

# SCIENCE

LENGTH OF TIME: one year

GRADE LEVEL: 5

## COURSE STANDARDS:

Students will:

1. Demonstrate knowledge of energy transformation as it applies to the components of an electric circuit. (PA Academic Std 3.1.7a, 3.4.7b)
2. Demonstrate an understanding of conductors of electricity. (PA Academic Std 3.4.7b)
3. Communicate results of an experiment through writing, drawing, and discussion. (PA Academic Std 3.2.7a, 3.2.7c, 3.6.7b)
4. Demonstrate use of a microscope. (PA Academic Std 3.7.7a, 3.7.7b)
5. Communicate detailed observations of three microscopic organisms through writing, drawing, and discussion. (PA Academic Std 3.3.7a, 3.7.7b)
6. Describe basic elements of meteorology including: ocean impact on climate, air masses and global wind patterns, cloud types and formation, and water cycle/precipitation. (PA Academic Std 3.1.7a, 3.1.7c, 3.5.7c, 3.5.7d)
7. Communicate the factors that determine the climate and weather of a specific location including knowledge of how the Earth's tilt causes the seasons. (PA Academic Std 3.1.7c, 3.5.7c)
8. Explain benefits and harmful effects of pests and how pest management effects the environment. (PA Academic Std 4.5.7a, 4.5.7b, 4.5.7c)

## RELATED PA ACADEMIC STANDARDS FOR SCIENCE AND TECHNOLOGY

- 3.1 Unifying Themes
  - A. Systems
  - C. Patterns
- 3.2 Inquiry and Design
  - A. Nature of Scientific Knowledge
  - C. Scientific Method
- 3.3 Biological Sciences
  - A. Living Forms
- 3.4 Physical Science, Chemistry and Physics
  - B. Energy
- 3.5 Earth Sciences
  - C. Meteorology
  - D. Hydrology and Oceanography
- 3.6 Technology Education
  - B. Information Technology
- 3.7 Technological Devices
  - A. Tools
  - B. Instruments

## RELATED PA ACADEMIC STANDARDS FOR ENVIRONMENT AND ECOLOGY

- 4.5 Integrated Pest Management
  - A. Effects, Benefits and Impacts
  - B. Health Risks
  - C. Management Practices

### PERFORMANCE ASSESSMENTS:

Students will demonstrate achievement of the standards by:

1. Developing laboratory techniques to avoid contamination of test samples. (Course Standard 6)
2. Identifying two common crystals and two non-crystals using a microscope. (Course Standard 5)
3. Communicating detailed observations of microbes that have developed in hay and grass infusions. (Course Standard 6)
4. Designing and wiring a cardboard house. (Course Standard 1)
5. Explaining how the Earth's tilt causes the seasons. (Course Standard 7)
6. Explaining how the properties of gases relate to weather phenomena such as wind and clouds. (Course Standard 8)
7. Communicating the factors that determine the climate and weather of a specific location. (Course Standard 9)
8. Interviewing parents and/or neighbors regarding experiences with local pests and their management of those pests. Design and present a pest "un-Wanted" poster.

### DESCRIPTION OF COURSE:

This course allows students to observe and investigate science concepts of biology, physical science, and chemistry. This course introduces new concepts to the student and builds on previous knowledge using a variety of topics such as: how an electric circuit works, materials that do or do not conduct electricity, how to apply troubleshooting strategies to an incomplete electric circuit, properties of a magnifying lens, all living things are made of at least one cell, microbial communities change with the environment, foods contain starches, sugars, fats and/or proteins, and nutrients are essential to human health, how the tilt of the earth causes the seasons, how the properties of gases relate to weather phenomena, what factors determine the weather in a specific location and integrated pest management.

### TITLES OF UNITS:

- |  |            |
|--|------------|
| 1. Biology, <u>Micro-Worlds</u>                      | 35-45 days |
| 2. Physical Science, <u>Magnets and Motors</u>       | 35-45 days |
| 3. Meteorology, <u>Investigating Weather Systems</u> | 35-45 days |
| 4. Pest management                                   | 10-15 days |

### SAMPLE INSTRUCTIONAL STRATEGIES:

1. Science teams for projects and experiments
2. Independent Research
3. Discussion Groups
4. K-W-L Strategies

5. Lecture
6. Role Playing
7. Simulations

#### MATERIALS:

1. Carolina Biological Kits, Grade 5, 1998
2. BSCS Science T.R.A.C.S.: Investigating Weather Systems, 1999
3. PDE pest management resources

#### METHODS OF ASSISTANCE AND ENRICHMENT:

1. Peer helpers
2. Specialist assistance - IST, resource room, PAL
3. Adaptive strategies - graphic organizers
4. Volunteer helpers
5. Use of library

#### PORTFOLIO DEVELOPMENT:

1. Photo and explanation of wiring of a cardboard house
2. Create a meteorological travel brochure

#### METHODS OF EVALUATION:

1. Tests with short answers and longer written reports
2. Experiments
3. Projects
4. Written and Oral Reports
5. Self-evaluation
6. Group evaluation

#### INTEGRATED ACTIVITIES:

1. Concepts
  - technology/technological tools
  - micro-organisms
  - meteorology
  - electricity/circuits
2. Communication Skills
  - Read and use a variety of methods to make sense of various kinds of complex texts.
  - Respond orally and in writing.
  - Write for a variety of purposes (e.g. narrate, inform, persuade)
  - Listen and understand complex oral messages
  - Compose and make oral presentations
  - Produce, perform or exhibit work
  - Converse
  - Construct meaning from

- Use the writing process

### 3. Thinking/Problem Solving

- Analyze
- Observe
- Make critical judgments about
- Use effective research and information management skills
- Evaluate
- Respond critically to
- Compute, measure, estimate
- Apply concepts
- Formulate and solve problems
- Infer
- Draw conclusions
- Show relationships
- Make decisions
- Make predictions
- Construct
- Generate potential conclusions
- Develop and defend a position
- Recognize patterns

### 4. Apply Knowledge

- Use and evaluate
- Develop and defend a position
- Relate
- Exhibit skills
- Examine and evaluate problems
- Demonstrate connections, relationships

### 5. Interpersonal Skills

- Demonstrate skills
- Work cooperatively
- Communicate effectively
- Work effectively with others
- Negotiate