

# NSCAS - Science Table of Specifications

## Grade 8

### Inquiry, The Nature of Science, and Technology

Grade 8 Abilities to do Scientific Inquiry	Highest DOK level tested	DOK 1	DOK 2	DOK 3	Item Total
<b>SC 8.1.1 Students will design and conduct investigations that will lead to descriptions of relationships between evidence and explanations.</b>					<b>8-13</b>
<i>SC 8.1.1.a Formulate testable questions that lead to predictions and scientific investigations</i>	2				
<i>SC 8.1.1.b Design and conduct logical and sequential investigations including repeated trials</i>	3				
<i>SC 8.1.1.c Determine controls and use dependent (responding) and independent (manipulated) variables</i>	3				
<i>SC 8.1.1.d Select and use equipment appropriate to the investigation, demonstrate correct techniques</i>	1				
<i>SC 8.1.1.e Make qualitative and quantitative observations</i>	2				
<i>SC 8.1.1.f Record and represent data appropriately and review for quality, accuracy, and relevancy</i>	3				
<i>SC 8.1.1.g Evaluate predictions, draw logical inferences based on observed patterns/relationships, and account for non-relevant information</i>	3				
<i>SC 8.1.1.h Share information, procedures, results, and conclusions with appropriate audiences</i>	2				
<i>SC 8.1.1.i Analyze and provide appropriate critique of scientific investigations</i>	3				
<i>SC 8.1.1.j Use appropriate mathematics in all aspects of scientific inquiry</i>	2				
Grade 8 Nature of Science	Highest DOK level tested	DOK 1	DOK 2	DOK 3	Item Total
<b>SC 8.1.2 Students will apply the nature of science to their own investigations.</b>	<b>Assessed at the local level</b>				
<i>SC 8.1.2.a Recognize science is an ongoing process and the scientific community accepts and uses explanations until they encounter new experimental evidence not matching existing explanations</i>					
<i>SC 8.1.2.b Describe how scientific discoveries influence and change society</i>					

SC 8.1.2.c Recognize scientists from various cultures have made many contributions to explain the natural world					
<b>Grade 8 Technology</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.1.3 Students will solve a design problem which involves one or two science concepts.</b>	<b>Assessed at the local level</b>				
SC 8.1.3.a Identify problems for technical design					
SC 8.1.3.b Design a solution or product					
SC 8.1.3.c Implement the proposed design					
SC 8.1.3.d Evaluate completed technological designs or products					
SC 8.1.3.e Communicate the process of technical design					
SC 8.1.3.f Distinguish between scientific inquiry (asking questions about the natural world) and technological design (using science to solve practical problems)					
SC 8.1.3.g Describe how science and technology are reciprocal					
SC 8.1.3.h Recognize that solutions have intended and unintended consequences					
SC 8.1.3.i Compare and contrast the reporting of scientific knowledge and the reporting of technological knowledge					
<b>PHYSICAL SCIENCE</b>					
<b>Grade 8 Matter</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.2.1 Students will identify and describe the particulate nature of matter including physical and chemical interactions.</b>					<b>4-7</b>
SC 8.2.1.a Compare and contrast elements, compounds, and mixtures	2				
SC 8.2.1.b Describe physical and chemical properties of matter	2				
SC 8.2.1.c Recognize most substances can exist as a solid, liquid, or gas depending on temperature	1				
SC 8.2.1.d Compare and contrast solids, liquids, and gasses based on properties of these states of matter	2				
SC 8.2.1.e Distinguish between physical and chemical changes (phase changes, dissolving, burning, rusting)	1				
SC 8.2.1.f Recognize conservation of matter in physical and chemical changes	1				

