Title 7: Education K-12

Part 82: Trades Industrial

2005 Mississippi Curriculum Framework

Secondary Masonry

(Program CIP: 46.0101 – Mason/Masonry)

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Academic Standards Mississippi Department of Education Subject Area Testing Program

Workplace Skills for the 21st Century Secretary's Commission on Achieving Necessary Skills

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Foreword

Secondary vocational-technical education programs in Mississippi are faced with many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing true learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, Mississippi Code of 1972, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, ch. 487, §14; Laws, 1991, ch. 423, §1; Laws, 1992, ch. 519, §4 eff. from and after July 1, 1992; Carl D. Perkins Vocational Education Act III, 1998; and No Child Left Behind Act of 2001).

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 - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75-80 percent of the time in the course.
- Competencies and Suggested Objectives
    - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies.
    - The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. 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 rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.

- Integrated Academic Topics, Workplace Skills, Technology Standards, and Occupational Standards - This section identifies related academic topics as required in the Subject Area Assessment Program (SATP) in Algebra I, Biology I, English II, and U. S. History from 1877, which are integrated into the content of the unit. It also identifies the general workplace skills as identified in the Secretary's Commission on Achieving Necessary Skills (SCANS) report as being critical for all workers in the 21st Century. In addition, national technology standards and occupational skills standards associated with the competencies and suggested objectives for the unit are also identified.
- References - A list of suggested references is provided for each unit. The list includes 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.

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Program Description

Masonry is an instructional program which prepares students to enter the field of masonry. Study in the course allows an individual to prepare for employment and/or continued education in the masonry field. Included in Masonry I are units of study in student orientation, leadership and employability skills, safety, basic tools and equipment, basic math, masonry units, mortar, concrete, and rigging. Included in Masonry II are units of study in orientation, advanced leadership and employability skills, safety, power tools and equipment, wall layout, drawings/specifications and estimating, bricks, concrete masonry, and stonemasonry and precast panels.

Certification by the National Center for Construction Education and Research (NCCER):

This curriculum has been aligned to modules in the Contren Learning Series as endorsed by the National Center for Construction Education and Research (NCCER). Students who study this curriculum using the Contren Learning Series materials under the supervision of an instructor who has been certified by the NCCER are eligible to be tested on each module. Students who successfully pass these tests may be certified to the NCCER by the instructor and will receive documentation from NCCER.

Course Outline

Masonry I
Course CIP Code: 46.0102

Unit	Title	Hours
Unit 1:	Orientation, Leadership, and Employability Skills	10
Unit 2:	Basic Safety	15
Unit 3:	Basic Math	15
Unit 4:	Equipment, Hand, and Power Tools	15
Unit 5:	Introduction to Blueprints	15
Unit 6:	Basic Rigging	10
Unit 7:	Masonry Unit	80
Unit 8:	Mortar	20
Unit 9:	Concrete	20

Masonry II
Course CIP Code: 46.0190

Unit	Title	Hours
Unit 1:	Orientation, Advanced Leadership, and Employability Skills	10
Unit 2:	Basic Safety (Review)	15
Unit 3:	Power Tools and Equipment (Review)	15
Unit 4:	Wall Layout	40
Unit 5:	Drawings/Specifications and Estimating	15
Unit 6:	Brick	55
Unit 7:	Concrete Masonry	50
Unit 8:	Stonemasonry and Precast Panels	10

Masonry I
Unit 1: Orientation, Leadership, and Employability Skills (10 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Describe local program and vocational center policies and procedures. a. Describe local program and vocational center policies and procedures including dress code, attendance, academic requirements, discipline, and transportation regulations.	**Teaching:** • Present local program and vocational center policies and procedures. • Have students read the handbook to become aware of what is expected of them in relation to the policies and procedures of the school and explain the policies to the class.[E2, E3, E8] This will include dress code, attendance, academic requirements, discipline, and transportation regulations. • Have students complete exercises to identify equipment and functions found in the school lab. • Have students work together in pairs. A student with a higher reading ability will team up with a student with a lower reading ability to get a better understanding of the school's program policies and procedures. Have students write (or type) a report about what is expected in relation to local program and vocational center policies and procedures.[E1, E2,E3, E4, E8, E9] **Assessment:** • Evaluate students explanation of local student handbook requirements. • Evaluate exercises to identify equipment and functions found in the school lab. • Evaluate students' written report on rules and regulations. • Assess student' orientation knowledge through teacher observations and written unit test. File completed test to document student mastery of the school and program policies and procedures.
2. Describe employment opportunities and responsibilities. a. Describe employment opportunities including potential earnings, employee benefits, job availability, places of employment, working conditions, and educational requirements.	**Teaching:** • Explain educational and career opportunities that will be available to students after they complete the program (Contren Core Text, Basic Employability Skills Unit).[E2] • Have students use career software, such as Choices, to measure their aptitudes and

b. Describe basic employee responsibilities.	abilities for particular careers. E3, E8 • Have students work in groups and use the Internet, college catalogs, industry publications, and other information to research a list of careers for which they will be qualified upon program completion and postsecondary educational opportunities that will be available to them. E3, E4, E5, E10 Have each group orally present their findings to the class. E2, E5, E9 • Have each student select a career in a field related to the course and use the Occupational Outlook Handbook (book or website), Internet, and other resources to research job titles, educational and skill requirements, expected job growth, and entry-level salaries. Have each student report the findings in a two-page report. E1, E3, E8 E9 • Use a transparency to discuss the parts of a resume and cover letter, and provide each student a written sample. E3, E8 • Have each student use the Internet or newspapers to choose a job for which they are qualified and prepare a resume and cover letter that can be used to apply for the selected job. E1, E2, E4, E10 **Assessment:** • Monitor group work throughout the unit to ensure that each member participates • Evaluate the career and educational opportunities presentation for content and delivery. • Evaluate the career report for content and grammar. • Use a checklist to evaluate the resume and cover letter.
3. Explore leadership skills and personal development opportunities provided students by student organizations to include SkillsUSA. a. Demonstrate effective teambuilding and leadership skills. b. Practice appropriate work ethics.	**Teaching:** • Discuss the role of a team member and leader. Assign the students roles within a team and have them role play a situation in which there is a conflict which must be resolved. Utilize the lessons from SkillsUSA, Contren Tools for Success, or other resources to provide additional training. E3, E8 • Discuss appropriate work ethics standards.

	Have the students list what they believe to be the most common problems among the masonry profession. **Assessment:** • Assess the role play using a checklist for documentation. • Lessons from other resources should be assessed according to the recommended resource guide.
4. Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations.	**Teaching:** • Have the students perform an activity involving verbal instructions. Divide the students into groups and have one team be the customer and the other be the contractor. The customer will describe the project and the contractor will have to provide a brief plan for the construction of the project. Have the groups switch roles and the customer will provide the contractor with a written plan and blueprint. The contractor will describe the procedure for construction of the project (Contren Core Text, Basic Communication Skills Unit).[E2, E3, E4, E8,] **Assessment:** • The lesson will be assessed using a rubric and a checklist for the written projects.
5. Discuss the history of masonry to include materials and techniques.	**Teaching:** • Utilize the Contren Level I, Introduction to Masonry Unit to discuss the history of masonry. Have the students research the history of masonry to present day and develop a short presentation on each topic. The students will present to the class.[H1, H2] **Assessment:** • Assess the presentation using a checklist.

STANDARDS

Contren Learning Series Best Practices

Core Curriculum Best Practices

COM1 Demonstrate the ability to understand information and instructions that are presented in both written and verbal form.
COM2 Demonstrate the ability to communicate effectively in on-the-job situations using written and verbal skills.
EMP1 Explain the construction industry, the role of the companies that make up the industry, and the role of individual professionals in the industry.
EMP2 Demonstrate critical thinking skills and the ability to solve problems using those skills.
EMP3 Demonstrate knowledge of computer systems and explain common uses for computers in the construction industry.
EMP4 Demonstrate effective relationship skills with teammates and supervisors, exhibit the ability to work on a team, and demonstrate appropriate leadership skills.
EMP5 Be aware of workplace issues such as sexual harassment, stress, and substance abuse.

Level I

ITM1 Discuss the history of masonry.
ITM2 Describe modern masonry materials and methods.
ITM3 Explain career ladders and advancement possibilities in masonry work.
ITM4 Describe the skills, attitudes, and abilities needed to work as a mason.

Academic Standards

A5 Utilize various formulas in problem-solving situations.
A7 Interpret and apply slope as a rate of change.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
H2 Describe the impact of science and technology on the historical development of the United States in the global community.

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools

Suggested References

Choices [Computer software]. (n.d.). Ogdensburg, NY: Careerware, IMS Information Systems Management.

Davies, D. (1997). *Grammar? No problem!* Mission, KS: SkillPath.

Gould, M. C. (2002). *Developing literacy & workplace skills*. Bloomington, IN: National Education Service.

Local District Policy Handbook

National Center for Construction Education and Research. (2004). *Core curriculum.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Tools for success.* Upper Saddle River, NJ: Pearson Prentice Hall.

SkillsUSA. (2002). *Leadership and competition curricula.* Tinley Park, NY: Goodheart-Wilcox.

