

EXPLORING TECHNOLOGY

Description:	<p>In Exploring Technology, students develop an understanding of the progression and scope of technology through exploratory experiences. In group and individual activities, students experience ways in which technological knowledge and processes contribute to effective designs and solutions to technological problems. Students participate in design activities to understand how criteria, constraints, and processes affect designs. Brainstorming, visualizing, modeling, constructing, testing, and refining designs provide firsthand opportunities for students to understand the uses and impacts of innovations. Students develop skills in communicating design information and reporting results.</p> <p>In this course it is expected that students participate in all activities and gain new experiences. It is critical that students bridge their knowledge in mathematics and science so as to enhance their comprehension of technology. This course is a cornerstone for a middle school technology engineering education program.</p>
Pre-requisites	NA
Recommended Credits:	NA
Recommended Grade Levels:	6
Course Code:	0647

Standard 1.0

Demonstrate leadership, citizenship, and teamwork skills required for success in the school, community and workplace through Technology Student Association.

Standard 2.0

Safely use tools, materials, equipment and other technology resources.

Standard 3.0

Understand and describe how technology in motion has impacted society, individuals, and the environment.

Standard 4.0

Understand the Design and Engineering process is a method that can be used to solve technological challenges to change products.

Standard 5.0

Understand and define the need for human exploration beyond earth and recognize that agriculture and space travel are related.

Standard 6.0

Understand the production and distribution of plant products and green house design.

STANDARD 1.0

Demonstrate leadership, citizenship, and teamwork skills required for success in the school, community and workplace through Technology Student Association.

LEARNING EXPECTATIONS

The student will be able to:

- 1.1 Exhibit positive leadership skills.
- 1.2 Participate in the Technology Student Association (TSA) as an integral part of classroom instruction.
- 1.3 Evaluate school, community, and workplace situations by applying problem-solving and decision-making skills.
- 1.4 Demonstrate the ability to work professionally with others.
- 1.5 Identify personal, teamwork and leadership skills used in various occupations.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student should know and be able to:

- 1.1.1 Conduct a self-study of personal leadership and teamwork styles.
- 1.1.2 Identify and utilize the strengths of individuals to solve a problem as a team.
- 1.2.1 Explain the importance of the principles expressed in the TSA Motto and Creed.
- 1.2.2 Prepare a meeting agenda for a TSA monthly/weekly meeting.
- 1.3.1 Participate in and conduct meetings according to accepted rules of parliamentary procedure.
- 1.4.1 Participate in various TSA activities and/or competitive events.
- 1.5.1 Work with a team to develop, implement and evaluate the effectiveness of a community or school service project

SAMPLE PERFORMANCE TASKS

- Prepare a resume.
- Create a leadership inventory and use it to conduct a personal assessment.
- Participate in various TSA programs and/or competitive events.
- Evaluate an activity within the school, community, and/or workplace and project effects of the project.
- Prepare a meeting agenda for a TSA monthly/weekly meeting.
- Attend a professional organization meeting such as, Chamber of Commerce meeting.

INTEGRATION/LINKAGES

- International Technology Education Association – Center to Advance the Teaching of Technology and Science (ITEA-CATTS)
- Tech-Know Project Middle School Teacher's Guide A
- Tech-Know Project Middle School Teacher's Guide B
- Human Innovation Technology Series HITS
- Engineering Your Future Project Activities
- Technology Student Association Curriculum Resources Guide for Middle School and High School Events.

STANDARD 2.0

Safely use tools, materials, equipment and other technology resources.

LEARNING EXPECTATIONS

The student will be able to:

- 2.1 Pass with 100% accuracy a written examination relating specifically to safety issues.
- 2.2 Pass with 100% accuracy a performance examination relating specifically to tools and equipment.
- 2.3 Maintain a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.
- 2.4 List and explain the importance of safety guidelines for TSA competitive events.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student should know and be able to:

- 2.1.1 Passes with 100% accuracy a written examination relating specifically to safety issues.
- 2.2.1 Passes with 100% accuracy a performance examination relating specifically to tools and equipment.
- 2.3.1 Maintains a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.
- 2.4.1 List and explain the importance of safety guidelines for TSA competitive events.

SAMPLE PERFORMANCE TASKS:

- Pass with 100% accuracy a written examination relating specifically to safety issues.
- Pass with 100% accuracy a performance examination relating specifically to tools and equipment.

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STANDARD 3.0

Understand and describe how technology in motion has impacted society, individuals, and the environment.

