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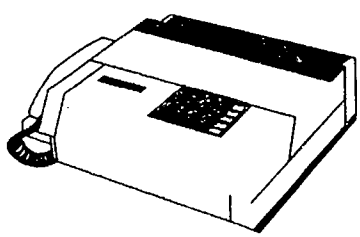
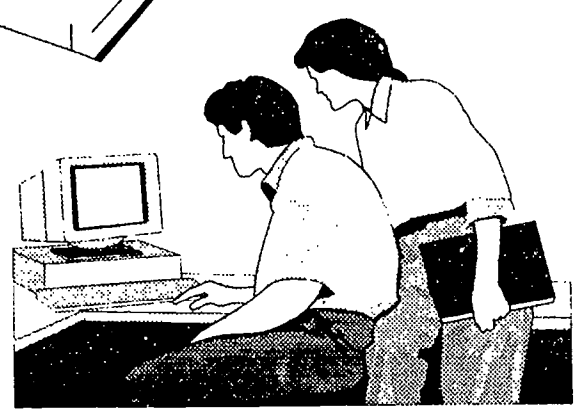
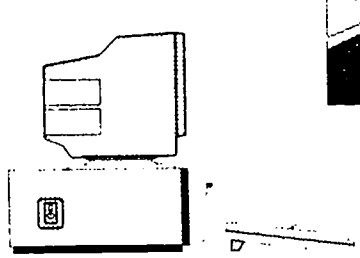
ABSTRACT

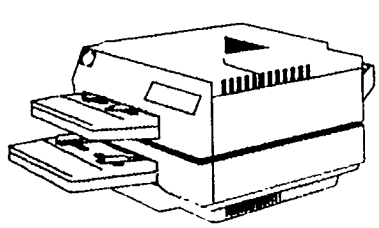
This document, which reflects Mississippi's statutory requirement that instructional programs be based on core curricula and performance-based assessment, contains outlines of the instructional units required in local instructional management plans and daily lesson plans for two secondary-level courses in business and computer data processing: computer programming technology I-II. Presented first are a program description and course outline. Section I contains curriculum frameworks for both courses, and section II contains outlines of the instructional units required in each course. The first course consists of an orientation unit and a unit on basic language syntax and programming applications. The second course contains units on the following topics: COBOL language syntax and programming applications, computer networking, and workplace skills. Each unit includes suggested time on tasks, competencies and objectives, teaching strategies, assessment strategies, and resources. Recommended tools and equipment are listed in section III. Appended are lists of related academic topics and workplace skills for the 21st century and student competency profiles for both courses. (MN)

Mississippi Curriculum Framework for Business and Computer Data Processing









Secondary
Vocational and Technical Education
1996

July 30, 1996

MISSISSIPPI

CURRICULUM FRAMEWORK

FOR

BUSINESS AND COMPUTER DATA PROCESSING

(Program CIP: 52.1201 - Mgmt. Info. Systems & Business Data)

SECONDARY PROGRAMS

1996

July 30, 1996

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1996

FOREWORD

The courses in this document reflect the following statutory requirements as found in Section 37-3-49, Mississippi Code of 1972, as amended:

> The State Department of Education shall provide an instructional program and establish guidelines and procedures for managing such programs in the public schools as part of the State Program of Educational Accountability and Assessment of Performance. . .
>
> The department shall provide that such program or guidelines . . . are enforced through the performance-based accreditation system.
>
> The local school board must adopt the objectives that will form the core curriculum that will be systematically delivered throughout the district.
>
> Standards for student performance must be established for each core objective in the local program and those standards establish the district's definition of mastery for each objective.
>
> There shall be an annual review of student performance in the instructional program against locally established standards.

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - The number of days of instruction that should be required to teach the competencies and objectives of the unit. For secondary occupational programs, a "day" represents a two-period block of instruction.
- Competencies and Suggested Objectives
  - A **Competency** represents a general concept of performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to master all competencies in the curriculum framework in order to satisfactorily complete the course.
  - The **Suggested Objectives** represent the enabling and supporting knowledge and performances that will indicate mastery of the competency.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each suggested objective. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.

- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include classroom discussions, laboratory exercises, and student assignments. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.
- Suggested Resources - This section indicates some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

The following guidelines were used in developing the curriculum framework in this document and should be considered in developing local instructional management plans and daily lesson plans:

- The content of the courses in this document reflects approximately 75 percent of the time allocated to each course. For a one-year course, this means that the content of the existing units of instruction should represent approximately 135 days of instruction. The remaining 25 percent of each course should be developed at the local district level and may reflect:
  - Additional units of instruction within the course related to topics not found in the state framework.
  - Activities which develop a higher level of mastery on the existing competencies and suggested objectives.
  - Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed/revised.
  - Activities which implement components of the Mississippi Tech Prep Initiative, including integration of academic and vocational-technical skills and coursework, school-to-career transition activities, and articulation of secondary and postsecondary vocational-technical programs.
  - Individualized learning activities, including work site learning activities, to better prepare individuals in the courses for their chosen occupational area.
- Sequencing of the units of instruction within a course is left to the discretion of the local district. Naturally, foundation units related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other units related to specific skill areas in the course, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors.

