Course – Grade 6 Science
Unit # 2 Physical Science

Grade 6
Unit # 2 - Physical Science
Unit #2 December 4, 2017 – February 16, 2017

Chapter 6, 7, 8 and 11
Chapter 6 – 15 days
Chapter 7 – 10 days
Chapter 8 – 15 days
Chapter 11 – 12 days

DBA #2 – Physical Science - 2/26/18 – 3/2/18

Unit Overview: Students will understand and apply scientific concepts, principles and theories pertaining to physical sciences and recognize the historical development /multicultural involvement of the ideas in science. Main ideas include: How objects react to forces; electrical forces; and the relationship between electricity and magnetism

NYSSLS Performance Expectations MS

Section 1: Motion and Stability: Forces and Interactions

MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.* [Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.]

MS-PS2-2. Plan and conduct 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. [Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system (including simple machines), qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.] [Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.]

MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. [Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.] [Assessment Boundary: Assessment about questions that require quantitative answers is limited to proportional reasoning and algebraic thinking.]

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 and the distance between them. [Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.] [Assessment Boundary: Assessment does not include Newton's Law of Gravitation or Kepler's Laws.]

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. [Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations. Emphasis should be on using arrows to represent the directions of forces.] [Assessment Boundary: Assessment is limited to electric and magnetic fields, and is limited to qualitative evidence for the existence of fields.]

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems • Ask questions that can be investigated within the scope of the classroom, outdoor, environment, and museums and other public facilities with available resources and, when appropriate, form a hypothesis based on observations and scientific principles. (MS-PS2-3) **Planning and Carrying out Investigations** • Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to-do the gathering, how measurements will be recorded,	**PS2.A: Forces and Motion** • For any pair of interacting objects, the force exerted by the first object on the second object is equal in strngth to the force that the seocnd object exerts on the first, but in the opposite directions (Newtons third law) (MS-PS2-1) • 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 great the force needed to achieve the same change in motion. For any given object, a larger force	**Cause and Effect** • Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS2-3, (MS-PS-5) **Systems and System Models** • Models can be used to represent systems and their interactions-such as inputs, processes and outputs-and energy and matter flows within systems. (MS-PS2-1), (MS-PS2-4) **Stability and Change** • Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (MS-PS2-2)

and how many data ae needed to support a claim. (MS-PS2-2) • Conduct an investigation and evaluate the experimental design to produce data to serve as the basis for evidence that can meet the goals of the investigation. (MS-PS2-5) **Constructing Explanations and Designing Solutions** • Apply scientific ideas or principles to design an object, to, process or system. (MS-PS2-1 **Engaging in Argument Form Evidence** • Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-PS2-4)	casues a larger change in motion. (MS-PS2-2) • All positions of objects and the directions of forces and mtoions must be described in an arbitrariy chosen reference frame and arbitrarily chosen units of size. In order to share inforamtion with other people, these choices must also be shared. (MS-PS2-2) **PS2.B: Types of Interactions** • Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, cirrrents, or magnetic strnghts involved and on the distances between the interacting objects. (MS-PS2-3) • Gravitational forces are always attractive. There is a gravitational force between any tow masses, bt it is a very small except when on or both of the objects have large mass-e.g., earth and the sun. (MS-PS2-5)	

Common Core State Standards Connections:

ELA/Literacy –

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-PS2-1),(MS-PS2-3)*
RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. *(MS-PS2-1),*(MS-PS2-2)*,(MS-PS2-5)*
WHST.6-8.1	Write arguments focused on *discipline-specific content.* (MS-PS2-4)
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-PS2-1),*(MS-PS2-2)*,(MS-PS2-5)*

Mathematics –

MP.2	Reason abstractly and quantitatively. (MS-PS2-1),(MS-PS2-2),(MS-PS2-3)
6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (MS-PS2-1)
6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers. *(MS-PS2-1),(MS-PS2-2)*
7.EE.B.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *(MS-PS2-1),(MS-PS2-2)*
7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(MS-PS2-1),(MS-PS2-2)*

Essential Questions/Big Questions

1. How do objects react to forces?
2. How does an electric circuit work?
3. How are electricity and magnetism related?

Resources

Pearson Interactive Science Book Chapters 6-8
PearsonRealize.com
Possible team kit use
Pearson Lab materials
http://ngss.nsta.org/Classroom-Resources.aspx

http://newyorkscienceteacher.com/sci/

Chapter 6 Forces

Content Vocabulary
Lesson 1: force, newton, net force
Lesson 2: friction, sliding friction, static friction, fluid friction, rolling friction, gravity, mass, weight
Lesson 3: inertia
Lesson 5: free fall, satellite, centripetal force

