

Standards For 7th Grade Life Science

Unit 1: Definition of Life

Nature of Science and Engineering (NoSE)

Understand that prior expectations create bias when conducting scientific investigations. *For example:* Students continue to think that air is not matter, even though they have evidence from investigations. (7.1.1.1.1.)

Generate and refine a variety of scientific questions and match them with appropriate methods of investigation, such as field studies, controlled experiments, reviews of existing work and development of models. (7.1.1.2.1)

Generate a scientific conclusion from an investigation, clearly distinguishing between results (evidence) and conclusions (explanation). (7.1.1.2.3)

Evaluate explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, and suggesting alternative explanations. (7.1.1.2.4)

Determine and use appropriate safety procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a life science. (7.1.3.4.2)

Content Standards

Recognize that some forces between objects act when the objects are in direct contact and others, such as magnetic, electrical and gravitational forces can act from a distance. (6.2.2.2.3)

Describe the differences between elements and compounds in terms of atoms and molecules. (7.2.1.1.2)

Recognize that cells carry out life functions, and that these functions are carried out in a similar way in all organisms, including animals, plants, fungi, bacteria and protists. (7.4.1.2.1)

Standards For 7th Grade Life Science

Unit 2: Animal Adaptations

Nature of Science and Engineering(NoSE)

Generate and refine a variety of scientific questions and match them with appropriate methods of investigation, such as field studies, controlled experiments, reviews of existing work and development of models. (7.1.1.2.1)

Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables, ensuring that one variable is systematically manipulated, the other is measured and recorded, and any other variables are kept the same (controlled). For example: The effect of various factors on the production of carbon dioxide by plants. (7.1.1.2.2)

Generate a scientific conclusion from an investigation, clearly distinguishing between results (evidence) and conclusions (explanation). (7.1.1.2.3)

Evaluate explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, and suggesting alternative explanations. (7.1.1.2.4)

Determine and use appropriate safety procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a life science context. (7.1.3.4.2)

Content Standards

Recognize that variation exists in every population and describe how a variation can help or hinder an organism's ability to survive. (7.4.3.2.3)

Compare and contrast predator/prey, parasite/host and producer/consumer/decomposer relationships. (7.4.2.1.2)

Distinguish between characteristics of organisms that are inherited and those acquired through environmental influences. (7.4.3.1.3)

Use internal and external anatomical structures to compare and infer relationships between living organisms as well as those in the fossil record. (7.4.3.2.2)

Identify a variety of populations and communities in an ecosystem and describe the relationships among the populations and communities in a stable ecosystem. (7.4.2.1.1)

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Unit 3: Cells and Kingdoms

Nature of Science and Engineering(NoSE)

Generate and refine a variety of scientific questions and match them with appropriate methods of investigation, such as field studies, controlled experiments, reviews of existing work and development of models. (7.1.1.2.1)

Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables, ensuring that one variable is systematically manipulated, the other is measured and recorded, and any other variables are kept the same (controlled). For example: The effect of various factors on the production of carbon dioxide by plants. (7.1.1.2.2)

Generate a scientific conclusion from an investigation, clearly distinguishing between results (evidence) and conclusions (explanation). (7.1.1.2.3)

Evaluate explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, and suggesting alternative explanations. (7.1.1.2.4)

Determine and use appropriate safety procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a life science context. (7.1.3.4.2)

Content Standards

Recognize that a chemical equation describes a reaction where pure substances change to produce one or more pure substances whose properties are different from the original substance(s). (7.2.1.1.3)

Recognize that cells carry out life functions, and that these functions are carried out in a similar way in all organisms, including animals, plants, fungi, bacteria and protists.(7.4.1.2.1)

Recognize that cells repeatedly divide to make more cells for growth and repair. (7.4.1.2.2)

Use the presence of the cell wall and chloroplasts to distinguish between plant and animal cells. For example: Compare microscopic views of plant cells and animal cells. (7.4.1.2.3)

Recognize that producers use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms. (7.4.2.2.1)

BOLD BENCHMARKS ARE ST. PAUL PUBLIC SCHOOL'S PRIORITY STANDARDS

Standards For 7th Grade Life Science

Diseases and the Human Body (Human Biology Benchmarks)

Nature of Science and Engineering (NoSE)

Generate and refine a variety of scientific questions and match them with appropriate methods of investigation, such as field studies, controlled experiments, reviews of existing work and development of models. (7.1.1.2.1)

Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables, ensuring that one variable is systematically manipulated, the other is measured and recorded, and any other variables are kept the same (controlled). For example: The effect of various factors on the production of carbon dioxide by plants. (7.1.1.2.2)

Generate a scientific conclusion from an investigation, clearly distinguishing between results (evidence) and conclusions (explanation). (7.1.1.2.3)

Evaluate explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, and suggesting alternative explanations. (7.1.1.2.4)

Determine and use appropriate safety procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a life science context. (7.1.3.4.2)

Content Standards

Recognize that all cells do not look alike and that specialized cells in multicellular organisms are organized into tissues and organs that perform specialized functions. For example: Nerve cells and skin cells do not look the same because they are part of different organs and have different functions. (7.4.1.1.1)

Describe how the organs in the respiratory, circulatory, digestive, nervous, skin and urinary systems interact to serve the needs of vertebrate organisms. (7.4.1.1.2)

