Warren County School District

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Science-Grade 5

Course Number: _____

Course Prerequisites: _____

Course Description: (Include "no final exam" or "final exam required")

This course focuses on physical science, chemistry and physics in the areas of matter, energy sources, force and motion. Unifying themes, inquiry and design, and technological devices are incorporated within those areas of study.

Suggested Grade Level: Grade 5

Length of Course: _____ One Semester __X__ Two Semesters _____Other (Describe)

Units of Credit: None (Insert ***NONE*** if appropriate.)

PDE *Certification and Staffing Policies and Guidelines (CSPG)* Required Teacher Certification(s) (Insert certificate title and CSPG#) _____

Certification verified by WCSD Human Resources Department:
_____ Yes _____ No

Board Approved Textbooks, Software, Materials:
Title:
Publisher:
ISBN #:
Copyright Date:
Date of WCSD Board Approval:

BOARD APPROVAL:

Date Written: _____

Date Approved: _____

Implementation Year: _____

Suggested Supplemental Materials: (List or insert **None**)

Course Standards

PA Academic Standards: (List by Number and Description)

3.1.7 Unifying Themes

A. Explain the parts of a simple system and their relationship to each other.
B. Describe the use of models as an application of scientific or technological concepts.
C. Identify patterns as repeated processes or recurring elements in science and technology.
D. Explain scale as a way of relating concepts and ideas to one another by some measure.
E. Identify change as a variable in describing natural and physical systems.

3.2.7 Inquiry and Design

A. Explain and apply scientific and technological knowledge.
B. Apply process knowledge to make and interpret observations.
C. Identify and use the elements of scientific inquiry to solve problems.
D. Know and use the technological design process to solve problems.

3.4.7 Physical Science, Chemistry and Physics

A. Describe concepts about the structure and properties of matter.
B. Relate energy sources and transfers to heat and temperature.
C. Identify and explain the principles of force and motion.

3.6.7 Technology Education

C. Explain physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design.

3.7.7 Technological Design

A. Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions.
B. Apply appropriate instruments and apparatus to examine a variety of objects and processes.

3.8.7 Science, Technology and Human Endeavors

A. Explain how science and technologies are limited in their effects and influences on society.
B. Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.
C. Identify the pros and cons of applying technological and scientific solutions to address problems and the effect upon society.

4.1.7 Watersheds and Wetlands

B. Understand the role of the watershed.

4.2.7 Renewable and Nonrenewable Resources

B. Examine the renewability of resources.

D. Describe the role of recycling and waste management.

4.3.7 Environmental Health

A. Identify environmental health issues.

C. Explain biological diversity.

4.6.7 Ecosystems and their Interactions

A. Explain the flows of energy and matter from organism to organism within an ecosystem.

4.7.7 Threatened, Endangered and Extinct Species

C. Explain natural or human actions in relation to the loss of species.

4.8.7 Humans and the environment

C. Explain how human activities may affect local, regional, and national environments.

4.9.7 Environmental Laws and Regulations

A. Explain the role of environmental Laws and Regulations.

WCSD Academic Standards: (List or **None**)

None

Industry or Other Standards: (List, Identify Source or **None**)

None

WCSD EXPECTATIONS

WCSD K-12 Expectations for instruction in writing, reading, mathematics and, technology have been developed and revised annually. The teacher will integrate all WCSD Expectations into this planned instruction.

SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

SPECIFIC EDUCATIONAL OBJECTIVES/CORRESPONDING STANDARDS AND ELIGIBLE CONTENT WHERE APPLICABLE

(List Objectives, PA Standards #'s, Other Standards (see samples at end))

S8A The Nature of Science

S8.A.1 Reasoning and Analysis

S8.A.1.1 Explain, interpret and apply scientific, environmental, or technological knowledge presented in a variety of formats (e.g., visuals, scenarios, graphs).

