

Health/Science Student Objectives by Grade and Unit Grades Four, Five & Six

Grade Four: Prairies

Students will:

- ◆ Identify locations of various prairies
- ◆ Analyze characteristics that distinguish the prairie land form from other land forms
- ◆ Develop listening skills as a means of information gathering
- ◆ Measure and create life sized drawings of prairie plants
- ◆ Compare and contrast various plants in the prairie
- ◆ Develop speaking skills
- ◆ Classify various animals found in the prairie
- ◆ Investigate prairie animals and record their findings in an organized manner
- ◆ Explore the concepts of an ecosystem, food chain, and food web
- ◆ Analyze the significance of interrelationships of living things
- ◆ Identify resources prairies provide for life forms and the environment
- ◆ Deduce the value of the prairie based on its resources
- ◆ Identify techniques that help to manage and preserve the prairie areas we now have
- ◆ Identify the issues that lead to destruction of the prairie, analyze the information, and communicate verbally and in writing
- ◆ Develop reading, listening, writing and speaking skills throughout the process of understanding and supporting the value of both global and Iowa prairies
- ◆ Compare and contrast the prairie today with the prairie of 100 years ago
- ◆ Listen to legends about prairie plants and then create stories of their own based on observations of characteristics of plants

Grade Four: Colored Solutions

Students will:

- ◆ Predict and observe the behavior of drops of food coloring in water
- ◆ Predict and identify variables affecting the outcome of an experiment
- ◆ Communicate procedures and findings of a scientific investigation
- ◆ Predict and identify the similarities and differences between the properties of plain and salt water and the behavior of food coloring in each
- ◆ Predict and infer the behavior of drops of food coloring placed in liquids of different densities
- ◆ When conducting scientific investigations in colored solutions, record observations in a systematic manner
- ◆ Demonstrate the proper techniques for using simple scientific apparatus
- ◆ Classify liquid densities and describe the basis for classification
- ◆ Contribute and participate in classroom exploration of colored solutions behavior

Grade Four: The Human Body Systems

Students will:

- ◆ Observe and investigate the human body skeletal system and muscle system
- ◆ Become aware of the versatility of movement provided by an articulated skeleton
- ◆ Gain experience with the use of photographs and diagrams to gather information
- ◆ Build mechanical models to demonstrate how muscles are responsible for human movement
- ◆ Compare the bones and muscles in their own bodies to photographs and models
- ◆ Investigate response time of hands and feet
- ◆ Develop an awareness of human bone and muscle structure and function and an appreciation for the versatility of the human body
- ◆ Acquire the vocabulary associated with the human skeleton and muscle systems
- ◆ Gain experience that contribute to their understanding of several pervasive themes that point out connection among scientific ideas and processes: **Pattern, Structure, Interaction, and System**
- ◆ Record what happens when you breathe
- ◆ Make a model to show how the lungs work
- ◆ Identify the parts of the respiratory system
- ◆ Compare the volume of air exhaled during a normal breath and a deep breath
- ◆ Describe how oxygen enters the bloodstream
- ◆ Measure heart rate and experiment to determine the factors that affect it
- ◆ Investigate the circulatory system and how it functions
- ◆ Collect data on the skin's functions
- ◆ Investigate the excretory system
- ◆ Analyze the factors that affect the body's fluid balance

Grade Four: Powders and Crystals

Students will:

- ◆ Observe and identify properties of given mystery compounds
- ◆ Using the data on physical properties of mystery compounds, infer the identity of each substance
- ◆ Demonstrate the use of simple chemical tests for identifying compounds
- ◆ Describe the reactions of simple chemical tests performed on the mystery powders
- ◆ Record observations of the chemical tests in an organized form
- ◆ Classify the compounds using observations and physical properties
- ◆ Infer the composition of mixtures and powders and record inferences along with supporting data
- ◆ Participate in classroom mystery powder activities and discussions

Grade Four: Physics of Sound

Students will:

