Fourth Grade Science CIP Pacing Guide   August 2017

1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks

Scientific Investigation, Reasoning, and Logic

Overview

The skills described in standard 4.1 are intended to define the ―investigate‖ component of all of the other fourth-grade standards (4.2–4.9) The intent of standard 4.1 is that students will continue to develop a range of inquiry skills, achieve proficiency with those skills in the context of the concepts developed at the fourth-grade level, and strengthen their understanding of the nature of science. **Standard 4.1 does not require a discrete unit be taught on scientific investigation and the nature of science because the skills that make up the standard should be incorporated in all the other fourth-grade standards.** It is also intended that by developing these skills, students will achieve greater understanding of scientific inquiry and the nature of science as well as more fully grasp the content-related concepts.

The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
a) distinctions are made among observations, conclusions, inferences, and predictions;
b) objects or events are classified and arranged according to characteristics or properties;
c) appropriate instruments are selected and used to measure length, mass, volume, and temperature in metric units;
d) appropriate instruments are selected and used to measure elapsed time;
e) predictions and inferences are made, and conclusions are drawn based on data from a variety of sources;
f) independent and dependent variables are identified;
g) constants in an experimental situation are identified;
h) hypotheses are developed as cause and effect relationships;
i) data are collected, recorded, analyzed, and displayed using bar and basic line graphs;
j) numerical data that are contradictory or unusual in experimental results are recognized;
k) data are communicated with simple graphs, pictures, written statements, and numbers;
l) models are constructed to clarify explanations, demonstrate relationships, and solve needs; and
m) current applications are used to reinforce science concepts.

Suggestions for incorporating these objectives into the other strands will be included with each strand.

(NT) – Not Tested   **Fourth Grade Science Pacing Guide**

1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
Scientific Investigation Reasoning & Logic	**Force, Motion and Energy**	**Scientific Investigation Reasoning & Logic**	**Life Process**
• Distinguish among observations, conclusions, inferences, and predictions. **(4.1a)**	• Conductors and insulators **(4.3a)**	• Distinguish among observations, conclusions, inferences, and predictions. **(4.1a)**	• Plant structure and functions (leaves, stems, roots, and flowers) **(4.4a)**
• Classification of objects & events according to characteristics or properties **(4.1b)**	• Basic circuits (open/closed, parallel/ series) **(4.3b)**	• Classification of objects & events according to characteristics or properties **(4.1b)**	• Plant processes and structures involved with reproduction (pollination, stamen, pistil, sepal, fertilization, stigma, embryo, spore, and seed) **(4.4b)**
• Measuring in metric units **(4.1c)** (tested in math) **(NT)**	• Static electricity (rubbing certain materials together and lightning) **(4.3c)**	• Measuring in metric units **(4.1c)** (tested in math) **(NT)**	
• Measuring elapsed time (tested in math) **(NT) (4.1d)**	• Electrical energy changing into heat (thermal), light (radiant), and mechanical energy **(4.3d)**	• Measuring elapsed time (tested in math) **(NT) (4.1d)**	• Process of photosynthesis **(4.4c)**
• Make predictions, inferences, and conclusions based on data from a variety of sources. **(4.1e)**	• Simple electromagnets and magnetism **(4.3e)**	• Make predictions, inferences, and conclusions based on data from a variety of sources. **(4.1e)**	• Adaptations (including dormancy and responses to moisture and light) in seeds and plants **(4.4d)**
• Defining variables (dependent and independent) **(4.1f)**	• Historical contributions (Franklin, Faraday, Edison) **(4.3f)**	• Defining variables (dependent and independent) **(4.1f)**	
• Identify constants **(4.1g)**	**Interrelationships in Earth/Space Systems**	• Identify constants **(4.1g)**	
• Formulating hypotheses **(4.1h)**	• Weather phenomena **(4.6a)**	• Formulating hypotheses **(4.1h)**	
• Recognize contradictory data from experiments **(4.1j)**	o Weather fronts (warm/cold)	• Recognize contradictory data from experiments **(4.1j)**	
	o Air pressure (high/low)		
	o Types of clouds (cirrus, cumulus, stratus, cumulonimbus)		

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• Collect, record, graph, and report data **(4.1i & k) (NT)** • Construct models to clarify information **(4.1L)** • Apply science concepts to current events **(4.1m)** **Force, Motion and Energy** • Describe and explain the relationship between the position, motion, and speed of an object. **(4.2a)** • Identify the forces that cause changes in motion (pushes and pulls that cause an object to stop, or change speed or direction) **(4.2b)** • Friction is a force that opposes motion and causes heat **(4.2c)** • Potential and kinetic energy **(4.2d)**	○ Precipitation (rain, snow, sleet, hail) ○ Storms (thunderstorms, hurricanes, tornadoes) ○ Label, analyze and report information about temperature, fronts, high and low pressure air masses, and precipitation on weather maps. • Weather measurements and meteorological tools (air pressure-barometer, with speed-anemometer, rainfall-rain gauge, and temperature-thermometer) (4.6b) • Use weather measurements and phenomena to make predictions **(4.6c)** **CIP BENCHMARK on all first and second nine weeks material (4.2, 4.3, 4.6)**	• Collect, record, graph, and report data **(4.1i & k) (NT)** • Construct models to clarify information **(4.1L)** • Apply science concepts to current events **(4.1m)** **Earth Patterns, Cycles and Change** • name the eight planets and describe whether they are a terrestrial planet or a gas giant **(4.7a)** • sequence the eight planets in the solar system based on their position from the sun. (Mercury is the first from the sun, Venus is the second, etc.)**(4.7b)** • sequence the eight planets in the solar system based on size (Jupiter is the largest, Saturn is next, etc.)**(4.7c)** • construct a simple model of the sun and the planets in our solar system.**(4.7)**	**Living Systems** • Distinguish between behavioral & structural adaptations in plants and animals **(4.5a)** • Organization of communities **(4.5b)** • Flow of energy through food chains and webs **(4.5c)** • Habitats and niches **(4.5d)** • Changes in an organism's niche during various stages of its life cycle (butterfly and frog) with focus on interactions with surroundings during various stages of the life cycle **(4.5e)** • Differentiate among positive and negative influences of human activity on ecosystems **(4.5f)**

