

North Dakota Science Content and Achievement Standards

Standard 4

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North Dakota Department of Public Instruction

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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
Kindergarten				
CHARACTERISTICS OF ORGANISMS K.4.1. Identify animals eat plants or other animals for food	Students identify animals that eat plants or other animals for food with no errors.	Students identify animals that eat plants or other animals for food with no significant errors.	Students identify animals that eat plants or other animals for food with few significant errors.	Students identify animals that eat plants or other animals for food with many significant errors.
Grade 1				
CHARACTERISTICS OF ORGANISMS 1.4.1. Identify plants and animals that closely resemble their parents and one another	Students identify plants and animals that closely resemble their parents and one another with no errors.	Students identify plants and animals that closely resemble their parents and one another with no significant errors.	Students identify plants and animals that closely resemble their parents and one another with few significant errors.	Students identify plants and animals that closely resemble their parents and one another with many significant errors.
LIFE CYCLES 1.4.2. Identify characteristics of living things (e.g., grow, sometimes reproduce, change, and die over time)	Students identify characteristics of living things with no errors.	Students identify characteristics of living things with no significant errors.	Students identify characteristics of living things with few significant errors.	Students identify characteristics of living with many significant errors.
Grade 2				
CHARACTERISTICS OF ORGANISMS 2.4.1. Identify how plants and animals are alike and different (e.g., in the way they look, in their behaviors)	Students identify an extensive variety of ways in which plants and animals are alike and different.	Students identify a variety of ways in which plants and animals are alike and different.	Students identify some different ways in which plants and animals are alike and different.	Students identify few ways in which plants and animals are alike and different.
COMPARE THE SIMILARITIES AND DIFFERENCES LIFE CYCLES <i>No benchmark expectations at this level</i>				
ORGANISMS AND THEIR ENVIRONMENTS 2.4.2. Identify various things that are found in different environments (e.g., cactus, lizard – desert; shark, coral- ocean)	Students identify an extensive variety of living things that are found in different environments.	Students identify a variety of living things that are found in different environments.	Students identify some different living things that are found in different environments.	Students identify few living things that are found in different environments.

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Grade 3				
CHARACTERISTICS OF ORGANISMS <i>No benchmark expectations at this level</i>				
STRUCTURE AND FUNCTION				
3.4.1. Identify parts of an organism that have specific functions (e.g., roots absorb water, heart pumps blood)	Students , identify with no errors, parts of an organism that have specific functions.	Students identify, with no significant errors, parts of an organism that have specific functions.	Students identify, with few significant errors, parts of an organism that have specific functions.	Students identify, with many significant errors, parts of an organism that have specific functions.
LIFE CYCLES				
3.4.2. Describe the life cycles of plants and animals (e.g., birds, mammals, grasses, trees, insects, flowers)	Students describe the life cycles of an extensive variety of plants and animals.	Students describe the life cycles of a variety of plants and animals.	Students describe the life cycles of some plants and animals.	Students describe the life cycles of few plants and animals.
ORGANISMS AND THEIR ENVIRONMENTS				
3.4.3. Identify the needs of living things (e.g., food, shelter, soil, space, water)	Students identify, with no errors, the needs of living things.	Students identify, with no significant errors, the needs of living things.	Students identify, with few significant errors, the needs of living things.	Students identify, with many significant errors, the needs of living things.
Grade 4				
STRUCTURE AND FUNCTION				
4.4.1. Classify plants and animals according to common physical characteristics	Students classify, with no errors, plants and animals according to common physical characteristics.	Students classify, with no significant errors, plants and animals according to common physical characteristics.	Students classify, with few significant errors, plants and animals according to common physical characteristics.	Students classify, with many significant errors, plants and animals according to common physical characteristics.
4.4.2. Identify adaptations that help plants and animals survive and grow in their environment	Students identify an extensive variety of adaptations that help plants and animals survive in their environment.	Students identify a variety of adaptations that help plants and animals survive in their environment.	Students identify some adaptations that help plants and animals survive in their environment.	Students identify very few adaptations that help plants and animals survive in their environment.
LIFE CYCLES <i>No benchmark expectations at this level</i>				

