

July 2001

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Technical Systems and Applications
Occupational Area: Career & Technical Areas

Secondary

Program Numbers: 8002000
CIP Number: 1400.002000
Grade Level: 9-12 30, 31
Length: 1 Credit
Certification: ANY VOCATIONAL FIELD OR COVERAGE

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this course is to provide students with a foundation of knowledge, skills, and attitudes needed for continued success in a diverse range of technical systems and applications. The program outcomes are critical for understanding and functioning in a technical world. The recommended teaching methods encourage teachers to reach beyond traditional lecture, demonstration, and written tests. The instructional strategies included will allow students opportunities to perform at higher levels and the freedom to develop insights and discover knowledge beyond what has traditionally been taught in the past. As a result, students will develop the ability to become self-directed in acquiring those academic, technical, personal managerial, problem solving and teamwork skills essential for a lifetime of achievements in a technological society.

The content includes, but is not limited to, a study of learning skills; problem solving; career assessment and exploration of technical careers; computer applications; technical reading and writing; communications; and work ethics.

II. **LABORATORY ACTIVITIES:** The instruction and learning activities should be provided in a laboratory or classroom setting using hands-on experiences with materials and equipment appropriate to the course content, student's career goals, and in accordance with current occupational practices.

III. **SPECIAL NOTE:** The participation in the appropriate Career and Technical Student Organization (CTSO) for leadership training and reinforcing specific career and technical skills is encouraged in the area reflecting the interests, aptitudes, and career goals of each student. Career and Technical Student Organizations should be an integral part of the instructional program. The activities of such organizations are defined as part of the curriculum in accordance with rule 6A-6.065, FAC.

IV. **INTENDED OUTCOMES:** After successfully completing this course, the student will be able to:

01.0 Identify and apply a variety of learning skills needed for success in a technical career.

- 02.0 Demonstrate the understanding and application of technological problem-solving techniques.
- 03.0 Explore technical careers, identifying the characteristics and aptitudes required for employment and develop a four-year high school course of study focused on post high school graduation plans.
- 04.0 Demonstrate computer application competencies and skills related to career choices.
- 05.0 Demonstrate technical reading and writing skills.
- 06.0 Utilize a variety of communication technologies.
- 07.0 Demonstrate professional work ethics.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Technical Systems and Applications
Program Number: 8002000

01.0 IDENTIFY AND APPLY A VARIETY OF LEARNING SKILLS NEEDED FOR SUCCESS IN A TECHNICAL CAREER. -- The student will be able to:

- 01.01 Identify and use a variety of applications such as graphic outlines and flowcharts
- 01.02 Demonstrate note taking/outlining and listening skills in a technical occupation setting.
- 01.03 Explain and apply a variety of strategies for knowledge retention of specific data and other information used in technical environments.
- 01.04 Demonstrate and apply various reasoning skills (i.e., inductive and deductive).
- 01.05 Differentiate between verifiable and non-verifiable information.
- 01.06 Apply the strategies used in time management to increase productivity.
- 01.07 Describe and apply unique study techniques needed to process complex information found in today's rapidly changing technical environment.
- 01.08 Discuss and employ a variety of test-taking strategies.

02.0 DEMONSTRATE THE UNDERSTANDING AND APPLICATION OF TECHNIQUES USED IN TECHNOLOGICAL PROBLEM-SOLVING. -- The student will be able to:

- 02.01 Demonstrate the need for problem-solving skills in the technical world of work by applying them to a specific career choice.
- 02.02 Identify and apply the sequential steps used in the formal problem-solving process.
- 02.03 Demonstrate the ability to use/design technological problem-solving and decision-making strategies.
- 02.04 Apply research and development techniques to implement a plan of action for given problems.
- 02.05 Apply problem-solving and decision-making strategies that relate to real-world situations while managing time and materials effectively in a variety of settings.
- 02.06 Outline and execute a realistic problem solution as it relates to available resources, constraints, feasibility, and ultimate goals.
- 02.07 Select and use appropriate mathematical processes to solve problem situations that are typical of technical systems and applications in a specific occupation.
- 02.08 Demonstrate and apply the principle that not every problem can be solved, but can lead to solutions in other applications.

