Warren County School District

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Science 7

Course Number: 00305

Course Prerequisites: _____

Course Description: (Include "no final exam" or "final exam required")
Seventh grade science is a life science based course covering the following topics: structure and function of organisms, continuity of life, and ecological behavior and systems. Unifying themes and biotechnology are incorporated throughout the course of study.

Suggested Grade Level: Grade 7

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#) Chemistry, Biology, Earth and Space, General Science, Middle Level Science, Physics

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

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

BOARD APPROVAL:

Date Written: September 2009

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.

3.3.7 Biological Sciences
- A. Describe the similarities and differences that characterize living things.
- B. Describe the cell as the basic structural and functional unit of living things.
- C. Know that every organism has a set of genetic instructions that determines its inherited traits.
- D. Explain basic concepts of natural selection.

3.7.10 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
- 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.

4.3.7 Environmental Health
- C. Explain biodiversity.

4.4.7 Agriculture and Society
- A. Explain society's standard of living in relation to agriculture.
- C. Explain agricultural systems' use of natural and human resources.

4.5.7 Integrated Pest Management
- A. Explain benefits and harmful effects of pests
- B. Explain how pest management affects the environment.
- C. Explain various integrated pest management practices used in society.

4.7.7 Threatened, Endangered and Extinct Species
- A. Describe diversity of plants and animals in ecosystems.

B. Explain how species of living organisms adapt to their environment.
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.
D. Explain the importance of maintaining the natural resources at the local, state and national levels.

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, 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, 3.7.7.B, 3.1.7.D

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**3.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).			

S8.B. Biological Sciences

S8.B.1 Structure and Function of Organisms

S8.B.1.1 Describe and compare structural and functional similarities and differences that characterize diverse living things.

PA Standard References: 3.3.7A, 3.3.7.B, 4.6.7.A, 4.7.7B

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.B.1.1.1** Describe the structures of living things that help them function affectively in specific ways (e.g., adaptations and characteristics).			
B.	**S8.B.1.1.2** Compare similarities or differences in both internal structures (e.g., invertebrate/vertebrate, vascular/nonvascular, singlecelled/multicelled, and external structures (e.g., appendages, body segments, types of covering, size, shape) of organisms.			
C.	**S8.B.1.1.3** Apply knowledge of characteristic structures to identify or categorize organisms (i.e., plants, animals, fungi, bacteria, and protista).			
D.	**S8.B.1.1.4** Identify the levels of organization from cell to organism and describe how specific structures (parts), which underlie larger systems, enable the system to function as a whole.			

S8.B. Biological Sciences

S8.B.2 Continuity of Life

S8.B.2.1 Explain the basic concepts of natural selection.

PA Standard Reference: 3.3.7D, 4.7.7A, 4.7.7.B

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.B.2.1.1** Explain how inherited structures or behaviors help organisms survive and reproduce in different environments.			
B.	**S8.B.2.1.2** Explain how different adaptations in individuals of the same species may affect survivability or reproduction success.			
C.	**S8.B.2.1.3** Explain that mutations can alter a gene and are the original source of new variations.			
D.	**S8.B.2.1.4** Describe how selective breeding or biotechnology can change the genetic makeup of organisms.			
E.	**S8.B.2.1.5** Explain that adaptations are developed over long periods of time and are passed from one generation to another.			

S8.B.2.2 Explain how a set of genetic instructions determines inherited traits of organisms.

PA Standard Reference: 3.3.7.C

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.B.2.2.1** Identify and explain differences between inherited and acquired traits.			
B.	**S8.B.2.2.2** Recognize that the gene is the basic unit of inheritance, that there are dominant and recessive genes, that traits are inherited.			

S8.B.3 Ecological Behavior and Systems

S8.B.3.2 Identify evidence of change to infer and explain the ways different variables may affect change in natural or human-made systems.

PA Standard: 3.1.7.C, 4.3.7.B, 4.6.7.C, 4.8.7.D, 3.1.7.E, 4.3.7.C

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.B.3.2.1** Use evidence to explain factors that affect changes in populations (e.g., deforestation, disease, land use, natural disaster, invasive species).			
B.	**S8.B.3.2.2** Use evidence to explain how diversity affects the ecological integrity of natural systems.			
C.	**S8.B.3.2.3** Describe the response of organisms to environmental changes (e.g., changes in climate, hibernation, migration, coloration) and how those changes affect survival.			

S8.B.3.3 Explain how renewable and nonrenewable resources provide for human needs or how these needs impact the environment.

PA Standard Reference: 3.6.7.A, 4.4.7.A, 4.4.7.C, 4.5.7.C, 3.8.7.C

X – performance assessed during that semester

	Performance Indicators	1	2	Assessment
A.	**S8.B.3.3.1** Explain how human activities may affect local, regional, and global environments.			
B.	**S8.B.3.3.2** Explain how renewable and nonrenewable resources provide for human needs (i.e., energy food, water, clothing, and shelter).			
C.	**S8.B.3.3.3** Describe how waste management affects the environment (e.g., recycling, composting, landfills, incineration, sewage treatment).			
D.	**S8.B.3.3.4** Explain the long-term effects of using integrated pest management (e.g., herbicides, natural predators, biogenetics) on the environment.			

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 or 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 chart, 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 Report

District Approved Assessment Instruments

- PSSA Tests-Grades 4, 8 and 11 only

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)

This is a topical outline. Specific content is identified in the assessment anchors.

1. Cells **9 weeks**
    a. Compare and contrast plant and animal cells.
    b. Cell as the basic building block of life.
    c. Cell → Organ system
    d. Mitosis and meiosis
2. Genetics **9 weeks**
    a. Dominant and recessive traits
    b. Mutations
    c. Adaptations
    d. Biogenetics
3. Natural selection **9 weeks**
    a. Environmental factors
    b. Biological factors
    c. Integrated Pest Management
    d. Human impact on environment
4. Classification **9 weeks**
    a. History
    b. Dichotomous keys
    c. Kingdoms

Objectives:

A. Describe the cell as the basic building of life.
B. Compare and contrast plant and animal life.
C. Describe the levels of organization from cell to organ system.
D. Compare and contrast mitosis and meiosis.
E. Investigate effects of dominant and recessive traits.
F. Describe how mutations may ultimately lead to adaptations.
G. Describe the advantages and disadvantages of biogentetics.
H. Describe the environmental and biological factors in natural selection.
I. Explain integrated pest management.
J. Describe how human impact on the environment can effect natural selection.
K. Describe the history of classification and the importance of dichotomous keys.
L. Compare and contrast the different kingdoms.

WRITING TEAM: Jeremy Criswell, Wendy Gray, Olivia Zapel, Jenny Watt

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? __X__ Yes _____ No
6. What is the academic weight of the course?

   __X__ No weight/Non credit _____ Standard weight

   _____ Enhanced weight (Describe)