

# Pennsylvania Academic Standards for Environment and Ecology

## Grade Specific Standards Addresses by STREAMS Activities

- Water Cycle (construct water cycle)
  - 4.1 Watersheds & Wetlands (4.1.7A)
  - 4.6 Ecosystems and their Interactions (4.6.4B)
- Watershed (demonstration-student activity )
  - 4.1 Watersheds & Wetlands (4.1.4A,B; 4.1.7A,B,E; 4.1.10A,B,E; 4.1.12A)
  - 4.3 Environmental Health (4.3.4B; 4.3.7A,B,C; 4.3.10C)
  - 4.4 Agriculture and Society (4.4.4A; 4.4.7A)
  - 4.6 Ecosystems and their Interactions (4.6.4C; 4.6.7C)
  - 4.7 Threatened, Endangered & Extinct (4.7.4C; 4.7.7C)
  - 4.8 Humans and the Environment (4.8.4C; 4.8.7C)
- Watershed Delineation (student activity)... using map
  - 4.1 Watersheds & Wetlands (4.1.4B; 4.1.7B; 4.1.10A,B,C; 4.1.12A,C)
- Groundwater (model)
  - 4.1 Watersheds & Wetlands (4.1.7B; 4.1.10B; 4.1.12A,D)
  - 4.3 Environmental Health (4.3.4A,B,C; 4.3.7A,B,C; 4.3.10B)
- Groundwater in Jar (student activity)
  - 4.1 Watersheds & Wetlands (4.1.7B; 4.1.10B; 4.1.12D)
- Stream Table (model)
  - 4.1 Watersheds & Wetlands (4.1.4A,B; 4.1.7B; 4.1.10A,B)
- Water Consumption (student activity)
  - 4.1 Watersheds & Wetlands (4.1.7B)
  - 4.3 Environmental Health (4.3.7A)
- Wetland (model)
  - 4.1 Watersheds & Wetlands (4.1.7D,E; 4.1.10D)
- Ecosystem Interrelationship Activity... using rope
  - 4.1 Watersheds & Wetlands (4.1.4E; 4.1.7D,E; 4.1.10D,E)
  - 4.3 Environmental Health (4.3.4B; 4.3.7A,B,C; 4.1.10C)
  - 4.4 Agriculture and Society (4.4.4A; 4.4.7A)
  - 4.6 Ecosystems and their Interactions (4.6.4C; 4.6.7C)
  - 4.7 Threatened, Endangered & Extinct (4.7.4C; 4.7.7C)
  - 4.8 Humans and the Environment (4.8.4C; 4.8.7C)
- Microbiology Lab Activity (Identify Organisms from Wetland)
  - 4.1 Watersheds & Wetlands (4.1.4A,C,D; 4.1.7C,D; 4.1.10C,D)