LEARNING EXPECTATIONS

The student will be able to:

- 3.1 Understand technology in general and that humans make decisions to use technology in positive and negative ways.
- 3.2 Understand basic manufacturing and its impact on our society.
- 3.3 Recognize the differences between desirable and undesirable outcomes of technology.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student should know and be able to:

- 3.1.1 Define and explain technology.
- 3.1.2 List examples of how technology has impacted society, individuals, and the environment.
- 3.2.1 List the impacts of technology.
- 3.2.2 Design and manufacture a product using discarded materials.
- 3.2.3 Create working drawings.
- 3.2.4 Develop a model/prototype.
- 3.3.1 Explain why jobs in the future will depend on very different skills.
- 3.3.2 Explore the positive and negative aspects of automation by role playing.

SAMPLE PERFORMANCE TASKS:

- Design, build, and manufacture a Kite.
- Design, build and test a Mouse Trap Race Car.

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STANDARD 4.0

Understand that the design and engineering process is a method that can be used to solve technological challenges to change products.

LEARNING EXPECTATIONS

The student will be able to:

- 4.1 Understand the importance of documenting and annotating their sketched ideas.
- 4.2 List and explain the steps of the Engineering Design Process.
- 4.3 Utilize computer technology to access and retrieve data.
- 4.4 Use the Engineering Design Process to solve design challenges in transportation.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student should know and be able to:

- 4.1.1 Make a two-dimensional representation of a designed solution.
- 4.1.2 Make a product of system and document the solution.
- 4.2.1 List and explain the steps of the Engineering Design Process.
- 4.2.2 Draw geometric objects with specified properties, such as side lengths or angle measures.
- 4.3.1 Utilize computer technology to access and retrieve data.
- 4.4.1 Use the Engineering Design Process to solve design challenges in transportation.

SAMPLE PERFORMANCE TASKS:

- Design, build, and test a Delta Dart
- Design, build and test a toothpick structure

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STANDARD 5.0

Understand and explain the need for human exploration beyond earth and recognize the many technological challenges.

LEARNING EXPECTATIONS

The student will be able to:

- 5.1 Explore space travel to the moon and lunar colonization.
- 5.2 Understand the limitations and constraints of living in space.
- 5.3 Conduct research related to lunar colonization including: energy considerations, shelter design, transportation, and sustainability.
- 5.4 Design and build a lunar habitation model.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student should know and be able to:

- 5.1.1 Develop a plan of action to transport people and goods to and from the moon.
- 5.1.2 Survey people in the community regarding lunar colonization and transportation plans.
- 5.2.1 Define and explain the limitations and constraints of living in space.
- 5.2.2 Conduct research related to lunar colonization.
- 5.4.1 Develop a lunar habitation model that includes energy considerations, shelter design, and transportation designs.
- 5.4.2 Create a variety of sketches either electronically or on paper to represent possible lunar colony designs.
- 5.3.3 Evaluate the quality and accuracy of their lunar colony model.

SAMPLE PERFORMANCE TASKS:

- Students in groups will compare their sketches and will list the major structures that will be needed on their lunar colony and enter this information in the Exploring Ideas: Lunar Colony Worksheet.
- Student groups will organize their structures into a coherent lunar colony. The model must fit onto an 18" x 17" base and not exceed 9" in height.
- Each student group will give a short presentation to the class about their lunar colony sketch.

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STANDARD 6.0

Understand the production and distribution of plant products and green house design.

LEARNING EXPECTATIONS

The student will be able to:

- 6.1 Describe the basic components of a greenhouse structure.
- 6.2 Explain the scientific basis for the “greenhouse effect” in the environment and in a contained structure.
- 6.3 Identify the strengths and weaknesses of growing plants in a greenhouse.
- 6.4 Design and build a greenhouse model.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student should know and be able to:

- 6.1.1 Understand how a greenhouse functions.
- 6.1.2 Write and submit a report on greenhouse design that includes the importance of temperature, humidity monitoring and control and types of plants that grow best in their community.
- 6.2.1 Explain the scientific basis for the “greenhouse effect” in the environment and in a contained structure.
- 6.2.2 Identify the strengths and weaknesses of growing plants in a greenhouse.
- 6.2.3 Describe possible ways to monitor and control the environment in a greenhouse to maintain the optimal growing conditions.
- 6.3.1 Design and build a greenhouse model.
- 6.3.2 Create and present a PowerPoint presentation on Greenhouse Designs.

SAMPLE PERFORMANCE TASKS:

- Tour Greenhouses in your area and have the students take pictures and develop a multi-media presentation.
- Design and build a Geodome that can be used as a greenhouse.
- Complete the Greenhouse Design Critique Worksheet

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