Masonry I
Unit 2: Basic Safety (Ongoing) **(15 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Describe general safety rules for working in a shop/lab and industry. a. Describe how to avoid on-site accidents. b. Explain the relationship between housekeeping and safety. c. Explain the importance of following all safety rules and company safety policies. d. Explain the importance of reporting all on-the-job injuries, accidents, and near misses. e. Explain the need for evacuation policies and the importance of following them. f. Explain the employer's substances abuse policy and how it relates to safety. g. Explain the safety procedures when working near pressurized or high temperature.	**Teaching:** **This can be used for the entire unit.** • Identify, discuss, and demonstrate terms, rules, and procedures related to shop/lab and industry safety. (Contren Core Text Basic Safety Unit and Level I Introduction to Masonry Unit).[E3, E8] • Required written tests will follow each section of guidelines for safety rules and procedures. • Provide the students with a list of terms and have them define the terms. Pair the students to quiz each other on the definitions in preparation for a written exam.[E2, E3, E8] • Divide the students into pairs and assign each pair one of the guidelines provided for personal safety (i.e., clothing, jewelry, hair, eyes, and ears). Have each pair demonstrate the "do's and don'ts" of the guidelines.[E2] • Have an industry speaker present to the class the necessity of safety in the work environment. Have students write a summary of the presentation.[E2, E9] • Divide the students into teams and have them develop scenarios of hazards and accidents using the Contren Series Core Text, Basic Safety Unit, publications, and the Internet. This will include tools; spills; working around welding; improper use of barriers, ladders, or scaffolds; use of MSDS information; fires; and electrical situations. In a game type situation, one team will read a scenario and the other teams will compete to be the first to provide the proper safety measures which should have been used to prevent the hazardous situation or accident. Points will be awarded to the teams with the correct answers.[E2, E4] • Required written tests will follow each section of guidelines for safety rules and
2. Identify and apply safety around welding operations. a. Use proper safety practices when welding or working around welding operations. b. Use proper safety practices when welding in or near trenches and excavations. c. Explain the term *proximity work*.	
3. Identify and explain use of various barriers and confinements. a. Explain the safety requirements for working in confined areas. b. Explain and practice lockout/tagout procedures. c. Explain the different barriers and barricades, and how they are used. d. Recognize and explain personal protective equipment. e. Inspect and care for personal protective equipment.	

4. Explain lifting and the use of ladders and scaffolds. a. Identify and explain the procedures for lifting heavy objects. b. Inspect and safely work with various ladders and scaffolds.	procedures. • NOTE: SAFETY IS TO BE TAUGHT AS AN ONGOING PART OF THE COURSE THROUGHOUT THE YEAR. **Assessment:** • Student participation will be monitored by the teacher and the written exam will be graded. • The "do's and don'ts" exercise will be critiqued with a peer review. • The summary of the speaker's presentation will be critiqued using a rubric. • The teams will be rewarded according to the points earned from the game. This could be extra points, classroom privileges, etc. • Written exams will be graded.
5. Explain the Material Safety Data Sheet (MSDS). a. Explain the function of the MSDS. b. Interpret the requirements of the MSDS.	
6. Explain fires. a. Explain the process by which fires start. b. Explain fire prevention of various flammable liquids. c. Explain the classes of fire and the types of extinguishers.	
7. Explain safety in and around electrical situations. a. Explain injuries when electrical contact occurs. b. Explain safety around electrical hazards. c. Explain action to take when an electrical shock occurs.	

STANDARDS

Contren Learning Series Best Practices

Core Curriculum Best Practices

SAF1 Identify the responsibilities and personal characteristics of a professional craftsperson.
SAF2 Explain the role that safety plays in the construction crafts.
SAF3 Describe what job-site safety means.
SAF4 Explain the appropriate safety precautions around common job-site hazards.
SAF5 Demonstrate the use and care of appropriate personal protective equipment.
SAF5 Follow safe procedures for lifting heavy objects.
SAF6 Describe safe behavior on and around ladders and scaffolds.
SAF7 Explain the importance of the HazCom (Hazard Communication Standard) requirement and MSDSs (Material Safety Data Sheets).
SAF8 Describe fire prevention and fire fighting techniques.
SAF9 Define safe work procedures around electrical hazards.

Level I

ITM5 State the safety precautions that must be practiced at a work site, including the following:
- Safety practices
- Fall-protection procedures
- Forklift-safety operations

ITM7 Put on eye protection, respiratory protection, and a safety harness.
ITM8 Use the correct procedures for fueling and starting a gasoline-powered tool.

Level II

ELW1 Describe the appropriate steps necessary for setting up and maintaining elevated workstations.
ELW2 Properly operate material handling and hoisting equipment.
ELW3 Describe the safety requirements and guidelines employed in elevated and high-rise construction.
ELW4 Describe basic activities that can be used on the job to prevent elevated workstation accidents.
ELW5 Understand scaffolding positioning and how it affects laying technique.

Academic Standards

A5 Utilize various formulas in problem-solving situations.
A8 Analyze data and apply concepts of probability.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools

Suggested References

Kreh, R. T. (2003). *Masonry skills.* Clifton Park, IL: Thompson/Delmar Learning.

National Center for Construction Education and Research. (2004). *Core curriculum.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level II.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry I
Unit 3: Basic Math **(15 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Apply the four basic math skills with whole numbers, fractions, and percent. a. Add, subtract, multiply, and divide whole numbers, decimals, and fractions. b. Convert whole numbers to fractions, and convert fractions to whole numbers. c. Convert decimals to percent, and convert percent to decimals. d. Convert fractions to decimals. e. Convert fractions to percent.	**Teaching:** • Have students complete a short pretest to apply the four basic math skills with whole numbers, fractions, and percent (may use Contren Core Text, Basic Math Unit).[A1, A5] • Give students the correct answers to problems, and ask at least one student who got the answers for whole numbers correct to write the problems on the chalkboard or a piece of chart paper. Have students who did not get the problems correct listen as the student at the board or paper works the problems. Do this procedure for fractions and percent as well, having students rotate through the skills until each student has spent time with each set of problems. Have a different student lead the discussion each time students rotate so that the students who are just learning how to work the problems have a chance to teach the other students.[E2, E4, E5] • Provide students with additional problems to apply the four basic math skills with whole numbers, fractions, and percent while working in small groups and then alone.[A1, A5] **Assessment:** • Monitor group work as students perform calculations. • Evaluate students on a posttest with whole number, fraction, and percent problems.
2. Use the metric system. a. Use a standard and metric ruler to measure. b. Explain what the metric system is and its importance. c. Recognize and use metric units of length, weight, volume, and temperature.	**Teaching:** • Briefly discuss the metric system, and have students use the Internet to research the standard and metric units of length, weight, volume, and temperature.[A1, A3, E3] • Divide students into groups to design a small building project appropriate for the program, including dimensions in standard and metric measurements.[A1, A3, A5, A8] • Have students use stiff paper (or materials

	in the shop) to build a simple model, measuring the pieces using a standard and metric ruler to ensure that the model is to proper scale with the design.[A2] • Have each student write or type (if technology resources are available) a paper comparing the use of the standard and metric systems and proposing why the United States should or should not use the metric system (may use Contren Core Text, Basic Math Unit).[E1, E9, E10] **Assessment:** • Compare design specifications to the constructed model to ensure that measurements are correct. • Evaluate each student's measurements for accuracy. • Evaluate each student's paper for content as well as grammar and organization.

STANDARDS

Contren Learning Series Best Practices

Core Curriculum Best Practices

MAT1 Add, subtract, multiply, and divide whole numbers, with and without a calculator.
MAT2 Use a standard ruler and a metric ruler to measure.
MAT3 Add, subtract, multiply, and divide fractions.
MAT4 Add, subtract, multiply, and divide decimals, with and without a calculator.
MAT5 Convert decimals to percents and percents to decimals.
MAT6 Convert fractions to decimals and decimals to fractions.
MAT7 Explain what the metric system is and how it is important in the construction trade.
MAT8 Recognize and use metric units of length, weight, volume, and temperature.
MAT9 Recognize some of the basic shapes used in the construction industry and apply basic geometry to measure them.

Level I

MDS1 Work with denominate numbers.
MDS2 Read a mason's measure.
MDS3 Convert measurements in the U.S. Customary (English) system into their metric equivalents.

MDS4 Recognize, identify, and calculate areas, circumferences, and volumes of basic geometric shapes.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
A5 Utilize various formulas in problem-solving situations.
A8 Analyze data and apply concepts of probability.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools

Suggested References

Ball, J. E. (1980). *Practical problems in mathematics for masons*. Albany, NY: Delmar.

Barrows, R., & Jone, B. (2002). *Fundamentals of math with career applications*. Upper Saddle River, NJ: Pearson Prentice Hall.

