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SCIENCE FUSION

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ScienceFusion

correlated to the

Oklahoma Academic Standards for Science: Disciplinary Core Ideas

Grade 6

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Oklahoma Academic Standards: Disciplinary Core Ideas Grade 6	Citations In the *ScienceFusion* digital curriculum, students encounter the same science concepts, vocabulary, and inquiry as they see in the Student Edition, but written with new examples or scenarios to provide an alternative digital experience for every write-in textbook lesson.
MS-PS1-4: Matter and Its Interactions	
Structure and Properties of Matter: • Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. • The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.	**SE/Digital Curriculum** Mod H U1 L6: Changes of State pp. 74-87 **TE/Digital Curriculum** Mod H U1 L6: Changes of State pp. 98-112
Structure and Properties of Matter: (secondary to MS-PI1-4) • The term "heat" as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that thermal energy from one object to another. In science, heat is used only for this second meaning; it refers to the energy transferred due to the temperature difference between two objects.	**SE/Digital Curriculum** Mod H U2 L3: Thermal Energy and Heat pp. 122-133 **TE/Digital Curriculum** Mod H U2 L3: Thermal Energy and Heat pp. 158-171

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Structure and Properties of Matter: (secondary to MS-PI1-4) • The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule (whichever is the appropriate building block for the system's material). The details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material.	**SE/Digital Curriculum** Mod H U2 L2: Temperature pp. 112-116 **TE/Digital Curriculum** Mod H U2 L2: Temperature pp. 144-154
Structure and Properties of Matter: (secondary to MS-PI1-4) • Temperature is not a direct measure of a system's total thermal energy.	**SE/Digital Curriculum** Mod H U2 L2: Temperature pp. 112-116 **TE/Digital Curriculum** Mod H U2 L2: Temperature pp. 144-154
Structure and Properties of Matter: (secondary to MS-PI1-4) • The total thermal energy (sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of the material.	**SE/Digital Curriculum** Mod H U2 L2: Temperature pp. 112-116 **TE/Digital Curriculum** Mod H U2 L2: Temperature pp. 144-154

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MS-PS2-3: Motion and Stability: Forces and Interactions	
Types of Interactions: • Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.	**SE/Digital Curriculum** Mod I U3 L4: Magnets and Magnetism pp. 156-165; Mod I U3 L1: Electric Charge and Static Electricity pp. 126-135 **TE/Digital Curriculum** Mod I U3 L4: Magnets and Magnetism pp. 212-224; Mod I U3 L1: Electric Charge and Static Electricity pp. 172-184
MS-PS2-5: Motion and Stability: Forces and Interactions	
Types of Interactions: • • Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively).	**SE/Digital Curriculum** Mod 1 U3 L4: Magnets and Magnetism pp. 156-165 **TE/Digital Curriculum** Mod 1 U3 L4: Magnets and Magnetism pp. 212-224
MS-PS3-1: Energy	
Definitions of Energy: • Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed.	**SE/Digital Curriculum** Mod I U2 L2: Kinetic and Potential Energy pp. 88-97 **TE/Digital Curriculum** Mod I U2 L2: Kinetic and Potential Energy pp. 120-132

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MS-PS3-2: Energy	
Definitions of Energy: • A system of objects may also contain stored (potential) energy, depending on their relative positions.	**SE/Digital Curriculum** Mod I U2 L2: Kinetic and Potential Energy pp. 88-97 **TE/Digital Curriculum** Mod I U2 L2: Kinetic and Potential Energy pp. 120-132
Relationship Between Energy and Forces: • Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed.	**SE/Digital Curriculum** Mod I U2 L2: Kinetic and Potential Energy pp. 88-97 **TE/Digital Curriculum** Mod I U2 L2: Kinetic and Potential Energy pp. 120-132
MS-PS3-3: Energy	
Definitions of Energy: • Temperature is a measure of the average kinetic energy of particles of matter. • The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.	**SE/Digital Curriculum** Mod H U2 L2: Temperature pp. 112-119 **TE/Digital Curriculum** Mod H U2 L2: Temperature pp. 144-155
Conservation of Energy and Energy Transfer: • Energy is spontaneously transferred out of hotter regions or objects and into colder ones.	**SE/Digital Curriculum** Mod H U2 L3: Thermal Energy and Heat pp. 122-133 **TE/Digital Curriculum** Mod H U2 L3: Thermal Energy and Heat pp. 158-171