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<p>CHARACTERISTICS OF ORGANISMS</p> <p>4.4.3. Identify behaviors of animals as instinctive or learned</p>	Students identify, with no errors, behaviors of animals as instinctive or learned.	Students identify, with no significant errors, behaviors of animals as instinctive or learned.	Students identify, with few significant errors, behaviors of animals as instinctive or learned.	Students identify, with many significant errors, behaviors of animals as instinctive or learned.
<p>ORGANISMS AND THEIR ENVIRONMENTS</p> <p>4.4.4. Identify ways that an organism's pattern of behavior is related to the nature of the organism's environment (e.g., the availability of food, space, and resources)</p>	Students identify an extensive variety of ways that an organism's pattern of behavior is related to the nature of the organism's environment.	Students identify a variety of ways that an organism's pattern of behavior is related to the nature of the organism's environment.	Students identify some ways that an organism's pattern of behavior is related to the nature of the organism's environment.	Students identify a limited variety of ways that an organism's pattern of behavior is related to the nature of the organism's environment.
Grade 5				
<p>STRUCTURE AND FUNCTION</p> <p>5.4.1. Identify components of a human organ system (e.g., digestive system, respiratory system, circulatory system, muscular system, skeletal system)</p>	Students identify all of the significant components of a human organ system.	Students identify most of the significant components of a human organ system.	Students identify some of the significant components of a human organ system.	Students identify few of the significant components of a human organ system.
<p>5.4.2. Explain the function of a human organ system (e.g., digestive system, respiratory system, circulatory system, muscular system, skeletal system)</p>	Students explain, with no errors, the function of a human organ system.	Students explain, with no significant errors, the function of a human organ system.	Students explain, with few significant errors, the function of a human organ system.	Students explain, with many significant errors, the function of a human organ system.
<p>CHARACTERISTICS OF ORGANISMS <i>No benchmark expectations at this level</i></p> <p>ORGANISMS AND THEIR ENVIRONMENTS</p> <p>5.4.3. Identify the producers, consumers, and decomposers in a food web.</p>	Students identify, with no errors, the producers, consumers, and decomposers in a food web	Students identify, with no significant errors, the producers, consumers, and decomposers in a food web.	Students identify, with few significant errors, the producers, consumers, and decomposers in a food web.	Students identify, with many errors, the producers, consumers, and decomposers in a food web.

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Grade 6				
STRUCTURE AND FUNCTION				
6.4.1. Identify single- or multi-celled organisms.	Students identify unicellular and multi-cellular organisms with no errors.	Students identify unicellular and multi-cellular organisms with no significant errors.	Students identify unicellular and multi-cellular organisms with few significant errors.	Students identify unicellular and multi-cellular organisms with many significant errors.
ORGANISMS AND THEIR ENVIRONMENTS <i>No benchmark expectations at this level</i>				
GENETICS AND REPRODUCTION				
6.4.2. Explain why reproduction is necessary for the continuation of the species (e.g., asexual, sexual)	Students give an insightful explanation for the necessity of reproduction for the continuation of the species.	Students give a reasonable explanation for the necessity of reproduction for the continuation of the species.	Students give a superficial explanation for the necessity of reproduction for the continuation of the species.	Students give an unreasonable explanation for the necessity of reproduction for the continuation of the species.
Grade 7				
STRUCTURE AND FUNCTION				
7.4.1. Explain the functions of the cell (e.g., growth, metabolism, reproduction, photosynthesis, response)	Students explain all of the significant details of the functions of a cell.	Students explain most of the significant details of the functions of a cell.	Students explain some of the significant details of the functions of a cell.	Students explain few of the significant details of the functions of a cell.
7.4.2. Identify levels of organization in living systems (e.g., cells, tissues, organs, organ systems, organisms, ecosystems)	Students identify all of the significant details of the levels of organization in living systems.	Students identify most of the significant details of the levels of organization in living systems.	Students identify some of the significant details of the levels of organization in living systems.	Students identify few of the significant details of the levels of organization in living systems.
GENETICS AND REPRODUCTION				
7.4.3. Identify the characteristics of reproduction (e.g., sexual, asexual)	Students identify all of the significant characteristics of reproduction.	Students identify most of the significant characteristics of reproduction.	Students identify some of the significant characteristics of reproduction.	Students identify few of the significant characteristics of reproduction.