Scenario Investigation

- Please drop in

STEM Activity

- Sail Away
- Design and Construct a Prototype

Lesson 1

Skills

- Reading: Relate text and visuals
- Inquiry: make models

Lab Zone

- Inquiry Warm up – Is the force with you?
- Quick Lab – Describing Acceleration
- Teacher Demo – Flying Balloons
- Quick Lab – What is Force?
- Quick Lab – Modeling Unbalanced Forces

Assess Your Understanding

- Pages 256, 257,259

Lesson 2

Skills

- Reading: Identify Supporting Evidence
- Inquire: Design Experiments

Lab Zone

- Inquiry Warm up – Observing Friction
- Teacher Demo – Demonstrate Friction
- Build Inquiry – Spinning Plates
- Quick Lab – Calculating

Assess Your Understanding

- Pages 264,267

Lesson 3

Skills

- Reading: Ask Questions
- Inquire: Infer

Lab Zone

- Inquiry Warm – What changes Motion?
- Quick Lab – Around and Around
- Teacher Demo – Force Affects Acceleration
- Quick Lab – Newton's Second Law
- Teacher Demo – Action-Reaction in Action
- Quick Lab – Interpreting Illustrations

Assess Your Understanding

- Pages – 269, 271, 275

Lesson 4 SKIP

Lesson 5

Skills

- Reading: Relate cause and Effect
- Inquire: Create Data Tables

Lab Zone

- Inquiry Warm – What makes an object move in a circle?

- Quick Lab – Which Lands First?
- Quick Lab – Orbiting Earth

Assess Your Understanding

- Pages – 281, 283

Chapter 7 Electricity

Content Vocabulary

Lesson 1: Electric force, electric field, static electricity, conservation of charge, friction, conduction, induction, polarization, static discharge

Scenario Investigation

- My House Is Wired!

Lesson 1

Skills

- Reading: Relate Cause and Effect
- Inquiry: Draw Conclusions

Lab Zone

- Inquiry Warm up – Can you move a can without touching it?
- Quick Lab – Drawing Conclusions
- Teacher Demo – Electric Field Exerts a Force
- Quick Lab – Sparks are flying

Assess Your Understanding

- Pages 298, 303

Lesson 2 – SKIP
Lesson 3 – SKIP
Lesson 4 – SKIP
Lesson 5 - SKIP

Chapter 8 Magnetism and Electromagnetism

Content Vocabulary

Lesson 1: magnet, magnetism, magnetic pole, magnetic force
Lesson 2: magnetic field, magnetic field lines, compass, magnetic declination
Lesson 3: electromagnetism, solenoid, electromagnet
Lesson 4: galvanometer, electric motor

Scenario Investigation

- Is the North Pole Really the South Pole?

Lesson 1

Skills

- Reading: Summarize
- Inquire: Infer

Lab Zone

- Inquiry Warm – Natural Magnets
- Lab Investigation: Detecting Fake Coins
- Build Inquiry: Attraction and Repulsion
- Quick Lab – Magnetic Poles

Assess Your Understanding

- Pages – 337, 339

Lesson 2
Skills
- Reading: Identify the Main
- Inquire: Observe

Lab Zone
- Inquiry Warm – Predict the Field
- Quick Lab – Spinning in Circles
- Teacher Demo – Earth's Magnetic Field
- Quick Lab – Earth's Magnetic Field

Assess Your Understanding
- Pages – 343, 345

Lesson 3
Skills
- Reading: Relate Cause and Effect
- Inquire: Predict

Lab Zone
- Inquiry Warm – Electromagnetism
- Quick Lab – electric current and magnetism
- Quick Lab – Magnetic Fields from Electric Current
- Build Inquiry – Modeling a Solenoid's Magnetic Field
- Quick Lab – Electromagnet

Assess Your Understanding
- Pages –348, 349, 351

Lesson 4
Skills
- Reading: Sequence
- Inquire: Graph

Lab Zone
- Inquiry Warm – How are Electricity, magnets, and Motion Related?
- Quick Lab – Can Magnet Move a Wire?
- Quick Lab – How Galvanometers work
- Quick Lab – Parts of an Electric Motor