- ◆ Observe and compare sounds to develop discrimination ability
- ◆ Communicate with others using a “drop code”
- ◆ Learn that sound originates from a source that is vibrating and is detected at a receiver such as the human ear
- ◆ Observe and compare how sound travels through solids, liquids and air
- ◆ Understand the relationship between the pitch of a sound and the physical properties of the source (length of vibrating object, frequency of the vibrations, or tension of vibrating string)
- ◆ Compare methods to amplify sound at the source and at the receiver
- ◆ Use knowledge of the physics of sound to solve simple sound challenges
- ◆ Acquire the vocabulary associated with the physics of sound
- ◆ Exercise language and math skills in the context of the physics of sound
- ◆ Develop and refine the manipulative skills required for investigating sound
- ◆ Collaborate in working on mini-activities
- ◆ Gain experiences that will contribute to their understanding of several pervasive themes that relate one scientific idea to another: **Pattern, Structure, and Interaction**

Grade Four: Variables

Students will:

- ◆ Gain experience with the concept of variable
- ◆ Gain experience with the concept of system
- ◆ Design and conduct controlled experiments
- ◆ Construct materials that will be used in the investigations
- ◆ Acquire some understanding of the behavior of pendulums
- ◆ Gain experience with buoyancy
- ◆ Use data to make predictions
- ◆ Apply mathematics in the context of science
- ◆ Record and graph data concretely, pictorially, and symbolically to discover relationships
- ◆ Acquire the vocabulary associated with controlled experimentation
- ◆ Gain experiences that will contribute to their understanding of several pervasive themes that point out connections among scientific ideas: **Pattern, Interaction, Change, and System**

Health/Science Student Objectives by Grade and Unit

Grades Five

Grade Five: Woodlands/Forests

Students will:

- ◆ Define vocabulary of forest ecology
- ◆ Investigate forest animals and record their findings in an organized manner
- ◆ Investigate forest plants and record their findings in an organized manner
- ◆ Develop listening skills to gather information
- ◆ Compare and contrast three environments (lawn, field and forest)
- ◆ Classify tree types
- ◆ Identify different types of forests
- ◆ Identify what is living and not living in an environment
- ◆ Classify organisms as producers, consumers or decomposers
- ◆ Explore the concept of food chain
- ◆ Observe using the sense of sight to determine different shapes of trees
- ◆ Measure the heights and circumference of a tree
- ◆ Measure the temperature of the environment being explored
- ◆ Analyze the rings of a tree to determine its age
- ◆ Identify the parts of a tree
- ◆ Classify leaves for tree identification
- ◆ Analyze the significance of how one decision can affect the environment, the people, the economy and financial interest of many people
- ◆ Identify products from the forest
- ◆ Develop reading, listening, writing and speaking skills that help to communicate learning about the forest

Grade Five: Electrical Circuits

Students will:

- ◆ Define parts of a circuit and construct simple circuits
- ◆ Draw and interpret circuit schematics
- ◆ Construct circuits in which batteries are connected in series and parallel and compare the brightness of bulbs
- ◆ Construct a switch in a circuit and infer the importance of switches
- ◆ Construct a circuit to test if solid objects and liquids will conduct electricity
- ◆ Classify different materials and liquids as conductors or non-conductors
- ◆ Observe that resistance is a function of wire thickness
- ◆ Construct a special circuit with which to examine the relationship between resistance and heat
- ◆ Infer how a light bulb works
- ◆ Make an incandescent light bulb and describe why the filament glows
- ◆ Make a fuse and observe how it works by overloading a circuit
- ◆ Discover the usefulness of fuses in household circuits
- ◆ Discover that the resistance in a thin wire causes heat
- ◆ Understand that energy continues in an endless cycle
- ◆ Become aware of the need to conserve energy

Grade Five: Models and Designs

Students will:

- ◆ Manipulate objects and materials
- ◆ Design and construct conceptual and physical models
- ◆ Look for relationships between structure and function of materials and system
- ◆ Organize and analyze data from investigations with physical objects and systems
- ◆ Apply mathematics in the concept of science
- ◆ Acquire some vocabulary associated with engineering and technology
- ◆ Gain confidence in their abilities to solve problems
- ◆ Learn that there is often more than one solution to a problem
- ◆ Communicate ideas to peers and work in a collaborative scientific manner
- ◆ Gain experiences that contribute to their understanding of several pervasive themes that point out connections among scientific ideas: **Structure, Interaction, and System**

