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EALR 1 – Systems: In grades 6-8 students learn how to use systems thinking to simplify and analyze complex situations. Systems concepts that students learn to apply at this level include choosing system boundaries, determining if a system is open or closed, measuring the flow of matter and energy through a system, and applying systems thinking to a complex societal issue that involves science and technology. These insights and abilities can help students see the connections between and among the domains of science and among science, technology, and society.			X	X	X		X			X
Content Standard 6-8 SysA – Any *system* may be thought of as containing *subsystems* and as being a *subsystem* of a larger *system*			X	X	X		X			X
Performance Expectations 6-8 SysA - Given a *system*, identify *subsystems* and a larger encompassing *system* (e.g., the heart is a *system* made up of tissues and cells, and is part of the larger circulatory *system*).			X	X	X					
Content Standard 6-8 SysB – The boundaries of a *system* can be drawn differently depending on the features of the *system* being *investigated*, the size of the *system*, and the purpose of the *investigation*.			X	X	X			X	X	X
Performance Expectations 6-8 SysB- *Explain how* the boundaries of a *system* can be drawn to fit the purpose of the study (e.g., to study how insect *populations* change, a *system* might be a forest, a meadow in the forest, or a single tree).			/	/	/			/	/	/
Content Standard 6-8 SysC – The *output* of one *system* can become the *input* of another *system*.			/	X	X		X	/		
Performance Expectations 6-8 SysC- Give an example of how *output* of *matter* or energy from a *system* can become *input* for another *system* (e.g., household waste goes to a landfill).*a			/	X	X		X	/		
Content Standard 6-8 SysD – In an *open system, matter* flows into and out of the *system*. In a *closed system*, energy may flow into or out of the *system*, but *matter* stays within the *system*.			/	X	X					
Performance Expectations 6-8 SysD- Given a description of a *system*, analyze and defend whether it is open or closed.			/	/						
Content Standard 6-8 SysE – If the *input* of *matter* or energy is the same as the *output*, then the amount of *matter* or energy in the *system* won't change; but if the *input* is more or less than the *output*, then the amount of *matter* or energy in the *system* will change				X	X					
Performance Expectations 6-8 SysE- Measure the flow of *matter* into and out of an *open system* and *predict* how the *system* is likely to change (e.g., a bottle of water with a hole in the bottom, an *ecosystem*, an *electric circuit*).*b				X		X				
Content Standard 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*.			/	/	/		/	/	/	/
Performance Expectations 6-8 SysF- Given a complex societal issue with strong *science* and *technology* components (e.g., overfishing, global warming), *describe* the issue from a *systems* point of view, highlighting how changes in one part of the *system* are likely to influence other parts of the *system*.				X	X	X		X	X	X
EALR 2 – Inquiry: In grades 6-8 students learn to revise questions so they can be answered scientifically and then to design an appropriate investigation to answer the question and carry out the study. Students learn to think critically and logically to make connections between prior science knowledge and evidence produced from their investigations. Students can work well in collaborative teams and communicate the procedures and results of their investigations, and are expected to critique their own findings as well as the findings of others.								/		X
Content Standard 6-8 INQA-Question: Scientific *inquiry* involves asking and answering *questions* and comparing the answer with what				X				X		X

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scientists already know about the world.										
Performance Expectations 6-8 INQA -*Generate* a *question* that can be answered through scientific *investigation*. This may involve refining or refocusing a broad and ill-defined *question*.										X
Content Standard 6-8 INQB-Investigate: Different kinds of *questions* suggest different kinds of scientific *investigations*.										X
Performance Expectations 6-8 INQB- Plan and conduct a scientific *investigation* (e.g., *field study*, systematic *observation*, *controlled experiment*, *model*, or simulation) that is appropriate for the *question* being asked.								X		X
Performance Expectations 6-8 INQB- Propose a *hypothesis*, give a reason for the *hypothesis,* and *explain how* the planned *investigation* will test the *hypothesis*.								X		X
Performance Expectations 6-8 INQB- Work collaboratively with other students to carry out the *investigations*.			X				X	X		X
Content Standard 6-8 INQC-Investigate: Collecting, analyzing, and displaying data are essential aspects of all *investigations*.		X		X		X	X	X		X
Performance Expectations 6-8 INQC- *Communicate* results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. *a								X		X
