Pennsylvania
Science, Technology & Engineering and Environmental Literacy & Sustainability Standards (STEEL)

Grade 4

Adopted 2022

Life Science 3.1

Structure and Function

A. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. 3.1.4.A

Growth and Development of Organisms

na1. Not applicable at this level. 3.1.4.NA1

Organization for Matter and Energy Flow in Organisms

na2. Not applicable at this level. 3.1.4.NA2

Information Processing

B. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. 3.1.4.B

Interdependent Relationships in Ecosystems

na3. Not applicable at this level. 3.1.4.NA3

Cycles of Matter and Energy Transfer in Ecosystems

na4. Not applicable at this level. 3.1.4.NA4

Ecosystem Dynamics, Functioning, and Resilience

na5. Not applicable at this level. 3.1.4.NA5

Social Interactions and Group Behavior

na6. Not applicable at this level. 3.1.4.NA6

Inheritance of Traits

na7. Not applicable at this level. 3.1.4.NA7

Variation of Traits

na8. Not applicable at this level. 3.1.4.NA8

Evidence of Common Ancestry and Diversity

na9. Not applicable at this level. 3.1.4.NA9

Natural Selection

na10. Not applicable at this level. 3.1.4.NA10

Adaptation

na11. Not applicable at this level. 3.1.4.NA11

Biodiversity and Humans

na12. Not applicable at this level. 3.1.4.NA12

Physical Science 3.2

Structure and Properties of Matter

na1. Not applicable at this level. 3.2.4.NA1

Chemical Reactions

na2. Not applicable at this level. 3.2.4.NA2

Nuclear Processes

na3. Not applicable at this level. 3.2.4.NA3

Forces and Motion

na4. Not applicable at this level. 3.2.4.NA4

Types of Interactions

na5. Not applicable at this level. 3.2.4.NA5

Definitions of Energy

A. Use evidence to construct an explanation relating the speed of an object to the energy of that object. 3.2.4.A

Conservation of Energy and Energy Transfer

B. Make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. 3.2.4.B

Relationship Between Energy and Forces

C. Ask questions and predict outcomes about the changes in energy that occur when objects collide. 3.2.4.C

Energy in Chemical Processes and Everyday Life

D. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. 3.2.4.D

Wave Properties

E. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. 3.2.4.E

Electromagnetic Radiation

F. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. 3.2.4.F

Information Technologies and Instrumentation

G. Generate and compare multiple solutions that use patterns to transfer information. 3.2.4.G

Earth and Space Science 3.3

The Universe and Its Stars

na1. Not applicable at this level. 3.3.4.NA1

Earth and the Solar System

na2. Not applicable at this level. 3.3.4.NA2

The History of Planet Earth

A. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. 3.3.4.A

Earth Materials and Systems

B. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. 3.3.4.B

Plate Tectonics and Large-Scale System Interactions

C. Analyze and interpret data from maps to describe patterns of Earth's features. 3.3.4.C

The Roles of Water in Earth's Surface Processes

na3. Not applicable at this level. 3.3.4.NA3

Weather and Climate

na4. Not applicable at this level. 3.3.4.NA4

Biogeology

na5. Not applicable at this level. 3.3.4.NA5

Natural Resources

D. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. 3.3.4.D

Natural Hazards

E. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. 3.3.4.E

Human Impact on Earth Systems

na6. Not applicable at this level. 3.3.4.NA6

Environmental Literacy & Sustainability 3.4

Agricultural Systems

A. Analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them. 3.4.3-5.A

Environment and Society

B. Make a claim about the environmental and social impacts of design solutions and civic actions, including their own actions. 3.4.3-5.B

Watersheds and Wetlands

C. Examine ways you influence your local environment and community by collecting and displaying data. 3.4.3-5.C

Investigating Environmental Issues

D. Develop a model to demonstrate how local environmental issues are connected to larger local environment and human systems. 3.4.3-5.D

Environmental Experiences

na1. Refer to other standards in this document to build a learning progression. 3.4.3-5.NA1