SC 8.2.1.g Classify substances into similar groups based on physical properties	2				
<b>Grade 8 Force and Motion</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.2.2 Students will investigate and describe forces and motion.</b>					<b>3-6</b>
SC 8.2.2.a Describe motion of an object by its position and velocity	2				
SC 8.2.2.b Recognize an object that is not being subjected to a force will continue to move at a constant speed in a straight line or stay at rest (Newton's 1st law)	1				
SC 8.2.2.c Compare the motion of objects related to the effects of balanced and unbalanced forces	2				
SC 8.2.2.d Recognize that everything on or around Earth is pulled towards Earth's center by gravitational force	1				
<b>Grade 8 Energy</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.2.3 Students will identify and describe how energy systems and matter interact.</b>					<b>3-6</b>
SC 8.2.3.a Recognize that vibrations set up wave-like disturbances that spread away from the source (sound, seismic, water waves)	1				
SC 8.2.3.b Identify that waves move at different speeds in different materials	1				
SC 8.2.3.c Recognize that light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection)	1				
SC 8.2.3.d Recognize that to see an object, light from the surface of the object must enter the eye; the color seen depends on the properties of the surface and the color of the available light sources	1				
SC 8.2.3.e Recognize that heat moves from warmer objects to cooler objects until both reach the same temperature	1				
SC 8.2.3.f Describe transfer of energy from electrical and magnetic sources to different energy forms (heat, light, sound, chemical)	1				
SC 8.2.3.g Recognize all energy is neither created nor destroyed	1				
<b>LIFE SCIENCE</b>					
<b>Grade 8 Structure and Function of Living Systems</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>

<b>SC 8.3.1 Students will investigate and describe the structure and function of living organisms.</b>					<b>4-7</b>
<i>SC 8.3.1.a Recognize the levels of organization in living organisms (cells, tissues, organs, organ systems, organisms)</i>	1				
<i>SC 8.3.1.b Recognize that all organisms are composed of one or many cells; that these cells must grow, divide, and use energy; and that all cells function similarly</i>	1				
<i>SC 8.3.1.c Recognize specialized cells perform specialized functions in multicellular organisms</i>	1				
<i>SC 8.3.1.d Identify the organs and functions of the major systems of the human body and describe ways that these systems interact with each other</i>	1				
<i>SC 8.3.1.e Describe how plants and animals respond to environmental stimuli</i>	1				
<b>Grade 8 Heredity</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.3.2 Students will investigate and describe the relationship between reproduction and heredity.</b>					<b>1-3</b>
<i>SC 8.3.2.a Recognize that hereditary information is contained in genes within the chromosomes of each cell</i>	1				
<i>SC 8.3.2.b Compare and contrast sexual and asexual reproduction</i>	2				
<b>Grade 8 Flow of Matter and Energy in Ecosystems</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.3.3 Students will describe populations and ecosystems.</b>					<b>3-6</b>
<i>SC 8.3.3.a Diagram and explain the flow of energy through a simple food web</i>	2				
<i>SC 8.3.3.b Compare the roles of producers, consumers, and decomposers in an ecosystem</i>	2				
<i>SC 8.3.3.c Recognize that producers transform sunlight into chemical energy through photosynthesis</i>	1				
<i>SC 8.3.3.d Determine the biotic and abiotic factors that impact the number of organisms an ecosystem can support</i>	2				
<i>SC 8.3.3.e Recognize a population is all the individuals of a species at a given place and time</i>	1				
<i>SC 8.3.3.f Identify symbiotic relationships among organisms</i>	1				
<i>SC 8.3.3.g Identify positive and negative effects of natural and human activity on an ecosystem</i>	2				

