

# QUIET VALLEY LIVING HISTORICAL FARM

## Quiet Valley Living Historical Farm and Pennsylvania's Academic Standards for Science and Technology

Programs at Quiet Valley offer a unique opportunity for your class to learn about Pennsylvania's 19<sup>th</sup> Century history and technology. Our programs dovetail well with Pennsylvania's Academic Standards for Science and Technology in a variety of ways. Below are highlights of how a visit to Quiet Valley can enhance your efforts to meet Pennsylvania's Academic Standards for Science and Technology.

### 3.1 Unifying Themes Grade 4

- A. Know that natural and human-made objects are made up of parts.
- Identify and describe what parts make up a system.
  - Identify system parts that are natural and human-made (e.g., ball point pen, simple electrical circuits, plant anatomy).
  - Describe the purpose of analyzing systems.
  - Know that technologies include physical technology systems (e.g., construction, manufacturing, transportation), informational systems and biochemical-related systems.
- C. Illustrate patterns that regularly occur and reoccur in nature.
- Identify observable patterns
  - (e.g., growth patterns in plants, crystal shapes in minerals, climate, structural patterns in bird feathers).
  - Use knowledge of natural patterns to predict next occurrences (e.g., seasons, leaf patterns, lunar phases).
- D. Know that scale is an important attribute of natural and human made objects, events and phenomena.
- Identify the use of scale as it relates to the measurement of distance, volume and mass.
- E. Recognize change in natural and physical systems.
- Recognize change as fundamental to science and technology concepts.
  - Examine and explain change by using time and measurement.
  - Describe the change to objects caused by heat, cold, light or chemicals.

### **3.2 Inquiry and Design**

#### **Grade 4**

- A. Identify and use the nature of scientific and technological knowledge.
  - Provide clear explanations that account for observations and results.
  - Relate how new information can change existing perceptions.
- B. Describe objects in the world using the five senses.
  - Recognize observational descriptors from each of the five senses (e.g., see-blue, feel-rough).
  - Use observations to develop a descriptive vocabulary.
- C. Recognize and use the elements of scientific inquiry to solve problems.
  - Generate questions about objects, organisms and/or events that can be answered through scientific investigations.
  - Design an investigation.
  - Conduct an experiment.
  - State a conclusion that is consistent with the information.
- D. Recognize and use the technological design process to solve problems.
  - Recognize and explain basic problems.
  - Identify possible solutions and their course of action.

### **3.3 Biological Sciences**

#### **Grade 4**

- A. Know the similarities and differences of living things.
  - Identify life processes of living things (e.g., growth, digestion, react to environment). Know that some organisms have similar external characteristics (e.g., anatomical characteristics; appendages, type of covering, body segments) and that similarities and differences are related to environmental habitat.
  - Describe basic needs of plants and animals
- B. Know that living things are made up of parts that have specific functions.
  - Determine how different parts of a living thing work together to make the organism function.
- C. Know that characteristics are inherited and, thus, offspring closely resemble their parents.
  - Identify characteristics for animal and plant survival in different climates.
  - identify physical characteristics that appear in both parents and offspring and differ between families, strains or species.
- D. Identify changes in living things over time.

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

#### **Grade 4**

- A. Recognize basic concepts about the structure and properties of matter.
- Describe properties of matter (e.g., hardness, reactions to simple chemical tests).
  - Know that combining two or more substances can make new materials with different properties.
  - Know different material characteristics (e.g., texture, state of matter, solubility).
- B. Know basic energy types, sources and conversions.
- Identify energy forms and examples (e.g., sunlight, heat, stored, motion).
  - Know and demonstrate the basic properties of heat by producing it in a variety of ways.
- C. Observe and describe different types of force and motion.
- Recognize forces that attract or repel other objects and demonstrate them.
  - Describe various types of motions.
  - Compare the relative movement of objects and describe types of motion that are evident.
  - Describe the position of an object by locating it relative to another object or the background (e.g., geographic direction, left, up).

### **3.5 Earth Sciences**

- A. Know basic landforms and earth history.
- Identify various earth structures (e.g., mountains, faults, drainage basins) through the use of models.
  - Identify the composition of soil as weathered rock and decomposed organic remains. Describe fossils and the type of environment they lived in (e.g., tropical, aquatic, desert).
- B. Know types and uses of earth materials.
- Identify uses of various earth materials (e.g., buildings, highways, fuels, growing plants).
  - Identify and sort earth materials according to a classification key (e.g., soil/rock type).
- C. Know basic weather elements.
- Explain how the different seasons effect plants, animals, food availability and daily human life.
- D. Recognize the earth's different water resources.

- Recognize other resources available from water (e.g., energy, transportation, minerals, food).

### **3.6 Technology Education**

#### **Grade 4**

- A. Know that biotechnologies relate to propagating, growing, maintaining, adapting, treating and converting.
- Identify agricultural and industrial production processes that involve plants and animals.
  - Identify waste management treatment processes.
  - Describe how knowledge of the human body influences or impacts ergonomic design.
  - Describe how biotechnology has impacted various aspects of daily life (e.g., health care, agriculture, waste treatment).
- C. Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design.
- Identify and group a variety of construction tasks.
  - Identify the major construction systems present in a specific local building.
  - Identify specific construction systems that depend on each other in order to complete a project.
  - Know skills used in construction.
  - Identify basic resources needed to produce a manufactured item.
  - Identify basic component operations in a specific manufacturing enterprise (e.g., cutting, shaping, attaching).
  - Identify waste and pollution resulting from a manufacturing enterprise.
  - Explain and demonstrate the concept of manufacturing (e.g., assemble a set of papers or ball point pens sequentially, mass produce an object).
  - Identify transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting.
  - Identify and experiment with simple machines used in transportation systems.
  - Explain how improved transportation systems have changed society.

### **3.7 Technological Devices**

- A. Explore the use of basic tools, simple materials and techniques to safely solve problems.
- Describe the scientific principles on which various tools are based.
  - Group tools and machines by their function.
  - Select and safely apply appropriate tools and materials to solve simple problems.
- B. Select appropriate instruments to study materials.
- Develop simple skills to measure, record, cut and fasten.

- Explain appropriate instrument selection for specific tasks.

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

#### **Grade 4**

A. Know that people select, create and use science and technology and that they are limited by social and physical restraints.

- Identify and describe positive and negative impacts that influence or result from new tools and techniques.
- Identify how physical technology (e.g., construction, manufacturing, transportation), informational technology and biotechnology are used to meet human needs.
- Describe how scientific discoveries and technological advancements are related.
- Identify interrelationships among technology, people and their world.
- Apply the technological design process to solve a simple problem.

B. Know how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.

- Identify and distinguish between human needs and improving the quality of life.
- Identify and distinguish between natural and human-made resources.
  - Describe a technological invention and the resources that were used to develop it. Know the pros and cons of possible solutions to scientific and technological problems in society.
- Compare the positive and negative expected and unexpected impacts of technological change.
- Identify and discuss examples of technological change in the community that have both positive and negative impacts.

