

FOURTH GRADE

The *Fourth Grade* competencies and objectives are designed to build on concepts and processes learned in Kindergarten through Third grade. Students will explore and investigate electricity, measurement and related concepts, environmental concerns, matter, and energy. The focus of the K-4 frameworks is hands-on science, full inquiry, self-discovery, cooperative learning, communication, and life-long learning.

The competencies are printed in bold face type and are required to be taught. Content strands include **Life Science**, **Physical Science**, and **Earth and Space Science** competencies. Process Strands, which should be incorporated into all content strands are: **Unifying Concepts and Processes**, **Science as Inquiry**, **Science and Technology**, **Science in Personal and Social Perspectives**, and **the History and Nature of Science**. Emphasis is on developing the ability to ask questions, to observe, to experiment, to measure, to use computers and calculators, to problem solve/reason, to use tools of science, to gather data, and to communicate findings. The competencies may relate to one, many or all the science curriculum strands and may be combined and taught with other competencies throughout the school year. Competencies are not listed in order of importance, rather the sequence of competencies relates to the broader K-12 framework. Competencies provide a general guideline of ongoing instruction, not isolated units, activities, or skills.

The suggested teaching objectives are optional. Objectives indicate concepts that enable the fulfillment of competencies, describe competencies in further detail, or show the progression of concepts throughout the grades. School districts may adopt or modify the objectives and are encouraged to write their own objectives to meet the needs of students in their school district. Through actively investigating and discussing scientific ideas using a variety of tools, students will become confident scientific thinkers.

The framework introduction, materials and equipment lists, technology and literature connections, and a glossary and reference section that are also a part of this document are available on-line at <http://www.mde.k12.ms.us/acad/id/science>.

FOURTH GRADE

CONTENT STRANDS:

Life Science (L)

Earth and Space Science (E)

Physical Science (P)

COMPETENCIES and Suggested Teaching Objectives:

1. Investigate the ability of living things to adapt to their environment. (L)

- a. Compare food chains and food webs.
- b. Compare and contrast adaptations necessary for animals and plants to survive in different habitats.

2. Explore the interactions of components in living systems. (L)

- a. Identify parts and basic functions of various body systems (circulatory, respiratory, digestive, skeletal and nervous systems).
- b. Analyze the circulatory system.
- c. Group animals as invertebrates or vertebrates.
- d. Explore the four requirements necessary for photosynthesis.
- e. Compare and contrast flowering and non-flowering plants.

3. Communicate an understanding of the interaction of bodies in the solar system. (E, P)

- a. Explain why the apparent size of an object depends on its distance from the observer.
- b. Describe the interaction between the Earth, Sun, Earth's moon, and planets of the solar system.
- c. Describe the apparent motion of constellations in the night sky (east to west throughout the night, east to west throughout the year).

4. Identify and describe the visual and telescopic appearance of planets and moons. (E, P)

- a. Locate and identify planets as bright, shining bodies that move in front of the background of constellations.
- b. Explain the nature of telescopes as devices that collect light and enlarge the apparent size of distant objects to reveal otherwise unseen features.
- c. Describe the physical features of the moon (craters, plains, mountains) and the planets.

5. Discover the effects of external forces on the Earth's surface. (E)

- a. Describe how external forces including heat, wind and water affect the Earth's surface.
- b. Using maps, students identify watershed and run-off patterns of local areas.
- c. Group landform examples by the forces that may have created them.

6. Explore changes that occur in the Earth's atmosphere. (E)

- a. Analyze and predict the weather using the thermometer, anemometer, rain gauge, barometer and hygrometer.
- b. Recognize and collect data of extreme weather conditions.

7. Discover how environmental concerns relate to the hydrosphere, lithosphere, and atmosphere. (E, L)

- a. Describe ways to protect the air we breathe.
- b. Recognize the need for conservation of water resources.
- c. Discuss the ways man can protect and manage organisms in the environment.

