

# Warren County School District

## PLANNED INSTRUCTION

### COURSE DESCRIPTION

**Course Title:** Science Grade 4

**Course Number:** \_\_\_\_\_

**Course Prerequisites:** \_\_\_\_\_

**Course Description:** (Include “no final exam” or “final exam required”)

Fourth grade science covers the various aspects of biological, chemical, earth, and environmental sciences using an activity-based approach. Unifying themes, inquiry and design are incorporated within the areas of study.

**Suggested Grade Level:** 4

**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 Unifying Themes**

3.1.4.A Know that natural and human-made objects are made up of parts.

3.1.4.B Know models as useful simplifications of objects or processes.

### **3.2 Inquiry and Design**

3.2.4.A Identify and use the nature of scientific and technological knowledge.

3.2.4.B Describe objects in the world using the five senses.

3.2.4.C Recognize and use the elements of scientific inquiry to solve problems.

### **3.3 Biological Science**

3.3.4.A Know similarities and differences of living things.

### **3.4 Physical Science, Chemistry and Physics**

3.4.4.A Recognize basic concepts about the structure and properties of matter.

3.4.4.B Know basic energy types, sources and conversions.

3.4.4.C Observe and describe different types of force and motion.

3.4.4.D Describe the composition and structure of the universe and the earth's place in it.

### **3.5 Earth Sciences**

3.5.4.A Know basic landforms and earth history.

3.5.4.C Describe basic elements of meteorology.

### **3.6 Technology Education**

3.6.4.A Know that biotechnologies relate to propagating, growing, maintaining, adapting, treating and converting.

3.6.4.C Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design.

### **3.7 Technological Devices**

3.7.4.A Explore the use of basic tools, simply materials and techniques to safely solve problems.

3.7.4.B Select appropriate instruments to study materials.

### **3.8 Science, Technology and Human Endeavors**

3.8.4.C Know the pros and cons of possible solutions to scientific and technological problems in society.

### **4.3 Environmental Health**

4.3.4.A Know that plants, animals and humans are dependent on air and water.

4.3.4.C Understand that the elements of natural systems are interdependent.

### **4.4 Agriculture and Society**

4.4.4.C Know that food and fiber originate from plants and animals.

### **4.6 Ecosystems and their Interactions**

4.6.4.A Understand that living things are dependent on nonliving things in the environment for survival.

4.6.4.B Understand the concept of cycles.

4.7.4.B Know that adaptations are important for survival.

**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))

#### S4. The Nature of Science

##### S4 A.1 Reasoning and Analysis

**S4A.1.1** Identify and explain the pros and cons of applying scientific, environmental, or technological knowledge to possible solutions to problems.

**PA Standards:** 3.2.4.A, 3.2.4.C, 3.8.4.C

| X – performance assessed during that semester |  |   |   |            |
|---|--|---|---|------------|
|   | Performance Indicators   | 1 | 2 | Assessment |
| A.  | <b>S4.A.1.1.1</b> Distinguish between a scientific fact and an opinion, providing clear explanations that connect observations and results (e.g., a scientific act can be supported through making observations).  |   |   |            |
| B.  | <b>S4.A.1.1.2</b> Identify and describe examples of common technological changes past to present in the community (e.g., energy production, transportation, communications, agriculture, packaging materials) that have either positive or negative impacts on society or the environment. |   |   |            |

##### S.4.A.2 Processes, Procedures and Tools of Scientific Investigations

**S4.A.2.1** Apply skills necessary to conduct an experiment or design a solution to a problem

**PA Standard:** 3.2.4.C

| X – performance assessed during that semester |  |   |   |            |
|---|--|---|---|------------|
|   | Performance Indicators   | 1 | 2 | Assessment |
| A.  | <b>S4.A.2.1.1</b> Generate questions about objects, organisms, or events that can be answered through scientific investigations.   |   |   |            |
| B.  | <b>S4.A.2.1.2</b> Design and describe an investigation (a fair test) to test one variable.   |   |   |            |
| C.  | <b>S4.A.2.1.3</b> Observe a natural phenomenon (e.g., weather changes, length of daylight/night, movement of shadows, animal migrations, growth of plants), record observations, and then make a prediction based on those observations. |   |   |            |
| D.  | <b>S4.A.2.1.4</b> State a conclusion that is consistent with the information.  |   |   |            |