Performance Expectations 6-8 INQC- Recognize and interpret *patterns* – as well as *variations* from previously learned or observed *patterns* – in data, diagrams, symbols, and words.*a		X		X				X		X
Performance Expectations 6-8 INQC- Use statistical procedures (e.g., median, mean, or mode) to analyze data and make *inferences* about *relationships*.*b								X		X
Content Standard 6-8 INQD-Investigate: 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.								X		X
Performance Expectations 6-8 INQD- Plan and conduct a *controlled experiment* to test a *hypothesis* about a *relationship* between two *variables*. *c								X		X
Performance Expectations 6-8 INQD- Determine which *variables* should be kept the same (*controlled*), which (*independent*) *variable* should be systematically *manipulated*, and which *responding (dependent) variable* is to be measured and recorded.								X		X
Performance Expectations 6-8 INQD- Report any *variables* not *controlled* and *explain how* they might affect results.		X						X		X
Content Standard 6-8 INQE-Model: *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.				X	X				X	X
Performance Expectations 6-8 INQE- Use the *model* to explore the *relationship* between two *variables* and point out how the *model* or simulation is similar to or different from the actual phenomenon.				X				X		X
Content Standard 6-8 INQF-Explain: It is important to distinguish between the results of a particular *investigation* and general conclusions drawn from these results.								X		X

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Performance Expectations 6-8 INQF-*Generate* a scientific conclusion from an *investigation* using inferential logic, and clearly distinguish between results (e.g., *evidence*) and conclusions (e.g., explanation).								X		X
Performance Expectations 6-8 INQF- *Describe* the differences between an objective summary of the findings and an *inference* made from the findings.*c										/
Content Standard 6-8 INQG-Communicate Clearly: Scientific reports should enable another investigator to repeat the study to check the results.								X		X
Performance Expectations 6-8 INQG-Prepare a written report of an *investigation* by clearly describing the *question* being *investigated*, what was done, and an objective summary of results.										X
Performance Expectations 6-8 INQG- The report should provide *evidence* to accept or reject the *hypothesis*, *explain* the *relationship* between two or more *variables*, and identify limitations of the *investigation*.*c								X		X
Content Standard 6-8 INQH-Intellectual Honesty: *Science* advances through openness to new *ideas*, honesty, and legitimate *skepticism*. Asking thoughtful *questions*, querying other scientists' explanations, and evaluating one's own thinking in response to the *ideas* of others are abilities of scientific *inquiry*.										X
Performance Expectations 6-8 INQH- Recognize flaws in scientific *claims*, such as uncontrolled *variables*, overgeneralizations from limited data, and experimenter bias.*c		X						X		X
Performance Expectations 6-8 INQH- Listen actively and respectfully to research reports by other students. Critique their presentations respectfully, using *logical argument* and *evidence*. *c										X
Performance Expectations 6-8 INQH- Engage in reflection and self-evaluation.								X		X
EALR 3 – Application: In grades 6-8 students work with other members of a team to apply the full process of technological design, combined with relevant science concepts, to solve problems. In doing so they learn to define a problem, conduct research on how others have solved similar problems, generate possible solutions, test the design, and communicate the results. Students also investigate professions in which science and technology are required so they can learn how the abilities they are developing in school are valued in the world of work.									X	X
Content Standard 6-8 APPA- People have always used *technology* to solve problems. Advances in human civilization are linked to advances in *technology*.									X	X
Performance Expectations 6-8 APPA- *Describe* how a *technology* has changed over time in response to societal challenges.									X	X
Content Standard 6-8 APPB- *Scientists* and technological designers (including *engineers*) have different goals. Scientists answer *questions* about the *natural world*; technological designers solve problems that help people reach their goals.									X	X
Performance Expectations 6-8 APPB - *Investigate* several professions in which an understanding of *science* and *technology* is required. *Explain* why that understanding is necessary for success in each profession.									/	/
Content Standard 6-8 APPC- *Science* and *technology* are interdependent. *Science* drives *technology* by demanding better instruments and									X	X

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suggesting *ideas* for new designs. *Technology* drives *science* by providing instruments and research methods.										