8. Investigate the changes in the states of matter. (P)

- a. Observe that matter occupies space and has mass and volume.
- b. Demonstrate transformations of the states of matter.
- c. Explore and classify physical and chemical changes.

9. Examine the different forms of energy. (E, L, P)

- a. Differentiate energy as potential or kinetic energy.
- b. Identify and explore forms of energy such as heat, sound, light, or electricity.
- c. Demonstrate the use of the sun as an energy source.

10. Develop the process of measurement and the concepts related to units of measurement. (L, E, P) *

- a. Measure a given object using specified scientific measurement (English and/or metric).
- b. Select, use, compare and convert within the appropriate standard (English and metric) system of measurement. *
- c. Identify the attributes of length, weight, capacity/volume, mass, time and temperature using English and metric units of measurement. *
- d. Calculate and solve problems with elapsed time. *

*** Indicates a similar competency/objective found in the Mississippi Mathematics Framework as well.**

Process Strands:

Unifying Concepts And Processes	Science As Inquiry	Science And Technology	Science In Personal And Social Perspectives	History And Nature Of Science
Systems, order, and organization	Abilities necessary to do scientific inquiry	Abilities of technological design	Personal Health	Science as a human endeavor
Evidence, models, and explanation	Understandings about scientific inquiry	Understandings about science and technology	Characteristics and changes in populations	
Change, constancy and measurement		Abilities to distinguish between natural objects made by humans	Types of resources	
Evolution and equilibrium			Changes in environments	
Form and function			Science and technology in local challenges.	
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Grade Level: Fourth

Comp.	Obj.	Suggested Teaching Strategies	Suggested Assessment
1	a	<ul style="list-style-type: none"> Students will role play a “food chain” and “food web”, students will be labeled as parts of each (consumer, producer, decomposer). 	<ul style="list-style-type: none"> Teacher Observation
1	b	<ul style="list-style-type: none"> Students create a diorama depicting animal and plant habitats. 	<ul style="list-style-type: none"> Teacher Observation
2	a	<ul style="list-style-type: none"> Students use modeling clay to make body systems, then label. (For skeletal system, students could use macaroni to construct skeleton). 	<ul style="list-style-type: none"> Student Work
2	b	<ul style="list-style-type: none"> Students walk through circulatory system drawn on plastic and labeled. Students identify parts and functions as they “walk” through the system. Use “Achy Breaky Heart” music – stop music – student must identify the part he/she stopped on. 	<ul style="list-style-type: none"> Teacher Observation
2	c	<ul style="list-style-type: none"> Students sort and classify pictures of vertebrates and invertebrates. 	<ul style="list-style-type: none"> Student Work
2	d	<ul style="list-style-type: none"> Students create a flow chart showing the requirements for photosynthesis. (Sunlight plus water plus carbon dioxide = sugar and oxygen) 	<ul style="list-style-type: none"> Student Work
2	e	<ul style="list-style-type: none"> Students use live samples of plants to order, compare, and contrast (conifers, ferns, angiosperms, mosses, and flowering plants). 	<ul style="list-style-type: none"> Teacher Observation
3	a	<ul style="list-style-type: none"> Teacher puts a black paper circle on the board. Students take small circle (black) and back away from board until the two circles are the “same” size. Students write explanation of this activity in journals. 	<ul style="list-style-type: none"> Written Assessment
3	b	<ul style="list-style-type: none"> Students hold foam balls to model interactions. Students rotate to model the movements of the Sun, Earth, Earth’s moon, and the planets. 	<ul style="list-style-type: none"> Observation
4	a	<ul style="list-style-type: none"> Students draw and label planets on posters, giving a written description of each planet. Students complete sky maps illustrating the current positions of the planets after dusk or before dawn. 	<ul style="list-style-type: none"> Student Work Product Analysis