**S4.A.2.2** Identify appropriate instruments for a specific task and describe the information the instrument can provide

**PA Standards: 3.7.4.A, 3.7.4.B**

X – performance assessed during that semester

|    | <b>Performance Indicators</b>  | <b>1</b> | <b>2</b> | <b>Assessment</b> |
|----|--|----------|----------|-------------------|
| A. | <b>S4.A.2.2.1</b> Identify appropriate tools or instruments for specific tasks and describe the information they can provide (e.g., measuring: length-ruler, mass-balance scale, volume-beaker, temperature-thermometer; making observations: hand lens, binoculars, telescope). |          |          |                   |

### **S4.A.3 Systems, Models and Patterns**

**S4.A.3.1** Identify systems and describe relationships among parts of a familiar system (e.g., digestive system, simple machines, water cycle).

**PA Standard: 3.1.4.A 4.4.4.C, 4.6.4.A, 4.6.4.B, 3.6.4.A, 3.6.4.B, 3.6.4.C**

X – performance assessed during that semester

|    | <b>Performance Indicators</b>  | <b>1</b> | <b>2</b> | <b>Assessment</b> |
|----|--|----------|----------|-------------------|
| A. | <b>S4.A.3.1.1</b> Categorize systems as either natural or human-made (e.g., ballpoint pens, simple electrical circuits, plant anatomy, water cycle). |          |          |                   |
| B. | <b>S4.A.3.1.2</b> Explain a relationship between the living and nonliving components in a system (e.g., food web, terrarium, bicycle).               |          |          |                   |
| C. | <b>S4.A.3.1.3</b> Categorize the parts of an ecosystem as either living or non-living and describe their roles in the system.                        |          |          |                   |
| D. | <b>S4.A.3.1.4</b> Identify the parts of the food and fiber systems as they relate to agricultural products from the source to the consumer.          |          |          |                   |

**S4.A.3.2** Use models to illustrate simple concepts and compare the models to what it represents.

**PA Standards: 3.1.4.B, 4.3.4.C**

X – performance assessed during that semester

|    | <b>Performance Indicators</b>   | <b>1</b> | <b>2</b> | <b>Assessment</b> |
|----|---|----------|----------|-------------------|
| A. | <b>S4.A.3.2.1</b> Identify what different models represent (e.g., maps show physical features, directions, distances; globes represent Earth; drawings of watersheds depict terrain; dioramas show ecosystems; concept maps show relationships of ideas). |          |          |                   |
| B. | <b>S4.A.3.2.2</b> Use models to make observations to explain how systems work (e.g., water cycle, sun-Earth-moon system).   |          |          |                   |
| C. | <b>S4.A.3.2.3</b> Use appropriate, simple modeling tools and techniques to describe or illustrate a system (e.g., two cans and string to model a communications system, terrarium to model an ecosystem).   |          |          |                   |
| D. | <b>S4.A.3.3.1</b> Identify and describe observable patterns (e.g., growth patterns in plants, weather, water cycle).  |          |          |                   |
| E. | <b>S4.A.3.3.2</b> Predict future conditions/events based on observable patterns (e.g., day/night, seasons, sunrise/sunset, lunar phases).   |          |          |                   |