- Huntingdon Waste Water Treatment... tour
  - 4.1 Watersheds & Wetlands (4.1.7B; 4.1.10E)
  - 4.2 Renewable and Nonrenewable Resources (4.2.4C,D; 4.2.7B,D; 4.2.10D)
  - 4.3 Environmental Health (4.3.4A,B; 4.1.7A,B; 4.1.10A,B)
  - 4.9 Laws and Regulation (4.9.4A; 4.9.7A; 4.9.10A)
- Limnology Activities... width, depth, speed, volume
  - 4.1 Watersheds & Wetlands (4.1.7A,C; 4.1.10A; 4.1.12A,C)
  - 4.3 Environmental Health (4.3.4B,C; 4.3.7B)
  - 4.8 Humans and the Environment (4.8.4C; 4.8.7C; 4.8.10C; 4.8.12C)
- Joller Mine... impact of acid mine drainage
  - 4.3 Environmental Health (4.3.4A,B; 4.3.7A,B; 4.3.10.A,B)
  - 4.8 Humans and the Environment (4.8.4B; 4.8.7B,C; 4.8.10C; 4.8.12C)
  - 4.9 Laws and Regulation (4.9.4A; 4.9.7A; 4.9.10.A)
- Wetlands...Benefits/Functions, Field Work
  - 4.1 Watersheds & Wetlands (4.1.4C,D; 4.1.7D; 4.1.10D; 4.1.12D,E)
  - 4.6 Ecosystems and their Interactions (4.6.4A,C; 4.6.7AC; 4.6.10A,C; 4.6.12A,C)
  - 4.9 Laws and Regulation (4.9.4A; 4.9.7A; 4.9.10.A)
- Stream Analysis... water quality monitoring/biological
  - 4.1 Watersheds & Wetlands (4.1.7A,B,C; 4.1.10C; 4.1.12C)
  - 4.3 Environmental Health (4.3.4B,C; 4.3.7B; 4.3.10B,C)
  - 4.8 Humans and the Environment (4.8.4C; 4.8.7C; 4.8.10C; 4.8.12C)
- Agriculture BMP's ...visit a farm
  - 4.2 Renewable and Nonrenewable Resources (4.2.4B,C; 4.2.7B)
  - 4.3 Environmental Health (4.3.10B)
  - 4.4 Agriculture and Society (4.4.4A,B; 4.4.7A,B; 4.4.10A,C)
  - 4.5 Integrated Pest Management (4.5.4A,B,C; 4.5.7A,B,C; 4.5.10B,C)
  - 4.6 Ecosystems and their Interactions (4.6.12A)
  - 4.8 Humans and the Environment (4.8.7D)
- Residential Developments...land management practices
  - 4.1 Watersheds & Wetlands (4.1.4E; 4.1.7E; 4.1.10E; 4.1.12E)
  - 4.3 Environmental Health (4.3.4B,C; 4.3.7B; 4.3.10B; 4.3.12B)
  - 4.8 Humans and the Environment (4.8.4C; 4.8.7C; 4.8.10C; 4.8.12C)
- Headwater to Mouth... examine a stream from headwater to mouth
  - 4.1 Watersheds & Wetlands (4.1.4E; 4.1.7E; 4.1.10E; 4.1.12E)
  - 4.3 Environmental Health (4.3.4B,C; 4.3.7B; 4.3.10B; 4.3.12B)
  - 4.8 Humans and the Environment (4.8.4C; 4.8.7C; 4.8.10C; 4.8.12C)

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## Grade Specific Standards Addresses by STREAMS Activities from Outside Resources

### PROJECT WET

- "The Incredible Journey" (pp. 161-165)... water cycle  
4.1 Watersheds & Wetlands (4.1.7A)
- "Imagine" (pp. 157-160)... water cycle writing  
4.1 Watersheds & Wetlands (4.1.4B; 4.1.7A)
- "Macroinvertebrate Mayhem" (pp. 322-327)... water quality/aquatic organism  
4.1 Watersheds & Wetlands (4.1.4C; 4.1.7C; 4.1.10C; 4.1.12C)  
4.3 Environmental Health (4.3.4.A,B,C; 4.3.7.A,BC; 4.3.10.B)  
4.6 Ecosystems and their Interactions (4.6.4.A,C; 4.6.7.A,C)  
4.8 Humans and the Environment (4.8.4C; 4.8.7C; 4.8.10C; 4.8.12C)
- "Water Address" (pp. 122-126)... identification/adaptations wildlife  
4.1 Watersheds & Wetlands (4.1.4D; 4.1.7D)  
4.6. Ecosystems and their Interactions (4.6.4A; 4.6.7A)  
4.7 Threatened, Endangered & Extinct Species (4.7.4A; 4.7.7A)
- "The Pucker Effect" (p. 341)... groundwater/pollution  
4.1 Watersheds & Wetlands (4.1.7B; 4.1.10B)  
4.3 Environmental Health (4.3.7B; 4.3.10B)
- "Pass the Jug" (pp. 392-397)...water conservation  
4.2 Renewable and Non-Renewable Resources (4.2.4A; 4.2.7A,B; 4.2.12A)  
4.3 Environmental Health (4.3.4A; 4.3.10A)

### WONDERS OF WETLANDS

- "Wetland Metaphors" (pp. 85-86)... functions/benefits of wetlands  
4.1 Watersheds & Wetlands (4.1.4D; 4.1.7D,E; 4.1.10D; 4.1.12D)
- "Wetland Habitats" (pp. 87-92)... types of wetlands  
4.1 Watersheds & Wetlands (4.1.4D; 4.1.7D; 4.1.10D; 4.1.12D)
- "Wetland Address Cards" (pp. 147-151)... identify plants and animals  
4.1 Watersheds & Wetlands (4.1.4D; 4.1.7D)
- "Salt Marsh Players" (pp. 165-173)... adaptation  
4.1 Watersheds & Wetlands (4.1.4C)  
4.6 Ecosystems and their Interactions (4.6.4A; 4.6.7A)  
4.7 Threatened, Endangered & Extinct Species (4.7.4B; 4.1.7B;  
4.1.10B)

S.W.I.M.M.

