

**Virtual Learning Academy**  
**Jefferson County Educational Service Center**  
**Academic Content Standards**  
**Science 06**

## Lesson 01

Scientific Inquiry, Exploration and Analysis

Standard Benchmark and Indicator
S06. Scientific Ways of Knowing
A. Use skills of scientific inquiry processes (e.g., hypothesis, record keeping, description and explanation). (06-08)
01. Identify that hypotheses are valuable even when they are not supported. (06)
02. Describe why it is important to keep clear, thorough and accurate records. (06)
C. Give examples of how thinking scientifically is helpful in daily life. (06-08)
03. Identify ways scientific thinking is helpful in a variety of everyday settings. (06)

## Lesson 02

Observations vs. Inferences

Standard Benchmark and Indicator
S05. Scientific Inquiry
B. Analyze and interpret data from scientific investigations using appropriate mathematical skills in order to draw valid conclusions. (06-08)
03. Distinguish between observation and inference. (06)
04. Explain that a single example can never prove that something is always correct, but sometimes a single example can disprove something. (06)

## Lesson 03

Safe Science Procedures

Standard Benchmark and Indicator
S05. Scientific Inquiry
A. Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools. (06-08)
02. Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations. (06)

# Lesson 04

## Setting Up an Experiment or Investigation

Standard Benchmark and Indicator
S05. Scientific Inquiry
A. Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools. (06-08)
01. Explain that there are not fixed procedures for guiding scientific investigations; however, the nature of an investigation determines the procedures needed. (06)
02. Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations. (06)
B. Analyze and interpret data from scientific investigations using appropriate mathematical skills in order to draw valid conclusions. (06-08)
03. Distinguish between observation and inference. (06)

# Lesson 05

## Observation Tools

Standard Benchmark and Indicator
S05. Scientific Inquiry
A. Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools. (06-08)
02. Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations. (06)

# Lesson 06

## Measurement Tools

Standard Benchmark and Indicator
S05. Scientific Inquiry
A. Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools. (06-08)
02. Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations. (06)

# Lesson 07

## Basic Concepts of Matter

<b>Standard Benchmark and Indicator</b>
S03. Physical Sciences
A. Relate uses, properties and chemical processes to the behavior and/or arrangement of the small particles that compose matter. (06-08)
01. Explain that equal volumes of different substances usually have different masses. (06)

# Lesson 08

## Periodic Table

<b>Standard Benchmark and Indicator</b>
S03. Physical Sciences
A. Relate uses, properties and chemical processes to the behavior and/or arrangement of the small particles that compose matter. (06-08)
01. Explain that equal volumes of different substances usually have different masses. (06)

# Lesson 09

## Properties of Solids, Liquids, and Gases

<b>Standard Benchmark and Indicator</b>
S03. Physical Sciences
A. Relate uses, properties and chemical processes to the behavior and/or arrangement of the small particles that compose matter. (06-08)
02. Describe that in a chemical change new substances are formed with different properties than the original substance (e.g., rusting, burning). (06)
03. Describe that in a physical change (e.g., state, shape and size) the chemical properties of a substance remain unchanged. (06)
04. Describe that chemical and physical changes occur all around us (e.g., in the human body, cooking and industry). (06)

# Lesson 10

## Identify Change in Properties

<b>Standard Benchmark and Indicator</b>

<b>S03. Physical Sciences</b>
A. Relate uses, properties and chemical processes to the behavior and/or arrangement of the small particles that compose matter. (06-08)
02. Describe that in a chemical change new substances are formed with different properties than the original substance (e.g., rusting, burning). (06)
03. Describe that in a physical change (e.g., state, shape and size) the chemical properties of a substance remain unchanged. (06)
04. Describe that chemical and physical changes occur all around us (e.g., in the human body, cooking and industry). (06)

## Lesson 11

### Everyday Perspectives

<b>Standard Benchmark and Indicator</b>
<b>S03. Physical Sciences</b>
A. Relate uses, properties and chemical processes to the behavior and/or arrangement of the small particles that compose matter. (06-08)
02. Describe that in a chemical change new substances are formed with different properties than the original substance (e.g., rusting, burning). (06)
03. Describe that in a physical change (e.g., state, shape and size) the chemical properties of a substance remain unchanged. (06)