### **S4.B.1 Structure and Function of Organisms**

**PA Standard: 3.3.4.A, 3.3.4., 4.3.4.A, 4.3.4.C, 4.6.4.A**

X – performance assessed during that semester

|    | <b>Performance Indicators</b>   | <b>1</b> | <b>2</b> | <b>Assessment</b> |
|----|---|----------|----------|-------------------|
| A. | <b>S4.B.1.1.1</b> Identify life processes of living things (e.g., growth, digestion, respiration).  |          |          |                   |
| B. | <b>S4.B.1.1.2</b> Compare similar functions of external characteristics of organisms (e.g., anatomical characteristics: appendages, type of covering, body segments). |          |          |                   |

|    |  |  |  |  |
|----|--|--|--|--|
| C. | <b>S4.B.1.1.4</b> Describe how different parts of a living thing work together to provide what the organism needs (e.g., parts of plants: roots, stems, leaves). |  |  |  |
|----|--|--|--|--|

## **S4.B.2 Continuity of Life**

**S4.B.2.1.** Identify and explain how adaptations help organisms to survive.

**PA Standard: 4.7.4.B**

|    |   | X – performance assessed during that semester |          |                   |
|----|---|---|----------|-------------------|
|    | <b>Performance Indicators</b>   | <b>1</b>                                      | <b>2</b> | <b>Assessment</b> |
| A. | <b>S4.B.2.1.1</b> identify characteristics for plant and animal survival in different environments (e.g., wetland, tundra, desert, prairie, deep ocean, forest).                                      |   |          |                   |
| B. | <b>S4.B.2.1.2</b> Explain how specific adaptations can help a living organism survive (e.g., protective coloration, mimicry, leaf sizes and shapes, ability to catch or retain water).                |   |          |                   |
| C. | <b>S4.B.2.2.1</b> Identify physical characteristics (e.g., height, hair color, eye color, attached earlobes, ability to roll tongue) that appear in both parents and could be passed on to offspring. |   |          |                   |

## **S4.B.3 Ecological Behavior and Systems**

**S4.B.3.1.** Identify and describe living and nonliving things in the environment and their interaction.

**PA Standard: 4.6.4.A**

|    |   | X – performance assessed during that semester |          |                   |
|----|---|---|----------|-------------------|
|    | <b>Performance Indicators</b>   | <b>1</b>                                      | <b>2</b> | <b>Assessment</b> |
| A. | <b>S4.B.3.1.1</b> Describe the living and nonliving components of a local ecosystem (e.g., lentic and lotic systems, forest, cornfield, grasslands, city park or playground).   |   |          |                   |
| B. | <b>S4.B.3.1.2</b> Describe interactions between living and nonliving components (e.g. plants – water, soil, sunlight, carbon dioxide, temperature; animals – food, water, shelter, oxygen, temperature) of a local ecosystem. |   |          |                   |
| C. | <b>S4.B.3.2.2</b> Describe and predict how changes in the environment (e.g., fire, pollution, flood, building dams) can affect systems.   |   |          |                   |
| D. | <b>S4.B.3.2.3</b> Explain and predict how changes in seasons affect plants, animals, or daily human life (e.g., food availability, shelter, mobility).  |   |          |                   |
| A. | <b>S4.B.3.1.1</b> Describe the living and nonliving components of a local ecosystem (e.g., lentic and lotic systems, forest, cornfield, grasslands, city park or playground).   |   |          |                   |

## **S4.C. Physical Sciences**

**S4.C.1 Structure, Properties, and Interaction of Matter and Energy**

**S4.C.1.1.** Describe observable physical properties of matter.

**PA Standard: 3.4.4.A, 3.2.4.B**

|    |  | X – performance assessed during that semester |          |                   |
|----|--|---|----------|-------------------|
|    | <b>Performance Indicators</b>  | <b>1</b>                                      | <b>2</b> | <b>Assessment</b> |
| A. | <b>S4.C.1.1.1</b> Use physical properties (e.g., mass, shape, size, volume, color, texture, magnetic property, state (solid, liquid, or gas), conductivity (electrical or heat)) to describe matter. |   |          |                   |
| B. | <b>S4.C.1.1.2</b> Categorize/group objects using physical characteristics.   |   |          |                   |