Explain how viruses, bacteria, fungi and parasites may infect the human body and interfere with normal body functions. (7.4.4.2.1)

Recognize that a microorganism can cause specific diseases and that there are a variety of medicines available that can be used to combat a given microorganism. (7.4.4.2.2)

Recognize that vaccines induce the body to build immunity to a disease without actually causing the disease itself. (7.4.4.2.3)

BOLD BENCHMARKS ARE ST. PAUL PUBLIC SCHOOL'S PRIORITY STANDARDS

Standards For 7th Grade Life Science

Recognize that the human immune system protects against microscopic organisms and foreign substances that enter from outside the body and against some cancer cells that arise from within. (7.4.4.2.4)

Standards For 7th Grade Life Science

Unit 4: Genetics & Evolution

Nature of Science and Engineering(NoSE)

Understand that prior expectations can create bias when conducting scientific investigations. For example: Students often continue to think that air is not matter, even though they have contrary evidence from investigations. (7.1.1.1.1)

Understand that when similar investigations give different results, the challenge is to judge whether the differences are significant, and if further studies are required. For example: Use mean and range to analyze the reliability of experimental results. (7.1.1.1.2)

Generate and refine a variety of scientific questions and match them with appropriate methods of investigation, such as field studies, controlled experiments, reviews of existing work and development of models. (7.1.1.2.1)

Generate a scientific conclusion from an investigation, clearly distinguishing between results (evidence) and conclusions (explanation). (7.1.1.2.3)

Evaluate explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, and suggesting alternative explanations. (7.1.1.2.4)

Use maps, satellite images and other data sets to describe patterns and make predictions about natural systems in a life science context. For example: Use online data sets to compare wildlife populations or water quality in regions of Minnesota. (7.1.3.4.1)

Determine and use appropriate safety procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a life science context. (7.1.3.4.2)

Content Standards

Recognize that all substances are composed of one or more of approximately one hundred elements and that the periodic table organizes the elements into groups with similar properties. (7.2.1.1.1)

Describe the differences between elements and compounds in terms of atoms and molecules. (7.2.1.1.2)

Recognize that cells contain genes and that each gene carries a single unit of information that either alone, or with other genes, determines the inherited traits of an organism. (7.4.3.1.1)

Standards For 7th Grade Life Science

Recognize that in asexually reproducing organisms all the genes come from a single parent, and that in sexually reproducing organisms about half of the genes come from each parent. (7.4.3.1.2)

Distinguish between characteristics of organisms that are inherited and those acquired through environmental influences. (7.4.3.1.3)

Explain how the fossil record documents the appearance, diversification and extinction of many life forms. (7.4.3.2.1)

Use internal and external anatomical structures to compare and infer relationships between living organisms as well as those in the fossil record. (7.4.3.2.2)

Recognize that variation exists in every population and describe how a variation can help or hinder an organism's ability to survive. (7.4.3.2.3)

Recognize that extinction is a common event and it can occur when the environment changes and a population's ability to adapt is insufficient to allow its survival. (7.4.3.2.4)

Describe examples where selective breeding has resulted in new varieties of cultivated plants and particular traits in domesticated animals. (7.4.4.1.1)

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Unit 5: Ecology

Nature of Science and Engineering(NoSE)

Understand that prior expectations can create bias when conducting scientific investigations. For example: Students often continue to think that air is not matter, even though they have contrary evidence from investigations. (7.1.1.1.1)

Understand that when similar investigations give different results, the challenge is to judge whether the differences are significant, and if further studies are required. For example: Use mean and range to analyze the reliability of experimental results. (7.1.1.1.2)

Generate and refine a variety of scientific questions and match them with appropriate methods of investigation, such as field studies, controlled experiments, reviews of existing work and development of models. (7.1.1.2.1)

Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables, ensuring that one variable is systematically manipulated, the other is measured and recorded, and any other variables are kept the same (controlled). For example: The effect of various factors on the production of carbon dioxide by plants. (7.1.1.2.2)

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Determine and use appropriate safety procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a life science context. (7.1.3.4.2)

Content Standards

Recognize that a chemical equation describes a reaction where pure substances change to produce one or more pure substances whose properties are different from the original substance(s). (7.2.1.1.3)

Standards For 7th Grade Life Science

Identify a variety of populations and communities in an ecosystem and describe the relationships among the populations and communities in a stable ecosystem.

(7.4.2.1.1)

Compare and contrast predator/prey, parasite/host and producer/consumer/decomposer relationships. (7.4.2.1.2)

Explain how the number of populations an ecosystem can support depends on the biotic resources available as well as abiotic factors such as amount of light and water, temperature range and soil composition. (7.4.2.1.3)

Recognize that producers use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms. (7.4.2.2.1)

Describe the roles and relationships among producers, consumers and decomposers in changing energy from one form to another in a food web within an ecosystem.

(7.4.2.2.2)

Explain that the total amount of matter in an ecosystem remains the same as it is transferred between organisms and their physical environment, even though its form and location change. For example: Construct a food web to trace the flow of matter in an ecosystem. (7.4.2.2.3)

Describe ways that human activities can change the populations and communities in an ecosystem. (7.4.4.1.2)