Exploring and Applying Technology

Grade 7 – 45 Days

Exploring and Applying Technology is an activity-based course that focuses on the application of the basic systems of communication, transportation, manufacturing, construction, and biotechnology. This course also allows students to explore some exciting new technologies. Students will study the ways materials, energy, and information are processed to transmit information, build structures, make products, move passengers and freight, and alter & affect their lives.

This course revolves around student-paced exploratory activities that can include a variety of the following: motorized machines, pneumatics, flight simulation, artificial intelligence, sketching, computer graphic design, problem solving, robotics, engineering & stress, 3-D modeling & structures, and computer animation.

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Introduction to Technology	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

STATE STANDARDS:	**UNIT OBJECTIVES:**
3.6.7.B*:** Explain information technologies of encoding, transmitting, receiving, storing, retrieving and decoding. ***3.6.7.C: Explain physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design. ***3.7.7.A:*** Describe the safe and appropriate use of tools, materials and techniques to answer questions and solve problems. ***3.7.7.B***: Use appropriate instruments and apparatus to study materials. ***3.7.7.C:*** Explain and demonstrate basic computer operations and concepts ***3.7.7.D:*** Apply computer software to solve specific problems ***3.7.7.E:*** Explain basic computer communications systems ***3.8.7.A***: Explain how sciences and technology are limited in their effects and influences on society. ***3.8.7.B***: Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life	- Develop technological literacy for the whole class including introductory understanding of the following: • The Power of Technology • Universals of Technology • Processes of Technology
ACTIVITIES: - Explore the nature and evolution of technology. - Discover how technological processes are developed, applied and used. - Examine informational, physical and biological systems. **RESOURCES:** - Multimedia computer module - Student module guide	**ASSESSMENTS:** - Pretests - Post tests - Worksheets - Workbook Activities - Ability to work effectively with a partner **REMEDIATION:** - Re-read - Re-test **ENRICHMENT:** - Level II activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Animation	

NATIONAL STANDARDS:
Standards 1, 2, 3: The Nature of Technology. Standards 4, 5, 6, 7: Technology and Society. Standards 8, 9, 10: Design. Standards 11, 12, 13: Abilities of a Technology World. Standards 14-20: The Designed World

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UNIT OBJECTIVES:

- Learn the computer principles and techniques of creating simple and complex animated graphics.
- Apply these skills and knowledge to produce animated graphics.
- Explore the history of animation and the expanding role that animation plays in today's movies, videos and cartoons.

ACTIVITIES:

- Create a storyboard to map out an animated movie.
- Use computer software to create a simple animated movie.

RESOURCES:

- Multimedia computer module
- Student module guide

ASSESSMENTS:

- Pretests
- Post tests
- Worksheets
- Workbook Activities
- Ability to work effectively with a partner

REMEDIATION:

- Re-read
- Re-test

ENRICHMENT:

- Level II activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Artificial Intelligence	

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UNIT OBJECTIVES:

- Learn the history, terminology and present-day applications of AI.
- Understand AI concepts, including expert systems, natural language and machine learning.
- Analyze and examine the nature of thought and thinking.
- Compare and contrast the human brain with a computer, and the relationships among science fiction, robots and AI.

ACTIVITIES:

- Program and operate an AI robot.
- Construct and expert system.
- Explore the future of AI research and applications.

RESOURCES:

- Multimedia computer module
- Student module guide

ASSESSMENTS:

- Pretests
- Post tests
- Worksheets
- Workbook Activities
- Ability to work effectively with a partner

REMEDIATION:

- Re-read
- Re-test

ENRICHMENT:

- Level II activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Automation and Robotics	

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ACTIVITIES: - Execute programs for a robotic arm and assess the results. - Experiment with a succession of commands to perform specific operations with the robotic arm. **RESOURCES:** - Multimedia computer module - Student module guide	**ASSESSMENTS:** - Pretests - Post tests - Worksheets - Workbook Activities - Ability to work effectively with a partner **REMEDIATION:** - Re-read - Re-test **ENRICHMENT:** - Level II activities

COURSE: Exploring and Applying Technology	GRADE: 7th
UNIT: Bio-Technology	

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STATE STANDARDS:	UNIT OBJECTIVES:
3.6.7. A: Explain biotechnologies that relate to related technologies of propagating, growing, maintaining, adapting, treating and converting. ***3.6.7. C:*** Analyze manufacturing steps that affect waste and pollutants. ***3.7.7. A:*** Describe the safe and appropriate use of tools, materials and techniques to answer questions and solve problems. ***3.7.7. B***: Use appropriate instruments and apparatus to study materials. ***3.7.7.C:*** Explain and demonstrate basic computer operations and concepts ***3.7.7.D:*** Apply computer software to solve specific problems ***3.7.7.E:*** Explain basic computer communications systems ***3.8.7. A***: Explain how sciences and technology are limited in their effects and influences on society. ***3.8.7. B***: Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life. ***3.8.7. C:*** Identify the pros and cons of applying technological and scientific solutions to address problems and the effects upon society.	- Explore the various fields that combine life science with technology: ergonomics, bioengineering, bionics, health and medicine, nutrition (including hydroponics), energy, genetics and the environment. - Examine the impact of biotechnology on our society and on the environment, including issues related to global warming. - Explore career options available in biotechnology. - Analyze and understand the ethical issues and applications of technology to biological sciences. - Evaluate the advantages and disadvantages of advancements in biotechnology
ACTIVITIES: - Use computer software and games to solve problems related to biotechnological systems. - Analyze and solve hypothetical problems involving the application of biotechnology to human and environmental concerns. - Use a microscope to perform a diagnosis and observe living organisms. - Make recycled paper. **RESOURCES:** - Multimedia computer module - Student module guide - Microscope - Recycled paper-making kit	**ASSESSMENTS:** - Pretests - Post tests - Quizzes **REMEDIATION:** - Re-read - Re-test **ENRICHMENT:** - Level II activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Computer Graphic Design	

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UNIT OBJECTIVES:

- Discover the early stages of graphics and their development up to the present era of computer graphics.
- Identify the industrial applications of computer graphics.
- Learn the basic tools use by graphic artists.
- Explore career options available in the field of computer graphic design.