## **S4.C.2 Forms, Sources, Conversion, and Transfer of Energy**

**S4.C.2.1.** Recognize basic energy types and sources or describe how energy can be changed from one form to another.

**PA Standard: 3.4.4.B, 3.4.4.C**

| X – performance assessed during that semester |  |          |          |                   |
|---|--|----------|----------|-------------------|
|   | <b>Performance Indicators</b>  | <b>1</b> | <b>2</b> | <b>Assessment</b> |
| A.  | <b>S4.C.2.1.1</b> Identify energy forms and examples (e.g., light, heat, stored, motion, electrical).  |          |          |                   |
| B.  | <b>S4.C.2.1.2</b> Describe the flow of energy through an object or system (e.g., feeling radiant heat from a light bulb, eating food to get energy, using a battery to light a bulb or run a fan). |          |          |                   |
| C.  | <b>S4.C.2.1.3</b> Recognize or illustrate simple direct current series and parallel circuits composed of batteries, light bulbs (or other common loads), wire, and on/off- switches.               |          |          |                   |
| D.  | <b>S4.C.2.1.4</b> Identify characteristics of sound (e.g., pitch, loudness, echoes).   |          |          |                   |

## **S4.C.3 Principles of Motion and Force**

**S4.C.3.1.** Identify and describe different types of force and motion, or the effect of the interaction between force and motion.

**PA Standard: 3.4.4.C, 3.6.4.C, 3.2.4.B**

| X – performance assessed during that semester |   |          |          |                   |
|---|---|----------|----------|-------------------|
|   | <b>Performance Indicators</b>   | <b>1</b> | <b>2</b> | <b>Assessment</b> |
| A.  | <b>S4.C.3.1.1</b> Describe changes in motion caused by forces (e.g., magnetic, pushes or pulls, gravity, friction).   |          |          |                   |
| B.  | <b>S4.C.3.1.2</b> Compare the relative movement of objects or describe types of motion that are evident (e.g., bouncing ball, moving in a straight line, back and forth, merry-go-round). |          |          |                   |
| C.  | <b>S4.C.3.1.3</b> Describe the position of an object by locating it relative to another object or the background (e.g., geographic direction, left, up).                                  |          |          |                   |

## **S4.D Earth and Space Sciences**

### **S4.D.1 Earth Features and Processes that Change Earth and Its Resources**

**S4.D.1.1.** Describe basic landforms in Pennsylvania

**PA Standard: 3.5.4.A**

| X – performance assessed during that semester |  |          |          |                   |
|---|--|----------|----------|-------------------|
|   | <b>Performance Indicators</b>  | <b>1</b> | <b>2</b> | <b>Assessment</b> |
| A.  | <b>S4.D.1.3.1</b> Describe types of freshwater and saltwater bodies (e.g., lakes, rivers, wetlands, oceans).   |          |          |                   |
| B.  | <b>S4.D.1.3.2</b> Explain how water goes through phase changes (i.e., evaporation, condensation, freezing, and melting).   |          |          |                   |
| C.  | <b>S4.D.1.3.4</b> Explain the role and relationship of a watershed or a wetland on water sources (e.g., water storage, groundwater recharge, water filtration, water source, water cycle). |          |          |                   |