Grade Five: Our Changing Earth

Students will:

- ◆ Observe and discuss properties of rocks and minerals
- ◆ Discuss the earth processes involved in rock formation
- ◆ Follow directions to make their own rocks
- ◆ Observe and classify minerals according to their luster
- ◆ Conduct scratch tests to determine hardness of minerals
- ◆ Conduct streak tests to determine true colors of minerals
- ◆ Perform, observe and record the effect of acid on mineral specimens to identify certain minerals
- ◆ Construct models of crystal shapes
- ◆ Grow salt crystals
- ◆ Dissect student-constructed rock models and perform tests to identify their mineral content
- ◆ Predict the properties of a rock
- ◆ Identify rocks based on their origin and properties
- ◆ Discuss uses of rocks and minerals in prehistoric and modern times
- ◆ Discuss applications of rocks and minerals based on their properties
- ◆ Discuss different ways rocks are formed
- ◆ Discuss the formation of four kinds of cool
- ◆ Discuss the different forces that change one type of rock into another
- ◆ Explore the concept that the earth consists of layers through the use of models
- ◆ Discover how to find the order in which rock layers are formed
- ◆ Explore and discuss how enormous pressures bend and shape rocks
- ◆ Discuss how rocks move along a fault

Health/Science Student Objectives by Grade and Unit

Grades Five

Grade Five: Small Things and Microscopes

Students will:

- ◆ Make a standard wet mount
- ◆ Adjust a mirror and focus a microscope
- ◆ Label parts of a cell
- ◆ Classify slides as plant, animal, crystal, or other nonliving
- ◆ Draw a tiny picture with details visible only through a magnifier
- ◆ Recall how two items look through a microscope
- ◆ Draw how an unfamiliar item might look through a microscope
- ◆ Use a chart to answer word problems about magnification
- ◆ Solve a problem by applying knowledge of lenses
- ◆ Recall activities and careers using magnification
- ◆ Compare and contrast a simple and compound microscope

Grade Five: Movement and Control

Students will:

- ◆ Observe bone specimens, record observations, and draw conclusions about bones
- ◆ List the functions of the skeletal systems
- ◆ Investigate how joints allow movement
- ◆ Hypothesize how muscles help bones to move
- ◆ Infer how fatigue affects muscle performance
- ◆ Define ways to avoid injury to bones and muscles
- ◆ Observe how the body responds to stimuli
- ◆ Identify the parts of the brain and the functions
- ◆ Describe how nerve impulses travel
- ◆ Infer how someone learns and remembers
- ◆ Compare reflex actions to voluntary actions
- ◆ Describe the stages of mental development
- ◆ Infer how advertisements influence attitudes toward drugs
- ◆ Identify various types of drugs and their effects on the body
- ◆ Describe how some athletes use harmful drugs
- ◆ Investigate alcohol's short and long term effects on the body
- ◆ Describe the effects of alcohol on a person's driving ability
- ◆ Define and record vocabulary associated with this unit

Health/Science Student Objectives by Grade and Unit

Grades Six

Grade Six: Wetlands and Lakes

Students will:

- ◆ Identify and describe the different types of fresh water wetlands: palustrine, lacustrine, riverine, seep, fens, bogs (see page 3, Iowa Wetlands) and common names for wetlands
- ◆ Name general characteristics of a wetland
- ◆ Name the values/functions of a wetland: flood control, sediment traps, pollution interceptors, habitat, etc.
- ◆ Research plant and animal life found in fresh water wetlands
- ◆ Identify food chains and food webs in wetlands
- ◆ Make a connection between the importance of wetlands and the way humans impact them
- ◆ Describe the process of decomposition and the role of decomposers in soil formation
- ◆ Analyze the effects of land development in the wetland
- ◆ Investigate issues (one global, one state-wide and one local) relating to the wetland
- ◆ Develop and complete an action plan on a current issue

Grade Six: Science in the News

Students will:

- ◆ Understand the types of articles that qualify as science
- ◆ Write up information from articles that reflect a summary, importance of the information, and personal connections to the information

