Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Grade level: 4th Grade	**Content: Science**
5.1 Science Practices: Science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.	
A. Understand Scientific Explanations: Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.1.**4**.A.1 Demonstrate understanding of the interrelationships among fundamental concepts in the physical, life, and Earth systems sciences.	• *Hypothesize how each branch of science is interrelated and interdependent.* • *Determine the cause and effect relationship of one system on another system (e.g., how can an earthquake impact various ecosystems?)*	Modifications: • Class concept wall- shows "big ideas" across disciplines. Students and teacher can add observations	• Students express connections over time • Common Quarterly Benchmark Assessment	• Should be used throughout content strands • Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html • Should be used throughout content strands
5.1.**4**.A.2 Use outcomes of investigations to build and refine questions, models, and explanations.	• *Analyze data to guide questions, solve problems, develop explanations and write results/solutions* • *Use outcomes of investigations to pose additional questions and/or generate additional investigation*	Modifications: • Graphic organizers	• Science notebooks • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html • http://www.dinah.com/foldedctelem.php • http://www.sciencenotebooks.org/student_work/search.php

				• http://voicethread.com/ • Should be used throughout content strands
5.1**.4.**A.3 Use scientific facts, measurements, observations, and patterns in nature to build and critique scientific arguments.	• *Interpret and analyze measurements, graphs, data, observations and additional patterns to generate opinions and criticisms of scientific arguments.*		• Science notebooks • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html • Should be used throughout content strands

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.1 Science Practices: Science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.	
B. Generate Scientific Evidence Through Active Investigations: Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.1.**4**.B.1 Design and follow simple plans using systematic observations to explore questions and predictions.	• *Produce illustrations of designs* • *Design and conduct investigations that* • *Review design to ensure desired outcome and integrity of designs* • *Using plans, predict outcomes of investigations*	Modifications: • Graphic organizers	• Science notebooks • Lab reports • Common Quarterly Benchmark Assessment	• Blueprint models • Scientific Process Model • Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.1.**4**.B.2 Measure, gather, evaluate, and share evidence using tools and technologies.	• *Describe standard units of measurements and their intended use* • *Measure a variety of objects to the nearest quarter inch and inch* • *Create graphs and charts with given set of data*	Modifications: • Explicit instruction and ample practice with measurement tools	• Science notebooks • Teacher observation • Common Quarterly Benchmark Assessment	• Shapes of various sizes • Rulers • Measuring tapes • Some Suggested items to be measured: Paper clips, pencils, desks, chairs, books, journals, folders, staples, chalk • Graphing paper

5.1.**4**.B.3 Formulate explanations from evidence.	• *Articulate results of observations to provide evidence in support/ rejection of investigation or experiment*	Modifications: • Explicit instruction and modeling/ shared writing • Use of graphic organizers-cause and effect	• Science notebooks • Teacher observation • Common Quarterly Benchmark Assessment	• Venn Diagram Chart • Scientific Process Model
5.1.**4**.B.4 Communicate and justify explanations with reasonable and logical arguments.	See 5.1.4.B3		• Science notebooks • Lab reports • Common Quarterly Benchmark Assessment	

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

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C. Reflect on Scientific Knowledge: Scientific knowledge builds on itself over time.	

CPI	Areas of Focus / Instructional Activities (Students should know / Students should be able to do)	Options for modification/extensions *(How will I differentiate?)*	Assessment *What evidence will I show to demonstrate mastery?*	Resources / Materials
5.1.**4**.C.1 Monitor and reflect on one's own knowledge regarding how ideas change over time.	• *Apply background knowledge to infer change in ideas.*	Modifications: • Graphic organizers to compare changes over time	• Science notebook: graphic organizers; research to follow scientific ideas over time • Common Quarterly Benchmark Assessment	• Should be used throughout content strands • Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.1.**4.**C.2 Revise predictions or explanations on the basis of learning new information.	• *Judge range of predictions for usefulness and applicability to new information*		• Science notebook • Science lab reports • Common Quarterly Benchmark Assessment	• Should be used throughout content strands • Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.1.**4**.C.3 Present evidence to interpret and/or predict cause-and-effect outcomes of investigations.	• *Observe, gather, collect and analyze evidence/data to support cause and effect relationships*	Modifications: • Cause and effect graphic organizers	• Science notebook • Science lab reports • Graphic organizers • Common Quarterly Benchmark Assessment	• Should be used throughout content strands • Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

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5.1 Science Practices: Science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.	
D. Participate Productively in Science: The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms.	