## Lesson 12

### Research Men and Women of Science

<b>Standard Benchmark and Indicator</b>
<b>S06. Scientific Ways of Knowing</b>
C. Give examples of how thinking scientifically is helpful in daily life. (06-08)
05. Research how men and women of all countries and cultures have contributed to the development of science. (06)

## Lesson 13

### What Is Energy?

**Standard Benchmark and Indicator**

05. Explain that the energy found in nonrenewable resources such as fossil fuels (e.g., oil, coal and natural gas) originally came from the sun and may renew slowly over millions of years. (06)
06. Explain that energy derived from renewable resources such as wind and water is assumed to be available indefinitely. (06)
07. Describe how electric energy can be produced from a variety of sources (e.g., sun, wind and coal). (06)
08. Describe how renewable and nonrenewable energy resources can be managed (e.g., fossil fuels, trees and water). (06)

## Lesson 14

### Non Renewable Energy Sources: Coal, Oil and Gas

<b>Standard Benchmark and Indicator</b>
S03. Physical Sciences
C. Describe renewable and nonrenewable sources of energy (e.g., solar, wind, fossil fuels, biomass, hydroelectricity, geothermal and nuclear energy) and the management of these sources. (06-08)
05. Explain that the energy found in nonrenewable resources such as fossil fuels (e.g., oil, coal and natural gas) originally came from the sun and may renew slowly over millions of years. (06)

## Lesson 15

### Renewable Energy Sources: Wind, Solar and Geothermal

<b>Standard Benchmark and Indicator</b>
S03. Physical Sciences
C. Describe renewable and nonrenewable sources of energy (e.g., solar, wind, fossil fuels, biomass, hydroelectricity, geothermal and nuclear energy) and the management of these sources. (06-08)
06. Explain that energy derived from renewable resources such as wind and water is assumed to be available indefinitely. (06)

## Lesson 16

### Electricity

#### Standard Benchmark and Indicator

fossil fuels, biomass, hydroelectricity, geothermal and nuclear energy) and the management of these sources. (06-08)

08. Describe how renewable and nonrenewable energy resources can be managed (e.g., fossil fuels, trees and water). (06)

## Lesson 17

### Impact on the Environment

#### Standard Benchmark and Indicator

S03. Physical Sciences

C. Describe renewable and nonrenewable sources of energy (e.g., solar, wind, fossil fuels, biomass, hydroelectricity, geothermal and nuclear energy) and the management of these sources. (06-08)

08. Describe how renewable and nonrenewable energy resources can be managed (e.g., fossil fuels, trees and water). (06)

## Lesson 18

### Properties of Minerals

#### Standard Benchmark and Indicator

S01. Earth and Space Sciences

D. Identify that the lithosphere contains rocks and minerals and that minerals make up rocks. Describe how rocks and minerals are formed and/or classified. (06-08)

01. Describe the rock cycle and explain that there are sedimentary, igneous and metamorphic rocks that have distinct properties (e.g., color, texture) and are formed in different ways. (06)

02. Explain that rocks are made of one or more minerals. (06)

03. Identify minerals by their characteristic properties. (06)

## Lesson 19

### The Rock Cycle

#### Standard Benchmark and Indicator

D. Identify that the lithosphere contains rocks and minerals and that minerals make up rocks. Describe how rocks and minerals are formed and/or classified.

01. Describe the rock cycle and explain that there are sedimentary, igneous and metamorphic rocks that have distinct properties (e.g., color, texture) and are

metamorphic rocks that have distinct properties (e.g., color, texture) and are formed in different ways. (06)
02. Explain that rocks are made of one or more minerals. (06)
03. Identify minerals by their characteristic properties. (06)

## Lesson 20

### 5 Kingdom System and Cells

<b>Standard Benchmark and Indicator</b>
S02. Life Sciences
A. Explain that the basic functions of organisms are carried out in cells and groups of specialized cells form tissues and organs; the combination of these cells make up multicellular organisms that have a variety of body plans and internal structures. (06-08)
01. Explain that many of the basic functions of organisms are carried out by or within cells and are similar in all organisms. (06)

## Lesson 21

### Basic Functions of Cells

<b>Standard Benchmark and Indicator</b>
S02. Life Sciences
A. Explain that the basic functions of organisms are carried out in cells and groups of specialized cells form tissues and organs; the combination of these cells make up multicellular organisms that have a variety of body plans and internal structures. (06-08)
02. Explain that multicellular organisms have a variety of specialized cells, tissues, organs and organ systems that perform specialized functions. (06)

