

(NT) – Not Tested

Sixth Grade Science CIP Pacing Guide

August 2017

1 st Nine Weeks	1 st Nine Weeks	2 nd Nine Weeks	2 nd Nine Weeks
<p><u>Scientific Investigation, Reasoning, and Logic (6.1) (T4)</u> The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which:</p> <ul style="list-style-type: none">• observations are made involving fine discrimination between similar objects and organisms; (6.1a) (T4)• precise and approximate measurements are recorded; (6.1b) (T4)• scale models are used to estimate distance, volume, and quantity; (6.1c) (T4)• hypotheses are stated in ways that identify the independent (manipulated) and dependent (responding) variables; (6.1d) (T4)• a method is devised to test the validity of predictions and inferences; (6.1e) (T4)• one variable is manipulated over time, using many repeated trials; (6.1f) (T4)	<p><u>Matter (6.4)</u> The student will investigate and understand that all matter is made up of atoms. Key concepts include:</p> <ul style="list-style-type: none">• atoms consist of particles, including electrons, protons, and neutrons (6.4a)• atoms of a particular element are alike but are different from atoms of other elements (6.4b)• elements may be represented by chemical symbols (6.4c)• two or more atoms interact to form new substances, which are held together by electrical forces (bonds) (6.4d)• compounds may be represented by chemical formulas (6.4e)• chemical equations can be used to model chemical changes (6.4f)• a limited number of elements comprise the largest portion of the solid Earth, living matter, the oceans, and the atmosphere (6.4g)	<p><u>Matter (6.5a-e)</u> The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. Key concepts include:</p> <ul style="list-style-type: none">• water as the universal solvent (6.5a)• the properties of water in all three phases (6.5b)• the action of water in physical and chemical weathering (6.5c)• the ability of large bodies of water to store thermal energy and moderate climate (6.5d)• the importance of water for agriculture, power generation, and public health (6.5e)	<p><u>Interrelationships in Earth/Space Systems (6.8)</u></p> <ul style="list-style-type: none">• the mechanics of day and night and the phases of the moon (6.8e)• the unique properties of Earth as a planet (6.8f)• the relationship of the Earth’s tilt and the seasons (6.8g)• the cause of tides (6.8h)• the history and technology of space exploration. (6.8i)

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<p><u>Scientific Investigation.</u> <u>Reasoning and Logic (6.1) T4</u></p> <ul style="list-style-type: none"> • data are collected, recorded, analyzed, and reported using appropriate metric tools and measurements; (6.1g) (T4) • data are analyzed and communicated through graphical representation (graphs, charts, and diagrams); (6.1h) (T4) • models and simulations are designed and used to illustrate and explain phenomena and systems; (6.1i) (T4) and • current applications are used to reinforce science concepts (6.1j) (T4) <p><u>Force, Motion, and Energy (6.2)</u> The student will investigate and understand basic sources of energy, their origins, transformations, and uses. Key concepts include:</p> <ul style="list-style-type: none"> • potential and kinetic energy (6.2a) • the role of the sun in the formation of most energy sources on Earth (6.2b) 	<p><u>Matter (6.5b)</u> The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. Key concepts include:</p> <ul style="list-style-type: none"> • the properties of water in all three phases (6.5b) <p><u>Matter (6.6)</u> The student will investigate and understand the properties of air and the structure and dynamics of Earth’s atmosphere. Key concepts include:</p> <ul style="list-style-type: none"> • air as a mixture of gaseous elements and compounds (6.6a) • air pressure, temperature, and humidity (6.6b) • atmospheric changes with altitude (6.6c) • natural and human-caused changes to the atmosphere and the importance of protecting and maintaining air quality (6.6d) 	<p><u>Matter (6.5f)</u> The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. Key concepts include:</p> <ul style="list-style-type: none"> • the importance of protecting and maintaining water resources (6.5f) <p><u>Living Systems (6.7)</u> The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include:</p> <ul style="list-style-type: none"> • the health of ecosystems and the abiotic factors of a watershed (6.7a) • the location and structure of Virginia’s regional watershed systems (6.7b) • divides, tributaries, river systems, and river and stream processes (6.7c) 	<p><u>Resources (6.9a, 6.9c, 6.9d)</u> The student will investigate and understand public policy decisions relating to the environment. Key concepts include:</p> <ul style="list-style-type: none"> • management of renewable resources (water, air, soil, plant life, animal life) (6.9a) • the mitigation of land-use and environmental hazards through preventive measures (6.9c) • cost/benefit tradeoffs in conservation policies (6.9d)