03.0 EXPLORE TECHNICAL CAREERS, IDENTIFYING THE CHARACTERISTICS AND APTITUDES REQUIRED FOR EMPLOYMENT. -- The student will be able to:

- 03.01 Complete a personal aptitude assessment test and relate the results to selected occupations.
- 03.02 Match skills, aptitudes, personal values, and interests to occupations requiring specialized technical training that reflect local and global high-growth models.
- 03.03 Identify traditional and nontraditional technical career options that match personal interests and abilities.
- 03.04 Locate, evaluate, and interpret career information to assist in making career decisions.
- 03.05 Develop a career plan/portfolio that includes results from career assessments, short and long term goals, secondary and postsecondary plans of study, job experiences/history, samples of work, resumes, and other activities related to career planning.
- 03.06 Create a four-year high school course of study focused on post high school graduation plans (i.e., going to college or directly to work after high school).
- 03.07 Describe specific characteristics and aptitudes required for careers in technical fields.

04.0 DEMONSTRATE COMPUTER APPLICATION COMPETENCIES AND SKILLS RELATED TO CAREER CHOICES. -- The student will be able to:

- 04.01 Use computer applications including but not limited to word-processing, spreadsheets (bar/line/pie charts), graphics, databases, multimedia, and networking technologies.
- 04.02 Use electronic communication tools (e.g., fax, e-mail, voice mail, instant messaging, digital images, etc.).
- 04.03 Identify and utilize methods of information acquisition available for the research of employment opportunities (e.g., on-line, bulletin boards, WWW, etc.).
- 04.04 Discuss and list advantages and disadvantages related to the utilization of computer applications in a selected technical career.
- 04.05 Apply the safe, correct, and efficient use of tools, equipment, and procedures found in today's technical occupations.
- 04.06 Perform basic troubleshooting techniques for computer malfunctions.
- 04.07 Select specific technologies appropriate to a given task.
- 04.08 Work safely using a variety of technologies (hardware and software) found in computer-related technical systems.
- 04.09 Describe the characteristics and scope of the application of technology used in a technical area of study.

05.0 DEMONSTRATE TECHNICAL READING AND WRITING SKILLS. -- The student will be able to:

- 05.01 Demonstrate an understanding of the differences between reading and writing in technical, formal, and informal formats.
- 05.02 Demonstrate and apply strategies for reading and comprehending technical data.

- 05.03 Read and follow a series of written directions in a technical journal in conjunction with a higher level hands-on task.
 - 05.04 Read and follow a series of technology-based graphic depictions in conjunction with a higher-level hands-on task.
 - 05.05 Prepare and test a series of audible directions that communicate verbal instructions for completion of a higher level hands-on technical task.
 - 05.06 Identify the use of the sequential steps required from start to finish in technical writing preparation.
 - 05.07 Create and test a series of written instructions that clearly communicate directions/instructions for completion of a higher level hands-on technical task.
 - 05.08 Prepare and evaluate a series of graphic based-documents that clearly communicate (through graphic depiction) directions/instructions for completion of a higher level hands-on technical task.
 - 05.09 Create and test a workplace technical system based on a chosen technical career.
 - 05.10 Explore and develop methods used to monitor and correct outcomes of technical writing and reading.
- 06.0 UTILIZE A VARIETY OF COMMUNICATION TECHNOLOGIES. -- The student will be able to:
- 06.01 Identify and utilize appropriate communication technologies found in today's workplace.
 - 06.02 Demonstrate and present strategies to show how the design of a message is influenced by such factors as the intended audience, medium, purpose, and nature of the message.
 - 06.03 Explore and develop methods to show that communication systems allow information to be transferred from human to human, human to machine, machine to human, and machine to machine.
 - 06.04 Prepare a series of projects that show how communication systems can be used to inform, persuade, entertain, control, manage, and educate in a technical field.
 - 06.05 Apply knowledge of communication technologies including the input, process, and output associated with sending and receiving information.
 - 06.06 Develop and present a model that demonstrates the understanding of a communication system composed of a source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.
 - 06.07 Discuss and apply technological knowledge and processes including how information is communicated using symbols, measurement, convention, icons, graphic images, and/or languages.
 - 06.08 Demonstrate and present how active listening strategies improve understanding and performance.
 - 06.09 Select and use modes of communication appropriate to specific technical workplace situations and environments.
 - 06.10 Demonstrate and apply listening, speaking, and nonverbal skills utilizing strategies to communicate effectively with supervisors, co-workers, and customers in a technical setting.
- 07.0 DEMONSTRATE PROFESSIONAL WORK ETHICS. -- The student will be able to:

- 07.01 Develop employability skills to seek, obtain, maintain, and change jobs (i.e., prepare resumes, complete job applications, prepare for an interview, and complete other documents required when applying for employment in a chosen technical career.
- 07.02 Describe and apply codes of professional ethical conduct in the school workplace setting (i.e., plagiarism, copyright violations, and sexual harassment).
- 07.03 Describe and demonstrate personal qualities related to employability (i.e., promptness, getting along with others, dependability, responsible behavior).
- 07.04 Demonstrate and apply an awareness of quality service and the personal and professional standards required to establish an effective service-based culture.
- 07.05 Explain and demonstrate the importance of cooperation (accepting criticism, managing conflict, and adjusting behavior appropriate to a situation) in the workplace.
- 07.06 Explain and demonstrate the importance of self-management and initiative when minimum direction and supervision are provided; the concept of accepting responsibility for one's actions, while exhibiting a positive attitude.
- 07.07 Describe and demonstrate the visible and transparent qualities of an effective leader.
- 07.08 Demonstrate the importance of dependability, initiative, courtesy, integrity, respect, empathy, punctuality, responsibility, fairness, and trustworthiness in school and describe how to transfer these traits to the workplace.
- 07.09 Define and discuss issues involving gender equity, disability, special needs, age, sexual harassment, cultural courtesy, and diversity.
- 07.10 Explain and demonstrate the importance of good personal hygiene, stress management, professional demeanor, and individual presentation.
- 07.11 Describe and present the concept of using forward thinking and the ability to facilitate a trend setting vision and mission statement for a technology-oriented organization.
- 07.13 Demonstrate employability skills such as working as a team member, problem-solving, and organizational skills.
- 07.14 Apply academic and employability skills in work-based learning situations (i.e., internships, job shadowing, mentoring, on-the-job training).

NOTES TO TEACHERS

Note to teachers (01.0): Leadership skills can have a significant positive impact on students during their lifetime and, thus are essential to career and personal success. It is important that the teacher instruct the students in learning strategies and their application. The students who understand how to learn effectively and can apply specific learned techniques to acquire new knowledge and skills will be well prepared for the challenges of the future. Learning skills need to have a balance of technical application and psychomotor relevance.

CAREER AND TECHNICAL STUDENT ORGANIZATIONS (CTSOS)

Business Professionals of America, Inc. (BPA)
Cooperative Education Clubs of Florida, Inc. (CECF)
DECA, Inc., An Association of Marketing Students, Secondary
DEX, Inc., An Association of Marketing Students, Postsecondary
Florida FFA Association
Florida Future Homemakers of America/Florida Family, Career and Community Leaders of America
Florida Public Service Association, Inc. (FPSA)
Future Business Leaders of America/Phi Beta Lambda, Inc. (FBLA/PBL)
Health Occupations Students of America (HOSA)
SkillsUSA-VICA
Technology Student Association (TSA)

Note to teachers (02.0): Setting an activity in context is one of the most important characteristics of technological problem solving. A problem should be chosen based on its ability to address relevant standards that students need to learn. The context should not be fanciful or farfetched; rather, it should be based on current technology content. The idea behind using technological problem-solving as a method of instruction is that students are provided the opportunity to apply, analyze, synthesize, and evaluate what was presented during previous activities. Managing and assessing student activities based on accepted design/technological problem solving models is recommended. Utilizing this method enables students the opportunity to discover new knowledge, develop critical-thinking skills, and manage their own learning. Also, it is a practical method for teaching abstract concepts from such disciplines as science and mathematics. The teacher is charged with facilitating deep inner-thinking skills to solve complex problems while showing the relevance of academic applications in formulating a solution.

Note to teachers (03.0): Students need to learn two things at the beginning of their career planning: (1) who they are and (2) what they want to do with their lives. It is also important that they understand how their education relates to achieving their future goals. Career assessment goal identification should include interests and aptitudes, as well as personality and value assessments. Students can explore careers based on their interests, abilities, and opportunities. Work-based activities allow students to evaluate their career choices as they relate to actual careers at the worksite. On-line interest assessments, skill checklists, career and education

exploration, financial aid, and other available career planning tools can be found in the *Choices* program (available in every public school in Florida).

Note to teachers (04.0): To live, learn, and work successfully in an increasingly complex and information-rich society, students must be competent in computer applications. Successful learning activities depend on teachers being prepared to empower students with the advantages this type of technology can bring. Programs must have up-to-date equipment, and must provide real-world connections, primary source materials, and sophisticated data-gathering and analysis tools. These are just a few of the resources that enable teachers to provide opportunities for conceptual understanding and learning in a high technologically fast advancing area.