CPI	Areas of Focus / Instructional Activities (Students should know / Students should be able to do)	Options for modification/extensions *(How will I differentiate?)*	Assessment *What evidence will I show to demonstrate mastery?*	Resources / Materials
5.1.**4**.D.1 Actively participate in discussions about student data, questions, and understandings.	Scientific inquiry involves asking scientifically-oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge • *Communicate evidence gathered to respond to questions, to dispel myths and expand understanding*		• Science notebooks • Classroom observation • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.1.**4**.D.2 Work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories.	• *Model how collaborative groups work to complete tasks.* • *Divide tasks per title or job description within cooperative groups (e.g., time keeper, materials manager, recorder, reporter, etc.)*		• Science notebooks • Classroom observation • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.1.**4**.D.3 Demonstrate how to safely use	• *Create a contract to establish lab safety*		• Classroom observation • Common Quarterly	• Teacher Resource: Science A Closer Look

tools, instruments, and supplies.	*rules, proper handling of instruments and supplies* • *Once created, follow established rituals and routines established by the class*		Benchmark Assessment	• http://www.macmillanmh.com/science/2011/student/index.html
5.1.**4**.D.4 Handle and treat organisms humanely, responsibly, and ethically.	• *Follow established routines and rituals created by the class to humanely and ethically treat organisms*		• Classroom observation • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.2 Physical Science: Physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.	
A. Properties of Matter: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.2**.4**.A.1 Identify objects that are composed of a single substance and those that are composed of more than one substance using simple tools found in the classroom.	Matter can be comprised of single substances or more than one substance • *Create a T-Chart dividing classroom objects into single substance and more than one substance* • *Observe a crystal, such as salt, under a magnifying glass. Observe NJ beach sand or soil under a magnifying glass. Compare observations.* • *Discuss whether salt and beach sand are composed of a single substance or more than one substance. Justify the argument.*	Modifications: • ELL: Vocabulary development activities with words that describe properties • Pre-made charts/frames	• Science notebook: T-chart, observations • Common Quarterly Benchmark Assessment See addendum for sample questions	• Science: A Closer Look • Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.2**.4**.A.2 Plan and carry out an investigation to distinguish	When liquid water disappears, it turns into water vapor (heat added) and when it is cooled	Modifications: • Pre-made charts/frames for the experiment and	• Science notebook • Lab report that shows completed experiment	• Science: A Closer Look • Density experiments: http://www.teachersdo

among solids, liquids, and gasses.	below the 0° Celsius/32° Fahrenheit, it reappears as a solid • *Identify stages of matter/Identify what causes matter to change state* • *Describe how an investigation can be carried out with a stated hypothesis* • *Investigate water and any other liquids in various states*	lab report • Extension: density experiments	design • Common Quarterly Benchmark Assessment See addendum for sample assessment questions	main.org/ resource/phy03.sci.phys.matter.lp_density/ • *Inquiry in Action: Investigating Matter through Inquiry*, 3rd edition. Permission is granted in advance for reproduction for classroom use. Please include "Reprinted with permission from Inquiry in Action, Third Edition, Copyright © 2007, American Chemical Society." • http://www.inquiryinaction.org/
5.2.**4**.A.3 Determine the weight (mass), and volume of common objects using appropriate tools.	Objects have many different observable physical properties. Measurement of objects does not impact physical properties • *Measure the weight (mass), and volume of classroom objects.* • *Test and record how adding an object to a graduated cylinder would impact measurements*	Modifications: • ELL: Vocabulary development activities with words that describe measurement words • Pre-made charts/frames • Provide multiple opportunities for students to measure and compare volume, mass	• Classroom observation: students use measuring tools correctly to determine volume, mass • Common Quarterly Benchmark Assessment See addendum for sample questions and performance assessment	• Science: A Closer Look • Scales, pan balance, graduated cylinders, formula for volume (cubic centimeters), cork, toothpicks, rocks, rubber band, cubic square, paper clips
5.2.**4**.A.4 Categorize objects based on the ability to absorb or reflect light and conduct heat or electricity.	Objects vary in the extent to which they absorb and reflect light and conduct heat (thermal energy) and electricity. • *Design a model that would allow you to see*	Modifications: • Pre-made charts/frames for the experiment and lab report	• Science notebook • Lab report that shows completed experiment design • Common Quarterly Benchmark Assessment	• Science: A Closer Look • Ancillary Resources-p.550B • http://www.inquiryinaction.org/

	an object at an angle • *Conduct an investigation to prove that model is effective* • *Design a device to keep an ice cube from melting. Compare designs and identify patterns.* • *Design an investigation to determine the best design for a travel mug. Compare designs and identify patterns.* • *Design an investigation to test the electrical conductivity of different substances. Develop a presentation of the results.*			