PA Standard References: ***3.2.7.A, 3.2.7.B***

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.A.1.1.1** Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data/ information may change existing theories and practices.			
B.	**S8.A.1.1.2** Explain how certain questions can be answered through scientific inquiry and/or technological design.			
C.	**S8.A.1.1.3** Use evidence, such as observations or experimental results, to support inferences about a			

	relationship.			
D.	**S8.A.1.1.4** Develop descriptions, explanations, predictions, and models using evidence.			

S8.A.1.2 Identify and explain the impacts of applying scientific, environmental, or technological knowledge to address solutions to practical problems.

PA Standard References: 3.2.7.C, 3.8.7.A, 3.8.7.B, 3.8.7.C, 4.3.7.A

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.A.1.2.1** Describe the positive and negative, intended and unintended, effects of specific scientific results or technological developments.(e.g., air/space travel, genetic engineering, nuclear fission/fusion, artificial intelligence, lasers, organ transplants).			
B.	**S8.A.1.2.2** Identify environmental issues and explain their potential long-term health effects (e.g., pollution, pest controls, vaccinations).			
C.	**S8.A.1.2.3** Describe fundamental scientific or technological concepts that could solve practical problems (e.g., Newton's Laws of motion, Mendelian genetics).			
D.	**S8.A.1.2.4** Explain society's standard of living in terms of technological advancements and how these advancements impact on agriculture. (e.g., transportation, processing, production, storage).			

S8.A.1.3 Identify evidence that certain variables may have caused measurable changes in natural or human-made systems.

PA Standard References: 3.1.7.E, 4.7.7.C, 4.8.7.C

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.A.1.3.1** Use ratio to describe change (e.g., percents, parts per million, grams per cubic centimeter, mechanical advantage).			
B.	**S8.A.1.3.2** Use evidence, observations, or explanations to make inferences about change in systems over time (e.g., carrying capacity, succession, population dynamics, loss of mass in chemical reactions, indicator fossils in geologic time scale) and the variables affecting these changes.			
C.	**S8.A.1.3.3** Examine systems changing over time, identifying the possible variables causing this change, and drawing inferences about how these variables affect this change.			
D.	**S8.A.1.3.4** Given a scenario, explain how a dynamically changing environment provides for the sustainability of living systems.			

S8.A.2 Processes, Procedures and Tools of Scientific Investigations

S8.A.2.1 Apply knowledge of scientific investigation or technological design in different contexts to make inferences to solve problems.

PA Standard References: 3.2.7.B, 3.2.7.D, 3.1.7.C, 3.1.7.D

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.A.2.1.1** Use evidence, observations, or a variety of scales (e.g., mass, distance, volume, temperature) to describe relationships.			
B.	**S8.A.2.1.2** Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses.			
C.	**S8.A.2.1.3** Design a controlled experiment by specifying how the independent variables will be manipulated, how the dependent variable will be measured, and which variables will be held constant.			
D.	**S8.A.2.1.4** Interpret data/observations; develop relationships among variables based on data/observations to design models as solutions.			
E.	**S8.A.2.1.5** Use evidence from investigations to clearly communicate and support conclusions.			
F.	**S8.A.2.1.6** Identify a design flaw in a simple technological system and devise possible working solutions and devise possible working solutions.			

S8.A.2.2 Apply appropriate instruments for a specific purpose and describe the information the instrument can provide.

PA Standard References: 3.3.7.A, 3.7.7A, 3.7.7.B, 3.1.7.D

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.A.2.2.1**Describe the appropriate use of instruments and scales to accurately and safely measure time, mass, distance, volume, or temperature under a variety of conditions.			
B.	**S8.A.2.2.2** Apply appropriate measurement systems (e.g., time, mass, distance, volume, temperature) to record and interpret observations under varying conditions.			
C.	**S8.A.2.2.3** Describe ways technology (e.g., microscope, telescope, micrometer, hydraulics, barometer) extends and enhances human abilities for specific purposes.			

S8.A.3 Systems, Models and Patterns

S8.A.3.1 Explain the parts of a simple system, their roles, and their relationships to the system as a whole.