ACKNOWLEDGEMENTS

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TABLE OF CONTENTS

July 30, 1996

PROGRAM DESCRIPTION

BUSINESS AND COMPUTER DATA PROCESSING
(Program CIP: 52.1201 - Mgmt. Info. Systems & Business Data)

The Business and Computer Data Processing program includes Computer Programming Technology I and Computer Programming Technology II. It is designed to educate, train, and provide guidance for secondary vocational students. Upon completion of this course the student will have the programming knowledge, skills, and behavioral characteristics to continue his/her education or seek entry level employment in the computer industry.

July 30, 1996

COURSE OUTLINE

COMPUTER PROGRAMMING TECHNOLOGY I

Unit #	Unit Name	No. Of Days
Unit 1	Orientation	30
Unit 2	BASIC Language Syntax and Programming Applications	120

COMPUTER PROGRAMMING TECHNOLOGY II

Unit #	Unit Name	No. Of Days
Unit 1	COBOL Language Syntax and Programming Applications	120
Unit 2	Introduction to Computer Networking	15
Unit 3	Workplace Skills	15

July 30, 1996

SECTION I:

CURRICULUM FRAMEWORK

FOR

BUSINESS AND COMPUTER DATA PROCESSING

CURRICULUM FRAMEWORK

Course Name: Computer Programming Technology I

Course CIP Code: 07.0390

Course Description: Computer Programming Technology I is the entry level course of the secondary Business and Computer Data Processing. Students in Computer Programming Technology I will gain foundation competencies related to Orientation and Basic Language Syntax and Programming Applications. (2-2½ Carnegie Units, depending upon time spent in the course)

Competencies and Suggested Objectives:

1. Review educational, occupational, and leadership opportunities in Computer Programming Technology.
   a. Review student rules and regulations for the local school.
   b. Investigate career opportunities in Computer Programming Technology.
   c. Update the students' career and educational plans.
   d. Identify and describe leadership opportunities available from student youth organizations in the school and community, including FBLA.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S5, S6, S7, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Explore safety in the computer classroom and lab.
   a. Handle diskettes correctly.
   b. Care for and use computer hardware correctly.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S5, S6, S7, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Discover the importance and uses of computers.
   a. Associate machines, concepts, dates, places, acronyms, and persons related to the history of computers.
   b. Define data processing and describe the concepts contained therein.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M7, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
4. Explore computer hardware.
   a. Differentiate between hardware and software in a computer environment.
   b. Classify computers by size.
   c. Graphically illustrate the functions performed in a computer center.
   d. Identify various pieces of hardware and the function(s) performed by each.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M2, M4, M7, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

5. Explore the various operating platforms and software categories.
   a. List and explore the commonly used operating systems.
   b. List and explore common programming languages.
   c. List and explore common application software.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
6. Discover and utilize program development cycle to include input/output, processing, and storage.
   a. Key in, run, debug, and produce printed reports for sample programs.
   b. Produce an original program to input data, process data, and output a printed report.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
7. Discover and utilize computational and logical operations.
   a. Prepare programs that use arithmetic operations (i.e., addition, subtraction, multiplication, division, and/or exponentiation).
   b. Produce programs that use relational operators.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
8. Explore and utilize techniques for interactive programs.
   a. Produce programs which require interaction between computer, program, and user.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
9. Discover and utilize the use of controlled loops.
   a. Produce programs which execute certain statements multiple times.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
10. Explore and utilize the techniques for processing arrays.
    a. Develop programs which use arrays.
    Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
    Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
11. Discover and utilize menu-driven programs.
    a. Produce programs that are menu driven.
    Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
    Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

CURRICULUM FRAMEWORK

Course Name: Computer Programming Technology II

Course CIP Code: 07.0391

Course Description: Computer Programming Technology II is the advanced level course of the secondary Business and Computer Data Processing. Students in Computer Programming Technology II will gain advanced competencies related to COBOL Language Syntax and Programming Applications, Introduction to Computer Networking, and Workplace Skills. (2-2½ Carnegie Units, depending upon time spent in the course)

Competencies and Suggested Objectives:

1. Analyze the COBOL language.
   a. Identify the four divisions of a COBOL program and describe the characteristics of each.
   b. Recognize the types of entries within each division.
   c. Name the basic classifications of COBOL verbs and an example of a verb under each classification.
   d. Identify and /or illustrate the meanings of destructive read-in and nondestructive read-out.
   e. Prepare the data division from a record layout (visually illustrated) and/or from a print line layout (visually illustrated on print layout form).
   f. Apply 1a through 1e to utilize the COBOL language syntax to DWRD to input data, process the data, and output a printed report.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Illustrate the use of arithmetic operations.
   a. Produce programs which perform some or all of the four arithmetic operations. This may include computations.
   b. Prepare a program which will accumulate final total(s) and/or subtotals(s) of one or more items.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Produce edited reports.
   a. Develop programs which will perform arithmetic operations; round; edit with a dollar sign, comma, decimal point, percent sign, or zero suppression; print headings; print column headings; and/or sort.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

4. Illustrate the use of decision making.
   a. Produce programs in which comparisons are to be made.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
5. Discover network terminology.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
6. Relate characteristics, theories, and components of networks.
   a. Discuss examples of recognized network topology.
   b. Compare network topology.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
7. Demonstrate various telecommunications activities.
   a. Distinguish between ethical and unethical use of telecommunications.
   b. Transmit and receive specified information.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
8. Explore the future of telecommunications.
   a. Research current trends and issues regarding telecommunications.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
9. Prepare documents for job application.
   a. Search resources for a job opening in computer programming and/or related area.
   b. Prepare, in an acceptable format, an application letter, a resume, and follow-up letter using word processing software.
   c. Integrate an application using word processing, database, and/or spreadsheet to simulate sending letters of application and resumes to various potential employers.
   d. Conduct himself/herself appropriately on a mock job interview, to include completing a job application.
   e. Visit an industry/computer center and analyze the hardware/software usage and needs, the educational training for personnel, the tasks performed by personnel, and the future outlook for those jobs.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S1, S2, S3, S4, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