ACTIVITIES:

- Use computer software to create shapes and text, and add colors, patterns, special effects and textures.
- Design a graphic with shapes and text, print it, and transfer the image onto a T-shirt.

RESOURCES:

- Multimedia computer module
- Student module guide

ASSESSMENTS:

- Pretests
- Post tests
- Worksheets
- Workbook Activities
- Ability to work effectively with a partner

REMEDIATION:

- Re-read
- Re-test

ENRICHMENT:

- Level II activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Computer Problem Solving	

NATIONAL STANDARDS:
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ACTIVITIES: - Use simulation models and challenging games to solve a variety of conceptual and spatial problems. - Use existing knowledge to solve problems. - Use modeling as a method of solving problems. - Test and evaluate a solution. **RESOURCES:** - Multimedia computer module - Student module guide	**ASSESSMENTS:** - Pretests - Post tests - Worksheets - Workbook Activities - Ability to work effectively with a partner **REMEDIATION:** - Re-read - Re-test **ENRICHMENT:** - Level II activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Electronics	

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ACTIVITIES: - Measure: voltage, current, resistance - Connect test circuits - Build circuits utilizing components, which will compare and contrast series and parallel circuits. - Build circuits from a simple schematic diagram. **RESOURCES:** - Electronic Kits	**ASSESSMENTS:** - Demonstrate characteristics of series and parallel circuits. - Demonstrate the hook-up of basic circuits from a schematic diagram **REMEDIATION:** **ENRICHMENT:** - Troubleshooting

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Engineering & Stress Analysis	

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ACTIVITIES: - Test the stress and deflection of a structure using a stress analyzer. - Design, construct and test the efficiency of a wood structure. **RESOURCES:** - Multimedia computer module - Student module guide	**ASSESSMENTS:** - Pretests - Post tests - Worksheets - Workbook Activities - Ability to work effectively with a partner **REMEDIATION:** - Re-read - Re-test **ENRICHMENT:** - Level II activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Flight Simulation	

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ACTIVITIES: - Locate and explain the flight instruments and execute basic instrument flight maneuvers. - Simulate a flight using flight controls - Demonstrate advanced flying skills, including advanced planning and plotting of a course, take-off, simulated flying, communication, and landing. **RESOURCES:** - Multimedia computer module - Student module guide	**ASSESSMENTS:** - Worksheets - Workbook Activities - Ability to work effectively with a partner **REMEDIATION:** - Re-read - Re-test **ENRICHMENT:** - Problem Solving Activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Motorized Machines with Lego's	

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UNIT OBJECTIVES:

- Students will build concrete activities with Lego models as they are introduced to motions, forces, transfer of energy, and principles of simple and motorized machines.
- Students will learn how to use gears, chain drivers, and pulleys to perform work.
- Students will use and apply knowledge of the principles of wheels and axles.
- Students will learn and utilize the different types and uses of levers.

ACTIVITIES:

- Use gears, chain drives, and pulleys to change a rotation's speed force, and direction.
- Use wheels and axles to deduce friction, store energy, and make crank handle winches.
- Use levers to increase force, increase distance of movement, and change direction of force.

RESOURCES:

- Motorized Machine with Lego Kits
- Lego activity packets

ASSESSMENTS:

- Pretests
- Post tests
- Worksheets
- Workbook Activities
- Ability to work effectively with a partner

REMEDIATION:

- Re-read
- Re-test

ENRICHMENT:

- Level II activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Pneumatic Lego Principles	

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ACTIVITIES: - Discussion of Robotic issues - Connect various pneumatic systems - Design and build pneumatic devices which solve problems - Compare and contrast pneumatics and hydraulics **RESOURCES:** - Pneumatic Lego Kits	**ASSESSMENTS:** - Completion and operation of various pneumatic devices. - Creation and demonstration of working solutions to problems. - Ability to work effectively with a partner **REMEDIATION:** **ENRICHMENT:** - Problem solving activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Problem Solving with Legos	

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ACTIVITIES: - Friction on a coasting vehicle - Determine speed of a vehicle - Compare and Contrast with other students vehicles - Develop and build devices using different mechanical drive systems, such as pulley/belt, gear and chain, in order to compare and contrast rate of speed. **RESOURCES:** Motorized Lego Kits	**ASSESSMENTS:** - Construct one device for speed - Construct on device for power. - Construct other devices using ultra gear, gear drive, belt drive and chain drive. - Ability to work effectively with a partner **REMEDIATION:** **ENRICHMENT:** - Problem Solving Activities

COURSE: Exploring and Applying Technology	GRADE: 7
UNIT: Technical Sketching	

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ACTIVITIES: - Visualization by the usage of objects as models. **RESOURCES:** - Sketching paper - Grid paper	**ASSESSMENTS:** - Completion of sketching problems, incorporating the following criteria: • accuracy • proper demonstration of sketching techniques • correct representation of the objects and sketching **REMEDIATION:** **ENRICHMENT:** - Advanced sketching problems