Note to teachers (05.0): We now live in a time when virtually everything is a product, function, or effect of a technological system. Never before has there been such a need to succeed in technical reading and writing. The process is completely formal, but the exposition needs to be highly readable, precise, and interweave intuition with formal description. One method to pursue this outcome is to address a solid technical problem, and then carefully, with great attention, infuse a logical sequence of steps within which to present a solution. This approach will provide a clear thinking path for the solution. It will also present a formal structure that makes use of a stepwise refinement that introduces facts for the reader in manageable pieces. Conflicts and conflict resolution will serve well as a means to understand key concepts and as a way to illustrate which concept might or might not confuse the reader.

Note to teachers (06.0): People have long used various technologies to communicate over distances. The invention of movable type provided the means for a transfer of knowledge to people all over the world. Although writing and printing have become visual means for communication, people did not typically consider them to be communications technologies, viewing them simply as technologies that met a particular need. A book was viewed as not having much in common with the telephone, or the phonograph with the fax machine. In the past couple of decades, such thinking has changed dramatically. Technologies that record, store, manipulate, analyze, and transmit data have developed into important communication areas, allowing students to step outside of the box and grasp the power of communications

Note to teachers (07.0): There is much information available on the topic of work ethics. Keep in mind that ethical decision making and work ethics are a process. There are many instances where simple answers are not available to resolve complex ethical issues. In addition, it is impossible to prescribe how workers should act in all situations, and each specific application must take into account the context in which it is being considered and the possibility of conflicts among the employees' values, principles, and standards. But teachers are charged with providing the tools and skills necessary to allow the students to make positive decisions and choices, and to consider how the issues would be judged in a peer review process where the ethical standards of the occupation would be applied.

Substitutions Meeting the Requirements For Technical Systems and Applications (1 Credit Course)

| <u>Program Number</u> | <u>CIP Number</u> | <u>Title</u> |
|--|-------------------|---|
| Agriscience and Natural Resources Education | | |
| 8103400 | 0101020410 | Agriscience Foundations 1 |
| 8103200 | 0101020400 | Agriscience Foundations 1 |
| 8116000 | 0101050100 | Agriscience Foundations 1 |
| 8106800 | 0101039901 | Agriscience Foundations 1 |
| 8106100 | 0102020100 | Agriscience Foundations 1 |
| 8106200 | 0101030210 | Agriscience Foundations 1 |
| 8112000 | 0101030300 | Agriscience Foundations 1 |
| 8106400 | 0101030401 | Agriscience Foundations 1 |
| 8103300 | 0101020310 | Agriscience Foundations 1 |
| 8113000 | 0103010101 | Agriscience Foundations 1 |
| 8121000 | 0101060601 | Agriscience Foundations 1 |
| 8118300 | 0103049901 | Agriscience Foundations 1 |
| 8123200 | 0101020600 | Agriscience Foundations 1 |
| 8121300 | 0101060510 | Agriscience Foundations 1 |
| 8112100 | 0103010100 | Agriscience Foundations 1 |
| 8121600 | 0101060610 | Agriscience Foundations 1 |
| 8106500 | 0102040100 | Agriscience Foundations 1 |
| 8121400 | 0101060700 | Agriscience Foundations 1 |
| Business Technology Education | | |
| 8216100 | 0506090110 | Business Systems and Technology 1 and 2 |
| 8203300 | 0507010101 | Business Systems and Technology 1 and 2 |
| 8212400 | 0507040101 | Business Systems and Technology 1 and 2 |
| 8206300 | 0507039901 | Business Systems and Technology 1 and 2 |
| 8215100 | 0506040100 | Business Systems and Technology 1 and 2 |
| 8218000 | 0507999900 | Business Systems and Technology 1 and 2 |
| 8209500 | 0507080103 | Business Systems and Technology 1 and 2 |
| 8212100 | 0507060401 | Business Systems and Technology 1 and 2 |
| 8212200 | 0507060501 | Business Systems and Technology 1 and 2 |
| 8207000 | 0507030400 | Business Systems and Technology 1 and 2 |
| 8207200 | 0507030501 | Business Systems and Technology 1 and 2 |
| 8207100 | 0507039900 | Business Systems and Technology 1 and 2 |
| 8207300 | 0507030301 | Business Systems and Technology 1 and 2 |
| 8207400 | 0510010100 | Business Systems and Technology 1 and 2 |
| 8206400 | 0507039904 | Business Systems and Technology 1 and 2 |
| Diversified Education | | |
| 8301600 | 10988640CP | Work Experience 1 |

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|---------|------------|--|
| 8303000 | 10988610CP | Diversified Career Technology Principles |
| 8300310 | 10988650PA | Workplace Essentials |
| 8300330 | 10110101PA | Workplace Technology Applications |