July 30, 1996

SECTION II:

CURRICULUM GUIDE

FOR

BUSINESS AND COMPUTER DATA PROCESSING

July 30, 1996

COMPUTER PROGRAMMING TECHNOLOGY I

COMPUTER PROGRAMMING TECHNOLOGY I
UNIT 1: ORIENTATION

(30 days)

Competencies and Suggested Objectives:

1. Review educational, occupational, and leadership opportunities in Computer Programming Technology.
   a. Review student rules and regulations for the local school.
   b. Investigate career opportunities in Computer Programming Technology.
   c. Update the students' career and educational plans.
   d. Identify and describe leadership opportunities available from student youth organizations in the school and community, including FBLA.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S5, S6, S7, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Explore safety in the computer classroom and lab.
   a. Handle diskettes correctly.
   b. Care for and use computer hardware correctly.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S5, S6, S7, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Discover the importance and uses of computers.
   a. Associate machines, concepts, dates, places, acronyms, and persons related to the history of computers.
   b. Define data processing and describe the concepts contained therein.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M7, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
4. Explore computer hardware.
   a. Differentiate between hardware and software in a computer environment.
   b. Classify computers by size.
   c. Graphically illustrate the functions performed in a computer center.
   d. Identify various pieces of hardware and the function(s) performed by each.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M2, M4, M7, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
5. Explore the various operating platforms and software categories.
   a. List and explore the commonly used operating systems.
   b. List and explore common programming languages.
   c. List and explore common application software.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Review educational, occupational, and leadership opportunities in Computer Programming Technology.*
   a. *Review student rules and regulations for the local school.*
   b. *Investigate career opportunities in Computer Programming Technology.*
   c. *Update the students' career and educational plans.*
   d. *Identify and describe leadership opportunities available form student youth organizations in the school and community, including VICA.*
2. *Explore safety in the computer classroom and lab.*
   a. *Have the students discuss and demonstrate the proper handling techniques for 3½" disks and CD's .*
   b. *Have the students discuss proper care and use of computer hardware.*
3. *Discover the importance and uses of computers.*
   a. *Have the students examine the various machines, concepts, dates, places, acronyms, and persons related to the history of computers.*
   b. *Have the students define data processing and describe the concepts.*
4. *Explore computer hardware.*
   a. *Have the students differentiate between hardware and software in a computer environment.*
   b. *Have the students classify computers by size.*
   c. *Have the students graphically illustrate the functions performed in a computer center.*
   d. *Have the students identify various pieces of hardware and the function(s) performed by each to include PC's, networks, and storage devices.*
5. *Explore the various operating platforms and software categories.*
   a. *Have the students perform various operations used with diskettes making use of various operating platforms.*
   b. *Have the students list common programming languages; and give type, application area, and a statement example for each.*
   c. *Have the students list and utilize the common application software to include: word processing, database, spreadsheet, and/or more application specific type software such as desktop publishing, CAD, or multi-media presentations.*

Suggested Assessment Strategies:

1. *Review educational, occupational, and leadership opportunities in Computer Programming Technology.*
   a. *Test and evaluate.*
   b. *Evaluate.*
   c. *Plan updated.*
   d. *Test.*

2. *Explore safety in the computer classroom and lab.*
   a. *Evaluate by test or visual observation.*
   b. *Evaluate by test or visual observation.*
3. *Discover the importance and uses of computers.*
   a. *Test.*
   b. *Test.*
4. *Explore computer hardware.*
   a. *Test.*
   b. *Test.*
   c. *Test.*
   d. *Test.*
5. *Explore the various operating platforms and software categories.*
   a. *Test.*
   b. *Test.*
   c. *Test and/or document produced.*

Suggested Resources:

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Wanous, S.J.; Wagner, Gerald W.; and Lambrecht, Judith J. Fundamentals of Data Processing. Cincinnati, Ohio: South-Western Publishing Co. 1971.

Wanous, S.J.; Wagner, Gerald W.; and Lambrecht, Judith J. Fundamentals of Data Processing. Cincinnati, Ohio: South-Western Publishing Co. 1981.

COMPUTER PROGRAMMING TECHNOLOGY I
UNIT 2: BASIC LANGUAGE SYNTAX AND PROGRAMMING APPLICATIONS (120 days)

Competencies and Suggested Objectives:

1. Discover and utilize program development cycle to include input/output, processing, and storage.
   a. Key in, run, debug, and produce printed reports for sample programs.
   b. Produce an original program to input data, process data, and output a printed report.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Discover and utilize computational and logical operations.
   a. Prepare programs that use arithmetic operations (i.e., addition, subtraction, multiplication, division, and/or exponentiation).
   b. Produce programs that use relational operators.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Explore and utilize techniques for interactive programs.
   a. Produce programs which require interaction between computer, program, and user.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
4. Discover and utilize the use of controlled loops.
   a. Produce programs which execute certain statements multiple times.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
5. Explore and utilize the techniques for processing arrays.
   a. Develop programs which use arrays.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
6. Discover and utilize menu-driven programs.
   a. Produce programs that are menu driven.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Discover and utilize program development cycle to include input/output, processing, and storage.*
   a. *Have the students key in, run, debug, and produce printed reports for instructor selected sample programs.*
   b. *Have the students use the BASIC syntax to design, flowchart, write, run, and debug (DFWRD) an original program to input data, process data, and output a printed report.*
2. *Discover and utilize computational and logical operations.*
   a. *Have the students translate algebraic formulas into programming statements using the BASIC syntax to produce a usable program.*
   b. *Have the students construct an original program utilizing combinations of relational operators.*
3. *Explore and utilize techniques for interactive programs.*
   a. *Have the students DFWRD programs which utilize interactive programming techniques.*
4. *Discover and utilize the use of controlled loops.*
   a. *Have the students construct programs which illustrate the power of the computer to do repetitive processes in a short period of time.*
5. *Explore and utilize the techniques for processing arrays.*
   a. *Have the students DFWRD programs which process arrays, which may include use of ASCII to sort and/or string function processing. This is not limited to single dimension arrays.*
6. *Discover and utilize menu driven programs.*
   a. *Have the students DFWRD programs that are menu driven which may include color, graphics, and/or file processing.*

Suggested Assessment Strategies:

1. *Discover and utilize program development cycle to include input/output, processing, and storage.*
   a. *Observe students running computer, keying in programs, and producing debug programs.*
   b. *Observe students operating printer and producing printed output, test on UTBLS, and evaluate the DFWRD for all the rest.*
2. *Discover and utilize computational and logical operations.*
   a. *Observe students translating algebraic formulas into programming statements.*
   b. *Observe students constructing an original program utilizing combinations of relational operators.*
3. *Explore and utilize techniques for interactive programs.*
   a. *Observe students as they DFWRD programs.*

4. *Discover and utilize the use of controlled loops.*
   a. *Observe students constructing programs which illustrate the power of the computer to do repetitive processes in a short period of time.*
5. *Explore and utilize the techniques for processing arrays.*
   a. *Observe students as they DFWRD programs which process arrays.*
6. *Discover and utilize menu-driven programs.*
   a. *Observe students as they DFWRD programs that are menu driven.*

Suggested Resources:

Clark and Drum. Structured BASIC (3rd ed.). 1994.

Crippen and Jaehne. VideoStop: A Computer Application Simulation. 1995.

July 30, 1996

COMPUTER PROGRAMMING TECHNOLOGY II

COMPUTER PROGRAMMING TECHNOLOGY II
UNIT 1: COBOL LANGUAGE SYNTAX AND PROGRAMMING APPLICATIONS (120 days)

Competencies and Suggested Objectives:

1. Analyze the COBOL language.
   a. Identify the four divisions of a COBOL program and describe the characteristics of each.
   b. Recognize the types of entries within each division.
   c. Name the basic classifications of COBOL verbs and an example of a verb under each classification.
   d. Identify and /or illustrate the meanings of destructive read-in and nondestructive read-out.
   e. Prepare the data division from a record layout (visually illustrated) and/or from a print line layout (visually illustrated on print layout form).
   f. Apply 1a through 1e to utilize the COBOL language syntax to DWRD to input data, process the data, and output a printed report.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Illustrate the use of arithmetic operations.
   a. Produce programs which perform some or all of the four arithmetic operations. This may include computations.
   b. Prepare a program which will accumulate final total(s) and/or subtotals(s) of one or more items.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Produce edited reports.
   a. Develop programs which will perform arithmetic operations; round; edit with a dollar sign, comma, decimal point, percent sign, or zero suppression; print headings; print column headings; and/or sort.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
4. Illustrate the use of decision making.
   a. Produce programs in which comparisons are to be made.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Analyze the COBOL language.*
   a. *Have the students list the four divisions of a COBOL program and describe the characteristics of each.*
   b. *Have the students recognize the types of entries within each division.*
   c. *Have the students name the basic classifications of COBOL verbs and an example of a verb under each classification.*
   d. *Have the students identify and/or illustrate the meanings of destructive read-in and nondestructive read-out.*
   e. *Have the students prepare the data division from a record layout (visually illustrated) and/or from a print line layout (visually illustrated on print layout form).*
   f. *Have the students use the COBOL language syntax to design, write, run, and debug (DWRD) a program to input data, process the data, and output a printed report.*
2. *Illustrate the use of arithmetic operations.*
   a. *Have the students use the COBOL language syntax to DWRD programs to perform some or all of the four arithmetic operations. This may include computation.*
   b. *Have the students use the COBOL language syntax to DWRD a program which will accumulate final total(s) and/or subtotal(s) of one or more items.*
3. *Produce edited reports.*
   a. *Have the students use the COBOL language syntax to DWRD programs which will perform arithmetic operations; round; edit with a dollar sign, comma, decimal point, percent sign, or zero suppression; print headings; print column headings; and/or sort.*
4. *Illustrate the use of decision making.*
   a. *Have the students use the COBOL language syntax to DWRD a program in which comparisons are to be made.*

Suggested Assessment Strategies:

1. *Analyze the COBOL language.*
   a. *Test on UTBLS and evaluate on DWRD.*
   b. *Test on UTBLS and evaluate on DWRD.*
   c. *Test on UTBLS and evaluate on DWRD.*
   d. *Test on UTBLS and evaluate on DWRD.*
   e. *Test on UTBLS and evaluate on DWRD.*
   f. *Test on UTBLS and evaluate on DWRD.*
2. *Illustrate the use of arithmetic operations.*
   a. *Test on UTBLS and evaluate on DWRD.*
   b. *Test on UTBLS and evaluate on DWRD.*

3. *Produce edited reports.*
   a. *Test on UTBLS and evaluate on DWRD.*
4. *Illustrate the use of decision making.*
   a. *Test on UTBLS and evaluate on DWRD.*

Suggested Resources:

Flowcharting template with description of symbols and usage.