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.2 Physical Science: Physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.	
B. Changes in Matter: Substances can undergo physical or chemical changes to form new substances. Each change involves energy.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.2**.4.**B.1 Predict and explain what happens when a common substance such as shortening or candle wax, is heated to melting and then cooled to a solid.	Heat can impact chemical/physical changes in matter • *Plan an investigation that looks at how heat (adding and removing) can impact matter.* • *Test and record how heat impacts wax* • *Investigate changes in states of matter*	Modifications: • ELL: Vocabulary development activities with words that describe processes (pour) and descriptive words (hotter) • Pre-made charts/frames for the experiment and lab report	• Science notebook • Lab report that shows completed experiment design • Common Quarterly Benchmark Assessment See addendum for sample assessments	• Science: A Closer Look • http://www.inquiryinaction.org/

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.2 Physical Science: Physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.	
C. Forms of Energy: Knowing the characteristics of familiar forms of energy, including potential and kinetic energy, is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.2.**4.**C.1 Compare various forms of energy as observed in everyday life and describe their applications.	Energy takes many forms • *Record and graph which forms of energy get used the most in homes* • *Create a Venn diagram that compares various forms of energy* • *Develop a list of various forms of energy used in a school such as chemical, electrical, light, thermal, mechanical, nuclear…..* • *Given a list of energy forms and a list of appliances (e.g., hair dyer, toaster, TV, radio), in groups, create a table that indicates which appliances demonstrate each energy form. Support claims with evidence or a rationale for the categorization (include*	Modifications: • Explicit instruction of content vocabulary • Graphic organizers	• Science notebook: graphic organizers, records, and lists • Common Quarterly Benchmark Assessment See addendum for sample questions	• • Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

	rationale in table as well). Share and debate lists as a whole class. • *In groups, develop concept maps that include appliances, all the energy forms present in them, as well notes on how to detect the energy form in the appliance (e.g., if thermal energy is present, they should detect heat, if light energy is present, they should be able to see light, if sound energy is present, they should be able to hear sound, if electrical energy is present, they should be able to identify wires and a source of the electrical energy such as a battery)*			
5.2.**4.**C.2 Compare the flow of heat through metals and nonmetals by taking and analyzing measurements.	Heat can be transferred through various mediums. Objects that easily transfer heat are known as conductors and objects that don't are known as insulators • *Conduct an investigation that measures and analyzes how heat is transferred through common objects* • *Analyze the data gathered from the investigation to determine most effective*	Modifications: • Pre-made charts/frames for the experiment and lab report	• Science notebook • Lab report that shows completed experiment design; data analysis • Common Quarterly Benchmark Assessment	• Science: A Closer Look • Fabric-wool, cotton, nylon, polyester and etc... • Containers-non-metal: glass, wooden and metal cans • Charts • Thermometers

	transfer of heat			
5.2.**4**.C.3 Draw and label diagrams showing several ways that energy can be transferred from one place to another.	Heat can be transferred through various mediums Objects that easily transfer heat are known as conductors and objects that don't are known as insulators • *Design an investigation that carries out ways in which energy can be transferred.*	Modifications: • Pre-made charts/frames for the experiment and lab report	• Science notebook: • Lab report that shows completed experiment design • Common Quarterly Benchmark Assessment See addendum for sample questions	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.2.**4**.C.4 Illustrate and explain what happens when light travels from air into water.	Light travels and maintains its direction until it interacts with another object. Light can be absorbed, reflected, refracted • *In groups, point a bright flash light into a clear tub of water. Draw what they observe: draw the path coming from the flashlight in the air and the path it takes through the water. Compare this path to that of a flashlight passing through the air and through an empty clear container with only air in it. As a whole class, discuss what they think happens when light travels from air to water. (The teacher may want to do this in a dark room for best observations)* • *Observe and record what*	Modifications: • Explicit content vocabulary instruction • Pre-made diagrams	• Science notebook: observations, diagrams • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

	they see when they stick part of their arm into a clear tube of water. Does the arm in the water appear to be aligned with the part of the arm exposed to the air? In whole class discussion, try to come up with explanations for this. • *Make ray diagrams to explain what happens when light from the sun travels from air into a window and into a room of a house. Compare with diagrams where light from the sun travels from air into a clear pool. Share diagrams as a whole class.* • *Observe light traveling through a series of different substances—a cube filled with water, a cube of solid plastic, a cube of solid glass. Record observations and conclusions.*			

