WATERSHED INTEGRATION PROGRAM
SCIENCE

LENGTH OF TIME: one year

GRADE LEVEL: 7

DESCRIPTION OF COURSE:

Curriculum integration and student choice are primary focal points of the PALMS Watershed Integration Program instructional plan. Within the framework, three overlying essential questions will be addressed. These questions encompassing the local watershed and environmental studies as a whole include: (1) *How do I make a difference?*, (2) *What is my impact on the environment?*, and (3) *How does the environment impact me?*

The curricular framework is designed around both essential questions and ecological studies to springboard and guide student interest. Each area of study concerning watersheds contains a common thread by addressing a community aspect, various systems located within the area of study, and an aspect concerning perspectives. The designated PALMS Watershed Integration Program areas of study include:

- Watershed dynamics – fresh water headwaters to marine deposition environments
- Areas of study to be included within the watershed dynamics include:
    - Cells and Heredity
    - Forces and Motion
    - Earth Structure and Surface

AREAS OF STUDY:

Watershed Dynamics – The overarching and underlying curricular area within all areas of study involve the local watershed waterways and how they impact all aspects of an environment. Studies follow the waterways themselves by acknowledging the unique dynamics detailed from the highest regions within the headwaters of a watershed to the final deposition within the largest marine ecosystem.

Cells and Heredity – Within a watershed genetic biodiversity plays a significant role which can be crucial for all areas of ecological success. Areas including the following will be explored:

- What are cells made of and how do living things get energy from such processes?
- How does DNA, genetic differentiation, impact an environment?
- How can genetic information be used in ecological area of importance?
- Why and how do life forms change over time?

Forces and Motion – Water flow dynamics are crucial in many aspects of w watershed. Areas including the following will be explored:

- What is the nature of force and its impact on varying objects?
- How can the force of water be assessed and evaluated in environmental areas of concern?

Earth Structure and Surface – The structure of the Earth determines the lay of the land and ultimately individual watershed boundaries. Areas including the following will be explored:

- How may topographic maps assist in determining a watershed?

- What is the importance of soil formation and conservation?
- Why is erosion an agent of disaster to a watershed?

Footprints Service Component
The Footprints Service Component may consist of an open-ended, solution-based performance assessment based upon broad topic selection taken from the first three themes of study or community outreach areas of service. Projected goals of such an assessment include an understanding of community-based efforts, data incorporation made tangible from year to year, and presentation of collected data to various audiences to allow for each student to make their own ecological footprint on our community.

COURSE STANDARDS:
Students will:
1. Demonstrate an understanding of cells and their functions within varying environments.
2. Demonstrate an understanding of basic genetics, including DNA and its role in inheritance, Mendel's laws, punnett squares, and genetic disorders
3. Demonstrate an understanding of watersheds, their components, and the ways that humans interact with watersheds.
4. Demonstrate an ability to gather and interpret field data through the use of different measurement devices and technology.
5. Apply the concepts and principles of motion, velocity, acceleration, deceleration, and momentum to problem solving.
6. Continue familiarity with the basic processes of the scientific method.

RELATED PA ACADEMIC STANDARDS FOR SCIENCE AND TECHNOLOGY
• Understand how theories are developed.
• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.
• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.
• Describe relationships using inference and prediction.
• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.
• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.
• Analyze alternative explanations and understanding that science advances through legitimate skepticism.
• Use mathematics in all aspects of scientific inquiry.
• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection.

3.2 Inquiry and Design
B. Process Knowledge
C. Scientific Method
3.3 Biological Sciences
C. Inheritance

3.4 Physical Science, Chemistry and Physics
C. Forces and Motion
3.7 Technological Devices
B. Instruments
3.8 Science, Technology and Human Endeavors
C. Consequences and Impacts

RELATED PA ACADEMIC STANDARDS FOR EARTH SCIENCES
3.3.A Earth Structure, Processes, and Cycles.

RELATED PA ACADEMIC STANDARDS FOR PHYSICS
3.2.B Physics

RELATED PA ACADEMIC STANDARDS FOR CELLS AND HEREDITY
3.1.A Organisms and Cells
3.1.B Genetics
3.1.C Evolution

RELATED PA ACADEMIC STANDARDS FOR ENVIRONMENT AND ECOLOGY
4.1 Watersheds and Wetlands
A. Cycles
B. Role of watersheds
C. Physical Factors
D. Characteristics and functions of wetlands
E. Impacts of watersheds and wetlands
4.6 Ecosystems and their Interactions
B. Cycles

PERFORMANCE ASSESSMENTS:
Students will demonstrate achievement of the standards by, but not be limited to:
1. Evaluating the general health of specific components of a watershed, identifying problems, and making recommendations, if warranted, for solutions to improve the overall health of the component being studied. (Course Standard 2)
2. Measuring the health of components within a watershed using a variety of instruments and techniques. (Course Standard 3)
3. Identifying, during the course of experimentation, the distinct steps of the scientific method, control, and variables that might influence the outcome. (Course Standard 6)

SAMPLE INSTRUCTIONAL STRATEGIES:
1. Informational reading
2. Cooperative learning
3. Comprehension questions
4. Graphic organization of content / notes
5. Class discussion
6. Laboratory activities (in and outside of the classroom)
7. Site based activities (local community and beyond)
8. Student presentations
9. Projects

10. Information summaries
11. Audio/Visual presentations
12. Internet-based presentations
13. Demonstrations
14. Computer activities

MATERIALS:

1. Cells and Heredity; Pearson/Prentice Hall, 2011
2. Forces and Motion; Pearson/Prentice Hall, 2011
3. Earth Structure; Pearson/Prentice Hall, 2011
4. Earth Surface; Pearson/Prentice Hall, 2011
5. Inquiry Skill Activities, Book 1, 2, and 3, Pearson, 2010
6. Scenario-Based Investigation, Pearson, 2010
7. Chapter Activities and Projects, Pearson, 2010
8. Interdisciplinary Activities, Pearson, 2010
9. Accelerating The Progress of English Language Learners, Pearson, 2010
10. Math Skill and Problem-Solving Activities, Pearson, 2010
11. Reading Strategies Handbook, Pearson, 2010
12. Stem Activity Book, Pearson, 2010
13. CD-Rom software – ExamView, Student eText, Untamed Science
14. Teacher generated materials
15. Library materials
16. Trade books
17. Laboratory equipment
18. Handheld computer and probe technology
19. Computers
20. Audio/Visual equipment
21. Guest speakers

METHODS OF ASSISTANCE AND ENRICHMENT:

1. Special assistance – IST, SAP
2. Review materials
3. Differentiation of content and product
4. Accommodation materials
5. Peer tutoring
6. Parent conferences
7. Supplemental materials
8. Speakers
9. Field trips
10. Student speaking engagements/presentations

METHODS OF EVALUATION:

1. Performance assessments
2. Projects
3. Presentations
4. Documentation of experimental laboratory work.
5. Use of rubrics specific to above methods of evaluation
6. Traditional tests and quizzes