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National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry I
Unit 4: Equipment, Hand, and Power Tools (15 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify and discuss the use of the tools and equipment. a. Match terms associated with hand tools to their correct definitions. b. Distinguish between modular spacing rule and standard brick spacing rule. c. Identify basic tools and proper use. d. Identify and describe the correct way to hold a brick trowel. e. Measure, mark, and cut brick and block to specifications. f. List basic rules concerning care of the level. g. Use a framing square to lay out a wall corner to specifications. h. Describe the measuring instruments and guides used to lay out masonry work.	**Teaching:** • Using the Contren Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools, and Masonry Level I Masonry Tools and Equipment Unit, identify basic hand and power tools (e.g., trowel, wheelbarrow, mortar hoe, level, masonry saw, mortar mixer) used in the field and how they have advanced through time.[E3, E8, H2] • Discuss safety factors, proper use, and maintenance.[E2, E5] **Assessment:** • Monitor class participation in discussions.
2. Explain the safe use of common hand and power tools. a. Explain the reasons for safety in the use of hand and power tools. b. Explain the procedures for selecting the proper tool for the job. c. Explain the safe use of each hand and power tool.	**Teaching:** • Describe accidents that can occur while using tools. Divide students into groups and give each group a scenario or case study (written or on video) involving an accident. Have each group identify safety mistakes in each situation, determine correct procedures, and present the scenario, mistakes found, and procedures which should have been used to the class.[E2-5, E9-10] • Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).[E3-4] • Demonstrate the uses of various hand and power tools for the class. Provide each student with a description of a project to be completed. Have the student select, demonstrate, and discuss and present the proper use of the appropriate tool to the entire class.[E2-5, E9-10] **Assessment:** • Teacher will monitor the groups for

	participation using a rubric or checklist to grade the presentation. • Have each student complete a test to identify specific tools. • Use a rubric or checklist to grade the presentation of the appropriate tool.
3. Explain the procedures for the maintenance of power tools. a. Explain preventive maintenance. b. Explain the procedures for the maintenance of power tools. c. Demonstrate how to perform maintenance of power tools.	**Teaching:** • Assign each student a specific set of tools (i.e., hammers, power saws, wrenches, etc.). Have students use the Internet to research and write or type (if technology resources are available) a report on the proper procedures for maintenance of the assigned set of tools.[E1, E3-5, E9-10] **Assessment:** • Use a rubric or checklist to grade the written report.

STANDARDS

Contren Learning Series Best Practices

Core Curriculum Best Practices

HTO1 Recognize and identify some of the basic hand tools used in the construction trade.
HTO2 Use these tools safely.
HTO3 Describe the basic procedures for taking care of these tools.
PTO1 Identify commonly used power tools of the construction trade.
PTO2 Use power tools safely.
PTO3 Explain how to maintain power tools properly.

Level I

SAR1 Identify and name the tools used in performing masonry work.
SAR2 Identify and name the equipment used in performing masonry work.
SAR3 Describe how each tool is used.
SAR4 Describe how the equipment is used.
SAR5 Associate trade terms with the appropriate tools and equipment.
SAR6 Demonstrate the correct procedures for assembling and disassembling scaffolding according to federal safety regulations, under the supervision of a competent person.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

Kreh, R. T. (2003). *Masonry skills.* Clifton Park, IL: Thompson/Delmar Learning.

National Center for Construction Education and Research. (2004). *Core curriculum.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry I
Unit 5: Introduction to Blueprints **(15 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify terms and symbols commonly used on blueprints. a. Identify symbols used in metal trades commonly found on blueprints. b. Identify terms used on blueprints.	**Teaching:** • Using a blueprint, explain each symbol or abbreviation on the blueprint and how it is used. Each student will have a copy of the symbols and abbreviations (Contren Core Text, Introduction to Blueprints Unit and Masonry Level I Measurements, Drawings, and Specifications Unit).[E3, E8] • Students will write in their own words an explanation of each symbol.[E9] • Students will divide into pairs and quiz each other on the symbols.[E2, E10] • Students will draw their own representation of the symbols. **Assessment:** • Teacher will check student notebooks for proper explanations and drawings for symbols. • Teacher will monitor group work as students quiz each other and will use a checklist of symbols to monitor student success (Contren Core Text Introduction to Blueprints Unit and Masonry Level 1 Measurements, Drawings, and Specifications Unit).
2. Relate information on prints to real parts and locations. a. Interpret various symbols to locate various elements. b. Interpret a plan to determine layout. c. Interpret basic electrical specifications. d. Interpret electrical drawings, including site plans, floor plans, and detail drawings. e. Read equipment schedule.	**Teaching:** • Students will work as a team to design a blueprint of a corner of a classroom (Contren Core Text, Introduction Unit and Masonry Level 1 Measurements, Drawings, and Specifications Unit). Students will add the appropriate symbols to the blueprint.[A1, A5 E2, E3, E8, E10] • Using the blueprint, students will use dry bond to build the corner of the classroom according to the blueprint specifications. (Contren Core Text Introduction to Blueprints Unit and Masonry Level 1 Measurements, Drawings, and Specifications Unit).[A1, A5, E10]

	Assessment: • Students will exchange drawings and grade each other's work. • A checklist will be used to evaluate the dry bond corner of the classroom.
3. Identify and apply basic principles of blueprints. a. Explain basic layout of a blueprint. b. Describe the information in a title block. c. Identify the lines used on blueprints. d. Explain the architect's and engineer's scales.	**Teaching:** • Students will compose a typed informative report or letter to the client that will include blueprint scales and all symbols, types of materials needed, and estimated cost of materials.[A1, A5, E1,E5, E9] • Students will simulate a call to the building supply manager to discuss the purchase of the materials and the estimated cost.[E2] **Assessment:** • The written report or letter will be graded using a rubric. Accuracy of content, grammar, and format will be considered. • The simulation will be graded according to content and delivery.

STANDARDS

Contren Learning Series Best Practices

Core Curriculum Best Practices

BLU1 Recognize and identify basic blueprint terms, components, and symbols.
BLU2 Relate information on blueprints to actual locations on the print.
BLU3 Recognize different classifications of drawings.
BLU4 Interpret and use drawing dimensions.

Level I

MDS5 Identify the basic parts of a set of drawings.
MDS6 Discuss the different types of specifications used in the building industry and the sections that pertain to masonry.

Level II

RPD1 Understand the organization of residential plans and drawings.
RPD2 Interpret dimensions and scales on drawings.
RPD3 Interpret information on residential plans.
RPD4 Estimate materials quantities from plans and drawings.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

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National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level II.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry I
Unit 6: Basic Rigging **(10 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Explain and identify safe rigging and equipment. a. Explain and practice safe rigging. b. Identify and explain rigging equipment. c. Inspect rigging equipment.	**Teaching:** • Using industry pictures of safe rigging from Contren Core Text Basic Rigging Unit, trade publications, and overheads of rigging equipment, identify, inspect, and explain the techniques of safe rigging.[E1] • Students will be given scale models of rigging equipment and will practice the rigging process. • Take students on a field trip to a local industry to observe rigging procedures. Students will be divided into groups, take pictures of rigging, and write or type an individual report describing their pictures and present their report to the class.[E1, E2, E5, E9, E10] **Assessment:** • Monitor the students as they quiz each other while working with the scale models. • Teacher will monitor the students at the field trip site and industry personnel will provide instruction on proper rigging techniques. • The written report, pictures, and presentation will be graded on content and delivery.
2. Discuss the proper use of load-handling and signaling practices. a. Estimate size, weight, and center of gravity. b. Rig and move materials and equipment.	**Teaching:** • Discuss procedures for handling a load. • Provide the proper hand signals for moving the load. • Given a scenario, have each student estimate, rig, and move materials and equipment. Utilize activities in Contren Core Text, Basic Rigging Unit.[A1] **Assessment:** • Assess the scenario using a checklist to monitor the activity. • Assess the Contren activities from the materials provided.

STANDARDS

Contren Learning Series Best Practices

Core Curriculum Best Practices

RIG1 Identify and describe the use of slings and common rigging hardware.
RIG2 Describe the basic inspection techniques and rejection criteria used for slings and hardware.
RIG3 Describe the basic hitch configurations and their proper connections.
RIG4 Describe basic load-handling safety practices.
RIG5 Demonstrate proper use of American National Standards Institute (ANSI) hand signals.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T6 Technology problem-solving and decision-making tools

Suggested References

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National Center for Construction Education and Research. (2004). *Core curriculum.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry I
Unit 7: Masonry Unit **(80 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Match terms associated with masonry units to their correct definitions. a. Name the different types of brick, block, and stone. b. Label parts of a brick, block, and stone. c. Identify the positions as they appear in a wall.	**Teaching:** • Utilize the Contren Level I Introduction to Masonry Unit to provide terms, definitions and examples of brick, block, and stone. Discuss the terms in class.[E2, E3, E8, E10] • Have the students research, from text, handouts, and Internet, the types, parts, and positions of brick, block, and stone.[E3] • Divide the students into groups and have them develop working projects using actual materials.[E1, E3, E5, E8, E9] **Assessment:** • Monitor student mastery by observing groups. • Assess the project using a rubric to judge the accuracy of the project.
2. Lay out a brick wall using the dry bond method to specifications. a. Set up the work area. b. Establish the building line. c. Dry bond the first course. d. Mark the bond.	**Teaching:** • Discuss the process of laying out a brick wall.[E2, E10] • Demonstrate the proper methods for preparing and accomplishing the project, and have the students practice and prepare for a performance project. **Assessment:** • Assessment for the project will include observing the procedures and checking for accuracy of the actual finished product using a dry bond rubric.
3. Lay out a block wall using the dry bond method to specifications. a. Set up the work area. b. Establish the building line. c. Dry bond the first course. d. Mark the bond.	**Teaching:** • Discuss the process of laying out a block wall.[E2, E10] • Demonstrate the proper methods for preparing and accomplishing the project, and have the students practice and prepare for a performance project. **Assessment:** • Assessment for the project will include observing the procedures and checking for accuracy of the actual finished product using

