

North Dakota Science Content and Achievement Standards

Grade 8

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North Dakota Department of Public Instruction

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Standard 1: Unifying Concepts

Standard 1: Students understand the unifying concepts and processes of science.				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
Grade 8				
MODELS <i>No benchmark expectations at this level</i> SYSTEMS 8.1.1. Organize changes (e.g., patterns, cycles) that occur sequentially in systems	Students organize sequentially the significant changes that occur in systems with no errors.	Students organize sequentially the significant changes that occur in systems with no significant errors.	Students organize sequentially the significant changes that occur in systems with a few significant errors.	Students organize sequentially the significant changes that occur in systems with many significant errors.
CONSTANCY AND CHANGE <i>No benchmark expectations at this level</i>				
FORM AND FUNCTION <i>No benchmark expectations at this level</i>				

Standard 2: Science Inquiry

Standard 2: Students use the process of science inquiry.				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
Grade 8				
UNDERSTANDINGS ABOUT SCIENTIFIC INQUIRY				
8.2.1. Explain how science advances through legitimate skepticism	Students provide an insightful explanation of how science advances through legitimate skepticism.	Students provide a relevant explanation of how science advances through legitimate skepticism.	Students provide an obvious explanation of how science advances through legitimate skepticism.	Students provide an irrelevant explanation of how science advances through legitimate skepticism.
ABILITIES NECESSARY TO DO SCIENTIFIC INQUIRY				
8.2.2. Use evidence to generate descriptions, explanations, predictions, and models	Students use evidence to generate insightful descriptions, explanations, predictions, and models.	Students use evidence to generate reasonable descriptions, explanations, predictions, and models.	Students use evidence to generate typical descriptions, explanations, predictions, and models.	Students use evidence to generate unreasonable descriptions, explanations, predictions, and models.
8.2.3. Use basic mathematics and statistics (e.g., operations, mean, median, mode, range, and estimation) to interpret quantitative data	Students use basic mathematics and statistics with no errors to interpret quantitative data.	Students use basic mathematics and statistics with no significant errors to interpret quantitative data.	Students use basic mathematics and statistics with a few significant errors to interpret quantitative data.	Students use basic mathematics and statistics with many significant errors to interpret quantitative data.
8.2.4. Design and conduct a scientific investigation (e.g., making systematic observations, making accurate measurements, identifying and controlling variables)	Students design and conduct an innovative scientific investigation.	Students design and conduct a reasonable scientific investigation.	Students design and conduct an obvious scientific investigation.	Students design and conduct a superficial scientific investigation.

Standard 3: Physical Science

Standard 3: Students understand the basic concepts and principles of physical science.				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
Grade 8				
PROPERTIES OF MATTER				
8.3.1. Identify elements and compounds	Students identify elements and compounds with no errors.	Students identify elements and compounds with no significant errors.	Students identify elements and compounds with few significant errors.	Students identify elements and compounds with many significant errors.
8.3.2. Explain the relationship between phases of matter and temperature	Students explain the relationship between phases of matter and temperature with no errors.	Students explain the relationship between phases of matter and temperature with no significant errors.	Students explain the relationship between phases of matter and temperature with few significant errors.	Students explain the relationship between phases of matter and temperature with many significant errors.
FORCE AND MOTION				
8.3.3. Interpret the effect of balanced and unbalanced forces on the motion of an object (e.g., convection currents, orbital motion, tides)	Students interpret the effect of balanced and unbalanced forces with no errors.	Students interpret the effect of balanced and unbalanced forces with no significant errors.	Students interpret the effect of balanced and unbalanced forces with few significant errors.	Students interpret the effect of balanced and unbalanced forces with many significant errors.
8.3.4. Explain how all objects exert gravitational force and this force is affected by the distance between the masses of the objects	Students explain, with no errors, the relationship among gravitational force, mass, and distance.	Students explain, with no significant errors, the relationship among gravitational force, mass, and distance.	Students explain, with few significant errors, the relationship among gravitational force, mass, and distance.	Students explain, with many significant errors, the relationship among gravitational force, mass, and distance.
ENERGY TRANSFER AND TRANSFORMATION				
8.3.5. Identify when heat can be transferred by conduction, convection, or radiation.	Students identify with no errors when heat can be transferred by conduction, convection, or radiation.	Students identify with no significant errors when heat can be transferred by conduction, convection, or radiation.	Students identify with few significant errors when heat can be transferred by conduction, convection, or radiation.	Students identify with significant errors when heat can be transferred by conduction, convection, or radiation..
VIBRATIONS AND WAVES				
8.3.6. Explain the characteristic properties (e.g., wavelength, frequency) and behaviors (e.g., reflection, refraction) of waves	Students explain an extensive variety of wave properties and behaviors.	Students explain many different wave properties and behaviors.	Students explain some different wave properties and behaviors.	Students explain limited variety of wave properties and behaviors.

Standard 4: Life Science

Standard 4: Students understand the basic concepts and principles of life science.				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
Grade 8				
STRUCTURE AND FUNCTION <i>No benchmark expectations at this level</i>				
GENETICS AND REPRODUCTION <i>No benchmark expectations at this level</i>				
INTERDEPENDENCE AMONG ORGANISMS <i>No benchmark expectations at this level</i>				
DIVERSITY AND UNITY AMONG ORGANISMS <i>No benchmark expectations at this level</i>				
NATURAL SELECTION AND BIOLOGICAL EVOLUTION				
8.4.1. Identify the evidence of biological evolution. (e.g., adaptation, radiation, extinction) as found in the fossil record	Students identify all of the significant details of the evidence of biological evolution as found in the fossil record.	Students identify most of the significant details of the evidence of biological evolution as found in the fossil record.	Students identify some of the significant details of the evidence of biological evolution as found in the fossil record.	Students identify few of the significant details of the evidence of biological evolution as found in the fossil record.