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1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
		Earth Patterns, Cycles and Change • Motion of Earth moon, and sun (revolution and rotation) **(4.8a)** • Causes for seasons **(4.8b)** • Moon phases **(4.8c)** • Relative size, position, age, and makeup of the Earth, sun and moon **(4.8d)** • Historical contributions in understanding the Earth-moon-sun system Aristotle, Ptolemy, Copernicus, and Galileo) **(4.8e)** • Importance of the NASA Apollo missions in understanding the moon **(4.8e)** Our understanding of the sun, moon, and the solar system continues to change with new scientific discoveries. **(4.8e)**	**Resources (natural and man-made)** • Identify VA watersheds and water resources including rivers, lakes, and bays **(4.9a)** • VA domesticated and wild animals and plants **(4.9b)** • Minerals, rocks, ores, and energy sources (coal,*-most important mineral resource*- limestone, granite, sand and gravel) **(4.9c)** • Importance of VA natural and cultivated forests **(4.9d)** • Describe the variety of soil and land uses important in VA **(4.9d)** **CIP BENCHMARK on all third and fourth nine weeks material (4.1, 4.4, 4.5, 4.7, 4.8, 4.9)**

Fourth Grade Science Vocabulary

1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
4.1	**4.3**	**4.1**	**4.4**
observation	static electricity	observation	structures
function	current electricity	function	pollinate/pollination
role	conductor	role	transfer
differ	insulator	differ	fertilization
variety	pathway	variety	joining
inference	circuit (open/closed)	inference	photosynthesis
conclusion	parallel circuit	conclusion	dormancy/dormant
classify	series circuit	classify	chlorophyll
hypothesis	electrical energy	hypothesis	pistil
prediction	mechanical energy	prediction	stigma
quantitative data	thermal (heat) energy	quantitative data	stamen
qualitative data	radiant (light) energy	qualitative data	sepal
Celsius	iron-bearing metals	Celsius	petal
constant	iron	constant	carbon dioxide
variable	nickel	variable	cultivate
dependent (responding) variable	cobalt	dependent (responding) variable	absorb
independent (manipulated) variable	magnet	independent (manipulated) variable	released
experiment	magnetism	experiment	fern
contradictory	magnetic field	contradictory	moss
outcome	lines of force	outcome	spore
factor	poles	factor	sepal
	transform		seed
	attract		embryo
4.2	repel	**4.7**	roots
position	discharge	solar system	stems
motion	resistance	gas giant	leaves
speed	dry cell battery	terrestrial planet	flowers
force	switch	telescope	enzymes
potential energy	electromagnet	Mercury	germination
	positive (terminal)	Venus	sprout
		Jupiter	

Fourth Grade Science Vocabulary

1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
4.2 (continued)	**4.3 (continued)**	**4.7 continued**	**4.4 continued**
kinetic energy	negative (terminal)	Saturn	reproduce
friction	socket	Uranus	develop
kinetic energy	outlet	Neptune	carbon dioxide
direction	generator	Earth	oxygen
increase	Thomas Edison	Mars	sugar
decrease	Benjamin Franklin	orbit	
accelerate	Michael Faraday	alignment	**4.5**
decelerate		Earth-centered	food web
friction	**4.6**	sun-centered	food chain
relative (location)	meteorology (meteorologist)	pollute/pollution	adaptation
weight/mass	air pressure (high/low)	impact	• structural/physical
	barometer	endanger	• behavioral
	anemometer	gravity	ecosystem
	rain gauge	species	impact
	thermometer		positive (influences)
	Celsius	**4.8**	negative (influence)
	fronts (warm/cold)	phases	habitat
	cirrus	rotation	niche
	cumulus	revolution	interaction
	cumulo-nimbus	contributions	community
	stratus	NASA	population
	phenomenon	position	organism
	precipitation	axis	life cycle
	rain/drizzle	tilt	consumer
	sleet	waning	producer
	hail	waxing	decomposer
	snow	gibbous	impact
	hurricane	quarter	
	tornado	crescent	
		full moon	

Fourth Grade Science Vocabulary

1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
	4.6 continued thunderstorm humidity temperature wind boundary condense/condensation evaporate/evaporation condition (ie: weather condition)	**4.8 continued** new moon satellite diameter atmosphere seasons Aristotle Ptolemy Copernicus Galileo	**4.9** watershed region surface single collection place resource (human made/natural) limestone granite minerals rocks coal sand gravel ores rocks energy sources