Department of Curriculum & Instruction

Science

Curriculum Guide

Grade 7

Montclair Public Schools

Approved by the Montclair Board of Education September 2011/
Revised: September 2013

Introduction

The Montclair Public Schools believes in celebrating the rich history of our magnet school system while ensuring consistent, high quality instruction for all learners. The Grade 7 Science curriculum is built upon this belief by incorporating the Next Generation Science Standards within the framework of the Crosscutting Concepts and the Science & Engineering Practices. This approach provides all students with equitable access to the same learning goals while allowing teachers the flexibility to adapt to the needs of their learners.

The standards below are overarching. While these standards may not appear specifically in any unit, they are the collective goals of all units.

By the end of Grade 7, Science students in the Montclair Public Schools:

MS-ESS1-4	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
MS-ESS2-3	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
MS-ESS2-5	Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
MS-ESS2-6	Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
MS-ESS3-1	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
MS-PS2-1	Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
MS-PS2-2	Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
MS-PS2-3	Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
MS-PS2-4	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
MS-PS2-5	Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.
MS-PS3-1	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
MS-PS3-2	Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
MS-PS3-4	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
MS-PS3-5	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
MS-PS4-1	Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
MS-PS4-2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
MS-ESS1-1	Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
MS-ESS1-2	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.

The Science & Engineering Practices:
Standards and performance expectations that are aligned to the framework must take into account that students cannot fully understand scientific and engineering ideas without engaging in the practices of inquiry and the discourses by which such ideas are developed and refined. At the same time, they cannot learn or show competence in practices except in the context of specific content. (NRC Framework, 2012, p. 218)

We use the term "practices" instead of a term such as "skills" to emphasize that engaging in scientific investigation requires not only skill but also knowledge that is specific to each practice. (NRC Framework, 2012, p. 30)

SP1.	Asking questions (for science) and defining problems (for engineering)
SP2.	Developing and using models
SP3.	Planning and carrying out investigations
SP4.	Analyzing and interpreting data
SP5.	Using mathematics and computational thinking
SP6.	Constructing explanations (for science) and designing solutions (for engineering)
SP7.	Engaging in argument from evidence
SP8.	Obtaining, evaluating, and communicating information

The Engineering Design Standards

At the high school level students are expected to engage with major global issues at the interface of science, technology, society and the environment, and to bring to bear the kinds of analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages—defining the problem, developing possible solutions, and improving designs.

HS-ETS1-1	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
HS-ETS1-4	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Scope and Sequence

Marking Period	Areas of Focus
1	Earth Science
2	Forces & Motion
3	Energy
4	Space Science

Montclair Public Schools Instructional Unit

Content:	Science			**Grade:**	7
Unit #:	1	**Unit Title:**	Earth Science	**Pacing:**	Marking Period 1

OVERVIEW

Students will be able to describe Earth's formation and the layers of Earth, plate tectonics, faults, evidence supporting Plate Tectonic Theory, the geologic timescale, evidence that supports the history of the Earth, the processes that occur during the rock cycle, and predict weather given data after completing this unit.
ELA Lexile® Levels: 970L - 1120L

BIG IDEAS

- The geologic timescale is used to organize the Earth's history.
- The surface of the Earth changes over time.
- Faults in the surface of Earth indicate how he Earth has changed over time.
- Erosion can be caused by wind, water, and ice.
- The Theory of Plate Tectonics is supported by several pieces of evidence.
- Rocks change over time, and these changes are described in the rock cycle.
- Water goes through physical changes during the water cycle.
- Factors like temperature and pressure influence changes in the weather, causing regional variations.

ESSENTIAL QUESTIONS

- What can geological time scale tell us about the history of the Earth?
- What cycles and processes shape the surface of the Earth?
- What are the complex factors that create weather?

