APPLYING TECHNOLOGY

LENGTH OF TIME: One quarter, every other day, for 90 minutes

GRADE LEVEL: 7

COURSE STANDARDS:
Students will:

1. Know how each system of technology processes information, energy and materials and manages people. **(PA Standard - 3.4.7.B1)**
2. Apply mathematics and scientific principles to the solution of technological problems. **(PA Standard - 3.4.7.D1)**
3. Apply a wide variety of materials.
4. Understand the importance of energy to each system of technology. **(PA Standard 3.4.7.E3)**
5. Communicate information using a variety of graphic and electronic communication processes.
6. Recognize that requirements for a design include such factors as the desired elements and features of a product or system or the limits that are placed on the design. **(PA Standard Standard - 3.4.6.C1)**
7. Use computers appropriately to access and organize and apply information **(PA Standard 3.4.6.D2)**
8. Select and safely use appropriate tools, products and systems for specific tasks **(PA Standard 3.4.7.D2)**

   Identify key aspects of manufacturing systems that use mechanical processes to change the form of natural materials (e.g., separating, forming, combining, conditioning)
9. Explain how the use of technology can have consequences that affect humans in many ways **(PA Standard Standard - 3.4.7.B1)**
10. Explain how modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions **(PA Standard - 3.4.7.C2)**
11. Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and **systems. (PA Standard 3.4.7.A3)**
12. Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a **technology (PA Standard 3.4.7.D3)**
13. Explain how processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing and communicating are necessary for the entire **system** to operate efficiently **(PA Standard 3.4.7.E5)**

COMPUTER SCIENCE COURSE STANDARD:

1. Systematically identify and fix problems with computing devices and their components **(PA Standard 2.CS.03)**

2. Collect data using computational tools and transform the data to make it more useful and reliable **(PA Standard - 2.DA.08)**
3. Systematically test and refine programs using a range of test cases **(PA Standard 2.AP.17)**
4. Systematically identify and fix problems with computing devices and their components **(PA Standard - 2.CS.0)**

INTERNATIONAL TECHNOLOGY STANDARDS (ITEA)

The Nature of Technology

Std 1 – Students will develop an understanding of the characteristics and scope of technology.
Std 2 – Students will develop an understanding of the core concepts of technology.
Std 3 – Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.

Technology and Society

Std 4 – Students will develop an understanding of the cultural, social, economic, and political effects of technology.
Std 5 – Students will develop an understanding of the effects of technology on the environment.
Std 6 – Students will develop an understanding of the role of society in the development and use of technology.
Std 7 – Students will develop an understanding of the influence of technology on history.

Design

Std 8 – Students will develop an understanding of the attributes of design.
Std 9 – Students will develop an understanding of engineering design.
Std 10 – Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Abilities for a Technological World

Std 11 – Students will develop abilities to apply the design process.
Std 12 – Students will develop abilities to use and maintain technological products and systems.
Std 13 – Students will develop abilities to assess the impact of products and systems.

The Designed World

Std 14 – Students will develop an understanding of and be able to select and use medical technologies.
Std 15 – Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.
Std 16 - Students will develop an understanding of and be able to select and use energy and power technologies.
Std 17 - Students will develop an understanding of and be able to select and use information and communication technologies.
Std 18 - Students will develop an understanding of and be able to select and use transportation technologies.
Std 19 - Students will develop an understanding of and be able to select and use manufacturing technologies.
Std 20 - Students will develop an understanding of and be able to select and use construction technologies.

RELATED PA ACADEMIC STANDARDS FOR SCIENCE AND TECHNOLOGY

3.1 Unifying Themes
- A. Systems
- B. Models
- D. Scale

3.2 Inquiry and Design
- B. Process Knowledge
- C. Scientific Method
- D. Problem Solving in Technology

3.4 Physical Science, Chemistry and Physics
- B. Energy
- C. Forces and Motion

3.5 Earth Sciences
- B. Resources

3.6 Technology Education
- A. Biotechnology
- B. Information Technology
- C. Physical Technologies

3.7 Technological Devices
- A. Tools
- B. Instruments
- C. Computer Operations
- D. Computer Software
- E. Computer Communication Systems

3.8 Science, Technology and Human Endeavors
- A. Constraints
- B. Meeting Human Needs
- C. Consequences and Impacts

PERFORMANCE ASSESSMENTS:

Students will demonstrate achievement of the standards by:

1. Developing a transportation system that processes information, energy, and materials and manages people.
2. Documenting and presenting mathematical and scientific principles to the solution of a transportation problem.
3. Creating a transportation model that incorporates the use of many different kinds of materials.
4. Producing a transportation device that utilizes an alternative energy source.
5. Informing an audience by creating different kinds of media using a variety of processes and tools.
6. Demonstrating and documenting several kinds of manufacturing processes by developing a transportation model.
7. Identifying the 6 technical subsystems of transportation by creating a model vehicle.

DESCRIPTION OF COURSE:
Applying Technology is an design/problems-based course that focuses on the application of the tools, materials and processes of Biotechnological, Informational and Physical systems. Students will study the ways materials, energy and information are processed to transmit information, design real world solutions to solve problems by building structures, making products, and moving passengers and freight.

TITLES OF UNITS:

A. Transportation Systems	week 1
B. Communication Graphic Art	week 1
C. Energy	week 2
D.Communication—Graphic Design	week 3,4
E. Manufacturing Lab- Safety	week 4,5
F. Manufacturing Processes	week 5
H. Construction	week 5,6,7
I. Transportation	weeks 8,9

1. Technical subsystems

SAMPLE INSTRUCTIONAL STRATEGIES:
1. Cooperative Learning
2. Group Activities
3. Classroom climate influence learning
3. Individual Activities
4. Self-directed learning
5. Demonstrations
6. Research
7. Writing
8. Projects

MATERIALS:
1. Teacher made resources
2. Student made resources
3. Reference books
4. On-line resources
5. Computer programs such as Model Smart, Bridge builder, and Key Cad
6. Applicable computers that will support software and student work.
7. Various graphic design materials.

METHODS OF ASSISTANCE AND ENRICHMENT:
1. Guest speakers
2. Teachers from other disciplines
3.

METHODS OF EVALUATION:

1. Teacher assessment
2. Student assessment
3. Worksheets
4. Problem- solving activities using rubrics
5. Individual projects
6. Group participation and Group projects
7. Productivity – Are they productive workers that can responsibly, produce quality work with little supervision.
8. Performance – Can they apply what they have learned by producing products that perform a series of tests successfully.