Performance Expectations 6-8 APPC- Give examples to illustrate how scientists have helped solve technological problems (e.g., how the *science* of biology has helped sustain fisheries) and how engineers have aided *science* (e.g., designing telescopes to discover distant planets).									/	/
Content Standard 6-8 APPD- The process of *technological design* begins by defining a problem and identifying *criteria* for a successful solution, followed by research to better understand the problem and brainstorming to arrive at potential *solutions*.									X	X
Performance Expectations 6-8 APPD- Define a problem that can be solved by *technological design* and identify *criteria* for success.									X	X
Performance Expectations 6-8 APPD- Research how others solved similar problems.									X	X
Performance Expectations 6-8 APPD- Brainstorm different *solutions*.										X
Content Standard 6-8 APPE- Scientists and engineers often work together to *generate* creative *solutions* to problems and decide which ones are most promising.									X	X
Performance Expectations 6-8 APPE- Collaborate with other students to *generate* creative *solutions* to a problem, and *apply* methods for making trade-offs to choose the best *solution*.*a										X
Content Standard 6-8 APPF- *Solutions* must be tested to determine whether or not they will solve the problem.										X
Content Standard 6-8 APPF- Results are used to modify the *design*, and the best solution must be communicated persuasively.										X
Performance Expectations 6-8 APPF-Test the best *solution* by building a model or other representation and using it with the intended audience. Redesign as necessary.										X
Performance Expectations 6-8 APPF- Present the recommended *design* using *models* or drawings and an engaging presentation.*b										/
EALR 4 – Physical Science/Force and Motion: Students learn to predict the motion of objects subject to opposing forces along the line of travel. If the forces are balanced, the object will continue moving with the same speed and direction, but if the forces are not balanced, the object's motion will change. These concepts and principles prepare students for a more formal understanding of mechanics in high school and help them make sense of the world around them.		/			/			/		/
Content Standard 6-8 PS1B- *Friction* is a *force* that acts to slow or stop the *motion* of objects.		/			/			/		/
Performance Expectations 6-8 PS1B- Demonstrate and explain the *frictional force* acting on an object with the use of a physical *model*.								/		
Content Standard 6-8 PS1C- Unbalanced *forces* will cause changes in the speed or direction of an object's *motion*.		/			/			/		/
Performance Expectations 6-8 PS1C- Determine whether *forces* on an object are balanced or unbalanced and justify with *observational evidence*.		/			/			/		/
Performance Expectations 6-8 PS1C- Given a description of *forces* on an object, *predict* the object's *motion*.*c					/			/		/
EALR 4 – Physical Science/Matter: Properties and Change: In grades 6-8 students learn the basic concepts behind the atomic nature of				/			/			

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matter. Atoms chemically combine with each other or with atoms of other elements to form compounds. When substances are combined in physical mixtures, their chemical properties do not change; but when they combine chemically, the new product has different physical and chemical properties from any of the reacting substances. When substances interact in a closed system, the amount of mass does not change. These concepts about the nature of matter are fundamental to all sciences and technologies.										
Content Standard 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.							/			
Performance Expectations 6-8 PS2A- Use *characteristic* intrinsic *properties* such as *density*, *boiling point*, and *melting point* to identify an unknown substance.										
Content Standard 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.							/			
Performance Expectations 6-8 PS2B- Demonstrate that the *properties* of a *compound* are different from the *properties* of the reactants from which it was formed.							/			
Content Standard 6-8 PS2D- *Compounds* are composed of two or more kinds of *atoms*, which are bound together in well-defined *molecules* or arrays.							/			
Content Standard 6-8 PS2F- When substances within a *closed system* interact, the total *mass* of the *system* remains the same. This *concept*, called *conservation of mass*, applies to all physical and *chemical change*s.						X	X			
Performance Expectations 6-8 PS2F- *Apply* the *concept* of *conservation of mass* to correctly *predict* changes in *mass* before and after *chemical reactions*, including reactions that occur in closed containers, and reactions that occur in open containers where a *gas* is given off.*a						X	X			
EALR 4 –Physical Science/Energy: Transfer, Transformation and Conservation: In grades 6-8 students learn how energy and matter interact in various settings. Heat (thermal energy) always moves from a warmer to a cooler place through solids (by conduction) and through liquids and gases (mostly by convection or mechanical mixing). These fundamental concepts of how matter and energy interact have broad application in all of the other sciences.					/					
Content Standard 6-8 PS3A- Energy exists in many forms: *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.					/					
Performance Expectations 6-8 PS3A- *Describe* ways in which energy is *transformed* from one *form* to another and *transferred* from one place to another (e.g., chemical to electrical energy in a battery, electrical to light energy in a bulb).					/					
Content Standard 6-8 PS3B- *Heat* (thermal energy) flows from warmer to cooler objects until both reach the same temperature. *Conduction*, *radiation,* and *convection,* or *mechanical mixing*, are the means of *heat transfer*.					/					
Performance Expectations 6-8 PS3B- Use everyday examples of *conduction*, *radiation*, and *convection*, or *mechanical mixing*, to illustrate the *transfer* of *heat* energy from warmer objects to cooler ones until the objects reach the same temperature.					/					
EALR 4 –Earth and Space Science/Earth Systems, Structures and Processes: Cycles in Earth Systems: In grades 6-8 students learn about planet Earth as an interacting system of solids, liquids, and gases. These fundamental ideas will enable students to understand the			/	/	/			/	/	/

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history of their planet, Earth processes occurring today, and future geologic events.										