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

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Grade level: 4th Grade	**Content: Science**
5.2 Physical Science: Physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.	
D. Energy Transfer and Conservation: The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.2.**4.**D.1 Repair an electric circuit by completing a closed loop that includes wires, a battery (or batteries), and at least one other electrical component to produce observable change.	Electrical circuits require components that allow the flow of energy. • *Illustrate open and closed circuits using an engineering design.* • *Carry out investigations to determine how electricity can flow from the various components that make up a closed and an open circuit.*	Modifications: • Pre-made charts/frames for the experiment and lab report • Graphic organizers	• Science notebook: • Lab report that shows completed experiment design • Circuit diagrams • Common Quarterly Benchmark Assessment	• FOSS-Electricity Kit • Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.2 Physical Science: Physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.	
E. Forces and Motion: It takes energy to change the motion of objects. The energy change is understood in terms of forces.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.2**.4**.E.1 Demonstrate through modeling that motion is a change in position over a period of time.	Motion is impacted by position and speed. Motion changes when an object changes position. • *Model change of position and speed with a variety of objects.* • *Hypothesize how speed would be impacted when an object is pushed or pulled on a variety of surfaces.*	Modifications: • ELL: Vocabulary development activities with words that describe processes (push) and descriptive words (toward, away) • Graphic organizers • Pre-made diagrams	• Science notebook: Observe moving objects and create symbolic representations that describe their motion. • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.2**.4**.E.2 Identify the force that starts something moving or changes its speed or direction of motion.	Unbalanced forces change the speed and direction of objects. • *Evaluate the type of force used to change the direction and speed of an object.* • *Investigate how mass affects the speed and direction of an object.*	Modifications: • Graphic organizers • Pre-made charts/frames for the experiment and lab report Extensions: • Design vehicles that move a certain distance with a rubber band or	• Science notebook: • Lab report that shows completed experiment design • Common Quarterly Benchmark Assessment See addendum for sample	• Science: A Closer Look • STC: Motion and Design

		weight to provide the push or pull	questions	
5.2.**4**.E.3 Investigate and categorize materials based on their interactions with magnets.	Magnets attract certain metal objects. Electric current creates an electromagnetic field. A magnet pulls on all things made of iron and either pushes or pulls on other magnets without touching them • *Test and record materials that are attracted to a magnet* • *Determine which types of metal are attracted to magnets*		• Science notebook: observations; lists of magnetic/non-magnetic objects • Common Quarterly Benchmark Assessment See addendum for sample questions	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.2.**4**.E.4 Investigate, construct, and generalize rules for the effect that force of gravity has on balls of different sizes and weights	The earth's gravity pulls any object toward it without touching it. • *Investigate techniques to make careful observations of the relative time of fall for objects dropped of different masses from the same height at the same instant. Use the evidence to explore generalized rules governing the force of gravity.* • *Predict, with reasoning, which would land first, a feather or a hammer, if they were dropped at the same time. Then watch as Apollo 15 astronaut Dave Scott recreates Galileo's famous gravity experiment while on the surface of the moon.*	Modifications: • Multiple opportunities for students to compare the force of gravity on different objects • ELL: Vocabulary development activities with words that describe processes (drop) and descriptive words (faster)	• Science notebook: Replicate and explain at least one of Galileo's investigations. Use online and text resources to compile information about the work Galileo did in studying gravity's effect on falling objects. • Common Quarterly Benchmark Assessment	• Science: A Closer Look • The Hammer and Feather video, which shows Dave Scott dropping a hammer and feather on the Moon, is available at: • http://www.youtube.com/watch?v=4mTsrRZEMwA

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.3 Life Science: Life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.	
A. Organization and Development: Living organisms are composed of cellular units (structures) that carry out functions required for life. Cellular units are composed of molecules, which also carry out biological functions.	