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<p>INTERDEPENDENCE AMONG ORGANISMS</p> <p>7.4.4. Identify interactions among organisms and their environment (e.g., competition, mutualism, predator/prey, consumers, producers)</p>	Students identify all of the significant details of interactions among organisms and their environment.	Students identify most significant details of interactions among organisms and their environment .	Students identify some significant details of interactions among organisms and their environment .	Students identify few details of interactions among organisms and their environment .
<p>DIVERSITY AND UNITY AMONG ORGANISMS</p> <p>7.4.5. Classify organisms (e.g., taxonomic groups)</p> <p>7.4.6. Explain how different adaptations help organisms survive</p>	Students classify organisms with accuracy.	Students classify organisms with no significant errors.	Students classify organisms with few significant errors.	Students classify organisms with many significant errors.
Grade 8				
<p>STRUCTURE AND FUNCTION <i>No benchmark expectations at this level</i></p> <p>GENETICS AND REPRODUCTION <i>No benchmark expectations at this level</i></p> <p>INTERDEPENDENCE AMONG ORGANISMS <i>No benchmark expectations at this level</i></p> <p>DIVERSITY AND UNITY AMONG ORGANISMS <i>No benchmark expectations at this level</i></p> <p>NATURAL SELECTION AND BIOLOGICAL EVOLUTION</p> <p>8.4.1. Identify the evidence of biological evolution. (e.g., adaptation, radiation, extinction) as found in the fossil record</p>	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.

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Grade 9-10				
STRUCTURE AND FUNCTION				
9-10.4.1. Relate cell function to cell structure (i.e., cell wall, cell membrane, nucleus, mitochondria, chloroplast)	Students relate cell functions to cell structures with no errors.	Students relate cell functions to cell structures with no significant errors.	Students relate cell functions to cell structures with few significant errors.	Students relate cell functions to cell structures with many significant errors.
9-10.4.2. Relate the functions of cells in multi-cellular organisms to their cell type (e.g., nerve cells, blood cells, guard cells)	Students relate the functions of cells in multi-cellular organisms to their cell type with no errors.	Students relate the functions of cells in multi-cellular organisms to their cell type with no significant errors.	Students relate the functions of cells in multi-cellular organisms to their cell type with few significant errors.	Students relate the functions of cells in multi-cellular organisms to their cell type with many significant errors.
9-10.4.3. Explain the relationship between protein structure and function	Students explain the relationship between protein structure and function with no errors.	Students explain the relationship between protein structure and function with no significant errors.	Students explain the relationship between protein structure and function with few significant errors.	Students explain the relationship between protein structure and function with many significant errors.
GENETICS AND REPRODUCTION				
9-10.4.4. Relate DNA, genes, and chromosomes	Students relate DNA, genes, and chromosomes with no errors.	Students relate DNA, genes, and chromosomes with no significant errors.	Students relate DNA, genes, and chromosomes with few significant errors.	Students relate DNA, genes, and chromosomes with many significant errors.
9-10.4.5. Explain the relationship between spontaneous changes in DNA and a source of genetic variation	Students explain the relationship between spontaneous changes in DNA and genetic variation with no errors.	Students explain the relationship between spontaneous changes in DNA and genetic variation with no significant errors.	Students explain the relationship between spontaneous changes in DNA and genetic variation with few significant errors.	Students explain the relationship between spontaneous changes in DNA and genetic variation with many significant errors.
9-10.4.6. Compare and contrast the results of mitosis and meiosis (i.e., mitosis involves a nuclear division that results in two daughter nuclei that are identical to the parent nucleus; meiosis involves two nuclear divisions that result in gametes cells containing half the number of chromosomes)	Students compare and contrast the results of mitosis and meiosis with no errors.	Students compare and contrast the results of mitosis and meiosis with no significant errors.	Students compare and contrast the results of mitosis and meiosis with few significant errors.	Students compare and contrast the results of mitosis and meiosis with many significant errors.