### **S4.D.2 Weather, Climate and Atmospheric Processes**

**S4.D.2.1.** Identify basic weather conditions and how they are measured.

**PA Standard: 3.5.4.C, 3.7.4.B, 3.2.4.B**

|    | <b>Performance Indicators</b>  | <b>1</b> | <b>2</b> | <b>Assessment</b> |
|----|--|----------|----------|-------------------|
| A. | <b>S4.D.2.1.1</b> Identify basic clouds types (cirrus, cumulus, stratus, cumulonimbus) and make connections to basic elements of weather (e.g., changes in temperature and precipitation). |          |          |                   |
| B. | <b>S4.D.2.1.2</b> Identify weather patterns from data charts or graphs   |          |          |                   |

|    |  |  |  |  |
|----|--|--|--|--|
|    | of the data (e.g., temperature, wind direction, wind speed, cloud types, precipitation).   |  |  |  |
| C. | <b>S4.D.2.1.3</b> Identify appropriate instruments (thermometer, rain gauge, weather vane, anemometer, barometer to study weather and what they measure. |  |  |  |

### **S4.D.3 Composition and Structure of the Universe**

**S4.D.3.1** Describe Earth's relationship to the sun and the moon.

**PA Standard: 3.4.4.D**

|    | <b>Performance Indicators</b>  | <b>1</b> | <b>2</b> | <b>Assessment</b> |
|----|--|----------|----------|-------------------|
| A. | <b>S4.D.3.1.1</b> Describe motions of the sun-Earth-moon system.   |          |          |                   |
| B. | <b>S4.D.3.1.2</b> Explain how the motion of the sun, earth, moon system relates to time (e.g., days, months, years). |          |          |                   |

## **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](mailto: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)

| Content Sequence                            | Dates          |
|---|----------------|
| <b>I. Cell Theory and <u>Organisms</u>:</b> | <b>3 weeks</b> |
| A. life functions of cells                  |                |
| B. cell differences.                        |                |
| C. observation tools.                       |                |
| <b>II Evolution</b>                         | <b>2 weeks</b> |
| A. heredity                                 |                |
| B. comparisons of fossils                   |                |
| C. comparing organisms                      |                |
| <b>III Earth System Theory</b>              | <b>8 weeks</b> |
| A. orbits                                   |                |
| B. water cycle                              |                |
| C. ground water                             |                |
| D. basic weather conditions                 |                |
| E. maps and models                          |                |
| <b>IV Energy</b>                            | <b>5 weeks</b> |
| A. sound                                    |                |
| B. heat production                          |                |
| C. changes in temperature                   |                |



- D. electrical circuits
- E. electrical pathways
- F. properties of materials

**V Force and Motion** **4 weeks**

- A. change in position
- B. Changes in motion
- C. Relative position
- D. Forces

**VI Force and Motion II** **4 weeks**

- A. Electricity

**VII Theory of Matter** **6 weeks**

- A. molecules
- B. Properties of matter
- C. states of matter
- D. compounds, mixtures and solutions
- E. properties of water

**Objectives:**

1. The students will be able to interpret the Newtonian Laws of **Force & Motion** by observing that a force is required to change an object's speed.
2. The students will be able to discover that magnets and electricity produce related forces while studying Newtonian Laws of **Force and Motion.**
3. The students will develop an understanding of the theory of **matter** and its characteristic properties that can be used to identify and separate one substance from another.
4. The students will relate how the difference characteristics of plants and animals help some populations survive and reproduce in greater numbers by examining **evolution** of life over time.
5. The students will analyze the **earth** system theory; and evaluate how the earth system changes constantly as air, water, soil and rock interact and how the earth is a part of a larger sun, earth, and moon system.
6. The students will apply their prior knowledge to gain a more thorough understanding of Cell theory and **Organisms:** They will discover that all living things are made of parts that have specific functions.
7. The students will formulate ideas to build upon their understanding of Forms, Source, Conversion, and Transformation of **Energy:** They will discover that Energy exists in many forms and can be changed from one form to another (transformed) as it moves through a system.

WRITING TEAM: Susan Benton, Celeste Gustafson, Leytha Jaquith, Terri Walters, Megan Yeager, Amanda McBriar

### 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?  
  X   No weight/Non credit    \_\_\_\_\_ Standard weight  
\_\_\_\_\_ Enhanced weight (Describe)