## Lesson 22

### Cell Differentiation

<b>Standard Benchmark and Indicator</b>
S02. Life Sciences
A. Explain that the basic functions of organisms are carried out in cells and groups of specialized cells form tissues and organs; the combination of these cells make up multicellular organisms that have a variety of body plans and internal structures. (06-08)
02. Explain that multicellular organisms have a variety of specialized cells, tissues, organs and organ systems that perform specialized functions. (06)

# Lesson 23

## Asexual Reproduction

Standard Benchmark and Indicator
S02. Life Sciences
B. Describe the characteristics of an organism in terms of a combination of inherited traits and recognize reproduction as a characteristic of living organisms essential to the continuation of the species. (06-08)
04. Recognize that an individual organism does not live forever; therefore reproduction is necessary for the continuation of every species and traits are passed on to the next generation through reproduction. (06)
05. Describe that in asexual reproduction all the inherited traits come from a single parent. (06)

# Lesson 24

## Sexual Reproduction

Standard Benchmark and Indicator
S02. Life Sciences
B. Describe the characteristics of an organism in terms of a combination of inherited traits and recognize reproduction as a characteristic of living organisms essential to the continuation of the species. (06-08)
04. Recognize that an individual organism does not live forever; therefore reproduction is necessary for the continuation of every species and traits are passed on to the next generation through reproduction. (06)
06. Describe that in sexual reproduction an egg and sperm unite and some traits come from each parent, so the offspring is never identical to either of its parents. (06)

# Lesson 25

## Inherited Traits

Standard Benchmark and Indicator
S02. Life Sciences
B. Describe the characteristics of an organism in terms of a combination of inherited traits and recognize reproduction as a characteristic of living organisms essential to the continuation of the species. (06-08)
07. Recognize that likenesses between parents and offspring (e.g., eye color, flower color) are inherited. Other likenesses, such as table manners are learned. (06)

# Lesson 26

## Interaction among Organisms; Symbiosis

Standard Benchmark and Indicator
S02. Life Sciences
C. Explain how energy entering the ecosystems as sunlight supports the life of organisms through photosynthesis and the transfer of energy through the interactions of organisms and the environment. (06-08)
08. Describe how organisms may interact with one another. (06)

# Lesson 27

## Bacteria, Viruses & Human Health

Standard Benchmark and Indicator
S02. Life Sciences
A. Explain that the basic functions of organisms are carried out in cells and groups of specialized cells form tissues and organs; the combination of these cells make up multicellular organisms that have a variety of body plans and internal structures. (06-08)
02. Explain that multicellular organisms have a variety of specialized cells, tissues, organs and organ systems that perform specialized functions. (06)
B. Describe the characteristics of an organism in terms of a combination of inherited traits and recognize reproduction as a characteristic of living organisms essential to the continuation of the species. (06-08)
05. Describe that in asexual reproduction all the inherited traits come from a single parent. (06)
S06. Scientific Ways of Knowing
C. Give examples of how thinking scientifically is helpful in daily life. (06-08)
04. Describe how the pursuit of scientific knowledge is beneficial for any career and for daily life. (06)

# Lesson 28

## Quality of Life & Technology

Standard Benchmark and Indicator
S04. Science and Technology
A. Give examples of how technological advances, influenced by scientific knowledge, affect the quality of life. (06-08)
01. Explain how technology influences the quality of life. (06)

# Lesson 29

## Robots & Machines

<b>Standard Benchmark and Indicator</b>
S04. Science and Technology
A. Give examples of how technological advances, influenced by scientific knowledge, affect the quality of life. (06-08)
03. Describe how automation (e.g., robots) has changed manufacturing including manual labor being replaced by highly-skilled jobs. (06)
04. Explain how the usefulness of manufactured parts of an object depend on how well their properties allow them to fit and interact with other materials. (06)

# Lesson 30

## Impact of Technology on Society

<b>Standard Benchmark and Indicator</b>
S04. Science and Technology
A. Give examples of how technological advances, influenced by scientific knowledge, affect the quality of life. (06-08)
02. Explain how decisions about the use of products and systems can result in desirable or undesirable consequences (e.g., social and environmental). (06)