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<ul style="list-style-type: none"> • nonrenewable energy sources (fossil fuels including petroleum, natural gas, and coal) (6.2c) • renewable energy sources (wood, wind, hydro, geothermal, tidal, and solar) (6.2d) • energy transformations (heat/light to mechanical, chemical, and electrical energy) (6.2e) <p><u>Force, Motion, and Energy (6.3a, 6.3b, 6.3c, 6.3d, 6.3e)</u></p> <p>The student will investigate and understand the role of solar energy in driving most natural processes within the atmosphere, the hydrosphere, and on Earth's surface. Key concepts include:</p> <ul style="list-style-type: none"> • Earth's energy budget (6.3a) • the role of radiation and convection in the distribution of energy (6.3b) • the motion of the atmosphere and the oceans (6.3c) • cloud formation (6.3d) • the role of thermal energy in weather-related phenomena including thunderstorms and hurricanes (6.3e) 	<ul style="list-style-type: none"> • the relationship of atmospheric measures and weather conditions (6.6e) • basic information from weather maps, including fronts, systems, and basic measurements (6.6f) <p><u>Resources (6.9a and b)</u></p> <p>The student will investigate and understand public policy decisions relating to the environment. Key concepts include:</p> <ul style="list-style-type: none"> • management of renewable resources (water, air, soil, plant life, animal life) (6.9a) • management of nonrenewable resources (coal, oil, natural gas, nuclear power, mineral resources) (6.9b) 	<ul style="list-style-type: none"> • wetlands (6.7d) • estuaries (6.7e) • major conservation, health, and safety issues associated with watersheds (6.7f) • water monitoring and analysis using field equipment including hand-held technology (6.7g) <p><u>Interrelationships in Earth/Space Systems (6.8)</u></p> <p>The student will investigate and understand the organization of the solar system and the interactions among the various bodies that comprise it. Key concepts include:</p> <ul style="list-style-type: none"> • the sun, moon, Earth, other planets and their moons, dwarf planets, meteors, asteroids, and comets (6.8a) • relative size of and distance between planets (6.8b) • the role of gravity (6.8c) • revolution and rotation (6.8d) 	

Sixth Grade Science Vocabulary

1 st Nine Weeks	1 st Nine Weeks	2 nd Nine Weeks	2 nd Nine Weeks
<p><u>SOL 6.1a</u> observation discrimination</p> <p><u>SOL 6.1b</u> classification</p> <p><u>SOL 6.1c</u> precise approximate</p> <p><u>SOL 6.1d</u> scale model estimate quality quantity volume</p> <p><u>SOL 6.1e</u> hypothesis variable independent (manipulated) variable dependent (responding) variable controlled variables</p> <p><u>SOL 6.1f</u> Inference method validity prediction</p> <p><u>SOL 6.1g</u> trials</p>	<p>SOL 6.1 vocabulary is used each nine weeks</p> <p><u>SOL 6.4a</u> matter atoms electrons protons neutrons nucleus positive charge negative charge neutral particle electron cloud</p> <p><u>SOL 6.4b</u> element</p> <p><u>SOL 6.4c</u> periodic table chemical symbol standard symbol</p> <p><u>SOL 6.4d</u> interact substance electrical forces chemical bonds</p> <p><u>SOL 6.4e</u> molecule formula</p>	<p>SOL 6.1 vocabulary is used each nine weeks</p> <p><u>SOL 6.5a</u> universal solvent dissolve</p> <p><u>SOL 6.5c</u> erosion geological feature physical weathering chemical weathering carbonic acid ice wedging</p> <p><u>SOL 6.5d</u> heat capacity climate elevations</p> <p><u>SOL 6.5e</u> flows seeps aquifer spring source groundwater r residential manufacturing agriculture</p>	<p>SOL 6.1 vocabulary is used each nine weeks</p> <p><u>SOL 6.8e</u> daylight mechanics phase (moon)</p> <p><u>SOL 6.8f</u> unique magnetic property compass unique</p> <p><u>SOL 6.8g</u> tilt equator seasons hemisphere</p> <p><u>SOL 6.8h</u> tides (spring tides neap tides) tsunamis</p>