	a dry bond rubric.
4. Examine the proper procedure for laying out a stone wall using the dry bond method to specifications. a. Discuss setting up the work area. b. Describe establishment of the building line. c. Simulate spreading the stone and check for shape. d. Select the larger stones and place in dry bed course. e. Trim stone as necessary.	**Teaching:** • Discuss the proper procedure for laying out a stone wall.[E2, E10] • Simulate these procedures utilizing materials available. **Assessment**: • Have the students critique the simulation using a checklist.
5. Perform procedures for laying and repairing ceramic tile. a. Select tools and materials. b. Explain the steps in mixing thin set. c. Perform trowel spreading. d. Lay and/or repair ceramic tile. e. Apply grout and finish.	**Teaching:** • Discuss the proper procedure for laying out a tile floor.[E2, E10] • Simulate these procedures utilizing materials available. **Assessment:** Have the students critique the simulation using a checklist.
6. Discuss modern construction materials and techniques. a. Interpret the importance of the construction industry. b. Recognize the major historical advancements in the construction industry. c. Examine the influence of construction technology. i. Describe the advancements in construction equipment. ii. Discuss the significance of GPS technology in the construction industry. iii. Explain the major technological advances in materials.	**Teaching:** • Discuss the proper procedure for laying out a tile floor.[E2, E10] • Simulate these procedures utilizing materials available. **Assessment:** Have the students critique the simulation using a checklist.

STANDARDS

Contren Learning Series Best Practices

Level I

ITM6 Perform the following basic bricklaying procedures:

Secondary Masonry

- Mixing of mortar
- Laying a mortar bed
- Laying bricks

MIT1 Describe the most common types of masonry units.
MIT2 Describe and demonstrate how to set up a wall.
MIT3 Lay a dry bond.
MIT4 Spread and furrow a bed joint, and butter masonry units.
MIT5 Describe the different types of masonry bonds.
MIT6 Cut brick and block accurately.
MIT7 Lay masonry units in a true course.

Level II

MWM1 Describe the uses and installation of vertical reinforcement.
MWM2 Describe the uses and installation of different types of horizontal joint reinforcements and ties.
MWM3 Describe the uses and installation of different anchors, fasteners, and embedded items.
MWM4 Describe the installation of hollow metal frames.
MWM5 Describe the functions and installations of sills and lintels.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
A5 Utilize various formulas in problem-solving situations.
A7 Interpret and apply slope as a rate of change.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

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Masonry I
Unit 8: Mortar **(20 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify factors concerning mortar. a. Match terms associated with mortar to their correct definitions. b. List primary ingredients used in mortar. c. Discuss factors to consider when mixing mortar. d. Describe the various types of mortar and its use. e. Determine the material proportions for the different types of mortar. f. List the properties, necessary qualities, and American Society for Testing and Materials (ASTM) specifications for each type of mortar.	**Teaching:** • Using the Contren, Masonry Level I, Mortar Unit, teacher-made handouts, and other resources, have the students discuss the terms and factors that affect mortar.[E2, E10] • Provide the students with situations concerning mortar, and have the students describe the types related to each situation.[E2, E3, E4, E8] **Assessment:** • Assessment of the situation activity will be contained in a written test.
2. Describe, mix, and apply mortar to specifications. a. Discuss the storage of materials b. Examine the techniques for measuring mortar materials. c. Describe the procedures for manually mixing mortar. d. Discuss the procedures for power mixing mortar. e. Mix a batch of mortar by hand to specifications. f. Mix a batch of mortar using a mechanical mixer to specifications. g. Discuss the types and functions of mortar additives.	**Teaching:** • Discuss the storage and techniques for measuring mortar materials.[A1, A5, A8,] • Describe and demonstrate the procedures for mixing mortar both manually and mechanically. • Discuss the types and functions of additives.[E2, E10] • Have the students prepare and mix mortar both manually and mechanically according to specifications provided. [A1, A5, A8,] **Assessment:** • Assessment will be by observation and checklist for procedure and consistency**.**

STANDARDS

Contren Learning Series Best Practices

Level I

ITM6 Perform the following basic bricklaying procedures:
- Mixing of mortar
- Laying a mortar bed
- Laying bricks

MOR1 Name and describe the primary ingredients in mortar and their properties.

MOR2 Identify the various types of mortar used in masonry work.
MOR3 Describe the common admixtures and their uses.
MOR4 Identify the common problems found in mortar application and their solutions.
MOR5 Properly set up the mortar mixing area.
MOR6 Properly mix mortar by hand.
MOR7 Properly mix mortar with a mechanical mixer.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
A5 Utilize various formulas in problem-solving situations.
A8 Analyze data and apply concepts of probability.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E6 Explore cultural contributions to the history of the English language and its literature.
E7 Discover the power and effect of language by reading and listening to selections from various literary genres.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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

WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

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National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry I
Unit 9: Concrete **(20 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Explain terms, tools, and equipment associated with concrete. a. Match terms associated with concrete finishing. b. Describe tools and equipment needed to pour and finish concrete. c. Discuss safety rules in concrete pouring and finishing. d. Identify the types of concrete finishing.	**Teaching:** • Using Contren Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools Unit, and Masonry I, Introduction to Masonry Unit, display various types of concrete tools. Provide students one example of the use of each tool. Allow students to examine each tool and brainstorm to determine other uses. E3, E4, E8 • Describe accidents that can occur. Divide students into groups and give each group an accident scenario or case study. Have the group identify safety mistakes in each situation and determine correct procedures. Each group will present to the class the scenario, mistakes found, and procedures which should have been used. E2, E4, E5 Have students complete a safety test for each specific tool. E8 • Using the Contren Series Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools, and Masonry I, Introduction to Masonry Unit, describe the uses of various concrete tools. Have various tools displayed. Provide each student with a definition or use of one tool. Have the student select, demonstrate, and discuss the proper use of that tool to the entire class. E2, E3, E8 • Assign each student a specific set of concrete tools. Using the Internet, have them research and write a report on the proper procedures for maintenance of the assigned set of tools. E1, E3, E9 **Assessment:** • Teacher will monitor the groups for individual participation. • Use a presentation rubric to grade each group. • Use a teacher made checklist for use of tools.

	• Use a rubric to grade each report for grammar, spelling, punctuation, and content accuracy.
2. Perform procedures used in pouring and finishing concrete. a. Estimate material. b. Erect forms for concrete. c. Place waterproof membrane and steel in form. d. Pour and finish concrete according to specifications.	**Teaching:** • Discuss and demonstrate the procedures for pouring and finishing concrete. A1, A3, A5, E2, E10 • Provide the students with a project description and have them complete the project. A1, A3, A5 **Assessment:** • Assessment will be determined by checklist.

STANDARDS

Contren Learning Series Best Practices

Level I

ITM5 State the safety precautions that must be practiced at a work site, including the following:
- Safety practices
- Fall-protection procedures
- Forklift-safety operations

SAR1 Identify and name the tools used in performing masonry work.
SAR2 Identify and name the equipment used in performing masonry work.
SAR3 Describe how each tool is used.
SAR4 Describe how the equipment is used.
SAR5 Associate trade terms with the appropriate tools and equipment.
SAR6 Demonstrate the correct procedures for assembling and disassembling scaffolding according to federal safety regulations, under the supervision of a competent person.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
A5 Utilize various formulas in problem-solving situations.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.

E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

Kreh, R. T. (2003). *Masonry skills.* Clifton Park, IL: Thompson/Delmar Learning.

National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level II.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry II
Unit 1: Orientation, Advanced Leadership, and Employability Skills (10 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Review local program and vocational center policies and procedures. a. Describe local program and vocational center policies and procedures including dress code, attendance, academic requirements, discipline, and transportation regulations.	**Teaching:** • Present local program and vocational center policies and procedures. • Have students read the handbook to become aware of what is expected of them in relation to the policies and procedures of the school and explain the policies to the class. E2, E3, E8 This will include dress code, attendance, academic requirements, discipline, and transportation regulations. • Have student's complete exercises to identify equipment and functions found in the school lab. • Have students work together in pairs. A student with a higher reading ability will team up with a student with a lower reading ability to get a better understanding of the school's program policies and procedures. Have students write (or type) a report about what is expected in relation to local program and vocational center policies and procedures. E1, E2,E3, E4, E8, E9 **Assessment:** • Evaluate student's explanation of local student handbook requirements. • Evaluate exercises to identify equipment and functions found in the school lab. • Evaluate student's written report on rules and regulations. • Assess student orientation knowledge through teacher observations and written unit test. File completed test to document student mastery of the school and program policies and procedures.
2. Describe employment opportunities and responsibilities. a. Describe employment opportunities including potential earnings, employee benefits, job availability, places of employment, working conditions, and educational requirements.	**Teaching:** • Explain educational and career opportunities that will be available to students after they complete the program. E2 • Have students use career software, such as Choices, to measure their aptitudes and abilities for particular careers. E3, E8

b. Describe basic employee responsibilities.	• Have students work in groups and use the Internet, college catalogs, industry publications, and other information to research a list of careers for which they will be qualified upon program completion and postsecondary educational opportunities that will be available to them.[E3, E4, E5, E10] Have each group orally present their findings to the class.[E2, E9] • Have each student select a career in a field related to the course and use the Occupational Outlook Handbook (book or website), Internet, and other resources to research job titles, educational and skill requirements, expected job growth, and entry-level salaries. Have each student report the findings in a two-page report.[E1, E9] • Use a transparency to discuss the parts of a resume and cover letter, and provide each student a written sample. • Have each student use the Internet or newspapers to choose a job for which they are qualified and prepare a resume and cover letter that can be used to apply for the selected job.[E1, E2, E4, E10] **Assessment:** • Monitor group work throughout the unit to ensure that each member participates. • Evaluate the career and educational opportunities presentation for content and delivery. • Evaluate the career report for content and grammar. • Use a checklist to evaluate the resume and cover letter.
3. Explore leadership skills and personal development opportunities provided students by student organizations to include SkillsUSA. a. Demonstrate effective teambuilding and leadership skills. b. Practice appropriate work ethics.	**Teaching:** • Discuss the role of a team member and leader. Assign the students roles within a team and have them role play a situation in which there is a conflict which must be resolved. Utilize the lessons from SkillsUSA, Contren Tools for Success, or other resources to provide additional training.