Richards, Roy Martin, Microcomputing in COBOL. Chicago, IL: Science Research Associates. 1987.

Sanders, Donald H. Computers Today (2nd ed.). New York, NY: McGraw-Hill Book Company. 1985.

Shelly, Gary B.; and Cashman, Thomas J. Introduction to Computer Programming ANSI COBOL. Brea, CA: Anaheim Publishing Company. 1981.

Shelly, Gary B.; and Cashman, Thomas J.; and Forsythe, Steven G. Structured COBOL Pseudocode Edition. Body and Fraser Publishing Company. 1986.

COMPUTER PROGRAMMING TECHNOLOGY II
UNIT 2: INTRODUCTION TO COMPUTER NETWORKING (15 days)

Competencies and Suggested Objectives:

1. Discover network terminology.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Relate characteristics, theories, and components of networks.
   a. Discuss examples of recognized network topology.
   b. Compare network topology.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Demonstrate various telecommunications activities.
   a. Distinguish between ethical and unethical use of telecommunications.
   b. Transmit and receive specified information.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
4. Explore the future of telecommunications.
   a. Research current trends and issues regarding telecommunications.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Discover network terminology.*
   a. Discuss and define terminology related to networks.
2. *Relate characteristics, theories, and components of networks.*
   a. Have the students illustrate types of network topology.
   b. Have the students discuss advantages and disadvantages of standard accepted network configurations.
3. *Demonstrate various telecommunications activities.*
   a. Have the students develop a list of acceptable practices for the use of telecommunications.
   b. Have the students originate and receive e-mail and other forms of information as specified by the instructor, which may include sharing programming techniques, and participate in a teleconference.

4. *Explore the future of telecommunications.*
   a. *Have the students request and receive information on computer science curriculum requirements, current trends, and scholarship opportunities from various colleges/universities and receive such information through the use of telecommunications.*

Suggested Assessment Strategies:

1. *Discover network terminology.*
   Written test and assignments.
2. *Relate characteristics, theories, and components of networks.*
   a. *Test.*
   b. *Evaluate with performance exercises.*
3. *Demonstrate various telecommunications activities.*
   a. *Evaluate the list of practices.*
   b. *Evaluate the performance exercise.*
4. *Explore the future of telecommunications.*
   a. *Evaluate the performance exercise.*

Suggested Resources:

Boillot, Michel. BASIC Concepts and Structured Problem Solving (2nd ed.). St. Paul, MN: West Publishing Company. 1988.

Bosworth, Bruce and Nagel, Harry L. Programming in BASIC for Microcomputers (4th ed.). Lake Forest, IL: Glencoe/Macmillan/McGraw-Hill. 1992.

Clark, James F. and Drum, William O. Structured BASIC (2nd ed.). Cincinnati, Ohio: South-Western Publishing Company. 1989 & 1995.

Cummins, Jerry and Kuechmann, Gene. Programming in BASIC. Columbus, OH: Charles E. Merrill Publishing Company. 1983.

Easy Internet. Que Corporation.

Flowcharting template with description of symbols and usage.

Golden, Neal. Computer Programming in the BASIC Language (2nd ed.). Orlando, Florida: Harcourt Brace Jovanovich, Publishers. 1981.

Mandell, Steven L. Complete BASIC Programming. St. Paul, MN: West Publishing Company. 1984.

Navigating the Internet. Que Corporation.

Norris, Cathleen and Poirot, James L. Basic Programming Solving with Structure and Style. Austin, TX: Sterling Swift Publishing Company. 1984.

Riding the Internet Highway. Prentice Hall.

Shelly, Gary B. and Cashman, Thomas J. Introduction to BASIC Programming Concepts, Principles, and Procedures. Anaheim Publishing Company. 1985.

Shoaff, Eileen Klimick. Advanced BASIC: A Structured Approach for MS BASIC. St. Paul, MN: West Publishing Company. 1988.

Using Internet, Special Edition. Que Corporation.

COMPUTER PROGRAMMING TECHNOLOGY II
UNIT 3: WORKPLACE SKILLS (15 days)

Competencies and Suggested Objectives:

1. Prepare documents for job application.
   a. Search resources for a job opening in computer programming and/or related area.
   b. Prepare, in an acceptable format, an application letter, a resume, and follow-up letter using word processing software.
   c. Integrate an application using word processing, database, and/or spreadsheet to simulate sending letters of application and resumes to various potential employers.
   d. Conduct himself/herself appropriately on a mock job interview, to include completing a job application.
   e. Visit an industry/computer center and analyze the hardware/software usage and needs, the educational training for personnel, the tasks performed by personnel, and the future outlook for those jobs.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M2, M3, M4, M5, M6, M7, S1, S2, S3, S4, S5, S6, S7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Prepare documents for job application.*
   a. Have the students search resources for a job opening programming and/or related area.
   b. Have the students prepare, in an acceptable format, an application letter, a resume, and a follow-up letter to various potential employers.
   c. Have the students integrate an application using word processing, database, and/or spreadsheet to simulate sending letters of application and resumes to various potential employers.
   d. Have the student conduct himself/herself appropriately on a mock job interview as the teacher videos for evaluation. The student will correctly complete a job application.
   e. Have the students visit an industry/computer center (ideally one student per center) and analyze the hardware/software usage and needs, the educational training for personnel, the tasks performed by personnel, and the future outlook for those jobs.