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Defining and Delimiting an Engineering Problem: (secondary to MS-PS3-3) • The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions.	**SE/Digital Curriculum** Mod K U3 L1: The Engineering Design Process pp. 114-125 **TE/Digital Curriculum** Mod K U3 L1: The Engineering Design Process pp. 150-163
Developing Possible Solutions: (secondary to MS-PS3-3) • A solution needs to be tested, and then modified on the basis of the test results in order to improve it. • There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem.	**SE/Digital Curriculum** Mod K U3 L1: The Engineering Design Process pp. 114-125 **TE/Digital Curriculum** Mod K U3 L1: The Engineering Design Process pp. 150-163

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MS-PS3-4: Energy	
Definitions of Energy: • Temperature is a measure of the average kinetic energy of particles of matter. • The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.	**SE/Digital Curriculum** Mod H U2 L2: Temperature pp. 112-119 **TE/Digital Curriculum** Mod H U2 L2: Temperature pp. 144-155
Conservation of Energy and Energy Transfer: • The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment.	**SE/Digital Curriculum** Mod H U2 L3: Thermal Energy and Heat pp. 122-133; Mod H U1 L6: Changes of State pp. 74-87 **TE/Digital Curriculum** Mod H U2 L3: Thermal Energy and Heat pp. 158-171; Mod H U1 L6: Changes of State pp. 98-112
MS-LS1-1: From Molecules to Organisms: Structure and Processes	
Structure and Function: • All living things are made up of cells, which is the smallest unit that can be said to be alive. • An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).	**SE/Digital Curriculum** Mod A U1 L1: The Characteristics of Cells pp. 4-13 **TE/Digital Curriculum** Mod A U1 L1: The Characteristics of Cells pp. 16-28

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MS-LS1-2: From Molecules to Organisms: Structure and Processes	
Structure and Function: • Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.	**SE/Digital Curriculum** Mod A U1 L3: Cell Structure and Function pp. 24-35; Mod A U1 L1: The Characteristics of Cells pp. 4-13 **TE/Digital Curriculum** Mod A U1 L3: Cell Structure and Function pp. 44-57; Mod A U1 L1: The Characteristics of Cells pp. 16-28
MS-LS1-3: From Molecules to Organisms: Structure and Processes	
Structure and Function: • In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.	**SE/Digital Curriculum** Mod A U1 L4: Levels of Cellular Organization pp. 38-49; Mod C U1 L1: Introduction to Body Systems pp. 4-13 **TE/Digital Curriculum** Mod A U1 L4: Levels of Cellular Organization pp. 60-73; Mod C U1 L1: Introduction to Body Systems pp. 16-28
MS-LS1-6: From Molecules to Organisms: Structure and Processes	
Organization for Matter and Energy Flow in Organisms: • Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later usey.	**SE/Digital Curriculum** Mod A U1 L6: Photosynthesis and Cellular Respiration pp. 66-77; Mod B U2 L2: Protists and Fungi pp. 92-105 **TE/Digital Curriculum** Mod A U1 L6: Photosynthesis and Cellular Respiration pp. 92-105; Mod B U2 L2: Protists and Fungi pp. 124-138

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Energy in Chemical Processes and Everyday Life: (secondary to MS-LS1-6) • The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen.	**SE/Digital Curriculum** Mod B U2 L4: Plant Processes pp. 120-133 **TE/Digital Curriculum** Mod B U2 L4: Plant Processes pp. 156-170
MS-LS2-1: Ecosystems: Interactions, Energy, and Dynamics	
Interdependent Relationships in Ecosystems: • Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.	**SE/Digital Curriculum** Mod D U1 L1: Introduction to Ecology pp. 4-15 **TE/Digital Curriculum** Mod D U1 L1: Introduction to Ecology pp. 12-25
Interdependent Relationships in Ecosystems: • In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.	**SE/Digital Curriculum** Mod D U1 L4: Interactions in Communities pp. 42-51 **TE/Digital Curriculum** Mod D U1 L4: Interactions in Communities pp. 56-68

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Oklahoma Academic Standards: Disciplinary Core Ideas Grade 6	Citations In the *ScienceFusion* digital curriculum, students encounter the same science concepts, vocabulary, and inquiry as they see in the Student Edition, but written with new examples or scenarios to provide an alternative digital experience for every write-in textbook lesson.
Interdependent Relationships in Ecosystems: • Growth of organisms and population increases are limited by access to resources.	**SE/Digital Curriculum** Mod D U1 L3: Population Dynamics pp. 30-41 **TE/Digital Curriculum** Mod D U1 L3: Population Dynamics pp. 42-55
MS-LS2-2: Ecosystems: Interactions, Energy, and Dynamics	
Interdependent Relationships in Ecosystems: • Predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared.	**SE/Digital Curriculum** Mod D U1 L4: Interactions in Communities pp. 42-51 **TE/Digital Curriculum** Mod D U1 L4: Interactions in Communities pp. 56-68