	• Discuss appropriate work ethics standards. Have the students list what they believe to be the most common problems among the masonry profession. **Assessment:** • Assess the role play using a checklist for documentation. Lessons from other resources should be assessed according to the recommended resource guide.
4. Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations.	**Teaching:** • Have the students perform an activity involving verbal instructions. Divide the students into groups and have one team be the customer and the other be the contractor. The customer will describe the project and the contractor will have to provide a brief plan for the construction of the project. Have the groups switch roles and the customer will provide the contractor with a written plan and blueprint. The contractor will describe the procedure for construction of the project. (Contren Core Text, Basic Communication Skills Unit).[E2, E10] **Assessment:** • The lesson will be assessed using a rubric or a checklist for the written projects and presentation.

STANDARDS

Contren Learning Series Best Practices

Communication Skills (Module 00107-04)

COM1 Demonstrate the ability to understand information and instructions that are presented in both written and verbal form.
COM2 Demonstrate the ability to communicate effectively in on-the-job situations using written and verbal skills.

Employability Skills (Module 00108-04)

EMP1 Explain the construction industry, the role of the companies that make up the industry, and the role of individual professionals in the industry.
EMP2 Demonstrate critical thinking skills and the ability to solve problems using those skills.
EMP3 Demonstrate knowledge of computer systems and explain common uses for computers in the construction industry.
EMP4 Demonstrate effective relationship skills with teammates and supervisors, exhibit the ability to work on a team, and demonstrate appropriate leadership skills.
EMP5 Be aware of workplace issues such as sexual harassment, stress, and substance abuse.

Level I

ITM2 Describe modern masonry materials and methods.
ITM3 Explain career ladders and advancement possibilities in masonry work.
ITM4 Describe the skills, attitudes, and abilities needed to work as a mason.

Academic Standards

A5 Utilize various formulas in problem-solving situations.
A8 Analyze data and apply concepts of probability.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

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.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools

Suggested References

Choices [Computer software]. (n.d.). Ogdensburg, NY: Careerware, IMS Information Systems Management Corporation.

Davies, D. (1997). *Grammar? No problem!* Mission, KS: SkillPath.

Gould, M. C. (2002). *Developing literacy & workplace skills*. Bloomington, IN: National Education Service.

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National Center for Construction Education and Research. (2004). *Core curriculum.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Tools for success.* Upper Saddle River, NJ: Pearson Prentice Hall.

SkillsUSA. (2002). *Leadership and competition curricula.* Tinley Park, IL: Goodheart-Wilcox.

Masonry II
Unit 2: Basic Safety (Review) **(15 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Describe general safety rules for working in a shop/lab and industry. a. Describe how to avoid on-site accidents. b. Explain the relationship between housekeeping and safety. c. Explain the importance of following all safety rules and company safety policies. d. Explain the importance of reporting all on-the-job injuries, accidents, and near misses. e. Explain the need for evacuation policies and the importance of following them. f. Explain the employer's substances abuse policy and how it relates to safety. g. Explain the safety procedures when working near pressurized or high temperature systems.	**Teaching:** **This can be used for the entire unit**. • Identify, discuss and demonstrate terms, rules, and procedures related to shop/lab and industry safety. (Contren Core Text Basic Safety Unit and Level I Introduction to Masonry Unit) E3, E8 • Required written tests will follow each section of guidelines for safety rules and procedures. • Provide the students with a list of terms and have them define the terms. Pair the students to quiz each other on the definitions in preparation for a written exam. E2, E3, E8 • Divide the students into pairs and assign each pair one of the guidelines provided for personal safety (i.e., clothing, jewelry, hair, eyes, and ears). Have each pair demonstrate the "do's and don'ts" of the guidelines. E2 • Have an industry speaker present to the class the necessity of safety in the work environment. Have students write a summary of the presentation. E2, E9 • Divide the students into teams and have them develop scenarios of hazards and accidents using the Contren Series Core Text, Basic Safety Unit, publications, and the Internet. This will include tools; spills; working around welding; improper use of barriers, ladders, or scaffolds; use of MSDS information; fires; and electrical situations. In a game type situation, one team will read a scenario and the other teams will compete to be the first to provide the proper safety measures which should have been used to prevent the hazardous situation or accident. Points will be awarded to the teams with the correct answers. E4 • Required written tests will follow each section of guidelines for safety rules and
2. Identify and apply safety around welding operations. a. Use proper safety practices when welding or working around welding operations. b. Use proper safety practices when welding in or near trenches and excavations. c. Explain the term *proximity work*.	
3. Identify and explain use of various barriers and confinements. a. Explain the safety requirements for working in confined areas. b. Explain and practice lockout/tagout procedures. c. Explain the different barriers and barricades, and how they are used. d. Recognize and explain personal protective equipment. e. Inspect and care for personal protective equipment.	

4. Explain lifting and the use of ladders and scaffolds. a. Identify and explain the procedures for lifting heavy objects. b. Inspect and safely work with various ladders and scaffolds.	procedures. • NOTE: SAFETY IS TO BE TAUGHT AS AN ONGOING PART OF THE COURSE THROUGHOUT THE YEAR. **Assessment:** • Student participation will be monitored by the teacher and the written exam will be graded. • The "do's and don'ts" exercise will be critiqued with a peer review. • The summary of the speaker's presentation will be critiqued using a rubric. • The teams will be rewarded according the points earned from the game. This could be extra points, classroom privileges, etc. • Written exams will be graded.
5. Explain the Material Safety Data Sheet (MSDS). a. Explain the function of the MSDS. b. Interpret the requirements of the MSDS.	
6. Explain fires. a. Explain the process by which fires start. b. Explain fire prevention of various flammable liquids. c. Explain the classes of fire and the types of extinguishers.	
7. Explain safety in and around electrical situations. a. Explain injuries when electrical contact occurs. b. Explain safety around electrical hazards. c. Explain action to take when an electrical shock occurs.	

STANDARDS

Contren Learning Series Best Practices

Basic Safety (Module 00101-00)

SAF1 Identify the responsibilities and personal characteristics of a professional craftsperson.
SAF2 Explain the role that safety plays in the construction crafts.
SAF3 Describe what job-site safety means.
SAF4 Explain the appropriate safety precautions around common job-site hazards.
SAF5 Demonstrate the use and care of appropriate personal protective equipment.
SAF5 Follow safe procedures for lifting heavy objects.
SAF6 Describe safe behavior on and around ladders and scaffolds.
SAF7 Explain the importance of the HazCom (Hazard Communication Standard) requirement and MSDSs (Material Safety Data Sheets).
SAF8 Describe fire prevention and fire fighting techniques.
SAF9 Define safe work procedures around electrical hazards.

Level I

ITM5 State the safety precautions that must be practiced at a work site, including the following:
- Safety practices
- Fall-protection procedures
- Forklift-safety operations

ITM7 Put on eye protection, respiratory protection, and a safety harness.
ITM8 Use the correct procedures for fueling and starting a gasoline-powered tool.

Level II

ELW1 Describe the appropriate steps necessary for setting up and maintaining elevated workstations.
ELW2 Properly operate material handling and hoisting equipment.
ELW3 Describe the safety requirements and guidelines employed in elevated and high-rise construction.
ELW4 Describe basic activities that can be used on the job to prevent elevated workstation accidents.
ELW5 Understand scaffolding positioning and how it affects laying technique.

Academic Standards

A5 Utilize various formulas in problem-solving situations.
A8 Analyze data and apply concepts of probability.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E10 Use language and critical thinking strategies to serve as tools for learning.
H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
H2 Describe the impact of science and technology on the historical development of the United States in the global community.
H3 Describe the relationship of people, places, and environments through time.