PA Standards Referenced: 3.1.7.A, 3.4.7.B, 4.3.7.C, 4.2.7.D, 4.6.7.A

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment

A.	**S8.A.3.1.1** Describe a system (e.g., watershed, circulatory system, heating system, agricultural system) as a group of related parts with specific roles that work together to achieve an observed result.			
B.	**S8.A.3.1.2** Explain the concept of order in a system [e.g., first to last: manufacturing steps, trophic levels); (simple to complex: cell, tissue, organ, organ system)].			
C.	**S8.A.3.1.3** Distinguish between system inputs, system processes, system outputs, and feedback (e.g., physical, ecological, biological, informational).			
D.	**S8.A.3.1.4** Distinguish between open loop (e.g., energy flow, food web) and closed loop (e.g., materials in the nitrogen and carbon cycles, closed switch) systems.			
E.	**S8.A.3.1.5** Explain how components of natural and human-made system play different roles in a working system.			

S8.A.3.2 Apply knowledge of models to make predictions, draw inferences, or explain technological concepts.

PA Standard Reference: 3.1.7.B, 3.2.7.B, 4.1.7.B

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.A.3.2.1** Describe how scientists use models to explore relationships in natural systems (e.g., an ecosystem, river system, or the solar system).			
B.	**S8.A.3.2.2** Describe how engineers use models to develop new and improved technologies to solve problems.			
C.	**S8.A.3.2.3** Given a model showing simple cause and effect relationships in a natural system, predict results that can be used to test the assumptions in the model. (e.g., photosynthesis, water cycle, diffusion, infiltration)			

S8.A.3.3 Describe repeated processes or recurring elements in scientific and technological patterns.

PA Standard References: 3.1.7.C, 3.2.7.B

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.A.3.3.1** Identify and describe patterns as repeated processes or recurring elements in human-made systems (e.g., trusses, hub and spoke system in communications and transportation systems, feedback controls in regulated systems).			
B.	**S8.A.3.3.2** Describe repeating structure patterns in nature (e.g., veins in a leaf, tree rings, crystals, water waves) or periodic patterns (e.g., daily, monthly, annually).			

S8C PHYSICAL SCIENCES

S8.C.1 Structure, Properties, and Interaction of Matter and Energy

S8.C.1.1 Explain concepts about the structure and properties (physical and chemical) of matter.

PA Standard References: ***3.4.7.A***

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.C.1.1.1** Explain the differences among elements, compounds, and mixtures.			
B.	**S8.C.1.1.2** Use characteristic physical or chemical properties to distinguish one substance from another (e.g., density, thermal expansion/contraction, freezing/melting points, streak test).			
C.	**S8.C.1.1.3** Identify and describe reactants and products of simple chemical reactions.			

S8.C.2 Forms, Sources, Conversion, and Transfer of Energy

S8.C.2.1 Describe energy sources, transfer of energy, or conversion of energy.

PA Standard Reference: ***3.4.7.B, 4.2.7.B***

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.C.2.1.1** Distinguish among forms of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear) and sources of energy (i.e., renewable and nonrenewable energy)			
B.	**S8.C.2.1.2** Explain how energy is transferred from one place to another through convection, conduction, or radiation.			
C.	**S8.C.2.1.3** Describe how one form of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear) can be converted into a different form of energy.			

S8.C.2 Forms, Sources, Conversion, and Transfer of Energy

S8.C.2.2 Compare the environmental impact of different energy sources chosen to support human endeavors.

PA Standard Reference: ***3.4.7.B, 4.2.7.B, 4.9.7A***

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.C.2.2.1** Describe the Sun as the major source of energy that impacts the environment.			
B.	**S8.C.2.2.2** Compare the time span of renewability for fossil fuels and the time span of renewability for alternative fuels.			
C.	**S8.C.2.2.3** Describe the waste (i.e., kind and quantity) derived from the use of renewable and nonrenewable			

	resources and their potential impact on the environment.			

S8.C.3 Principles of Motion and Force

S8.C.3.1 Describe the effect of multiple forces on the movement, speed, or direction of an object.