- "What Hanging Out in the Yard" (pp. 17-25)...biodiversity of plants/animals
  - 4.6 Ecosystems and their Interactions (4.6.4A)
  - 4.7 Threatened, Endangered & Extinct Species (4.7.7A; 4.7.10A)
- "When Rain Hits the Land" (pp. 59-66)...land surfaces; impact of household pollution
  - 4.1 Watersheds & Wetlands (4.1.7B; 4.1.10B)
  - 4.2 Renewable and Nonrenewable Resources (4.2.7B; 4.2.10B)
  - 4.3 Environmental Health (4.3.4B; 4.3.7B)
- "Driving the Bay to Exhaustion" (pp. 123-138)...impact of vehicle emissions
  - 4.3 Environmental Health (4.3.4B; 4.3.7B; 4.7.10B; 4.3.12B)
  - 4.8 Humans and the Environment (4.8.4B; 4.8.7B; 4.8.10B; 4.8.12B)
- "Testing the Waters" (pp. 157-158)...complete stream assessment
  - 4.1 Watersheds & Wetlands (4.1.7A,B,C; 4.1.10C; 4.1.12C)
  - 4.3 Environmental Health (4.3.4B,C; 4.3.7B; 4.3.10B)
  - 4.6 Ecosystems and their Interactions (4.6.4A,B; 4.6.7A,B)
  - 4.8 Humans and the Environment (4.8.4C; 4.8.7C; 4.8.10C; 4.8.12C)
- "Think! What's Under the Sink" (pp. 179-199)... common household products
  - 4.1 Watersheds & Wetlands (4.1.7B; 4.1.10B)
  - 4.3 Humans and the Environment (4.3.4B; 4.3.7B; 4.7.10B; 4.3.12B)
  - 4.5 Integrated Pest Management (4.5.4A,B; 4.5.7A,B; 4.5.10B)
  - 4.8 Humans and the Environment (4.8.4C; 4.8.7C; 4.8.10C; 4.8.12C)

### Project Wild

- "How Many Bears Live In This Forest?" (pp. 134-137)
  - ...habitat/sustainability
  - 4.6 Ecosystems and their Interactions (4.6.4A; 4.6.7A; 4.6.10A)
- "Good Buddies" (pp. 104-107)... symbiotic relationships
  - 4.3 Environmental Health (4.3.4C; 4.3.7C)
  - 4.6 Ecosystems and their Interactions (4.6.4A; 4.6.7A; 4.6.10A)
- "Quick Frozen Critters" (pp. 122-124)... predator/prey, adaptation
  - 4.1 Watersheds & Wetlands (4.1.4C)
  - 4.3 Environmental Health (4.3.4C)
  - 4.6 Ecosystems and their Interactions (4.6.4A; 4.6.7A)
  - 4.7 Threatened, Endangered & Extinct Species (4.7.4B; 4.7.7B; 4.7.10B)

K.A.R.E.

- Watershed Delineation Activity
  - 4.1 Watersheds & Wetlands (4.1.4B; 4.1.7B; 4.1.10A,B,C; 4.1.12A)
- "Where Have all the Shad Gone"
  - 4.1 Watersheds & Wetlands (4.1.10E; 4.1.12E)
  - 4.6 Ecosystems and their Interactions (4.6.12C)
  - 4.7 Threatened, Endangered & Extinct Species (4.7.4B; 4.7.7C)
- Watersheds in Pennsylvania Six Ways to the Sea...booklet
  - 4.1 Watersheds & Wetlands (4.1.7B; 4.1.10A,B)
- Stream Biodiversity. . . (netting & identification)
  - 4.1 Watersheds & Wetlands (4.1.4C; 4.1.7C; 4.1.10C)
  - 4.3 Environmental Health (4.3.4B,C; 4.3.7B; 4.3.10B)
  - 4.7 Threatened, Endangered & Extinct Species (4.7.4A; 4.7.7A; 4.7.10A)
  - 4.8 Humans and the Environment (4.8.4C; 4.8.7C; 4.8.10C; 4.8.12C)
- "Aquatic Habitats" from Living in Water (pp. 18-24)... fresh and salt water types
  - 4.1 Watersheds & Wetlands (4.1.4D; 4.1.7D; 4.1.10D; 4.1.12D)
  - 4.6 Ecosystems and their Interactions (4.6.4A; 4.6.7A; 4.6.10A)