CPI	Areas of Focus / Instructional Activities (Students should know / Students should be able to do)	Options for modification/extensions *(How will I differentiate?)*	Assessment *What evidence will I show to demonstrate mastery?*	Resources / Materials
5.3.**4.**A.1 Develop and use evidence-based criteria to determine if an unfamiliar object is living or nonliving.	Organisms reproduce, develop, have predictable life cycles, and pass on heritable traits to their offspring. Living things can be sorted into groups in many ways using various features to decide which things belong to which group. • *Describe and record the observable characteristics of living and nonliving objects* • *Identify and categorize objects as abiotic and biotic*	Modifications: • Explicit content vocabulary instruction	• Science Notebook: samples of living and non-living things with student explanations that prove that the thing is living/non-living. • Common Quarterly Benchmark Assessment	• Science: A Closer Look • Teachers' Domain provides lesson plans and other multimedia resources (video clips and simulations) that support this CPI. • http://www.teachersdomain.org/resource/tdc02.sci.life.colt.alive/ • http://www.teachersdomain.org/resource/tdc02.sci.life.colt.lp_living/
5.3.**4**.A.2 Compare and contrast structures that have similar functions in various organisms, and explain how those functions may be carried out by structures that	Organisms have similar structures that enable them to survive, reproduce and adapt to their environment. • *Compare similar*	Modifications: • graphic organizers • ELL: Vocabulary development activities with words that	• Science notebook: labeled diagrams of different organisms and their analogous structures • Common Quarterly Benchmark Assessment	• Science: A Closer Look • Plant Growth and Development kit

have different physical appearances.	*physical structures of organisms to identify and explain how they function* • *Observe and identify structures of plants and describe the function of each structure.*	describe processes (bend) and descriptive words (longer) • Pre-made diagrams		
5.3**.4**.A.3 Describe the interactions of systems involved in carrying out everyday life activities.	Essential functions required for the well-being of an organism are carried out by specialized structures in plants and animals. • *Describe the basic function of major systems of the human body including, but not limited to: digestive system, circulatory system, respiratory system.* • *Explain how the functions are interrelated.*	Modifications: • ELL: Vocabulary development activities with words that describe processes (bend) and descriptive words (longer) • Pre-made diagrams • Word banks	• Science notebook: diagrams and explanations of form and function of digestive system, circulatory system, respiratory system. • Common Quarterly Benchmark Assessment	• Science: A Closer Look • Teachers' Domain provides lesson plans and other multimedia resources (video clips and simulations) that support this CPI. • http://www.teachersdomain.org/resource/lsps07.sci.life.stru.bodysystems/

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.3 Life Science: Life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.	
B. Matter and Energy Transformations: Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.3**.4.**B.1 Identify sources of energy (food) in a variety of settings (farm, zoo, ocean, forest).	A source of energy is needed for all organisms to stay alive and grow. • *Diagram the source of foods for organisms in different environments back to the source (the Sun)*	Modifications: • Explicit content vocabulary instruction • Pre-made diagrams/ graphic organizers	• Science notebooks: completed diagrams in various environments • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.3**.4.**B.2 See 5.3.**4**.B.1	See 5.3.**4**.B.1		Common Quarterly Benchmark Assessment	

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.3 Life Science: Life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.	
C. Interdependence: All animals and most plants depend on both other organisms and their environment to meet their basic needs.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.3**.4**.C.1 Predict the biotic and abiotic characteristics of an unfamiliar organism's habitat.	Biotic and abiotic organisms have various properties • *Communicate and defend observations to distinguish an abiotic organism from a biotic organism.* • *Explain how biotic and abiotic organisms interact and impact each other.*	Modifications: • Graphic organizers	Common Quarterly Benchmark Assessment See addendum for sample question	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.3**.4**.C.2 Explain the consequences of rapid ecosystem change (e.g., flooding, wind storms, snowfall, volcanic eruptions), and compare them to consequences of gradual ecosystem change (e.g., gradual increase or decrease in daily temperatures, change in yearly rainfall).	Earth's components make up systems. These systems continuously interact to shape and change Earth's surface. Gradual changes can not be recorded on a daily basis, however rapid changes can be documented as a result of various events • *Research and discuss the impact of rapid and*		• Completed presentation (see addendum for rubric) • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

	gradual changes in an ecosystem • *Develop a presentation that demonstrates rapid and gradual changes.*			