Suggested Assessment Strategies:

1. *Prepare documents for job application.*
   a. *Evaluate via test, checksheet, document prepared, completed form, and/or industry/computer center evaluation form.*
   b. *Evaluate via test, checksheet, document prepared, completed form, and/or industry/computer center evaluation form.*
   c. *Evaluate via test, checksheet, document prepared, completed form, and/or industry/computer center evaluation form.*
   d. *Evaluate via test, checksheet, document prepared, completed form, and/or industry/computer center evaluation form.*
   e. *Evaluate via test, checksheet, document prepared, completed form, and/or industry/computer center evaluation form.*

Suggested Resources:

Clark, James F. and Lambrecht, Judith J. Information Processing. Cincinnati, Ohio: South-Western Publishing Co. 1985 & 1995.

Flowcharting template with description of symbols and usage.

Groneman, Nancy. LOTUS 1-2-3 Tutorial and Applications. Cincinnati, Ohio: South-Western Publishing Compay. 1993.

Hopper, Grace Murray and Mandell, Steven L. Understanding Computers. West Publishing Co. 1994.

Mandell, Steven L. Working With Applications Software/IBM PC. St. Paul, MN: West Publishing Company. 1986.

Sanders, Donald H. Computers Today (2nd ed.) New York, NY: McGraw-Hill Book Company. 1985.

Shelley, Cashman, and Forsythe. Introduction to Data Processing and Computer Fundamentals.

Shelley, Gary B.; Cashman, Thomas J.; and Waggoner, Gloria A. Computer Concepts. Cincinnati, Ohio: South-Western Publishing Company. 1990.

SECTION III:

RECOMMENDED TOOLS AND EQUIPMENT

RECOMMENDED TOOLS AND EQUIPMENT FOR SECONDARY BUSINESS AND COMPUTER DATA PROCESSING

1. Computer work centers (desk and chair) (1 for handicapped) (1 per student)
   Personal computers (to be networked to a file server with system and application software, to include COBOL, BASIC, Office Suite, Windows [latest edition], etc.) – to follow minimum specifications as published by MDE
   a. 3.5" disk drive
   b. CD ROM
   c. Telecommunications service/software
   d. Sound card with speakers
   e. Head phone (1 with speaker)
   f. Modem
   g. Fax capability
   h. Teleconferencing equipment (or access to)
2. Laser printer (1 per 10 stations)
3. Color ink jet printer (1 per class)
4. Copier (1 per class)
5. Fax machine (1 per class)
6. Page scanner with support software installed (1 per class)
7. Presentation binding machine (1 per class)
8. Paper cutter (1 per class)
9. Copy holder (1 per student)
10. 3.5" diskette holder (1 per computer per class period)
11. 3.5" disk holder and CD holder (1 per class)

RECOMMENDED INSTRUCTIONAL MATERIALS/RESOURCES

1. LCD panel for overhead projector and large screen TV and/or external VGA-to-video/TV screen converter for PC
2. Access to video camera
3. TV and VCR (1 per lab)
4. Access to copier
5. Access to laser disc player
6. Overhead projector

APPENDIX A:

RELATED ACADEMIC TOPICS

APPENDIX A

RELATED ACADEMIC TOPICS FOR COMMUNICATIONS

C1 Interpret written material.
C2 Interpret visual materials (maps, charts, graphs, tables, etc.).
C3 Listen, comprehend, and take appropriate actions.
C4 Access, organize, and evaluate information.
C5 Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.
C6 Communicate ideas and information effectively using various oral and written forms for a variety of audiences and purposes.

EXPANDED TOPICS FOR COMMUNICATIONS

TOPIC C1: Interpret written material.

C1.01 Read and follow complex written directions.
C1.02 Recognize common words and meanings associated with a variety of occupations.
C1.03 Adjust reading strategy to purpose and type of reading.
C1.04 Use sections of books and reference sources to obtain information.
C1.05 Compare information from multiple sources and check validity.
C1.06 Interpret items and abbreviations used in multiple forms.
C1.07 Interpret short notes, memos, and letters.
C1.08 Comprehend technical words and concepts.
C1.09 Use various reading techniques depending on purpose for reading.
C1.10 Find, read, understand, and use information from printed matter or electronic sources.

TOPIC C2: Interpret visual materials (maps, charts, graphs, tables, etc.).

C2.01 Use visuals in written and in oral presentations.
C2.02 Recognize visual cues to meaning (layout, typography, etc.).
C2.03 Interpret and apply information using visual materials.

TOPIC C3: Listen, comprehend, and take appropriate action.

C3.01 Identify and evaluate orally-presented messages according to purpose.
C3.02 Recognize barriers to effective listening.
C3.03 Recognize how voice inflection changes meaning.
C3.04 Identify speaker signals requiring a response and respond accordingly.
C3.05 Listen attentively and take accurate notes.
C3.06 Use telephone to receive information.

