Pacing Guide_Self Contained Science_Year 2-Physical Science-Physics

Content Area: **Special Education**
Course(s):
Time Period: **Full Year**
Length: **2 Semesters**
Status: **Published**

General Overview, Course Description or Course Philosophy

Science and engineering—significant parts of human culture that represent some of the pinnacles of human achievement—are not only major intellectual enterprises but also can improve people's lives in fundamental ways. Although the intrinsic beauty of science and a fascination with how the world works have driven exploration and discovery for centuries, many of the challenges that face humanity now and in the future—related, for example, to the environment, energy, and health—require social, political, and economic solutions that must be informed deeply by knowledge of the underlying science and engineering.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Learning Set 1: What Determines How Fast or High an Object Will Go? How is energy transferred and conserved? What is energy? What is meant by conservation of energy? How is energy transferred between objects or systems? How are forces related to energy?

Learning Set 2 - Why Do Some Things Stop? How can one explain the structure, properties, and interactions of matter? How do particles combine to form the variety of matter one observes? What is energy? How is energy transferred and conserved? What is energy? What is meant by conservation of energy? How is energy transferred between objects or systems? How are forces related to energy? How are waves used to transfer energy and information? What are the characteristic properties and behaviors of waves? What is light? How can one explain the varied effects that involve light? What other forms of electromagnetic radiation are there? How are instruments that transmit and detect waves used to extend human senses?

Learning Set 3 - Why Do Some Things Keep Going? How can one explain the structure, properties, and interactions of matter? How do particles combine to form the variety of matter one observes? How do substances combine or change (react) to make new substances? How doesone characterize and explain these reactions and make predictions about them? How do engineers solve problems? What is the process for developing potential design solutions? What is the process for developing potential design solutions? How can one explain and predict interactions between objects and within systems of objects? What underlying forces explain the variety of interactions observed? How is energy transferred and conserved? What is energy? What is meant by conservation of energy? How is energy transferred between objects or systems? How are forces related to energy? What are the characteristic properties and behaviors of waves? What is light? How can one explain the varied effects that involve light? What other forms of electromagnetic radiation are there? How are instruments that transmit and detect waves used to extend human senses?

CONTENT AREA STANDARDS

SCI.MS-PS1-4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
SCI.MS-PS1-6	Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.
SCI.MS-PS2-3	Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
SCI.MS-PS1-2	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
SCI.MS-PS4-2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
SCI.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.
SCI.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.
SCI.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.
SCI.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.
SCI.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.
SCI.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.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
LA.RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.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).
LA.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.
MA.7.EE.B.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), 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.
MA.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.

MA.7.RP.A.2	Recognize and represent proportional relationships between quantities.
MA.7.SP	Statistics and Probability

EVIDENCE OF LEARNING

Formative Assessments

PS2.A: Reading 1.2: Newton's Cradle, Activity 4.2: Measuring Forces with Force Probes and Newton's Third Law, Activity 4.3: Revisiting Familiar Apparatuses, Activity 6.1: Graphs That Show When a Ball Moves.

PS2.A: Activity 2.1: Analyzing Apparatuses, Activity 2.2: Systems and Contact Forces, Homework 2.2: The World's Greatest Sandwich, Reading 2.3: Balance and Force, Activity 2.4: Putting Things Together, Activity 3.1: Objects That Begin Moving, Activity 3.2: More Objects That Begin Moving, Homework 3.2: Heavy Duty Shopping, Activity 3.3: Complex Systems that Begin Moving, Reading 3.3: Why Does an Object Start Moving?, Activity 4.1: Measuring Forces, Reading 4.3: What Keeps Things from Moving?, Reading 4.4: Who Will Win a Tug-of-War?, Activity 5.1: A Book That Stops Moving, Homework 5.1: Hard and Soft Landings, Activity 5.2: Recoil in the Magnetic Cannon, Reading 5.2: What Affects How Quickly Something Stops Moving?, Homework 6.1: Rat Race, Activity 6.2: Graphs That Show How a Ball Moves, Homework 6.2: Rat Race Part 2, Activity 6.3: Motion Graphs for the Magnetic Cannon, Activity 7.1: Changing Speed, Homework 7.1: Forces and Motions, Activity 7.2: Changing Direction, Activity 7.3: Newton's First Law, Activity 8.1: Revisiting and Summarizing the Scientific Principles, Homework 8.1: Motion Graph, Activity 8.2: Can We Explain the Behavior of the Magnetic Cannon?, Activity 8.3: Concluding the Activity.