TARGET STANDARDS

Standard	NGSS	SLO	Student Learning Objectives	Depth of Knowledge
MS-ESS1-4	**Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.**	1	Construct a model of strata showing major geologic events.	3
		2	Construct a timeline related to evidence or major events represented by fossil, geologic, or other evidence found in strata.	3
MS-ESS2-1	**Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.**	3	Create a diagram depicting the rock cycle.	2
		4	Create a written explanation of what is occurring during each phase of the rock cycle.	4

MS-ESS2-2	**Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.**	5	Compare the different types of boundaries and what features they cause.	3
		6	Design a model demonstrating weathering via water, ice or wind.	3
MS-ESS2-3	**Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.**	7	Analyze the validity of Plate Tectonic Theory.	4
MS-ESS2-5	**Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.**	10	Collect meteorological data over period of time.	2
		11	Analyze meteorological data to determine cause and effect relationships.	4
		12	Predict future weather using meteorological data.	2
MS-ESS2-6	Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	13	Describe how unequal heating and the rotation of the Earth causes changes in regional climates	1
		14	Describe types of climates and currents on Earth.	2
MS-ESS3-1	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	15	Locate and map the distribution of various minerals, energy and groundwater globally.	1
		16	Connect distribution of natural resources with past and current geological processes.	4
RST.6-8.1	**Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.**	18	**Conduct** research to support inferences made regarding topics in this unit.	3
RST.6-8.3	**Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.**	19	**Follow** a multi-step procedure to collect required data.	1
		20	**Compose** a multi-step procedure to collect data or perform a task.	4
RST.6-8.7	**Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).**	21	**Construct** and label diagrams and tables.	4
		22	**Describe** the process used to demonstrate a concept.	3
RST.6-8.9	**Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.**	23	**Analyze** the similarities and differences between information or data from various sources in context.	4
WHST.6-8.2	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.	24	**Compose** informational text after conducting academic research to elucidate that topic.	3

WHST.6-8.7	**Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.**	25	**Develop** and **conduct** an experiment or research project that relies on information gathered prior to designed data collection.	4
WHST.6-8.8	**Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.**	26	**Determine** whether or not information from any source is veracious or opinionated.	2
		27	**Cite** all sources using proper MLA format.	1
WHST.6-8.9	**Draw evidence from informational texts to support analysis, reflection, and research.**	28	**Support** a thesis pertaining to a relevant topic using informational texts.	4
SL.8.5	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.	29	**Present** a summary of the results of research, a thesis, or knowledge-based opinion using graphs, illustrations, videos, or presentation software.	2

Assessments
Common labs, or a lab similar to the common lab, should be offered to the students at some point during the marking period. The purpose of this lab is to offer a common experience to all middle school students in the district. You may also use student scores for these labs to evaluate current levels of class and individual comprehension and to generate data for your SGOs. **"Crayons Rock" lab -** You should allot 3 days of class time at any point during the unit (marking period) to complete "Crayons Rock" with your students. Assessment is rubric-based. The Assessment of Content Comprehension (ACC) is a topic-specific assessment Composed of multiple choice and open-ended questions. You may choose to offer this assessment to students three times throughout the unit (marking period). You can determine how much time students way have to complete this assessment and when, or if, you will offer this assessment to your students. **This assessment is optional**. You may also use student scores for these assessments to evaluate current levels of class and individual comprehension and to generate data for your SGOs.

Montclair Public Schools Instructional Unit

Content:	Science			**Grade:**	7
Unit #:	2	**Unit Title:**	Forces & Motion	**Pacing:**	Marking Period 2

OVERVIEW

Students will be able to describe motion and the interactions between objects in terms of Newton's Laws of Motion and describe the relationship between electricity and magnetism after completing the material in this unit.
ELA Lexile® Levels: 970L - 1120L

BIG IDEAS

- For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law).
- The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change.
- The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion.
- Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.
- Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun.

ESSENTIAL QUESTIONS

- How does Newton's 3rd Law of Motion apply to events I can observe?
- How can I describe forces that act on an object? How do these forces affect the object?
- What is the relationship between the mass of an object and force applied to it?
- What factors affect the polarity or strength of an electromagnetic charge?
- What is the relationship between mass and gravity?

TARGET STANDARDS

Standard	NGSS	SLO	Student Learning Objectives	Depth of Knowledge
MS-PS2-1	**Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.**	1	Hypothesize about changes in the outcomes of collisions between two objects traveling with different velocities and masses.	3
MS-PS2-2	**Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.**	2	Connect changes in an object's motion to Newton's 1st and 2nd Laws of Motion.	4
		3	Design and conduct an experiment testing the effect of changing the mass of an object and the force affecting an object on an object's motion.	4
		4	Calculate the mass, velocity (or speed), and acceleration	2