PA Standard Reference: ***3.4.7.C, 3.6.7.C***

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.C.3.1.1** Describe forces acting on objects (e.g., friction, gravity, balanced versus unbalanced).			
B.	**S8.C.3.1.2** Distinguish between kinetic and potential energy.			
C.	**S8.C.3.1.3** Explain that mechanical advantage helps to do work (physics) by either changing a force or changing the direction of the applied force (e.g., simple machines, hydraulic systems).			

ASSESSMENTS

PSSA Assessment Anchors Addressed: The teacher must be knowledgeable of the PDE Assessment Anchors and/or Eligible Content and incorporate them into this planned instruction. Current assessment anchors can be found at pde@state.pa.us.

Suggested Formative Assessments: The teacher will develop and use standards-based assessments throughout the course.

- Pre-Assessments of prior knowledge (e.g. entrance cards of KWL chart)
- Labs/lab reports
- Bell ringers/Problems of the Day (PODs)
- Discussions
- Teacher observation/Questioning
- Graphic organizers (e.g. Venn diagrams, word mapping, webbing, KWL charts, etc)
- Summarizing
- Retelling
- Notetaking
- Problem-based learning modules
- Authentic assessment
- Oral presentations
- Outlining
- Journaling
- Student presentations/projects
- Open-ended response
- Quizzes/tests
- Activities

- Classroom Performance System (CPS)
- White boards

Suggested Summative Assessments:

- Essays
- Open ended Responses
- Projects
- Quizzes/Tests
- Student Presentations
- Portfolios
- Lab Practical
- Lab Reports

Portfolio Assessment: _____ Yes __X__ No

District-wide Final Examination Required: _____ Yes __X__ No

Course Challenge Assessment (Describe):

REQUIRED COURSE SEQUENCE AND TIMELINE

(Content must be tied to objectives)

I. The Nature of Science **(Throughout the School Year)**
- A. Reasoning and Analysis
  - 1. Scientific Theories and Laws
- B. Processes, Procedures, and Tools of Scientific Investigations
  - 1. Observations and Inferences
- C. Systems, Models and Patterns

II. Physical Science
- A. Structure and properties of Matter **(6-9 Weeks)**
  1. Elements, Compounds, and Mixtures
  2.. Physical and Chemical Properties
  3. Simple and Chemical Reactions
- B. Transfer of Energy **(6-9 Weeks)**
  1. Forms of Energy
  2. Energy Transfer
  3. Conversion of Energy
- C. Environmental Impact (6-9 Weeks)
  1. Major source- Sun
  2. Renewability of Energy Sources
  3. Potential impact of Waste
- D. Principles of Motion and Force **(6-9 Weeks)**
  1. Forces on objects
  2. Kinetic and Potential Energy

3. Mechanical Advantage (eg. Simple Machines, Hydraulic Systems)

Objectives:

1. The student will explain concepts about the physical and chemical properties and the structure of matter.
2. The student will describe energy sources, transfer of energy, or conversion of energy.
3. The student will compare the environmental impact of different energy sources chose to support human endeavors.
4. The student will describe the effect of multiple forces on the movement, speed, or direction of an object.
5. The student will explain, interpret and apply scientific, environmental, or technological knowledge presented in a variety of formats.
6. The student will identify and explain the impacts of applying scientific, environmental, or technological knowledge to address solutions to practical problems.
7. The student will identify evidence that certain variables may have caused changes.
8. The student will apply knowledge of scientific investigation to solve problems.
9. The student will apply appropriate instruments for a specific purpose.
10. The student will demonstrate an understanding systems.
11. The student will apply knowledge of models to make predictions, draw inferences, and explain concepts.
12. The student will describe repeated patterns relating to scientific concepts.

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WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? _____ Yes __X__ No
2. Does this course issue a mark/grade for the report card?

   __X__ Yes _____ No
3. Does this course issue a Pass/Fail mark? _____ Yes __X__ No
4. Is the course mark/grade part of the GPA calculation?

   _____ Yes __X__ No
5. Is the course eligible for Honor Roll calculation? _____ Yes __X__ No
6. What is the academic weight of the course?

   _____ No weight/Non credit _____ Standard weight

   _____ Enhanced weight (Describe)