PS2.B: Reading 7.3: Tides

PS2.B: Activity 2.3: Forces That Act at a Distance

PS3.A, PS3.C: Activity 2.1: Analyzing Apparatuses, Activity 2.2: Systems and Contact Forces, Homework 2.2: The World's Greatest Sandwich, Reading 2.3: Balance and Force, Activity 2.4: Putting Things Together, Activity 3.1: Objects That Begin Moving, Activity 3.2: More Objects That Begin Moving, Homework 3.2: Heavy Duty Shopping, Activity 3.3: Complex Systems that Begin Moving, Reading 3.3: Why Does an Object Start Moving?, Activity 4.1: Measuring Forces, Reading 4.3: What Keeps Things from Moving?, Reading 4.4: Who Will Win a Tug-of-War?, Activity 5.1: A Book That Stops Moving, Homework 5.1: Hard and Soft Landings, Activity 5.2: Recoil in the Magnetic Cannon, Reading 5.2: What Affects How Quickly Something Stops Moving?, Homework 6.1: Rat Race, Activity 6.2: Graphs That Show How a Ball Moves, Homework 6.2: Rat Race Part 2, Activity 6.3: Motion Graphs for the Magnetic Cannon, Activity 7.1: Changing Speed, Homework 7.1: Forces and Motions, Activity 7.2: Changing Direction, Activity 7.3: Newton's First Law, Activity 8.1: Revisiting and Summarizing the Scientific Principles, Homework 8.1: Motion Graph, Activity 8.2: Can We Explain the Behavior of the Magnetic Cannon?, Activity 8.3: Concluding the Activity

PS3.B: Activity 1.1: Anchoring Activity, Activity 1.2: Driving Question Board

ESS1.A, ESS1.B: Reading 7.2: Planetary Motion

ESS1.B: Reading 6.3: The Universe

Summative Assessments

1. CER

2. Lab Checks

3. IQWST End of Unit Assessment (performance based & written)

RESOURCES (Instructional, Supplemental, Intervention Materials)

IQWST Unit Materials for Physical Science 3, Learning Sets 1 - 3

A Framework For K-12 Science Education

Onlne Resources provided by IQWST not included in the program (to be used as support/reinforcement/enrichment): https://docs.google.com/spreadsheets/d/1VpyFCL4_50_-1w2NhcGpdNNZ2jj6aJJegcIUNCy_uzQ/pubhtml

INTERDISCIPLINARY CONNECTIONS

Collaboration with Math and Language Arts teachers is an essential part of the IQWST curriculum.

Information Writing

Current Events

Topography

Data collection/analysis

Computations

Statistics

Engineereering

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.

IQWST provides audio recording for all readings in student workbook-available through teacher portal online

Reading differentiation strategies are embedded in the IQWST program and all students prepare for reading through a 'Getting Reading' section which begins each reading.

The sections are desgined to engage students, generate interest, activate prior knowledge and provide a purpose for reading. Teachers use advance organizers for desired readings and to encourage students to plan and annote the passages.

A word wall is developed through vocabulary aquisition in the program. Students develop the word wall as words are learned in context and through experience in class. This helps to build meaning and understanding which support students when reading text.

Students are encouraged to ask questions and post them to the Driving Question Board. This DQB helps students develop a greater level of understanding and encourages students to work together to solve problems in and outside of class.

Support will be provided to students when writing in the student manual and use of the computer, printing, and pasting into the manual is acceptable if there is a present need.