Standard 5: Earth and Space Science

Standard 5: Students understand the basic concepts and principles of earth and space science.				
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Grade 8				
WEATHER, SEASONS, AND CLIMATE				
8.5.1. Explain how factors (i.e., fronts, winds, air masses, air pressure, humidity, temperature, location) affect weather	Students explain how an extensive variety of factors that affect weather.	Students explain how many different factors that affect weather.	Students explain how some different factors that affect weather.	Students explain how a limited variety of factors that affect weather.
GEOLOGIC PROCESSES				
8.5.2. Understand the rock cycle	Students explain all of the significant details of the rock cycle.	Students explain most of the significant details of the rock cycle.	Students explain some of the significant details of the rock cycle.	Students explain few of the significant details of the rock cycle.
8.5.3. Explain the water cycle	Students explain the water cycle with no errors.	Students explain the water cycle with no significant errors.	Students explain the water cycle with few significant errors.	Students explain the water cycle with many significant errors.
8.5.4. Explain how landforms are changed (e.g., crustal deformation, volcanic eruption, deposition, weathering, erosion)	Students explain, with no errors, how landforms are changed.	Students explain, with no significant errors, how landforms are changed.	Students explain, with few significant errors, how landforms are changed.	Students explain, with many significant errors, how landforms are changed.
8.5.5. Identify evidence for plate tectonics theory (e.g., fit of continents, location of earthquakes, volcanoes, mid-ocean ridge, plate boundaries)	Students identify an extensive variety of evidence for plate tectonics theory.	Students identify a variety of evidence for plate tectonics theory.	Students identify some different evidence for plate tectonics theory.	Students identify a limited variety of evidence for plate tectonics theory.
8.5.6. Identify a variety of methods (e.g., rock sequences, fossil correlation, radiometric dating) used to determine geologic time	Students identify an extensive variety of methods used to determine geologic time.	Students identify a variety of methods used to determine geologic time.	Students identify some different methods used to determine geologic time.	Students identify a limited variety of methods used to determine geologic time.
8.5.7. Explain the changes Earth has undergone over geologic time (e.g., fossil record, plate tectonics, climate change, glaciation)	Students explain all of the significant details of the changes Earth has undergone over geologic time.	Students explain most of the significant details of the changes Earth has undergone over geologic time.	Students explain some of the significant details of the changes Earth has undergone over geologic time.	Students explain few of the significant details of the changes Earth has undergone over geologic time.

Standard 5: Students understand the basic concepts and principles of earth and space science.				
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CHARACTERISTICS OF THE EARTH				
8.5.8. Explain how phenomena on Earth (i.e., day, year, seasons, lunar phases, eclipses, tides) are related to the position and motion of the Sun, Moon, and Earth	Students explain, with no errors, how phenomena on Earth are related to the position and motion of the Sun, Moon, and Earth.	Students explain, with no significant errors, how phenomena on Earth are related to the position and motion of the Sun, Moon, and Earth.	Students explain, with few significant errors, how phenomena on Earth are related to the position and motion of the Sun, Moon, and Earth.	Students explain, with many significant errors, how phenomena on Earth are related to the position and motion of the Sun, Moon, and Earth.
THE UNIVERSE				
8.5.9. Identify characteristics of stars (e.g., color, size, temperature, life cycle)	Students identify an extensive variety of characteristics of stars.	Students identify many different characteristics of stars.	Students identify some different characteristics of stars.	Students identify a limited variety of characteristics of stars.
8.5.10. Identify the composition (e.g., stars, galaxies) and scale of the universe	Students identify all of the significant details of the composition and scale of the universe.	Students identify most of the significant details of the composition and scale of the universe.	Students identify some of the significant details of the composition and scale of the universe.	Students identify few of the significant details of the composition and scale of the universe.

Standard 6: Science and Technology

Standard 6: Students understand relations between science and technology.				
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Grade 8				
TECHNOLOGY AND SOCIETY <i>No benchmark expectations at this level</i>				

Standard 7: Science and Other Areas

Standard 7: Students understand relations between science and personal, social, and environmental issues.				
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Grade 8				
SCIENCE AND SOCIAL ISSUES				
8.7.1. Explain the interaction of science and technology with social issues (e.g., mining, natural disasters)	Students provide an insightful explanation of the interaction of science and technology with social issues.	Students provide a reasonable explanation of the interaction of science and technology with social issues.	Students provide superficial explanation of the interaction of science and technology with social issues.	Students provide an unreasonable explanation of the interaction of science and technology with social issues.

Standard 8: History and Nature of Science

Standard 8: Students understand the history and nature of science.				
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Grade 8				
PEOPLE IN SCIENCE <i>No benchmark expectations at this level</i> SCIENTIFIC KNOWLEDGE				
8.8.1. Explain how many people from various cultures have made important contributions to the advancement of science and technology	Students provide an insightful explanation of how many people from various cultures have made important contributions to the advancement of science and technology.	Students provide a reasonable explanation of how many people from various cultures have made important contributions to the advancement of science and technology.	Students provide a superficial explanation of how many people from various cultures have made important contributions to the advancement of science and technology.	Students provide an unreasonable explanation of how many people from various cultures have made important contributions to the advancement of science and technology.