make Judgments and Decisions<br>2.C.26 Effectively analyze and evaluate evidence, arguments, claims and beliefs<br>2.C.27 Analyze and evaluate major alternative points of view<br>2.C.28 Synthesize and make connections between information and arguments<br>2.C.29 Interpret information and draw conclusions based on the best analysis<br>2.C.30 Reflect critically on learning experiences and processes |
| Solve Problems<br>2.D.9 Solve different kinds of non-familiar problems in both conventional and innovative ways<br>2.D.10 Identify and ask significant questions that clarify various points of view and lead to better solutions |
| Communicate Clearly<br>3.A.26 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts<br>3.A.27 Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions<br>3.A.28 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)<br>3.A.29 Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact<br>3.A.30 Communicate effectively in diverse environments (including multi-lingual) |
| Collaborate with Others<br>3.B.16 Demonstrate ability to work effectively and respectfully with diverse teams<br>3.B.17 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal<br>3.B.18 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member |
| Access and Evaluate Information<br>4.A.5 Access information efficiently (time) and effectively (sources)<br>4.A.6 Evaluate information critically and competently |
| Use and Manage Information<br>4.B.7 Use information accurately and creatively for the issue or problem at hand<br>4.B.8 Manage the flow of information from a wide variety of sources<br>4.B.9 Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information |
| Analyze Media<br>5.A.4 Understand both how and why media messages are constructed, and for what purposes<br>5.A.5 Examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors<br>5.A.6 Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of media |
| Create Media Products<br>5.B.5 Understand and utilize the most appropriate media creation tools, characteristics and conventions<br>5.B.6 Understand and effectively utilize the most appropriate expressions and interpretations in diverse, multi-cultural environments |
| Apply Technology Effectively<br>6.A.7 Use technology as a tool to research, organize, evaluate and communicate information<br>6.A.8 Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy<br>Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies |

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| Adapt to Change<br>7.A.9 Adapt to varied roles, jobs responsibilities, schedules and contexts<br>7.A.10 Work effectively in a climate of ambiguity and changing priorities |
| Be Flexible<br>7.B.16 Incorporate feedback effectively<br>7.B.17 Deal positively with praise, setbacks and criticism<br>7.B.18 Understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments |
| Manage Goals and Time<br>8.A.13 Set goals with tangible and intangible success criteria<br>8.A.14 Balance tactical (short-term) and strategic (long-term) goals<br>8.A.15 Utilize time and manage workload efficiently |
| Work Independently<br>8.B.1 Monitor, define, prioritize and complete tasks without direct oversight |
| Be Self-Directed Learners<br>8.C.21 Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise<br>8.C.22 Demonstrate initiative to advance skill levels towards a professional level<br>8.C.23 Demonstrate commitment to learning as a lifelong process<br>8.C.24 Reflect critically on past experiences in order to inform future progress |
| Interact Effectively with Others<br>9.A.11 Know when it is appropriate to listen and when to speak<br>9.A.12 Conduct themselves in a respectable, professional manner |
| Work Effectively in Diverse Teams<br>9.B.16 Respect cultural differences and work effectively with people from a range of social and cultural backgrounds<br>9.B.17 Respond open-mindedly to different ideas and values<br>9.B.18 Leverage social and cultural differences to create new ideas and increase both innovation and quality of work |
| Manage Projects<br>10.A.5 Set and meet goals, even in the face of obstacles and competing pressures<br>10.A.6 Prioritize, plan and manage work to achieve the intended result |
| Produce Results<br>10.B.5 Demonstrate additional attributes associated with producing high quality products including the abilities to:<br>10.B.1.gg Work positively and ethically<br>10.B.1.hh Manage time and projects effectively<br>10.B.1.ii Multi-task<br>10.B.1.jj Participate actively, as well as be reliable and punctual<br>10.B.1.kk Present oneself professionally and with proper etiquette<br>10.B.1.ll Collaborate and cooperate effectively with teams<br>10.B.1.mm Respect and appreciate team diversity<br>10.B.1.nn Be accountable for results |
| Guide and Lead Others<br>11.A.13 Use interpersonal and problem-solving skills to influence and guide others toward a goal<br>11.A.14 Leverage strengths of others to accomplish a common goal<br>11.A.15 Inspire others to reach their very best via example and selflessness<br>11.A.16 Demonstrate integrity and ethical behavior in using influence and power |
| Be Responsible to Others<br>11.B.1 Act responsibly with the interests of the larger community in mind |