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.3 Life Science: Life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.	
D. Heredity and Reproduction: Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.3**.4.**D.1 Compare the physical characteristics of the different stages of the life cycle of an individual organism, and compare the characteristics of life stages among species.	Organisms reproduce, develop, have predictable life cycles, and pass on heritable traits to their offspring. Plants and animals have life cycles that may include being born, developing into adults, reproducing, and eventually dying. The details of a life cycle are different for different organisms. • *Describe the organism in different stages of its life cycle from seed or egg, to seedling/young, to mature/adult, to death, and explain how the structures of the organism change over time.* • *Compare and contrast the life cycle of organisms that undergo metamorphosis to the life cycle of organisms that don't.*	Modifications: • Graphic organizers • Pre-made diagrams	• Science notebook: graphic organizers • Common Quarterly Benchmark Assessment See addendum for performance assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.3 Life Science: Life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.	
E. Evolution and Diversity: Sometimes, differences between organisms of the same kind provide advantages for surviving and reproducing in different environments. These selective differences may lead to dramatic changes in characteristics of organisms in a population over extremely long periods of time.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.3.**4**.E.1 Model an adaptation to a species that would increase its chances of survival, should the environment become wetter, dryer, warmer, or colder over time.	Individuals of the same kind differ in their characteristics, and sometimes differences give individuals an advantage in surviving and reproducing. • *Use various materials to conduct an investigation that would allow organisms to survive in various environments*	Modifications: • ELL: Vocabulary development activities with words that describe processes (camouflage) and descriptive words (spiny) • Pre-made diagrams	• Science notebooks: completed lab write up • Common Quarterly Benchmark Assessment See addendum for sample questions	• Science: A Close Look • FOSS Environments kit (salinity in plant growth, salinity in Brine shrimp hatching)
5.3.**4.**E.2 Evaluate similar populations in an ecosystem with regard to their ability to thrive and grow.	See 5.3.4.E.1 Individuals of the same kind differ in their characteristics, and sometimes differences give individuals an advantage in surviving and reproducing. • *Observe a group of organisms (living or through digital media) of the same kind.* • *Discuss and describe how*		Common Quarterly Benchmark Assessment See addendum for performance assessment	• Teachers' Domain provides lesson plans and other multimedia resources (video clips and simulations) that support this CPI. • http://www.teachersdomain.org/resource/tdc02.sci.life.reg.deathvall/

	physical appearances can differ between the same types of organism. • *Discuss how one knows that they are still the same species (i.e. what traits are common to all species).* • *After recognizing their similarities, determine how one specific observed variation might help an individual outcompete others of the same species.* • *After predicting or determining how slight variations might confer an advantage, consider how certain environmental conditions or surroundings might impact an individual's survival.* • *Explore how the advantage or disadvantage might affect the survival of an individual in a variety of different conditions.* • *Make claims about an individual's survival success in a certain habitat or ecosystem based on evidence and scientific reasoning.*			

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

Name(s):	**School:**
Grade level: 4th Grade	**Content: Science**
5.4 Earth Systems Science: Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.	
A. Objects in the Universe: Our universe has been expanding and evolving for 13.7 billion years under the influence of gravitational and nuclear forces. As gravity governs its expansion, organizational patterns, and the movement of celestial bodies, nuclear forces within stars govern its evolution through the processes of stellar birth and death. These same processes governed the formation of our solar system 4.6 billion years ago.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.4**.4**.A.1 Formulate a general description of the daily motion of the Sun across the sky based on shadow observations. Explain how shadows could be used to tell the time of day.	See 5.4.3.A.1		Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.4**.4**.A.2 Identify patterns of the Moon's appearance and make predictions about its future appearance based observational data.	The Moon's appearance follows a predictable monthly pattern. • *Analyze the patterns of the moon in order to predict future moon phases.* • *Use models to demonstrate the relative scale size of the Earth and the Moon.*	Modifications: • White chalk on black paper helps students having trouble inverting the colors when drawing their observations	• Science Notebook: daily observations of Moon for at least 6 weeks, written predictions of Moon patterns • Completed models • See addendum for sample questions • Common Quarterly Benchmark Assessment	• Science: A Closer Look • http://planetariumweb.madison.k12.wi.us/mooncal/daymoon for tips on observing the Moon during the day • http://www.middleschoolscience.com/moonphases.htm Moon observation and recording activities • http://www.calculatorcat.com/moon_phases/phasenow.php today's Moon phase
5.4**.4**.A.3 Generate a model with	Earth is approximately spherical in shape. Objects fall		Common Quarterly Benchmark Assessment	• Science: A Closer Look