			of an object, or strength of a force affecting an object, given quantitative data.	
MS-PS2-3	**Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.**	5	Investigate the effect of the number of turns on a wire to the strength of an electromagnet.	3
		6	Synthesize data describing the effect of increasing the number or strength of magnets on the speed of an electric motor.	4
MS-PS2-4	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	7	Prove that there are a number of variables effecting the strength of gravity.	4
MS-PS2-5	Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	8	Develop and conduct an experiment to demonstrate magnetic or electrical fields.	3
RST.6-8.1	**Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.**	9	Cite specific experimental data to **support** analysis of science and technical information gathered during an experiment.	3
RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	10	**Follow** a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks to produce results or collect data that is within the expectations of the teacher.	2
		11	**Construct** a multistep procedure that can be followed by others to replicate a process resulting in the collection of data and measurements.	4
RST.6-8.7	**Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).**	12	**Construct** and label diagrams and tables.	4
		13	**Describe** the process used to demonstrate a concept.	3
WHST.6-8.1	Write arguments focused on discipline content.	14	**Develop** and present arguments using evidence to support claims.	3
WHST.6-8.7	**Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.**	15	**Conduct** academic research prior to the design of a scientific problem with the aim of improving the problem.	3

Assessments
Common labs, or a lab similar to the common lab, should be offered to the students at some point during the marking period. The purpose of this lab is to offer a common experience to all middle school students in the district. You may also use student scores for these labs to evaluate current levels of class and individual comprehension and to generate data for your SGO's. **Momentum and Collisions labs -** You should allot one week of class time near the end of the unit (marking period) to complete "The Scientific Method" with your students. Assessment is rubric-based. The Assessment of Content Comprehension (ACC) is a topic-specific assessment Composed of multiple choice and open-ended questions. You may choose to offer this assessment to students three times throughout the unit (marking period). You can determine how much time students way have to complete this assessment and when, or if, you will offer this assessment to your students. **This assessment is optional**. You may also use student scores for these assessments to evaluate current levels of class and individual comprehension and to generate data for your SGO's.

Montclair Public Schools Instructional Unit					
Content:	Science			**Grade:**	7
Unit #:	3	**Unit Title:**	Energy	**Pacing:**	Marking Period 3

OVERVIEW

Students will be able to describe the relationship between potential and kinetic energy and energy transfers, photons in terms of electromagnetic radiation and resulting place in the electromagnetic spectrum, and the ways and reasons why light can be reflected, absorbed, or transmitted through various media after completing the material in this unit.
ELA Lexile® Levels: 970L - 1120L

BIG IDEAS

- Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed.
- A system of objects may also contain stored (potential) energy, depending on their relative positions.
- When the motion energy of an object changes, there is inevitably some other change in energy at the same time.
- The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment.
- When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object.
- A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude.
- A sound wave needs a medium through which it is transmitted.
- When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light.
- The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends.
- A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media.

ESSENTIAL QUESTIONS

- How are kinetic and potential energy related to each other?
- How do changes in energy, or energy transfers, affect motion? How does motion allow energy to be transferred?
- How can waves be used to describe and identify types of electromagnetic radiation?
- Why doesn't sound travel through empty space?
- Why can you see yourself in a mirror? Why can't you use a piece of black construction paper to reflect light? Why can you see through glass?
- Why do objects appear to be "shifted" when you view them through a curved glass that is full of water?

TARGET STANDARDS				
Standard	**NGSS**	**SLO**	**Student Learning Objectives**	**Depth of Knowledge**
MS-PS3-1	**Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.**	1	Analyze data to identify linear and nonlinear relationships between kinetic energy, mass, and speed.	4
MS-PS3-2	**Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.**	2	Apply the concept of potential energy to different systems, involving gravity, elastics and matter.	4
MS-PS3-4	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	3	Construct a lab and identify dependent and independent variables related to the relationship between kinetic energy and temperature.	3
MS-PS3-5	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	4	Prove that energy is transferred when the kinetic energy of an object changes.	4
MS-PS4-1	**Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.**	5	Compare forms of electromagnetic radiation.	3
		6	Describe specific forms of electromagnetic radiation according to frequency (Hz), wavelength (λ), and source using a chart.	2
MS-PS4-2	**Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.**	7	Investigate how waves can be reflected, absorbed, or transmitted through various materials.	3
RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.	8	**Conduct** research to support inferences made regarding topics in this unit.	3
RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	9	**Follow** a multi-step procedure to collect required data.	1
		10	**Compose** a multi-step procedure to collect data or perform a task.	4
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	11	**Construct** and label diagrams and tables.	4
		12	**Describe** the process used to demonstrate a concept.	3
WHST.6-8.1	Write arguments focused on discipline content.	13	**Develop** and present arguments using evidence to support claims.	3

WHST.6-8.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	14	**Develop** and **conduct** an experiment or research project that relies on information gathered prior to designed data collection.	4
SL.8.5	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.	15	**Present** a summary of the results of research, a thesis, or knowledge-based opinion using graphs, illustrations, videos, or presentation software.	2

Assessments

Common labs, or a lab similar to the common lab, should be offered to the students at some point during the marking period. The purpose of this lab is to offer a common experience to all middle school students in the district. You may also use student scores for these labs to evaluate current levels of class and individual comprehension and to generate data for your SGOs.