Assess Your Understanding
- Pages – 353, 355, 357

Lesson 5 SKIP

Chapter 11

Content Vocabulary
Lesson 3: Force, gravity, Law of universal gravitation, mass, weight, inertia
Newton's first law of motion
Lesson 5: tide, spring tide, neap tide

Lesson 1 SKIP
Lesson 2 SKIP

Lesson 3
Skills
- Reading: Ask Questions
- Inquire: Draw Conclusions

Lab Zone
- Inquiry Warm – What Forces Affect Gravity?
- Quick Lab – What's Doing the Pulling?
- Teacher Demo – Demonstrate Inertia
- Quick Lab – Around and Around we Go

Assess Your Understanding
- Pages –489, 491

Lesson 4 SKIP

Lesson 5

Skills
- Reading: Relate Cause and Effect
- Inquire: Observe

Lab Zone
- Inquiry Warm – When is High Tide?
- Quick Lab – Modeling the Moon's Pull of Gravity

Assess Your Understanding
- Pages – 501

Lesson 6 SKIP

Higher Level Questions

- Give an example of a force you apply to slow something down.
- Describe how forces affect motion.
- Explain why some sports would be more fun in space. Pick specific sports and explain why.
- If you would like to increase the acceleration of a bicycle, explain what must be done and why.
- Describes what happens to an object's atoms when the object becomes positively charged?
- Explain how magnetic poles interact and give an example.
- How can forces affect the motion of objects?
- What are some examples of electromagnets that are used to make work easier?
- Draw a diagram showing the magnetic fields around a bar magnet.

Step Up to Writing

SUTW Strategy

Explore Activities

Easy 2-Column Notes

SUTW 4th Edition p. 31

SUTW Tools S1-17a-c

Content Vocabulary

Breaking Down Definitions

SUTW 5th Edition p. 212

SUTW Tools S3-2a-b, S3-1a

STEM Activity

IVF Summary Sentences

SUTW 4th Edition p. 43

SUTW Tools S1-23b

STEM Activity

Four Step Summary Paragraph

SUTW 4th Edition p. 44

SUTW Tools S1-24a-b

Investigate it! and Inquiry:
Color-Coding the Elements of Informative
SUTW 4th Edition p. 268
SUTW Tools S4-1a-b

Elaborate: Science Notebook
Explanatory Writing Informal Outlines
SUTW 4th Edition p. 272
SUTW Tools S4-3a-b, S4-4a,b

Measurement of Student Learning

- Lesson Quiz
- Exam view Assessments
- Performance expectation activities
- Performance assessment
- Review and Assessment
- Assess your Understanding

ELL Enhancements

Listening	Speaking	Reading	Writing	Accommodations
Build Background Knowledge Audio	Sentence Frames Academic conversation Starters	Supplementary Texts Visual Aids Video Standards-based questions	Sentence Frames Graphic Organizers Standards-based sentence stems	Extended time Directions read 3x Oral interpretation Translated version of test (may have both English and other) Responses in home language

Special Education Modifications

Instructional	Assistive technology	Assessment:	
Pre-teach vocabulary Use picture vocabulary Picture examples of safety measures posted Pictures for each category of science Scaffold Depth of Knowledge questions Provide copy of notes/notes in ”cloze” form Peer partner Extended time for written tasks/verbal response Break long tasks over multiple days Allow for multiple ways to respond (verbal, written, response board, scribe) Provide mock/model of performance task	Computer for lengthy writing tasks Audio textbook Videos to clarify concepts Recording device to record class lecture/discussions **Other** Arrange seating for maximum engagement and minimum distraction Accessible lab space (counter level)	Scaffold written assignments Individual criteria for success Provide with review packet Modify the number of questions Provide model of the task Provide multiple options for project Practice calculating density with sample problem before assessing student.	

Model use of graphic organizers (fade until mastery) Modify informational text to shorter passages Provide model of exemplar lab write-up Provide interactive notebook Present complex tasks in multiple ways Model steps to read, interpret, and construct graphs Multiple opportunities to perform to repeat labs Provide advance organizer of class tasks			

Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom
• Materials, resources, and/or discussions address diverse cultural backgrounds and real world applications
• Artifacts (posters, charts, etc.) in the science classroom are representative of the cultures of the student population
• All students are given an opportunity to engage in science discourse
• Teacher demonstrates high expectations for all students