Workplace Skills for the 21st Century

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools

Suggested References

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National Center for Construction Education and Research. (2004). *Core curriculum.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level II.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry II
Unit 3: Power Tools and Equipment (Review) (15 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Safely use power tools. a. Identify safety rules when using power tools. b. List the parts of the brick saw. c. Identify types of saw blades. d. Identify safety rules when using the mortar mixer. e. Explain the use and care of the mortar mixers. f. Explain the use and care of the power grinder.	**Teaching:** • Using the Contren Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools, and Masonry Level I Masonry Tools and Equipment Unit, identify basic power tools (e.g., masonry saw and mortar mixer) used in the field and how they have advanced through time.[H2] Discuss safety factors, proper use, and maintenance.[E2, E10] • Describe accidents that can occur while using tools. Divide students into groups and give each group a scenario/case study (written or on video) involving an accident. Have each group identify safety mistakes in each situation, determine correct procedures, and present the scenario, mistakes found, and procedures which should have been used to the class.[E2-5, E9-10] • Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).[E3-4] • Demonstrate the uses of various hand and power tools for the class. Provide each student with a description of a project to be completed. Have the student select, demonstrate, and discuss and present the proper use of the appropriate tool to the entire class.[E2-5, E9-10] • Assign each student a specific set of tools (i.e., hammers, power saws, wrenches, etc.). Have students use the Internet to research and write or type (if technology resources are available) a report on the proper procedures for maintenance of the assigned set of tools.[E1, E3-5, E9-10] **Assessment:** • Teacher will monitor the groups for participation using rubric or checklist. Use a rubric or checklist to grade activity. • Teacher will grade the safety test. • Use a rubric or checklist to grade activity.

	• Use a rubric or checklist to grade the written report.
2. Safely use masonry equipment. a. Explain the care and use of the mortar boards. b. Explain the care and use of various types of wheelbarrows. c. Explain the care and use of the mortar pan and stand. d. Explain the care and use of scaffolding.	**Teaching:** • Using the Contren Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools, and Masonry Level I Masonry Tools and Equipment Unit, identify basic masonry equipment (e.g., trowel, wheelbarrow, mortar hoe, and level) used in the field and explain each tool's care and use. Discuss safety factors, proper use, and maintenance.[E3, E8] • Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).[E3-4] **Assessment:** • Teacher will monitor the students for class participation. • Teacher will grade the safety test.

STANDARDS

Contren Learning Series Best Practices

Core Curriculum Best Practices

HTO1 Recognize and identify some of the basic hand tools used in the construction trade.
HTO2 Use these tools safely.
HTO3 Describe the basic procedures for taking care of these tools.
PTO1 Identify commonly used power tools of the construction trade.
PTO2 Use power tools safely.
PTO3 Explain how to maintain power tools properly.

Level I

SAR1 Identify and name the tools used in performing masonry work.
SAR2 Identify and name the equipment used in performing masonry work.
SAR3 Describe how each tool is used.
SAR4 Describe how the equipment is used.
SAR5 Associate trade terms with the appropriate tools and equipment.
SAR6 Demonstrate the correct procedures for assembling and disassembling scaffolding according to federal safety regulations, under the supervision of a competent person.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

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National Center for Construction Education and Research. (2004). *Core curriculum.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry II
Unit 4: Wall Layout **(40 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Explain the terms associated with the layout of a masonry wall.	**Teaching:** • Provide the students with a list of terms and definitions related to the layout of a masonry wall using Contren Masonry Level I Masonry Units and Installation Techniques Unit and Level II Advanced Laying Techniques Unit. Discuss these terms with the class in detail.[E3, E8] • Divide the students into pairs and have them ask each other questions concerning the terms and definitions as practice for assessment.[E4] **Assessment:** • Assessment for the terms and definitions will be determined with a matching test.
2. Build a wall to the required layout. a. Explain where to begin the wall. b. Explain the type of wall to build. c. Lay up a block and/or brick wall using steel tape bonding.	**Teaching:** • Provide the students with a drawing that explains where to begin and what type of wall to build.[E3, E8] • Given the proper materials, the students will demonstrate the proper procedure for building a wall.[A1, A5] **Assessment:** • Monitor student mastery by observing groups. • Assessment will be determined by a checklist

STANDARDS

Contren Learning Series Best Practices

Level I

MIT1 Describe the most common types of masonry units.
MIT2 Describe and demonstrate how to set up a wall.
MIT3 Lay a dry bond.
MIT4 Spread and furrow a bed joint, and butter masonry units.
MIT5 Describe the different types of masonry bonds.
MIT6 Cut brick and block accurately.

MIT7 Lay masonry units in a true course.

Level II

Residential Plans and Drawing Interpretation

RPD1 Understand the organization of residential plans and drawings.
RPD2 Interpret dimensions and scales on drawings.
RPD3 Interpret information on residential plans.
RPD4 Estimate materials quantities from plans and drawings.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A5 Utilize various formulas in problem-solving situations.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

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National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry II
Unit 5: Drawings/Specifications and Estimating (15 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify and discuss drawings and specifications. a. Match terms associated with specifications and drawings. b. Discuss the purposes of specifications. c. Identify commonly used scales for blueprints.	**Teaching:** • Using Contren Core Text Introduction to Blueprints Unit, Masonry Level I Measurements, Drawings, and Specifications Unit, and Level II Residential Plans and Drawings Interpretation Unit, provide the students with handouts relating to terms, definitions, scales, and abbreviations.[E3, E8] • Given a set of blueprints, the students must identify the parts of the blueprint and identify the various plans.[E3, E4, E8] • Have the students draw a set of plans and label the parts and plans. **Assessment:** • Assessment of the activity will be determined by the accuracy of the student drawn parts and plans.
2. Estimate material for a masonry project. a. List the rule-of-thumb guidelines for estimating. b. Estimate material for a brick, block, and stone job.	**Teaching:** • Discuss the rule-of-thumb guidelines for estimating. Provide the student with a plan for a job relating to brick block and stone. The student will figure the estimation for each job. This may be done by hand and/or computer.[A1, A2, A3] **Assessment:** • Assessment for the estimation will be determined by the accuracy of the estimation.

STANDARDS

Contren Learning Series Best Practices

Core Curriculum Best Practices

BLU1 Recognize and identify basic blueprint terms, components, and symbols.
BLU2 Relate information on blueprints to actual locations on the print.
BLU3 Recognize different classifications of drawings.
BLU4 Interpret and use drawing dimensions.

Level I

MDS5 Identify the basic parts of a set of drawings.
MDS6 Discuss the different types of specifications used in the building industry and the sections that pertain to masonry.

Level II

RPD1 Understand the organization of residential plans and drawings.
RPD2 Interpret dimensions and scales on drawings.
RPD3 Interpret information on residential plans.
RPD4 Estimate materials quantities from plans and drawings.
CIQ1 Discuss industry standards for quality control.
CIQ2 Build masonry sample panels and prisms.
CIQ3 Perform field tests on mortar.
CIQ4 Discuss and perform field inspections.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T6 Technology problem-solving and decision-making tools

Suggested References

National Center for Construction Education and Research. (2004). *Core curriculum.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level II.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry II
Unit 6: Brick **(55 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Describe basic facts about bricks. a. Describe the various characteristics of brick masonry. b. Describe the various classification types of bricks. c. Describe the modular system of sizing bricks.	**Teaching:** • Provide the students with a handout with terms and definitions using Contren Masonry Level I Introduction to Masonry Unit and Level II Residential Masonry Unit.[E3, E8] • Have students participate in discussion of the application of terms related to brick masonry.[E2] • Show a video and/or demonstration of the types and sizing of bricks.[E2] • Use a performance activity to identify the characteristics, types, and sizing of bricks. **Assessment:** • Assessment will be determined by written exam on terms and a checklist will be used for the performance activity.
2. Explain and perform basic brick laying techniques. a. Explain preparing materials and setting up the work area at a job site. b. Explain the steps to establish corners and leads and to set up a corner pole. c. Describe the steps in laying up corners, coursing, and racking. d. Describe the properties of mortar bond and structural bond and a variety of patterned bonds. e. Perform the procedures used in tooling, brushing, pointing, and cleaning the completed structure. f. Perform repair procedures. a. Measure, mark, and cut brick and block to specifications. b. Perform repairs on a brick and block wall.	**Teaching:** • Discuss the importance of basic brick laying techniques (Contren Masonry Level I Introduction to Masonry Unit) and demonstrate the process.[E2, E8] • Have students perform a complete project from job set-up to finished masonry project in the lab. **Assessment:** • The project will be assessed using a performance checklist.
3. Explain moisture control in brick structures. a. Define *parging*; including its purpose, placement, and effectiveness. b. Explain potential flashing materials:	**Teaching**: • Provide terms and definitions related to moisture control.[E3, E8] • Using a handout, video, and/or demonstration explain the techniques of

including advantages and disadvantages, and placement and purpose. c. Explain weep holes: including purpose and placement.	providing moisture control.[E2, E10] **Assessment**: • Assessment for the activity can be written or performance test.
4. Explain reinforcing and wall supports of brick structures. a. Explain the forces which affect masonry structures. b. Explain the materials used in reinforced brick masonry. c. Explain the process of bracing and its purpose. d. Explain the different types of anchors. e. Explain the difference among piers, pilasters, columns, and buttresses.	**Teaching:** • Provide terms and definitions related to reinforcing and wall supports of brick structures. [E3, E8] • Using a handout, video, and/or demonstration, explain the techniques of providing reinforcement and wall supports. [E2, E10] **Assessment:** • Assessment for the activity can be written or performance test.
5. Identify the basic wall types. a. Define the terms necessary for describing and recognizing wall types. b. List the basic six wall types, the structural principles, and uses. c. State the reasons for cavity construction. d. Discuss means of controlling moisture in a cavity wall. e. Discuss means of reinforcing cavity walls and advantages and disadvantages. f. Explain the reasons for composite wall construction. g. Discuss means of reinforcing composite walls and advantages and disadvantages.	**Teaching:** • Utilize Contren Masonry Level II Advanced Laying Techniques Unit activities to discuss the basic wall types.[E3, E8] • Divide the students into groups and assign each group a specific wall type. They will prepare a plan for wall construction and present the plan to the class.[A1, A3, E1, E5] **Assessment:** • Assessment will be according to the Contren activities and peer critique, teacher observation, and rubric.