explanatory value that explains both why objects roll down ramps as well as why the Moon orbits Earth.	towards the center of the Earth because of the pull of the force of gravity. • *Present evidence to assist in explaining why the shape of the Earth is a sphere.* • *Conduct experiments that can be used to explain why objects fall.* • *Explore how the earth's and moon's gravity affects the path of a rocket launched into space.* See also 5.2.4.E.3-4		See addendum for sample questions	• Gravity Launch
5.4.**4**.A.4 Analyze and evaluate evidence in the form of data tables and photographs to categorize and relate solar system objects (e.g., planets, dwarf planets, moons, asteroids, and comets).	Earth is the third planet from the Sun in our Solar System which includes seven other planets. • *Using various models to sort solar objects, compare and evaluate the sizes, relative locations and positions of solar objects.*	Modifications: • Vocabulary development activities with words that describe processes (orbit) and descriptive words (rocky) Extensions: • Make a model to compare the relative size and distance of objects in the Solar System	Common Quarterly Benchmark Assessment See addendum for sample questions	Science: A Closer Look http://astrophysics.gsfc.nasa.gov/outreach/podcast/wordpress/index.php/2009/04/30/april-30-2009-stroll-the-solar-system/ for making scale models of Solar System and other Solar System activities

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

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5.4 Earth Systems Science: Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.	
B. History of Earth: From the time that Earth formed from a nebula 4.6 billion years ago, it has been evolving as a result of geologic, biological, physical, and chemical processes.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.4.**4**.B.1 Use data gathered from observations of fossils to argue whether a given fossil is terrestrial or marine in origin	Fossils can be compared to one another and to living organisms based on similarities and differences. Some organisms that lived long ago are similar to existing organisms, but some are quite different. • *Examine a variety of fossils to determine the environmental conditions in which they lived.*	Modifications: • Vocabulary development activities with words that describe processes (press) and descriptive words (older)	• Labeled diagrams of fossils pointing out recognizable features; explanation of where the organism may have lived • Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

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5.4 Earth Systems Science: Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.	
C. Properties of Earth Materials: Earth's composition is unique, is related to the origin of our solar system, and provides us with the raw resources needed to sustain life.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.4.**4**.C.1 Create a model to represent how soil is formed.	Soils have properties of color and texture, capacity to retain water, and ability to support the growth of many kinds of plants, including those in our food supply. Soil is made partly from weathered rock, partly from plant remains – and also contains many living organisms. • *Gather information on how soil is formed and design an investigation that helps to identify components of soil and how soil is made.*	Modifications • ELL: Vocabulary development activities with words that describe processes (decay) and descriptive words (sandy) • Pre-made diagrams and experiment frames	• Science notebooks: completed lab write up • Common Quarterly Benchmark Assessment See addendum for performance assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

	• *Determine porosity and permeability of soil.*			
5.4.**4.**C.2 Categorize unknown samples as either rocks or minerals.	Minerals are made up of a single component and rocks are made up of several different combinations of minerals. • *Examine rock samples in order to determine their composition* • *Identify how igneous, metamorphic and sedimentary rocks are formed*	Modifications: • Graphic organizers • Pre-made diagrams	• Science notebook: labeled diagrams that show how rocks are formed; rock observations • Common Quarterly Benchmark Assessment See addendum for sample questions	Science: A Closer Look

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

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5.4 Earth Systems Science: Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.	
D. Tectonics: The theory of plate tectonics provides a framework for understanding the dynamic processes within and on Earth.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.4.**4**.D.1 Recognize the crust consists of oceanic and continental plates which rest on the mantle.	See 5.3.4.C.2, 6.1.4.B.4		Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.4.**4**.D.2 Identify the erosive forces caused by wind, water and ice that destroy landforms and create land and landforms by deposition.	See 5.3.4.C.2, 6.1.4.B.4		Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.4.**4**.D.3 Observe that magnets occur naturally on Earth (e.g., lodestone/magnetite) and attract materials made of certain substances.	See 5.3.4.C.2, 6.1.4.B4		Common Quarterly Benchmark Assessment	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

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5.4 Earth Systems Science: Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.	
E. Energy in Earth Systems: Internal and external sources of energy drive Earth systems.	