Grade Six: Astronomy

Students will:

- ◆ Define rotation, axis, and revolution
- ◆ Name the planets in our solar system
- ◆ Describe and compare characteristics of planets and moons
- ◆ Describe and discuss problems involved in managing natural resources
- ◆ Estimate the number of stars in the sky
- ◆ Describe the stages in the life of a star
- ◆ Construct a Star Finder to help locate stars
- ◆ Define magnitude
- ◆ Give reasons star appear brighter
- ◆ Become familiar with some constellations
- ◆ Make simple star projector
- ◆ Gain an understanding of mythologies and their relationships to stars
- ◆ Define astrology
- ◆ Use graphing skills
- ◆ Describe accomplishments of seven famous astronomers

Grade Six: Chemical Interactions

Students will:

- ◆ Understand and label viscosity
- ◆ Understand and label states of matter
- ◆ Understand the make-up of atoms and the charges
- ◆ Be able to build an atom
- ◆ Demonstrate knowledge of elements and the periodic table
- ◆ Understand what a compound is and its formula
- ◆ Gain understanding of mixtures
- ◆ Define suspension
- ◆ Discover and be able to name different ways of separating mixtures
- ◆ Understand saturated solutions
- ◆ Discover the properties of BTB, vinegar and ammonia

Grade Six: DNA - From Genes to Proteins

Students will:

- ◆ Observe and compare human characteristics and relate differences to cell proteins
- ◆ Identify cell parts and visualize by making a model
- ◆ Explore the structure and identify the parts of DNA molecules
- ◆ Learn how DNA replicates itself and how it makes proteins that produce human traits
- ◆ Demonstrate how mutations occur
- ◆ Discuss genetic engineering and DNA fingerprinting

Grade Six: Optics

Students will:

- ◆ Observe and manipulate the behavior of light
- ◆ Experiment with the properties of images through the use of mirrors and lenses
- ◆ Predict and observe the results of mixing colored light
- ◆ Explore afterimages
- ◆ Investigate the parts of the eye and sight
- ◆ Discuss convex and concave lenses in use of correcting vision problems
- ◆ Dissect a cow's eye in order to identify the parts of an eye

Grade Six: Food and Nutrition

Students will:

- ◆ Observe and investigate properties of foods
- ◆ Become aware of carbohydrates, proteins, fats, and vitamins as components of food
- ◆ Gain experience with the use of indicators
- ◆ Use indicators to test for the presence of acid, vitamin C, sugar, and fat in foods
- ◆ Relate the results of investigations and experiments to the amount of certain types of chemicals in foods
- ◆ Become aware of guides for healthy nutrition
- ◆ Become informed consumers, able to gather information about food products
- ◆ Apply mathematics in the context of science
- ◆ Acquire the vocabulary associated with nutrition
- ◆ Gain experiences that contribute to their understanding of several pervasive themes that point out connections among scientific ideas and processes: **Pattern, Structure, Interaction, Change, and System**
- ◆ Become aware of personal eating habits
- ◆ Learn about the value of nutrients in our bodies
- ◆ Learn recommended food groups and number/size of servings
- ◆ Analyze personal eating habits
- ◆ Create a day of meals that meet recommended standard
- ◆ Learn how to use the computer programs "Science Explorer: Nutrition" and Microsoft Spreadsheet

Grade Six: Human Growth and Development

Students will:

- ◆ Learn vocabulary associated with heredity and human development
- ◆ Identify hereditary traits, collect and graph data
- ◆ Complete Punnett Squares predicting the percentage possibility of appearance of certain traits
- ◆ Review their development from birth to present and learn changes that occur during puberty
- ◆ Learn the parts and functions of the male and female reproductive systems
- ◆ Learn about gender determining chromosomes
- ◆ Learn about pregnancy, development of a fetus, and birth of a baby
- ◆ Learn more about their own birth and development
- ◆ Learn about emotional growth as it relates to life stages
- ◆ Locate and label primary glands in the endocrine system
- ◆ Describe the function of each endocrine gland
- ◆ Recognize names of hormones secreted by endocrine glands.
- ◆ Recognize names and describe several disorders of the endocrine system