"Distorted Light" lab and/or "Bouncing Spheres" lab - You should allot one week of class time near the end of the unit (marking period) to complete "The Scientific Method" with your students. Assessment is rubric-based.

The Assessment of Content Comprehension (ACC) is a topic-specific assessment Composed of multiple choice and open-ended questions. You may choose to offer this assessment to students three times throughout the unit (marking period). You can determine how much time students way have to complete this assessment and when, or if, you will offer this assessment to your students. **This assessment is optional**. You may also use student scores for these assessments to evaluate current levels of class and individual comprehension and to generate data for your SGOs.

Montclair Public Schools Instructional Unit

Content:	Science			**Grade:**	7
Unit #:	4	**Unit Title:**	Space Science	**Pacing:**	Marking Period 4

OVERVIEW

Students should be able to describe the sun-Earth-moon system according to relative position and motion, phases of the moon and eclipses, the cause and effect of seasons on Earth, and gravity as an influence that affects all matter in the universe after completing the material in this unit.
ELA Lexile® Levels: 970L - 1120L

BIG IDEAS

- Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models.
- Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.
- The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them.
- This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year.
- The solar system appears to have formed from a disk of dust and gas, drawn together by gravity.

ESSENTIAL QUESTIONS

- What phenomena can I observe on Earth that is related to the positions and motion of the Earth with respect to the sun and moon?
- How can I describe the size, origin, and composition of our solar system?
- How can I describe and model gravity to demonstrate that it is an influence that affects orbit and the shape of galaxies?

TARGET STANDARDS

Standard	NGSS	SLO	Student Learning Objectives	Depth of Knowledge
MS-ESS1-1	**Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.**	1	Construct a diagram of the Earth-sun-moon system in which the relative positions and motions of the Earth, sun, and moon are correctly represented.	3
		2	Compare diagrams of phases of the moon as they appear from the Earth's surface to the diagrams showing the positions of the Earth, sun, and moon that result in the phases of the moon.	3
		3	Create and label diagrams of the relative positions of the Earth, sun, and moon during lunar and solar eclipses.	4

		4	Describe the cause and effect of that seasons that occur at our location on Earth.	3
		5	Compare seasons occurring locally to seasons occurring at other locations on Earth.	2
MS-ESS1-2	**Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.**	6	Support the idea that gravity is the influence that causes objects to orbit larger objects.	4
		7	Differentiate between the different types of galaxies according to shape.	3
MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.	8	Design a demonstration to visually illustrate the proportional distances between objects in our isolated system.	4
RST.6-8.1	**Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (MS-ESS1-3)**	9	Cite specific text or data to **support** a demonstration of the proportional distances in our solar system.	3
RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS1-6) (MS-PS3-3)	10	**Follow** a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks to produce results or collect data that is within the expectations of the teacher.	2
		11	**Construct** a multistep procedure that can be followed by others to replicate a process resulting in the collection of data and measurements or the assembly of a device.	4
RST.6-8.7	**Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS1-1) (MS-ESS1-3)**	12	**Construct** and label diagrams of the Earth-sun-moon system representing relative position, motion, and relative position during events such as particular phases of the moon and eclipses.	4
		13	**Describe** the process used to demonstrate proportional distances between objects in our solar system.	3
WHST.6-8.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-PS3-3)	14	**Conduct** academic research prior to the design of a scientific problem or device with the aim of improving the problem or device.	4
WHST.6-8.8	**Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. (MS-LS4-5)**	15	**Determine** whether or not information from any source is veracious or opinionated.	2
		16	**Cite** all sources using proper MLA format.	1

SL.8.5	**Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-ESS1-1) (MS-ESS-2)**	17	**Present** a summary of the results of research using graphs, illustrations, videos, or presentation software.	2