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<p><u>SOL 6.1h</u> data analyze record</p> <p><u>SOL 6.1i</u> graphs charts diagrams</p> <p><u>SOL 6.1j</u> sequence</p> <p><u>SOL 6.2a</u> energy potential energy kinetic energy</p> <p><u>SOL 6.2b</u> nuclear fusion</p> <p><u>SOL 6.2c</u> energy sources nonrenewable depleted fossil fuels petroleum refine natural gas coal gasoline</p>	<p><u>SOL 6.4f</u> equation yield chemical reaction</p> <p><u>SOL 6.4g</u> comprise abundant elements substance</p> <p><u>SOL 6.5b</u> phases solubility adhesion cohesion polarity surface tension</p> <p><u>SOL 6.6b</u> humidity</p> <p><u>SOL 6.6c</u> exosphere troposphere stratosphere mesosphere thermosphere altitude increase decrease ozone ozone layer chlorofluorocarbons (CFC's) UV radiation/UV rays</p> <p><u>SOL 6.6d</u> drought</p>	<p><u>SOL 6.5f</u> hydroelectric turbine desalination</p> <p><u>SOL 6.5g</u> protect maintain resources waste management public health ground water reservoir aquifer ecological disaster</p> <p><u>SOL 6.7a</u> ecosystem biotic abiotic habitat</p> <p><u>SOL 6.7b</u> topography terrain watershed drainage basin</p> <p><u>SOL 6.7c</u> divide tributary river/stream processes</p>	<p><u>SOL 6.8i</u> Shuttle Voyager Sputnik Galileo Viking refraction telescope binoculars advances technological instruments space probes statistics researchers Ptolemy Aristotle Copernicus robotic explorers artificial satellites</p>

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1 st Nine Weeks	1 st Nine Weeks	2 nd Nine Weeks	2 nd Nine Weeks
<p>government agencies manage resources reuse reduce recycle landfill renewable</p> <p><u>SOL 6.2d</u> biomass hydropower alternative fuels wind hydro geothermal tidal solar</p> <p><u>SOL 6.2e</u> energy transformations chemical energy light energy electrical energy mechanical energy heat energy thermal energy solar energy law of conservation of energy</p>	<p><u>SOL 6.6e</u> air pressure low pressure high pressure</p> <p><u>SOL 6.6f</u> indication boundary front cold front occluded front stationary front warm front function thermometer dimensions capacity forecast barometric pressure</p> <p><u>SOL 6.6g</u> air quality pollutants</p> <p><u>SOL 6.9a</u> resource management forestry conservation</p> <p><u>SOL 6.9b</u> minerals</p>	<p><u>SOL 6.7d</u> wetland swamp bog marsh flood plain nesting/nurseries</p> <p><u>SOL 6.7e</u> estuaries brackish tidal/non-tidal nutrients filter Chesapeake Bay</p> <p><u>SOL 6.7g</u> water monitoring bacteria pH acid alkaline turbidity dissolved oxygen macroinvertebrate pollutants</p>	

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<p><u>SOL 6.3a</u> energy budget greenhouse effect solar energy reflect absorb rays waves wavelength h ultraviolet infrared visible spectrum</p> <p><u>SOL 6.3b</u> radiation convection conduction distribution currents convection currents</p> <p><u>SOL 6.3c</u> force motion energy rapidly rising currents convection currents humid downdrafts polar air Coriolis effect jet stream</p>		<p><u>SOL 6.8a</u> atmosphere planet dwarf planet names of planets moon satellites meteors, meteorites, meteoroids asteroids comets ammonia methane diameter</p> <p><u>SOL 6.8b</u> relative size</p> <p><u>SOL 6.8c</u> gravity mass gravitational attraction</p> <p><u>SOL 6.8d</u> Axis revolve revolution rotate rotation elliptical</p>	

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<p><u>SOL 6.3d</u> moisture precipitation evaporation condensation condensation nuclei water vapor water cycle cumulus stratus cirrus</p> <p><u>SOL 6.3e</u> atmosphere phenomena thermal thunderstorms hurricanes</p>			