Content Standard 6-8 ES2A- The atmosphere is a *mixture* of nitrogen, oxygen, and trace *gases* that include *water vapor*. The atmosphere has different *properties* at different elevations.			/	/	/			/	/	/
EALR 4 –Life Science/Structure and function of Organisms: From Cells to Organisms: In grades 6-8 students learn that all living systems are composed of cells which make up tissues, organs, and organ systems. At each level of organization, the structures enable specific functions required by the organism. Lifestyle choices and environmental conditions can affect parts of the human body, which may affect the health of the body as a whole. Understanding how organisms operate as systems helps students understand the commonalities among life forms, provides an introduction to further study of biology, and offers scientific insights into the ways that personal choices may affect health.			X	X	X				X	
Content Standard 6-8 LS1A- All *organisms* are composed of cells, which carry on the many *functions* needed to sustain life.			X	X	X				X	
Performance Expectations 6-8 LS1A- *Describe* the *functions* performed by cells to sustain a living *organism* (e.g., division to produce more cells, taking in *nutrients*, releasing waste, using energy to do work, and producing materials the *organism* needs).			X	X	X				X	
Content Standard 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*.			X	X	X				X	
Performance Expectations 6-8 LS1C- Relate the structure of a specialized cell (e.g., nerve and muscle cells) to the *function* that the cell performs.			X		X				X	
Performance Expectations 6-8 LS1C- *Explain* the *relationship* between tissues that make up individual organs and the *functions* the organ performs (e.g., valves in the heart control blood flow, *air* sacs in the lungs maximize surface area for *transfer* of *gases*).			/		X					
Performance Expectations 6-8 LS1C- *Describe* the components and *functions* of the digestive, circulatory, and respiratory *systems* in humans and how these systems interact.			/	X	/			/	/	
Content Standard 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*.		X	X	X	X	X	X	X	X	X
Performance Expectations 6-8 LS1F- *Evaluate* how lifestyle choices and *environments* (e.g., tobacco, drug, and alcohol use, amount of exercise, quality of *air*, and kinds of food) affect parts of the human body and the *organism* as a whole.		X	X	X	X	X	X	X	X	X
EALR 4 –Life Science/Ecosystems: Flow of Energy Through Ecosystems: In grades 6-8 students learn to apply key concepts about ecosystems to understand the interactions among organisms and the nonliving environment. Essential concepts include the process of photosynthesis used by plants to transform the energy of sunlight into food energy, which is used by other organisms, and possible causes of environmental change. Knowledge of how energy flows through ecosystems is a critical aspect of students' understanding of how energy sustains life on the planet, including human life.			/	/	/	/	/		/	
Content Standard 6-8 LS2C- The major source of energy for *ecosystems* on Earth's surface is sunlight. *Producers* transform the energy of sunlight into the chemical energy of food through *photosynthesis*. This food energy is used by plants, and all other *organisms* to carry on life				/		/	/			

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processes. Nearly all *organisms* on the surface of Earth depend on this energy source.										
Performance Expectations 6-8 LS2C- *Explain that* plants are the only organisms that make their own food. Animals cannot survive without plants because animals get food by eating plants or other animals that eat plants.				/		/	/			
EALR 4 –Life Science/Biological Evolution: Inheritance, Variation and Adaptation: In grades 6-8 students learn how the traits of organisms are passed on through the transfer of genetic information during reproduction and how inherited variations can become adaptations to a changing environment. Sexual reproduction produces variations because genes are inherited from two parents. Variations can be either physical or behavioral, and some have adaptive value in a changing environment. In the theory of biological evolution the processes of inheritance, variation, and adaptation explain both the diversity and unity of all life.		X	X		X	X				X
Content Standard 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.		/	/		/	/				/
Performance Expectations 6-8 LSB3- *Explain that* information on how cells are to grow and *function* is contained in *genes* in the *chromosomes* of each cell *nucleus* and that during the process of reproduction the *genes* are passed from the parent cells to offspring.		/	/		/	/				/
Content Standard 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 children inherit *genes* from both parents.		/	/		/	/				
Performance Expectations 6-8 LS3C-*Explain* why offspring that result from *sexual reproduction* are likely to have more diverse *characteristics* than offspring that result from *asexual reproduction*.		/	/		/	/				
Content Standard 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 to either parent. In *asexual reproduction* just one parent is involved, and *genetic information* is passed on *nearly unchanged.*		/	/		/	/				X
Performance Expectations 6-8 LS3D- *Describe* that in *sexual reproduction* the offspring receive *genetic information* from both parents, and therefore differ from the parents.		/	/		/	/				/
Performance Expectations 6-8 LS3D- *Explain* the survival value of *genetic variation*.		X	X		X	X				
Content Standard 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*.		/	/		/	/				/
Performance Expectations 6-8 LS3E- Give an example of a plant or animal adaptation that would confer a survival and reproductive advantage during a given *environmental* change.		X	X		X	X				X