

EXPLORING TECHNOLOGY

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

GRADE LEVEL: 6

COURSE STANDARDS:

Students will:

1. Develop knowledge in technology and its basic systems of biotechnological, Informational, and Physical systems. **(PA Standard - 3.4.6.A2)**
2. Understand the systems approach and how it is applied to the study of technology. **(PA Standard - 3.4.6.A3,)**
3. Understand the relationship between technology, mathematics and science. **(PA Standard - 3.4.6.A3)**
4. Make decisions and solve problems as an individual and in group situations. **(PA Standard - 3.4.6.C3, 3.4.6.D1)**
5. Demonstrate safe, proper and efficient use of various tools, machines and equipment. **(PA Standard - 3.4.6.E6)**
6. Appreciate the evolution of technology; analyze its impact on people, society and the environment; and research possible future developments. **(PA Standard 3.4.6.D1)**

COMPUTER SCIENCE STANDARDS

1. Explain how physical and digital security measures and protects electronic information. **(PA Standard -2.NI.05)**
2. Apply multiple methods of encryption to model the secure transmission of information. **(PA Standard - 2.NI.06)**
3. Collect data using computational tools and transform the data to make it more useful and reliable. **(PA Standard - 2.DA.08)**
4. Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.**(PA Standard - 2.AP.12)**
5. Create procedures with parameters to organize code and make it easier to reuse. **(PA Standard - 2.AP.14)**
6. Systematically test and refine programs using a range of test cases.**(PA Standard Standard - 2.AP.17)**

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
- C. Patterns
- D. Scale
- E. Change

3.2 Inquiry and Design

- A. Nature of Scientific Knowledge
- B. Process Knowledge
- C. Scientific Method
- D. Problem Solving in Technology

- 3.6 Technology Education
 - A. Biotechnology
 - 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. Creating solutions to problems involving the basic systems of biotechnological, Informational and Physical Systems.
2. Documenting and presenting solutions to technological problems using the Universal systems model.
3. Solving technological problems utilizing different mathematical, scientific and technological skills, tools and processes.
4. Producing journals that document the participation in a group or individual project.
5. Creating solutions to technological problems using a variety of tools, machines and processes.
6. Producing a visual of an invention that documents the historical and social impact on our society.
7. Developing models that solve problems related to bio-related, communication, construction, manufacturing, and transportation.

DESCRIPTION OF COURSE:

Exploring Technology is a project-based course that introduces students to technology by examining the basic systems of Biotechnological, Informational and Physical Systems. Students in Grade 6 will study the evolution of technology, invention and innovation, impacts of technology, the systems approach and various problem-solving methods. Students will also study computer systems, parts and language through various projects and problems.

TITLES OF UNITS:

- | | |
|--|--------|
| 1. Definitions of Technology | week 1 |
| 2. Invention, Innovation, and Systems | |
| 2. Production and the Universal System | week 2 |
| Manufacturing | |

- Construction
3. Communication
 4. Intro to Design
 5. Intro to Computer Science

week 3, 4
Week 5,6,7
Week 7,8,9

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. Career fair

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. Competency – Do they have the basic knowledge for success.
8. Productivity – Are they productive workers that can responsibly, produce quality work with little supervision.

9. Performance – Can they apply what they have learned by producing products that perform a series of tests successfully.