Family and Consumer Sciences

| | | |
|---------|------------|------------------------------------|
| 8500375 | 09200119PA | Blueprint for Professional Success |
|---------|------------|------------------------------------|

Health Science Education

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| 8417130 | 0317029903 | Health Science 2 |
| 8417140 | 0317010103 | Health Science 2 |
| 8417150 | 0317019902 | Health Science 2 |
| 8417160 | 0317020302 | Health Science 2 |
| 8417170 | 0317020502 | Health Science 2 |
| 8417180 | 0317051301 | Health Science 2 |
| 8417190 | 0317040401 | Health Science 2 |
| 8417200 | 0317030402 | Health Science 2 |
| 8417210 | 0317060201 | Health Science 2 |
| 8417230 | 0317070202 | Health Science 2 |

Industrial Education

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|---------|------------|---|
| 8709400 | 0647060405 | Automotive Service Technology 1 |
| 8732100 | 0647010400 | Computer Electronics Technology 1 |
| 8727200 | 0646030202 | Electricity 1 |
| 8730000 | 0615030300 | Electronic Technology 1 |
| 8722100 | 0646020105 | Carpentry and Cabinetmaking 1 |
| 8720100 | 0648070302 | Carpentry and Cabinetmaking 1 |
| 8754000 | 0648050302 | Machining 1 |
| 8763000 | 0620040300 | Commercial Foods and Culinary Arts 1 |
| 8730200 | 0647010301 | Telecommunication Technology 1 |
| 8716000 | 0647010200 | Commercial Business Machine Maintenance 1 |
| 8743000 | 0647030301 | Engineering Assisting 1 |
| 8723000 | 0647020303 | Intro to Heating, A/C, and Refrigeration Tech 1 |
| 8703030 | 0647019903 | Electronic System Assembly 1 |
| 8709000 | 0647060300 | Automotive Collision Repair and Refinishing 1 |
| 8742000 | 0647060501 | Diesel Engine Service 1 |
| 8772000 | 0648020400 | Commercial Photography Technology 1 |
| 8725000 | 0648010102 | Drafting 1 |
| 8725200 | 0648010401 | Drafting 1 |
| 8725100 | 0648010402 | Drafting 1 |
| 8725300 | 0648010501 | Drafting 1 |
| 8725500 | 0648010301 | Drafting 1 |
| 8725400 | 0648010201 | Drafting 1 |
| 8751300 | 0649030601 | Boat and Yacht Repair |
| 8754500 | 0648050802 | Welding Technologies 1 |
| 8751000 | 0649030600 | Marine Service 1 |
| 8700100 | 0647999901 | Industrial Education Directed Study 1 |
| 8700300 | 06469999PA | Practical Technical and Industrial Occupations |
| 8757200 | 0612040303 | Grooming and Salon Services Core 1 WITH |
| 8757200 | 0612040303 | Cosmetology 2 |
| 8718000 | 0648020300 | Commercial Art Technology 1 |
| 8751200 | 0649030300 | Commercial Fishing 1 |

Marketing Education

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|---------|------------|----------------------|
| 8839100 | 0208070300 | Marketing Essentials |
| 8830300 | 0206070100 | Marketing Essentials |
| 8836100 | 0208100100 | Marketing Essentials |
| 8827200 | 0208089901 | Marketing Essentials |
| 8827100 | 02089999SP | Marketing Essentials |
| 8824100 | 0208090500 | Marketing Essentials |

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| 8821100 | 0208060100 | Marketing Essentials |
| 8827400 | 0208090105 | Sports, Recreation, and Entertainment Essentials |
| 8845100 | 0208110400 | Introduction to Hospitality and Tourism |
| 8806000 | 0208010200 | Fashion Essentials |
| 8812100 | 0208030100 | Principles of Entrepreneurship |
| 8800310 | 02080301PA | Practical Entrepreneurship Skills |
| 8815100 | 0208040110 | Financial Computing |

Public Service Education

None

Technology Education

| | | |
|---------|------------|---|
| 8600080 | 0821011800 | Aerospace Technology 1 |
| 8607000 | 0821011700 | Engineering Technology 1 |
| 8604000 | 0821011400 | Production Technology 1 |
| 8601000 | 0821010600 | Communications Technology 1 |
| 8600800 | 0821010300 | Drafting/Illustrative Design Technology 1 |
| 8601100 | 0821010700 | Material and Processes Technology 1 |
| 8600900 | 0821010400 | Electronics Technology 1 |
| 8601200 | 0821010500 | Power and Transportation Technology 1 |
| 8600700 | 0821010200 | Construction Technology 1 |
| 8600100 | 0821010100 | Technology Studies 1 |