Evaluating Solutions

E. Construct an argument to support whether action is needed on a selected environmental issue and propose possible solutions. 3.4.3-5.E

Environmental Sustainability

na2. Refer to other standards in this document to build a learning progression. 3.4.3-5.NA2

Environmental Stewardship

F. Critique ways that people depend on and change the environment. 3.4.3-5.F

Environmental Justice

G. Investigate how perspectives over the use of resources and the development of technology have changed over time and resulted in conflict over the development of societies and nations. 3.4.3-5.G

Technology & Engineering 3.5

Applying, Maintaining, and Assessing Technological Products and Systems

A. Use appropriate symbols, numbers, and words to communicate key ideas about technological products and systems. 3.5.3-5.A

B. Examine information to assess the trade-offs to using a product or system. 3.5.3-5.B

C. Follow directions to complete a technological task. 3.5.3-5.C

D. Predict how certain aspects of their daily lives would be different without given technologies. 3.5.3-5.D

E. Explain why responsible use of technology requires sustainable management of resources. 3.5.3-5.E

F. Classify resources used to create technologies as either renewable or nonrenewable. 3.5.3-5.F

G. Describe the helpful and harmful effects of technology. 3.5.3-5.G

H. Determine factors that influence changes in a society's technological systems or infrastructure. 3.5.3-5.H

I. Design solutions by safely using tools, materials, and skills. 3.5.3-5.I

J. Explain how technologies are developed or adapted when individual or societal needs and wants change. 3.5.3-5.J

K. Judge technologies to determine the best one to use to complete a given task or meet a need. 3.5.3-5.K

L. Demonstrate how tools and machines extend human capabilities, such as holding, lifting, carrying, fastening, separating, and computing. 3.5.3-5.L

Design and Design Thinking in Technology and Engineering Education

M. Demonstrate essential skills of the engineering design process. 3.5.3-5.M

N. Identify why a product or system is not working properly. 3.5.3-5.N

O. Describe requirements of designing or making a product or system. 3.5.3-5.O

P. Evaluate the strengths and weaknesses of existing design solutions, including their own solutions. 3.5.3-5.P

Q. Practice successful design skills. 3.5.3-5.Q

R. Apply tools, techniques, and materials in a safe manner as part of the design process. 3.5.3-5.R

S. Illustrate that there are multiple approaches to design. 3.5.3-5.S

T. Apply universal principles and elements of design. 3.5.3-5.T

U. Evaluate designs based on criteria, constraints, and standards. 3.5.3-5.U

V. Interpret how good design improves the human condition. 3.5.3-5.V

Integration of Knowledge, Technologies, and Practices

W. Describe the properties of different materials. 3.5.3-5.W

X. Explain how various relationships can exist between technology and engineering and other content areas. 3.5.3-5.X

Y. Identify the resources needed to get a technical job done, such as people, materials, capital, tools, machines, knowledge, energy, and time 3.5.3-5.Y

Z. Create a new product that improves someone's life. 3.5.3-5.Z

Nature and Characteristics of Technology and Engineering

AA. Create representations of the tools people made, how they cultivated to provide food, made clothing, and built shelters to protect themselves. 3.5.3-5.AA

BB. Illustrate how, when parts of a system are missing, it may not work as planned. 3.5.3-5.BB

CC. Describe how a subsystem is a system that operates as a part of another larger system. 3.5.3-5.CC

DD. Demonstrate how simple technologies are often combined to form more complex systems. 3.5.3-5.DD

EE. Explain how solutions to problems are shaped by economic, political, and cultural forces. 3.5.3-5.EE

FF. Compare how things found in nature differ from things that are human-made, noting differences and similarities in how they are produced and used. 3.5.3-5.FF

GG. Describe the unique relationship between science and technology, and how the natural world can contribute to the human-made world to foster innovation. 3.5.3-5.GG

HH. Differentiate between the role of scientists, engineers, technologists, and others in creating and maintaining technological systems. 3.5.3-5.HH