C3.07 Analyze and distinguish information from formal and informal oral presentations.

TOPIC C4: Access, organize, and evaluate information.

C4.01 Distinguish fact from opinion.
C4.02 Use various print and non-print sources for specialized information.
C4.03 Interpret and distinguish between literal and figurative meaning.
C4.04 Interpret written or oral communication in relation to context and writer's point of view.
C4.05 Use relevant sources to gather information for written or oral communication.

TOPIC C5: Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.

C5.01 Select appropriate words for communication needs.
C5.02 Use reading, writing, listening, and speaking skills to solve problems.
C5.03 Compose inquiries and requests.
C5.04 Write persuasive letters and memos.
C5.05 Edit written reports, letters, memos, and short notes for clarity, correct grammar, and effective sentences.
C5.06 Write logical and understandable statements, phrases, or sentences for filling out forms, for correspondence or reports.
C5.07 Write directions or summaries of processes, mechanisms, events, or concepts.
C5.08 Select and use appropriate formats for presenting reports.
C5.09 Convey information to audiences in writing.
C5.10 Compose technical reports and correspondence that meet accepted standards for written communications.

TOPIC C6: Communicate ideas and information using oral and written forms for a variety of audiences and purposes.

C6.01 Give complex oral instructions.
C6.02 Describe a business or industrial process/mechanism.
C6.03 Participate effectively in group discussions and decision making.
C6.04 Produce effective oral messages utilizing different media.
C6.05 Explore ideas orally with partners.
C6.06 Participate in conversations by volunteering information when appropriate and asking relevant questions when appropriate.
C6.07 Restate or paraphrase a conversation to confirm one's own understanding.
C6.08 Gather and provide information utilizing different media.

C6.09 Prepare and deliver persuasive, descriptive, and demonstrative oral presentations.

RELATED ACADEMIC TOPICS FOR MATHEMATICS

M1 Relate number relationships, number systems, and number theory.
M2 Explore patterns and functions.
M3 Explore algebraic concepts and processes.
M4 Explore the concepts of measurement.
M5 Explore the geometry of one-, two-, and three-dimensions.
M6 Explore concepts of statistics and probability in real world situations.
M7 Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

EXPANDED TOPICS FOR MATHEMATICS

TOPIC M1: Relate number relationships, number systems, and number theory.

M1.01 Understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, and scientific notation) in real world and mathematical problem situations.
M1.02 Develop number sense for whole numbers, fractions, decimals, integers, and rational numbers.
M1.03 Understand and apply ratios, proportions, and percents in a wide variety of situations.
M1.04 Investigate relationships among fractions, decimals, and percents.
M1.05 Compute with whole numbers, fractions, decimals, integers, and rational numbers.
M1.06 Develop, analyze, and explain procedures for computation and techniques for estimations.
M1.07 Select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil, calculator, and computer methods.
M1.08 Use computation, estimation, and proportions to solve problems.
M1.09 Use estimation to check the reasonableness of results.

TOPIC M2: Explore patterns and functions.

M2.01 Describe, extend, analyze, and create a wide variety of patterns.
M2.02 Describe and represent relationships with tables, graphs, and rules.
M2.03 Analyze functional relationships to explain how a change in one quantity results in a change in another.
M2.04 Use patterns and functions to represent and solve problems.
M2.05 Explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.

M2.06 Use a mathematical idea to further their understanding of other mathematical ideas.

M2.07 Apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, and business.

TOPIC M3: Explore algebraic concepts and processes.

M3.01 Represent situations and explore the interrelationships of number patterns with tables, graphs, verbal rules, and equations.

M3.02 Analyze tables and graphs to identify properties and relationships and to interpret expressions and equations.

M3.03 Apply algebraic methods to solve a variety of real world and mathematical problems.

TOPIC M4: Explore the concepts of measurement.

M4.01 Estimate, make, and use measurements to describe and compare phenomena.

M4.02 Select appropriate units and tools to measure to the degree of accuracy required in a particular situation.

M4.03 Extend understanding of the concepts of perimeter, area, volume, angle measure, capacity, and weight and mass.

M4.04 Understand and apply reasoning processes, with special attention to spatial reasoning and reasoning with proportions and graphs.

TOPIC M5: Explore the geometry of one-, two-, and three-dimensions.

M5.01 Identify, describe, compare, and classify geometric figures.

M5.02 Visualize and represent geometric figures with special attention to developing spatial sense.

M5.03 Explore transformations of geometric figures.

M5.04 Understand and apply geometric properties and relationships.

M5.05 Classify figures in terms of congruence and similarity and apply these relationships.

TOPIC M6: Explore the concepts of statistics and probability in real world situations.

M6.01 Systematically collect, organize, and describe data.

M6.02 Construct, read, and interpret tables, charts, and graphs.

M6.03 Develop an appreciation for statistical methods as powerful means for decision making.

M6.04 Make predictions that are based on exponential or theoretical probabilities.

M6.05 Develop an appreciation for the pervasive use of probability in the real world.

TOPIC M7: Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

M7.01 Use computers and/or calculators to process information for all mathematical situations.
M7.02 Use problem-solving approaches to investigate and understand mathematical content.
M7.03 Formulate problems from situations within and outside mathematics.
M7.04 Generalize solutions and strategies to new problem situations.