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MS-LS2-3: Ecosystems: Interactions, Energy, and Dynamics	
Cycle of Matter and Energy Transfer in Ecosystems: • Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. • Transfers of matter into and out of the physical environment occur at every level. • Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments • The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem	**SE/Digital Curriculum** Mod D U1 L2: Roles in Energy Transfer pp. 18-29; Mod D U2 L3: Energy and Matter in Ecosystems pp. 88-99 **TE/Digital Curriculum** Mod D U1 L2: Roles in Energy Transfer pp. 28-41; Mod D U2 L3: Energy and Matter in Ecosystems pp. 116-129

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MS-LS2-4: Ecosystems: Interactions, Energy, and Dynamics	
Ecosystem Dynamics, Functioning, and Resilience: • Ecosystems are dynamic in nature; their characteristics can vary over time. • Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.	**SE/Digital Curriculum** Mod D U2 L4: Changes in Ecosystems pp. 100-109; Mod D U2 L5: Human Activity and Ecosystems pp. 114-125 **TE/Digital Curriculum** Mod D U2 L4: Changes in Ecosystems pp. 130-142; Mod D U2 L5: Human Activity and Ecosystems pp. 148-161
MS-LS2-5: Ecosystems: Interactions, Energy, and Dynamics	
Ecosystem Dynamics, Functioning, and Resilience: • Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. • The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health.	**SE/Digital Curriculum** Mod D U2 L4: Changes in Ecosystems pp. 100-109 **TE/Digital Curriculum** Mod D U2 L4: Changes in Ecosystems pp. 130-142

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Biodiversity and Humans: (secondary to MS-LS2-5) • Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling.	**SE/Digital Curriculum** Mod D U2 L5: Human Activity and Ecosystems pp. 114-125 **TE/Digital Curriculum** Mod D U2 L5: Human Activity and Ecosystems pp. 148-161
Developing Possible Solutions: (secondary to MS-LS2-5) • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.	**SE/Digital Curriculum** Mod K U3 L1: The Engineering Design Process pp. 114-125 **TE/Digital Curriculum** Mod K U3 L1: The Engineering Design Process pp. 150-163
Influence of Engineering, Technology, and Science on Society and the Natural World: • The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time.	**SE/Digital Curriculum** Mod K U3 L6: Engineering and Our World pp. 180-191 **TE/Digital Curriculum** Mod K U3 L6: Engineering and Our Word pp. 236-241

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MS-ESS2-4: Earth's Systems	
The Roles of Water in Earth's Surface Processes: • Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. • Global movements of water and its changes in form are propelled by sunlight and gravity.	**SE/Digital Curriculum** Mod F U1 L2: The Water Cycle pp. 14-25 **TE/Digital Curriculum** Mod F U1 L2: The Water Cycle pp. 26-39
MS-ESS3-3: Earth and Human Activity	
Human Impacts on Earth Systems: • Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.	**SE/Digital Curriculum** Mod D U2 L5: Human Activity and Ecosystems pp. 114-125 **TE/Digital Curriculum** Mod D U2 L5: Human Activity and Ecosystems pp. 148-161

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• Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise	SE Print: Mod D U4 L1; Human Impact on Water (partial) [pp. 206-219]; Mod D U4 L2: Human Impact on Land (partial) [pp. 222-231]; Mod D U4 L3: Human Impact on the Atmosphere (partial) [pp. 232-243]; Mod D U4 L4: Protecting Earth's Water, Land, and Air (partial) [pp. 244-257] Digital: Mod D U4 L1; Human Impact on Water (partial); Mod D U4 L2: Human Impact on Land (partial); Mod D U4 L3: Human Impact on the Atmosphere (partial); Mod D U4 L4: Protecting Earth's Water, Land, and Air (partial) TE Mod D U4 L1; Human Impact on Water (partial) [pp. 266-280; Mod D U4 L2: Human Impact on Land (partial) [pp. 284-296]; Mod D U4 L3: Human Impact on the Atmosphere (partial) [pp. 298-311]; Mod D U4 L4: Protecting Earth's Water, Land, and Air (partial) [pp. 312-326]
Influence of Engineering, Technology, and Science on Society and the Natural World: • The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time.	**SE/Digital Curriculum** Mod K U3 L6: Engineering and Our World pp. 180-191 **TE/Digital Curriculum** Mod K U3 L6: Engineering and Our Word pp. 236-241