STANDARDS

Contren Learning Series Best Practices

Level I

ITM6 Perform the following basic bricklaying procedures:
- Mixing of mortar
- Laying a mortar bed
- Laying bricks

MIT1 Describe the most common types of masonry units.

MIT2 Describe and demonstrate how to set up a wall.
MIT3 Lay a dry bond.
MIT4 Spread and furrow a bed joint, and butter masonry units.
MIT5 Describe the different types of masonry bonds.
MIT6 Cut brick and block accurately.
MIT7 Lay masonry units in a true course.

Level II

REM1 Understand the requirements for construction of various types of residential foundations.
REM2 Identify and explain the characteristics, uses, and installation techniques for brick pavers.
REM3 Lay out and construct steps, patios, and decks made from masonry units.
REM4 Lay out and construct chimneys and fireplaces.
MWM1 Describe the uses and installation of vertical reinforcement.
MWM2 Describe the uses and installation of different types of horizontal joint reinforcements and ties.
MWM3 Describe the uses and installation of different anchors, fasteners, and embedded items.
MWM4 Describe the installation of hollow metal frames.
MWM5 Describe the functions and installations of sills and lintels.
ALT1 Recognize the structural principles and fundamental uses of basic types of walls.
ALT2 Recognize the requirement for, and function of, control joints and expansion joints.
ALT3 Construct various types of walls using proper reinforcement, jointing, and bonding techniques.
ALT4 Construct speciality structures such as manholes, segmented block walls, and screens.
ALT5 Identify and explain the different types of masonry arches used today.
ALT6 Construct a semicircular and jack arch.
CTM1 Explain and demonstrate techniques for constructing masonry around windows, doors, and other openings.
CTM2 Explain the requirements for wall bracing and demonstrate the techniques used to construct pilasters and other types of bracing.
CTM3 Identify the various types of insulation used in conjunction with masonry construction and explain installation techniques.
CTM4 Identify the need for moisture control in various types of masonry construction and demonstrate the techniques used to eliminate moisture problems.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.

E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level II.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry II
Unit 7: Concrete Masonry **(50 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify and discuss the various materials used in concrete masonry. a. Discuss the basic manufacturing techniques. b. List the properties common to concrete masonry units. c. List the basic methods for classifying concrete units. d. Identify the basic sizes and shapes of concrete masonry units. e. Describe special, customized shapes of blocks.	**Teaching:** • Provide the students with a handout with terms and definitions.[E3, E8] • Participate in discussion of the application of terms related to masonry.[E2, E10] • Show a video, demonstrate, or invite a guest speaker or utilize field trip to provide information on concrete masonry units.[E2, E10] • A performance activity to identify the characteristics, types, and sizing of concrete masonry units will be used.[E2] **Assessment:** • Assessment will be determined by written exam on terms and a checklist will be used for the performance activity.
2. Describe the procedures for basic laying techniques. a. Describe the means of preparing materials and setting up the work area at a job site. b. Describe the process of spreading mortar. c. Describe the steps in laying blocks to a line. d. Describe the process of laying corner blocks and establishing leads. e. Describe procedures used in tooling, brushing, rubbing, pointing, and cleaning a completed structure.	**Teaching:** • Discuss the importance of basic concrete masonry techniques, show a video, and demonstrate the process. Have students perform a complete project from job set-up to finished masonry project in the lab.[E2, E10] **Assessment:** • The project will be assessed using a performance checklist.
3. Identify the various methods of waterproofing concrete masonry. a. Discuss the mason's responsibilities in waterproofing and damp proofing a structure. b. Identify areas where flashing applications are most critical. c. Discuss the physical properties of various flashing material. d. Install flashing material in a structure.	**Teaching**: • Provide terms and definitions related to moisture control. Using a handout, video, and/or demonstration, explain the techniques of providing moisture control.[E2, E3, E8] **Assessment**: • Assessment for the activity can be written or a performance test.

4. Discuss various methods of reinforcing concrete masonry structures. a. Discuss the need for horizontal and vertical reinforcement in certain structures. b. Explain the various masonry units available for reinforcing. c. Identify the various types of reinforcement. d. Explain the function and positioning of bond beams. e. Explain different ways in which the term *grouting* is used. f. Explain the *a*dvantages and disadvantages of low-lift and high-lift grouting for reinforced masonry walls.	**Teaching:** • Utilize the Contren Masonry Level II Grout and Other Reinforcement to provide background related to reinforcing concrete masonry. A field trip can be utilized to demonstrate the techniques. Have the students write a summary of the field trip.[E3, E8] **Assessment:** • The assessment will be a critique of the written summary using a rubric.
5. Identify and discuss various wall supports for concrete masonry structures. a. Explain the needs and methods of maintaining support for masonry structures during and after construction. b. Identify the forces which may require bracing walls. c. Discuss the methods of applying anchoring systems d. Explain the functions of pilasters, a "rule-of-thumb" for pilaster size, and the different pilaster designs.	**Teaching:** • Discuss and provide handouts relating the wall supports for concrete masonry structures. Have students research new materials and techniques relating to wall supports and present a summary of the findings.[E2, E3, E8] **Assessment:** • The presentation will be assessed using a presentation rubric.

STANDARDS

Contren Learning Series Best Practices

Level I

MIT1 Describe the most common types of masonry units.
MIT2 Describe and demonstrate how to set up a wall.
MIT3 Lay a dry bond.
MIT4 Spread and furrow a bed joint, and butter masonry units.
MIT5 Describe the different types of masonry bonds.
MIT6 Cut brick and block accurately.
MIT7 Lay masonry units in a true course.

Level II

GOR1	Name and describe the primary ingredients in grout and their properties.
GOR2	Identify the different types of grout used in masonry work.
GOR3	Describe the common admixtures and their uses.
GOR4	Describe the use of steel bar reinforcement in masonry construction.
GOR5	Use the proper techniques to apply grout in low and high lifts.
MWM1	Describe the uses and installation of vertical reinforcement.
MWM2	Describe the uses and installation of different types of horizontal joint reinforcements and ties.
MWM3	Describe the uses and installation of different anchors, fasteners, and embedded items.
MWM4	Describe the installation of hollow metal frames.
MWM5	Describe the functions and installations of sills and lintels.
ALT1	Recognize the structural principles and fundamental uses of basic types of walls.
ALT2	Recognize the requirement for, and function of, control joints and expansion joints.
ALT3	Construct various types of walls using proper reinforcement, jointing, and bonding techniques.
ALT4	Construct speciality structures such as manholes, segmented block walls, and screens.
ALT5	Identify and explain the different types of masonry arches used today.
ALT6	Construct a semicircular and jack arch.
CTM1	Explain and demonstrate techniques for constructing masonry around windows, doors, and other openings.
CTM2	Explain the requirements for wall bracing and demonstrate the techniques used to construct pilasters and other types of bracing.
CTM3	Identify the various types of insulation used in conjunction with masonry construction and explain installation techniques.
CTM4	Identify the need for moisture control in various types of masonry construction and demonstrate the techniques used to eliminate moisture problems.

Academic Standards

A1	Recognize, classify, and use real numbers and their properties.
A2	Recognize, create, extend, and apply patterns, relations, and functions and their applications.
A3	Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
E1	Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2	Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3	Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4	Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.

E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

National Center for Construction Education and Research. (2004). *Masonry level I.* Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2004). *Masonry level II.* Upper Saddle River, NJ: Pearson Prentice Hall.

Masonry II
Unit 8: Stonemasonry and Precast Panels (10 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify and discuss the techniques of stonemasonry. a. Match terms associated with stonemasonry. b. Define the classifications of stone. c. Define the uses of stone in the masonry field. d. Discuss types of mortar used in stone masonry e. Describe the various surface finishes of stone.	**Teaching:** • Provide a handout on terms relating to stonemasonry.[E3, E8] • Discussion of material can be followed by guest speaker, field trip to stone yard, or onsite visit to provide additional information. A written summary of the material will be turned in.[E2, E9] **Assessment:** • Assessment will be written exam and a critique of the summary.
2. Estimate an assigned basic stone project. a. Explain how to do an estimate. b. Discuss precast panels.	**Teaching:** • Discuss and demonstrate estimating a project. Have the student complete an estimation project using the specifications provided.[A1, A2, A3, E2] • Discuss information related to precast panel.[E2, E10] **Assessment:** • Assessment will be the correct completion of the estimation project. • Assessment will be the observation of the participation during the discussion.