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<p>9-10.4.7. Apply the basic concepts of genetics to predict inherited traits (i.e., segregation, independent assortment, dominant and recessive traits)</p> <p>NATURAL SELECTION AND BIOLOGICAL EVOLUTION</p>	Students apply the basic concepts of genetics to predict inherited traits with no errors.	Students apply the basic concepts of genetics to predict inherited traits with no significant errors.	Students apply the basic concepts of genetics to predict inherited traits with few significant errors.	Students apply the basic concepts of genetics to predict inherited traits with many significant errors.
<p>9-10.4.8. Relate the concept of natural selection to its evolutionary consequences</p>	Students identify all of the significant details relating the concept of natural selection to its evolutionary consequence.	Students identify most of the significant details relating the concept of natural selection to its evolutionary consequence.	Students identify some of the significant details relating the concept of natural selection to its evolutionary consequence.	Students identify few of the significant details relating the concept of natural selection to its evolutionary consequence.
<p>9-10.4.9. Identify evidence for evolution (e.g., fossil records, vestigial structures, similarities between organisms, and DNA)</p> <p>INTERDEPENDENCE AMONG ORGANISMS</p>	Students identify an extensive variety of evidence for evolution.	Students identify many different types of evidence for evolution.	Students identify some different types of evidence for evolution.	Students identify few different types of evidence for evolution.
<p>9-10.4.10. Explain the energy and organization related to trophic pyramids</p> <p>MATTER AND ENERGY IN LIVING SYSTEMS</p>	Students explain all of the significant details explaining the energy and organization related to trophic pyramids.	Students explain most of the significant details explaining the energy and organization related to trophic pyramids.	Students explain some of the significant details explaining the energy and organization related to trophic pyramids.	Students explain few of the significant details explaining the energy and organization related to trophic pyramids.
<p>9-10.4.11. Explain how matter and energy flow through living and nonliving components in an ecosystem (e.g., carbon cycle, water cycle, nitrogen cycle)</p>	Students explain all of the significant details of how matter and energy flow through components in an ecosystem.	Students explain most of the significant details of how matter and energy flow through components in an ecosystem.	Students explain some of the significant details of how matter and energy flow through components in an ecosystem.	Students explain few of the significant details of how matter and energy flow through components in an ecosystem.

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9-10.4.12. Compare and contrast photosynthesis and cellular respiration	Students identify all of the significant similarities and differences between photosynthesis and cellular respiration.	Students identify most of the significant similarities and differences between photosynthesis and cellular respiration.	Students identify some of the significant similarities and differences between photosynthesis and cellular respiration.	Students identify few of the significant similarities and differences between photosynthesis and cellular respiration.
Grade 11-12				
STRUCTURE AND FUNCTION				
11-12.4.1. Explain the importance of cell differentiation in the development of tissues, organs, organ systems, and multi-cellular organisms.	Students explain, with no errors, the importance of cell differentiation in the development of multi-cellular organisms.	Students explain, with no significant errors, the importance of cell differentiation in the development of multi-cellular organisms.	Students explain, with few significant errors, the importance of cell differentiation in the development of multi-cellular organisms.	Students explain, with many significant errors, the importance of cell differentiation in the development of multi-cellular organisms.
GENETICS AND REPRODUCTION				
11-12.4.2. Explain how types of DNA technology (e.g., genetic engineering, forensic science, cloning) may impact society now and in the future.	Students provide an insightful explanation how types of DNA technology may impact society.	Students provide a reasonable explanation how types of DNA technology may impact society.	Students provide a superficial explanation how types of DNA technology may impact society.	Students provide an unreasonable explanation how types of DNA technology may impact society.
NATURAL SELECTION AND BIOLOGICAL EVOLUTION				
11-12.4.3. Explain how change through time has ensured adaptation to changing environments	Students explain all of the significant details of how change through time has ensured adaptation to changing environments.	Students explain most of the significant details of how change through time has ensured adaptation to changing environments.	Students explain some of the significant details of how change through time has ensured adaptation to changing environments.	Students explain few of the significant details how of change through time has ensured adaptation to changing environments.
INTERDEPENDENCE AMONG ORGANISMS <i>No benchmark expectations at this level</i>				
MATTER AND ENERGY IN LIVING SYSTEMS <i>No benchmark expectations at this level</i>				