#### Other Resources

- Wildlife Notes
  - 4.3 Environmental Health (4.3.4C; 4.3.7C)
  - 4.6 Ecosystems and their Interactions (4.6.4A; 4.6.7A)
  - 4.7 Threatened, Endangered & Extinct Species (4.7.4A,B; 4.7.7A; 4.7.10A,B)
- "Cowbird Caper" Pennsylvania Songbirds (pp. 255-258) parasitism
  - 4.3 Environmental Health (4.3.4C)
  - 4.6 Ecosystems and their Interactions (4.6.4A; 4.7.7A; 4.7.10A)
- Watershed Delineation Activity Watershed Education
  - 4.1 Watersheds & Wetlands (4.1.4B; 4.1.7B; 4.1.10A,B,C; 4.1.12A,B,C)
- Wildlife Forever CD-ROM Curriculum for Elementary Grades
  - 4.3 Environmental Health (All grades 5-12)
  - 4.6 Ecosystems and their Interactions (All grades 5-12)
  - 4.7 Threatened, Endangered & Extinct Species (All grades 5-12)
  - 4.8. Humans and the Environment (All grades 5-12)

## Standards Addressed by the Program

### National Standards of Teachers of Mathematics (NCTM)

- Pose tasks based on sound and significant mathematics.
- Build on students' prior experience and knowledge.
- Develop mathematics thinking skills that convince students of the validity of particular representations, solutions, conjectures, and answers.
- Engage students' intellect: pose questions and tasks that elicit, engage, and challenge each students' thinking.
- Develop students' mathematical knowledge and skills.
- Stimulate students to make connections and develop a coherent framework for mathematical ideas.
- Call for problem formulation, problem solving, and mathematical reasoning.
- Promote the development of all students' dispositions to do mathematics.
- Develop an instructional model based on the range of ways students learn mathematics.

### Grades 5-8

- Mathematics as Problem Solving
- Mathematics as Communications
- Mathematics as Reasoning
- Mathematical Connections
- Computation and Estimation
- Pattern and Functions
- Statistics
- Probability
- Measurements

The addressed areas of increased Attention in 5-8 Mathematics are as follows:

#### Mathematics as Problem Solving

- Pursuing open-ended problems and extended problem-solving projects.
- Investigating and formulating questions from problem situations.
- Representing situations verbally, numerically, graphically, geometrically, or symbolically.

#### Mathematics as Communications

- Discussing, writing, reading, and listening to mathematical ideas.

#### Mathematics as Reasoning

- Reasoning in spatial contexts.
- Reasoning with proportions.
- Reasoning from graphs.
- Reasoning inductively and deductively.

#### Mathematical Connections

- Connecting mathematics to other subjects and to the world.
- Connecting topics within mathematics.
- Applying mathematics.

#### Computation and Estimation

### Pattern and Functions

- Identifying and using functional relationships.
- Developing and using tables, graphs, and rules to describe situations.
- Interpreting among different mathematical representations.

### Statistics

- Using a variety of methods to describe, analyze, evaluate, and make decisions.

### Probability

- Creating experimental and theoretical models of situations involving probabilities.

### Measurement

- Estimating and using measurement to solve problems.

## National Center for Improving Science Education (SCISE)

- Accessible to all students
- Build on students' prior experience and knowledge.
- Use an instructional model based on scientific process such as: question, discover, create, communicate, and pursue new questions.
- Relate to personal and social needs.
- Select science concepts that are developmentally appropriate, with illustrative examples drawn from the content on multiple disciplines of science.
- Develop scientific thinking skills such as drawing conclusions based on evidence, using inference, creating models.
- Developing scientific habits of mind such as curiosity, skepticism, honesty, living with ambiguity.
- Shift the role of teacher from imparter of knowledge to designer and facilitator of learning.
- Seek relevant and significant applications of science content and concepts to students' personal and community life.