<b>Grade 8 Biodiversity</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.3.4 Students will identify characteristics of organisms that help them survive.</b>					<b>2-4</b>
<i>SC 8.3.4.a Describe how an inherited characteristic enables an organism to improve its survival rate</i>	2				
<i>SC 8.3.4.b Recognize the extinction of a species is caused by the inability to adapt to an environmental change</i>	1				
<i>SC 8.3.4.c Use anatomical features of an organism to infer similarities among other organisms</i>	2				
<b>EARTH AND SPACE SCIENCE</b>					
<b>Grade 8 Earth in Space</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.4.1 Students will investigate and describe Earth and the solar system.</b>					<b>2-4</b>
<i>SC 8.4.1.a Describe the components of the solar system (the Sun, planets, moons, asteroids, comets)</i>	1				
<i>SC 8.4.1.b Describe the relationship between motion of objects in the solar system and the phenomena of day, year, eclipses, phases of the Moon and seasons</i>	2				
<i>SC 8.4.1.c Describe the effects of gravity on Earth (tides) and the effect of gravity on objects in the solar system</i>	2				
<b>Grade 8 Earth Structures and Processes</b>	<b>Highest DOK level Tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.4.2 Students will investigate and describe Earth's structure, systems, and processes.</b>					<b>6-10</b>
<i>SC 8.4.2.a Describe the layers of Earth (core, mantle, crust, atmosphere)</i>	1				
<i>SC 8.4.2.b Describe the physical composition of soil</i>	1				
<i>SC 8.4.2.c Describe the mixture of gasses in Earth's atmosphere and how the atmosphere's properties change at different elevations</i>	1				
<i>SC 8.4.2.d Describe evidence of Earth's magnetic field</i>	1				
<i>SC 8.4.2.e Compare and contrast constructive and destructive forces (deposition, erosion, weathering, plate motion causing uplift, volcanoes, earthquakes) that impact Earth's surface</i>	2				
<i>SC 8.4.2.f Describe the rock cycle</i>	1				
<i>SC 8.4.2.g Describe the water cycle (evaporation, condensation, precipitation)</i>	1				

<b>Grade 8 Biodiversity</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
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<i>SC 8.3.4.b Recognize the extinction of a species is caused by the inability to adapt to an environmental change</i>	1				
<i>SC 8.3.4.c Use anatomical features of an organism to infer similarities among other organisms</i>	2				
<b>EARTH AND SPACE SCIENCE</b>					
<b>Grade 8 Earth in Space</b>	<b>Highest DOK level tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
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<i>SC 8.4.1.b Describe the relationship between motion of objects in the solar system and the phenomena of day, year, eclipses, phases of the Moon and seasons</i>	2				
<i>SC 8.4.1.c Describe the effects of gravity on Earth (tides) and the effect of gravity on objects in the solar system</i>	2				
<b>Grade 8 Earth Structures and Processes</b>	<b>Highest DOK level Tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
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<i>SC 8.4.2.b Describe the physical composition of soil</i>	1				
<i>SC 8.4.2.c Describe the mixture of gasses in Earth's atmosphere and how the atmosphere's properties change at different elevations</i>	1				
<i>SC 8.4.2.d Describe evidence of Earth's magnetic field</i>	1				
<i>SC 8.4.2.e Compare and contrast constructive and destructive forces (deposition, erosion, weathering, plate motion causing uplift, volcanoes, earthquakes) that impact Earth's surface</i>	2				
<i>SC 8.4.2.f Describe the rock cycle</i>	1				
<i>SC 8.4.2.g Describe the water cycle (evaporation, condensation, precipitation)</i>	1				

<i>SC 8.4.2.h Classify Earth materials as renewable or nonrenewable</i>	2				
<b>Grade 8 Energy in Earth's Systems</b>	<b>Highest DOK level Tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.4.3 Students will investigate and describe energy in Earth's systems.</b>					<b>2-4</b>
<i>SC 8.4.3.a Describe how energy from the Sun influences the atmosphere and provides energy for plant growth</i>	1				
<i>SC 8.4.3.b Identify factors that influence daily and seasonal changes on Earth (tilt of the Earth, humidity, air pressure, air masses)</i>	1				
<i>SC 8.4.3.c Describe atmospheric movements that influence weather and climate (air masses, jet stream)</i>	1				
<b>Grade 8 Earth's History</b>	<b>Highest DOK level Tested</b>	<b>DOK 1</b>	<b>DOK 2</b>	<b>DOK 3</b>	<b>Item Total</b>
<b>SC 8.4.4 Students will use evidence to draw conclusions about changes in Earth.</b>					<b>1-3</b>
<i>SC 8.4.4.a Recognize that Earth processes we see today are similar to those that occurred in the past (uniformity of processes)</i>	1				
<i>SC 8.4.4.b Describe how environmental conditions have changed through use of the fossil record</i>	2				