RELATED ACADEMIC TOPICS FOR SCIENCE

S1 Explain the Anatomy and Physiology of the human body.
S2 Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.
S3 Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.
S4 Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.
S5 Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.
S6 Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.
S7 Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance, population genetics, the structure and function of DNA, and current applications of DNA technology.
S8 Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

EXPANDED TOPICS FOR SCIENCE

TOPIC S1: Explain the Anatomy and Physiology of the human body.

S1.01 Recognize common terminology and meanings.
S1.02 Explore the relationship of the cell to more complex systems within the body.

S1.03 Summarize the functional anatomy of all the major body systems.
S1.04 Relate the physiology of the major body systems to its corresponding anatomy.
S1.05 Compare and contrast disease transmission and treatment within each organ system.
S1.06 Explore the usage of medical technology as related to human organs and organ systems.
S1.07 Explain the chemical composition of body tissue.

TOPIC S2: Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.

S2.01 Identify the major types and structures of plants, viruses, monera, algae protista, and fungi.
S2.02 Explain sexual and asexual reproduction.
S2.03 Describe the ecological importance of plants as related to the environment.
S2.04 Analyze the physical chemical and behavioral process of a plant.

TOPIC S3: Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.

S3.01 Explain the morphology, anatomy, and physiology of animals.
S3.02 Describe the characteristics, behaviors, and habitats of selected animals.

TOPIC S4: Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.

S4.01 Examine minerals and their identification, products of the rock cycle, byproducts of weathering, and the effects of erosion.
S4.02 Relate the Hydrologic Cycle to include groundwater its zones, movement, and composition; surface water systems, deposits, and runoff.
S4.03 Consider the effects of weather and climate on the environment.
S4.04 Examine the composition of seawater; wave, tides, and currents; organisms, environment, and production of food; energy, food and mineral resources of the oceans.

TOPIC S5: Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.

S5.01 Examine the science of chemistry to include the nature of matter, symbols, formulas and nomenclature, and chemical equations.

S5.02 Identify chemical reactions including precipitation, acids-bases, and reduction-oxidation.

S5.03 Explore the fundamentals of chemical bonding and principles of equilibrium.

S5.04 Relate the behavior of gases.

S5.05 Investigate the structure, reactions, and uses of organic compounds; and investigate nuclear chemistry and radiochemistry.

TOPIC S6: Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.

S6.01 Examine fundamentals of motion of physical bodies and physical dynamics.

S6.02 Explore the concepts and relationships among work, power, and energy.

S6.03 Explore principles, characteristics, and properties of electricity, magnetism, light energy, thermal energy, and wave energy.

S6.04 Identify principles of modern physics related to nuclear physics.

TOPIC S7: Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance; population genetics, the structure and function of DNA, and current applications of DNA technology.

S7.01 Examine principles, techniques, and patterns of traits and inheritance in organisms.

S7.02 Apply the concept of population genetics to both microbial and multicellular organism.

S7.03 Identify the structure and function of DNA and the uses of DNA technology in science, industry, and society.

TOPIC S8: Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

S8.01 Apply the components of scientific processes and methods in classroom and laboratory investigations.

S8.02 Observe and practice safe procedures in the classroom and laboratory.

S8.03 Demonstrate proper use and care for scientific equipment.

S8.04 Investigate science careers, and advances in technology.

S8.05 Communicate results of scientific investigations in oral, written, and graphic form.

APPENDIX B:

WORKPLACE SKILLS

APPENDIX B
WORKPLACE SKILLS FOR THE 21ST CENTURY

WP1 Allocates resources (time, money, materials and facilities, and human resources).

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.

WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.

WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.

WP5 Selects, applies, and maintains/troubleshoots technology.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.

APPENDIX C:

STUDENT COMPETENCY PROFILE

STUDENT COMPETENCY PROFILE
COMPUTER PROGRAMMING TECHNOLOGY I

Student: _____

This record is intended to serve as a method of noting student achievement of the competencies in each course. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the program.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: Orientation

_____ 1. Review educational, occupational, and leadership opportunities in Computer Programming Technology.
_____ 2. Explore safety in the computer classroom and lab.
_____ 3. Discover the importance and uses of computers.
_____ 4. Explore computer hardware.
_____ 5. Explore the various operating platforms and software categories.

Unit 2: Basic Language Syntax and Programming Applications

_____ 1. Discover and utilize program development cycle to include input/output, processing, and storage.
_____ 2. Discover and utilize computational and logical operations.
_____ 3. Explore and utilize techniques for interactive programs.
_____ 4. Discover and utilize the use of controlled loops.
_____ 5. Explore and utilize the techniques for processing arrays.
_____ 6. Discover and utilize menu-driven programs.

July 30, 1996

STUDENT COMPETENCY PROFILE
COMPUTER PROGRAMMING TECHNOLOGY II

Student: _____

This record is intended to serve as a method of noting student achievement of the competencies in each course. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the program.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: COBOL Language Syntax and Programming Applications

_____ 1. Analyze the COBOL language.
_____ 2. Illustrate the use of arithmetic operations.
_____ 3. Produce edited reports.
_____ 4. Illustrate the use of decision making.

Unit 2: Introduction to Computer Networking

_____ 1. Discover network terminology.
_____ 2. Relate characteristics, theories, and components of networks.
_____ 3. Demonstrate various telecommunications activities.
_____ 4. Explore the future of telecommunications.

Unit 3: Workplace Skills

_____ 1. Prepare documents for job application.