# Lesson 31

## Designs Using Technology & Problem Solving

<b>Standard Benchmark and Indicator</b>
S04. Science and Technology
B. Design a solution or product taking into account needs and constraints (e.g., cost, time, trade-offs, properties of materials, safety and aesthetics). (06-08)
05. Design and build a product or create a solution to a problem given one constraint (e.g., limits of cost and time for design and production, supply of materials and environmental effects). (06)

# Lesson 32

## Jobs in Technology

<b>Standard Benchmark and Indicator</b>
S04. Science and Technology

A. Give examples of how technological advances, influenced by scientific knowledge, affect the quality of life. (06-08)
04. Explain how the usefulness of manufactured parts of an object depend on how well their properties allow them to fit and interact with other materials. (06)
<b>S06. Scientific Ways of Knowing</b>
C. Give examples of how thinking scientifically is helpful in daily life. (06-08)
05. Research how men and women of all countries and cultures have contributed to the development of science. (06)

## Lesson 33

### Women In Science, Ohio Scientists & Inventors

<b>Standard Benchmark and Indicator</b>
S06. Scientific Ways of Knowing
C. Give examples of how thinking scientifically is helpful in daily life. (06-08)
05. Research how men and women of all countries and cultures have contributed to the development of science. (06)

## Lesson 34

### Science Review Part 1

<b>Standard Benchmark and Indicator</b>
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02. Explain that multicellular organisms have a variety of specialized cells,

B. Describe the characteristics of an organism in terms of a combination of inherited traits and recognize reproduction as a characteristic of living organisms essential to the continuation of the species. (06-08)
04. Recognize that an individual organism does not live forever; therefore reproduction is necessary for the continuation of every species and traits are passed on to the next generation through reproduction. (06)
05. Describe that in asexual reproduction all the inherited traits come from a single parent. (06)
06. Describe that in sexual reproduction an egg and sperm unite and some traits come from each parent, so the offspring is never identical to either of its parents. (06)
07. Recognize that likenesses between parents and offspring (e.g., eye color, flower color) are inherited. Other likenesses, such as table manners are learned. (06)
C. Explain how energy entering the ecosystems as sunlight supports the life of organisms through photosynthesis and the transfer of energy through the interactions of organisms and the environment. (06-08)
08. Describe how organisms may interact with one another. (06)

## Lesson 35

### Science Review Part 2

#### Standard Benchmark and Indicator

S04. Science and Technology
A. Give examples of how technological advances, influenced by scientific
01. Explain how technology influences the quality of life. (06)

01. Explain how technology influences the quality of life. (06)
02. Explain how decisions about the use of products and systems can result in desirable or undesirable consequences (e.g., social and environmental). (06)
03. Describe how automation (e.g., robots) has changed manufacturing including manual labor being replaced by highly-skilled jobs. (06)
04. Explain how the usefulness of manufactured parts of an object depend on how well their properties allow them to fit and interact with other materials. (06)
B. Design a solution or product taking into account needs and constraints (e.g., cost, time, trade-offs, properties of materials, safety and aesthetics). (06-08)
05. Design and build a product or create a solution to a problem given one constraint (e.g., limits of cost and time for design and production, supply of materials and environmental effects). (06)

## Lesson 36

### Science Review Part 3

Standard Benchmark and Indicator
<b>S05. Scientific Inquiry</b>
A. Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools. (06-08)
01. Explain that there are not fixed procedures for guiding scientific investigations; however, the nature of an investigation determines the procedures needed. (06)
02. Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations. (06)
B. Analyze and interpret data from scientific investigations using appropriate mathematical skills in order to draw valid conclusions. (06-08)
03. Distinguish between observation and inference. (06)
04. Explain that a single example can never prove that something is always correct, but sometimes a single example can disprove something. (06)
<b>S06. Scientific Ways of Knowing</b>
A. Use skills of scientific inquiry processes (e.g., hypothesis, record keeping, description and explanation). (06-08)
01. Identify that hypotheses are valuable even when they are not supported. (06)
02. Describe why it is important to keep clear, thorough and accurate records. (06)
C. Give examples of how thinking scientifically is helpful in daily life. (06-08)
03. Identify ways scientific thinking is helpful in a variety of everyday settings. (06)
04. Describe how the pursuit of scientific knowledge is beneficial for any career and for daily life. (06)
05. Research how men and women of all countries and cultures have contributed to the development of science. (06)