Assessments
Common labs, or a lab similar to the common lab, should be offered to the students at some point during the marking period. The purpose of this lab is to offer a common experience to all middle school students in the district. You may also use student scores for these labs to evaluate current levels of class and individual comprehension and to generate data for your SGOs. **"Graphic Sunlight" lab and/or Spectroscopy lab -** You should allot one week of class time near the end of the unit (marking period) to complete "The Scientific Method" with your students. Assessment is rubric-based. The Assessment of Content Comprehension (ACC) is a topic-specific assessment Composed of multiple choice and open-ended questions. You may choose to offer this assessment to students three times throughout the unit (marking period). You can determine how much time students way have to complete this assessment and when, or if, you will offer this assessment to your students. **This assessment is optional**. You may also use student scores for these assessments to evaluate current levels of class and individual comprehension and to generate data for your SGOs.

Suggested Resources
Text Resource: Glencoe Interactive iScience (McGraw Hill) **Online Resources:** **Glencoe Science Textbook web resources –** http://connected.mcgraw-hill.com **Next Generation Science Standards -** http://www.nextgenscience.org/next-generation-science-standards Select "Arranged by Disciplinary Core Idea" and scroll down to the middle school standards. Select the standard to find detailed information. **The Lexile® Framework for Reading -** http://lexile.com/ This site contains information about an assessment scheme related to text complexity. **WebElements: The Periodic Table on the Web** - http://www.webelements.com/ Find information about the physical and chemical properties of every element here. **Perdue University's "Gases, Liquids, and Solids"** - http://www.chem.purdue.edu/gchelp/liquids/character.html This site provides very general information about solids, liquids, and gasses. **The Physics Classroom** - http://www.physicsclassroom.com Find great tutorials, lab ideas, videos, and applets here. **The Naked Scientists "Make your own Electromagnet" -** http://www.thenakedscientists.com/HTML/content/kitchenscience/exp/electromagnet/ You'll find good instructions to build an electromagnet, and easy to follow explanations as to why electromagnets work, here. **The Physics Classroom** - http://www.physicsclassroom.com Find great tutorials, lab ideas, videos, and applets here. **UCDavis ChemWiki -** http://chemwiki.ucdavis.edu/Physical_Chemistry/Spectroscopy/Fundamentals/Electromagnetic_Radiation Nice visuals, clear text, and easy to access site about electromagnetic radiation. **MoonConnection -** http://www.moonconnection.com/ This site provides very general, but comprehensive, information about the moon. **YouTube - What is Gravity? - Newton vs. Einstein -** http://www.youtube.com/watch?v=6MJ0lTEhoL8 The video presents two ideas about gravity in a very clear, entertaining, and somewhat cheesy way. **NASA Science - Astrophysics "Galaxies" -** http://science.nasa.gov/astrophysics/focus-areas/what-are-galaxies/ This page contains links to images of galaxies as well as some useful, general information

DIFFERENTIATION		
Special Education	**ELL**	**RtI**
• Modifications & accommodations as listed in the student's IEP • Assign a peer to help keep student on task • Modified or reduced assignments • Reduce length of assignment for different mode of delivery • Increase one to one time • Working contract between you and student at risk • Prioritize tasks • Think in concrete terms and provide hands on tasks • Position student near helping peer or have quick access to teacher • Anticipate where needs will be • Break tests down in smaller increments • NJDOE resources	• Strategy groups • Teacher conferences • Graphic organizers • Modification plan • NJDOE resources • Adapt a Strategy-Adjusting strategies for ESL students: http://www.teachersfirst.com/content/esl/adaptstrat.cfm	• Tiered Interventions following RtI framework • NJDOE resources

ALIGNMENT TO 21st CENTURY SKILLS AND TECHNOLOGY	
21st Century/ Interdisciplinary Themes: Bold all that apply	**21st Century Skills: Bold all that apply**
Global Awareness Financial, Economic, Business and Entrepreneurial Literacy Civic Literacy Health Literacy **Environmental Literacy**	**Creativity & Innovation** **Critical Thinking & Problem Solving** **Communication & Collaboration** **Media Literacy** **Information Literacy** **Information, Communication & Technology** **Life & Career Skills**

Technology Infusion
• Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others • Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism. • Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

Evidence of Student Learning			
• Common benchmarks/labs • Evaluation rubrics	• Teacher-student conferences • Running records	• Students' published work • Unit tests	• Quizzes • Laboratory Investigations