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5.4.**4**.E.1 Develop a general set of rules to predict temperature changes of Earth materials, such as water, soil, and sand, when placed in the Sun and in the shade.	Land, air, and water absorb the Sun's energy at different rates. • *Investigate how the temperature of an object is affected when placed in water, sand and soil.* • *Based on observation, create a general rule to predict changes*	Modifications: • Vocabulary development activities with words that describe processes (layer) and descriptive words (cooler) • Pre-made diagrams and experiment frames	Common Quarterly Benchmark Assessment See addendum for sample questions	Teacher Resource: Science A Closer Look http://www.macmillanmh.com/science/2011/student/index.html

Plainfield Public School District
Curriculum Initiative 2016-2017

Curriculum Framework

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5.4 Earth Systems Science: Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.	
F. Climate and Weather: Earth's weather and climate systems are the result of complex interactions between land, ocean, ice, and atmosphere	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.4.**4**.F.1 Identify patterns in data collected from basic weather instruments.	Weather changes from day to day and over the seasons can be measured and documented using basic instruments such as a thermometer, wind vane, anemometer, and rain gauge. • *Observe and graph weather patterns through measurable quantities using basic weather instruments such as thermometers, rain gauges, anemometers, wind vanes, barometer and hygrometer.*	Modifications: • explicit vocabulary instruction • Explicit instruction in use of weather measuring tools • Multiple practice opportunities • Pre-made frames for observations	• Science notebook: weather observations over time; predictions of future weather patterns • Classroom observation of correct use of tools • Common Quarterly Benchmark Assessment See addendum for sample questions	• Science: A Closer look • www.weather.gov

Plainfield Public School District
Curriculum Initiative 2016-2017
Curriculum Framework

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G. Biogeochemical Cycles: The biogeochemical cycles in the Earth systems include the flow of microscopic and macroscopic resources from one reservoir in the hydrosphere, geo-sphere, atmosphere, or biosphere to another, are driven by Earth's internal and external sources of energy, and are impacted by human activity.	

CPI	**Areas of Focus / Instructional Activities (Students should know / Students should be able to do)**	**Options for modification/extensions** *(How will I differentiate?)*	**Assessment** *What evidence will I show to demonstrate mastery?*	**Resources / Materials**
5.4.**4**.G.1 Explain how clouds form.	Clouds are made of tiny droplets of water and/or tiny particles of ice. • *Develop a theory to explain how water flows through the water cycle in various states* • *Develop and carry out an investigation to determine how clouds are formed* • *Analyze why certain clouds do not produce any precipitation*	Modifications: • explicit vocabulary instruction • Graphic organizers • Lab/experiment frames Extensions: • Investigate the science of cloud seeding	• Science notebook: completed lab write up • Graphic organizers with clouds that precipitate/do not precipitate • See addendum for performance assessment • Common Quarterly Benchmark Assessment	• Science: A Closer Look • Cloud in a Bottle Demonstration • Information on cloud seeding How Stuff Works: Cloud Seeding found at: http://science.howstuffworks.com/cloud-seeding1.htm
5.4.**4**.G.2 Observe daily cloud patterns, types of precipitation, and temperature, and categorize the clouds by the conditions that form precipitation.	Clouds are made of tiny droplets of water and/or tiny particles of ice. • *Observe daily weather patterns and use the data to classify cloud types by relative altitude in the atmosphere, and by those that produce*	Modifications: • observation frames • Explicit content vocabulary instruction	• Science notebook: list weather conditions required for different types of precipitation • Common Quarterly Benchmark Assessment See addendum for sample	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html

	precipitation and those that do not. • *Correlate collected weather and cloud observation data to develop generalized rules for predicting weather.* See also 5.4.4.F.1		questions	
5.4.**4.**G.3 Trace a path a drop of water might follow through the water cycle.	Earth is mostly covered in water. The amount of water on Earth is constant and simply changes state as water flows through its cycle • *Produce a design that allows a drop of water to flow through the water cycle* See 5.4.4.G.1	Modifications: • pre-drawn diagrams • Explicit content vocabulary instruction • Word banks	• Science notebooks: water cycle diagrams • Common Quarterly Benchmark Assessment See addendum for sample questions	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html
5.4.**4.**G.4 Model how the properties of water can change as water moves through the water cycle.	Properties of water depend on where the water is located (oceans, rivers, lakes, underground sources and glaciers). • *Determine how properties of water change as it changes states.*	Modifications • Explicit content vocabulary instruction • Graphic organizers	• Science notebooks: properties of water in the water cycle • Common Quarterly Benchmark Assessment See addendum for sample questions	• Teacher Resource: Science A Closer Look • http://www.macmillanmh.com/science/2011/student/index.html