Comp.	Obj.	Suggested Teaching Strategies	Suggested Assessment
4	b	<ul style="list-style-type: none"> Students examine a telescope in class. 	<ul style="list-style-type: none"> Student Observation
4	c	<ul style="list-style-type: none"> Students work in groups to describe the features of the moon, planets, and stars. 	<ul style="list-style-type: none"> Student Work
4	a, b, c	<ul style="list-style-type: none"> Take a field trip to a planetarium to see a program that shows the planets. 	<ul style="list-style-type: none"> Teacher Observation
5	a	<ul style="list-style-type: none"> Students “build” a model of a hillside; then use water to simulate erosion. Write a description of what occurred. 	<ul style="list-style-type: none"> Teacher Observation
5	b	<ul style="list-style-type: none"> Students use maps to label watershed and run-off paths. Compare with old maps. 	<ul style="list-style-type: none"> Student Work
5	c	<ul style="list-style-type: none"> Use pictures to group landforms by the forces that may have created them. 	
6	a	<ul style="list-style-type: none"> Students make a chart to show weather predictions, then use various scientific instruments to collect actual data and add the data to the chart. 	<ul style="list-style-type: none"> Teacher Observation
6	b	<ul style="list-style-type: none"> Watch a weather channel on TV – record data and make bar graphs showing various weather types. 	<ul style="list-style-type: none"> Student Work
7	a	<ul style="list-style-type: none"> Students discuss ways businesses, homes, etc. protect air by using filters and other devices. Students construct an air filter. 	<ul style="list-style-type: none"> Teacher Observation
7	b	<ul style="list-style-type: none"> Students list reasons for conserving water resources. 	<ul style="list-style-type: none"> Student Work
7	c	<ul style="list-style-type: none"> Students watch a video or read books on protecting and managing the environment. Then students work in groups to draw a poster showing one way to protect organisms in environment. Ex. Bill Nye – “Pollution Solution” 	<ul style="list-style-type: none"> Student Work
8	a	<ul style="list-style-type: none"> Teacher demonstration: Put a crumpled paper towel inside a cup. Invert cup. Push into a container of water (straight down); pull out to show the paper towel is still dry. 	<ul style="list-style-type: none"> Student Observation
8	b	<ul style="list-style-type: none"> Heat transfer races: Divide students into groups. Students time an ice cube to see how long it takes to melt in air. Then time a similar sized ice cube in water. Students may choose other substances to melt ice cubes (vinegar, oil, etc.) 	<ul style="list-style-type: none"> Student Written Explanation

Comp.	Obj.	Suggested Teaching Strategies	Suggested Assessment
8	c	<ul style="list-style-type: none"> Demonstration: Teacher will mix cement, plaster of Paris, sand, gravel, and soil in water individually. Students predict which "mixtures" will undergo a physical or chemical change. 	<ul style="list-style-type: none"> Teacher Observation
9	a	<ul style="list-style-type: none"> Blow up a balloon and explain how potential energy is stored in the balloon. Release the balloon demonstrating kinetic energy as moving energy. 	<ul style="list-style-type: none"> Teacher Observation
9	b	<ul style="list-style-type: none"> Demonstrate how light travels through various media by placing a straw in water. The students will observe that the straw appears bent due to the refraction of light. 	<ul style="list-style-type: none"> Teacher Observation
9	c	<ul style="list-style-type: none"> Build a solar cooker. Cover a cone-shaped piece of tag board with aluminum foil. Cover a quarter of an apple with plastic wrap and place in the cone. Prop up the cone and observe the apple two hours later. 	<ul style="list-style-type: none"> Teacher Observation Student Observation
10	a	<ul style="list-style-type: none"> Students will measure given objects using given scientific measuring tools and record answers on a chart. 	<ul style="list-style-type: none"> Teacher Observation
10	b	<ul style="list-style-type: none"> Students measure given objects using standard and metric instruments; then convert. 	<ul style="list-style-type: none"> Student Work
10	c	<ul style="list-style-type: none"> Students make posters showing attributes of length, weight, capacity, etc. 	<ul style="list-style-type: none"> Student Work