STANDARDS

Contren Learning Series Best Practices

Level II

REM1 Understand the requirements for construction of various types of residential foundations.
REM2 Identify and explain the characteristics, uses, and installation techniques for brick pavers.
REM3 Lay out and construct steps, patios, and decks made from masonry units.
REM4 Lay out and construct chimneys and fireplaces.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.

A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
E10 Use language and critical thinking strategies to serve as tools for learning.

Workplace Skills for the 21st Century

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.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

National Educational Technology Standards for Students

T1 Basic operations and concepts
T3 Technology productivity tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Suggested References

Kreh, R. T. (2003). *Masonry skills.* Clifton Park, IL: Thompson/Delmar Learning.

National Center for Construction Education and Research. (2004). *Masonry level II.* Upper Saddle River, NJ: Pearson Prentice Hall.

Recommended Tools and Equipment

CAPITALIZED ITEMS

1. Air compressor (1)
2. Mixer, cement, gas or electric powered (1)
3. Saw, demolition, gas powered with blade (1)
4. Scaffold (4 sets)
5. Student computers in a networked environment with Internet access (6)
6. Networkable laser printer

NON-CAPITALIZED ITEMS

1. Box, mortar (15 cu. ft.) (1)
2. Corner poles (4)
3. Brush, masonry (20)
4. C-clamp, vise grip (4)
5. C-clamp, assorted sizes (4)
6. Chalkline (10)
7. Chisel, ripping (1)
8. Chisel set, cold (3" - 1") (6)
9. Clamp, bar (4)
10. Cutter, bolt – 8" and 24" (2)
11. Drill, portable (2") (1)
12. Edger, cement (10)
13. Extension cord (100' 12/3 conductor) (2)
14. Eye protection and sterilization chest (with 20 pairs of safety glasses) (1)
15. Float, rubber (6)
16. Float, bull (1)
17. Groover, cement (6)
18. Hacksaw (2)
19. Hammer, straight claw (3)
20. Hammer, sledge (3)
21. Hammer, brick (10)
22. Hammer, curved claw (16 oz.) (3)
23. Handsaw, crosscut (3)
24. Hawk, plastering (2)
25. Hoe, mortar (2)
26. Hose, water (50') (2)
27. Hose, air (50') (2)
28. Joiner, sled block (10)
29. Jointer, rake bricklaying (10)
30. Jointer, concave bricklaying (10)
31. Joiner (V) (10)
32. Ladder, step (8') (1)
33. Ladder, extension (16') (1)

34. Level, transit with tripod and leveling rod (1)
35. Level, masonry (15)
36. Pliers, channel lock (12") (2)
37. Pliers, vise grip (2)
38. Plumb bob (2)
39. Rule, folding (6' spacing) (12)
40. Rule, folding (6' modular) (12)
41. Safety kit (OSHA approved) (1)
42. Saw, circular (72" portable) (1)
43. Screwdriver set (Phillips, assorted sizes) (2)
44. Screwdriver set (flat blade, assorted sizes) (2)
45. Set, brick (10)
46. Shield safety (2)
47. Shovel, round point (6)
48. Shovel, square point (6)
49. Square, framing with rafter chart (6)
50. Square, combination (2)
51. Tamper, hand (1)
52. Tape, steel (1-100') (1-50')
53. Tape, steel (16') (6)
54. Tong, brick (4)
55. Trowel, bricklaying (20)
56. Trowel, tuck point (10)
57. Trowel, cement finishing (4)
58. Wheelbarrow (6 cu. ft.) (3)
59. Wheelbarrow, brick (1)
60. Wrench, pipe (8") (1)
61. Wrench, pipe (10") (1)
62. Wrench set, combination (SAE) (1)
63. Wrench, adjustable (12") (1)
64. Wrench, adjustable (10") (1)
65. Wrench set, sockets with ratchets and pullhandles (SAE 1/4”, 3/8”, and 1/2" drives) (2)
66. Tool bags (20)
67. Mortar stands (20)
68. Mortar boards (20)
69. Line blocks with pins (20 sets)
70. Hammer, chipping (2)
71. Hammer, rotary with bits (1)
72. Grinder, pedestal with grinder wheels (1)

RECOMMENDED INSTRUCTIONAL AIDS

It is recommended that instructors have access to the following items:

1. Scientific calculator (1)

2. Cart, AV (for TV-VCR) (1)
3. TV-VCR/DVD (1)
4. Video/audio data projector (1)
5. Laptop computer (1)
6. Digital camera
7. Digital scanner with Optical Character Recognition (OCR)
8. Interactive display board

Student Competency Profile for Masonry I

Student:_____

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

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

Unit 1: Orientation, Leadership, and Employability Skills

_____1. Describe local program and vocational center policies and procedures.
_____2. Describe employment opportunities and responsibilities.
_____3. Explore leadership skills and personal development opportunities provided students by student organizations to include SkillsUSA.
_____4. Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations.
_____5. Discuss the history of masonry to include materials and techniques.

Unit 2: Basic Safety

_____1. Describe general safety rules for working in a shop/lab and industry.
_____2. Identify and apply safety around welding operations.
_____3. Identify and explain use of various barriers and confinements.
_____4. Explain lifting and the use of ladders and scaffolds.
_____5. Explain the Material Safety Data Sheet (MSDS).
_____6. Explain fires.
_____7. Explain safety in and around electrical situations.

Unit 3: Basic Math

_____1. Apply the four basic math skills with whole numbers, fractions, and percent.
_____2. Use the metric system.

Unit 4: Equipment, Hand, and Power Tools

_____1. Identify and discuss use the tools and equipment.
_____2. Explain the safe use of common hand and power tools.
_____3. Explain the procedures for the maintenance of power tools.

Unit 5: Introduction to Blueprints

_____1. Identify terms and symbols commonly used on blueprints.
_____2. Relate information on prints to real parts and locations.

_____3. Identify and apply basic principles of blueprints.

Unit 6: Basic Rigging

_____1. Explain and identify safe rigging and equipment.
_____2. Discuss the proper use of load-handling and signaling practices.

Unit 7: Masonry Unit

_____1. Match terms associated with masonry units to their correct definitions.
_____2. Lay out a brick wall using the dry bond method to specifications.
_____3. Lay out a block wall using the dry bond method to specifications.
_____4. Examine the proper procedure for laying out a stone wall using the dry bond method to specifications.

Unit 8: Mortar

_____1. Identify factors concerning mortar.
_____2. Describe, mix, and apply mortar to specifications.

Unit 9: Concrete

_____1. Explain terms, tools, and equipment associated with concrete.
_____2. Perform procedures used in pouring and finishing concrete.

Student Competency Profile for Masonry II

Student:_____

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

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

Unit 1: Orientation, Advanced Leadership, and Employability Skills

_____1. Review local program and vocational center policies and procedures.
_____2. Describe employment opportunities and responsibilities.
_____3. Explore leadership skills and personal development opportunities provided students by student organizations to include SkillsUSA.
_____4. Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations.

Unit 2: Basic Safety (Review)

_____1. Describe general safety rules for working in a shop/lab and industry.
_____2. Identify and apply safety around welding operations.
_____3. Identify and explain use of various barriers and confinements.
_____4. Explain lifting and the use of ladders and scaffolds.
_____5. Explain the Material Safety Data Sheet (MSDS).
_____6. Explain fires.
_____7. Explain safety in and around electrical situations.

Unit 3: Power Tools and Equipment (Review)

_____1. Safely use power tools.
_____2. Safely use masonry equipment.

Unit 4: Wall Layout

_____1. Explain the terms associated with the layout of a masonry wall.
_____2. Build a wall to the required layout.

Unit 5: Drawings/Specifications and Estimating

_____1. Identify and discuss drawings and specifications.
_____2. Estimate material for a masonry project.

Unit 6: Brick

_____1. Describe basic facts about bricks.
_____2. Explain and perform basic brick laying techniques.
_____3. Explain moisture control in brick structures.
_____4. Explain reinforcing and wall supports of brick structures.
_____5. Identify the basic wall types.

Unit 7: Concrete Masonry

_____1. Identify and discuss the various materials used in concrete masonry.
_____2. Describe the procedures for basic laying techniques.
_____3. Identify the various methods of waterproofing concrete masonry.
_____4. Discuss various methods of reinforcing concrete masonry structures.
_____5. Identify and discuss various wall supports for concrete masonry structures.

Unit 8: Stonemasonry and Precast Panels

_____1. Identify and discuss the techniques of stonemasonry.
_____2. Estimate an assigned basic stone project.

Appendix A: Contren Learning Series Best Practices[1]

Core Curriculum Best Practices

BASIC SAFETY

SAF1 Identify the responsibilities and personal characteristics of a professional craftsperson.
SAF2 Explain the role that safety plays in the construction crafts.
SAF3 Describe what job-site safety means.
SAF4 Explain the appropriate safety precautions around common job-site hazards.
SAF5 Demonstrate the use and care of appropriate personal protective equipment.
SAF5 Follow safe procedures for lifting heavy objects.
SAF6 Describe safe behavior on and around ladders and scaffolds.
SAF7 Explain the importance of the HazCom (Hazard Communication Standard) requirement and MSDSs (Material Safety Data Sheets).
SAF8 Describe fire prevention and fire fighting techniques.
SAF9 Define safe work procedures around electrical hazards.

INTRODUCTION TO CONSTRUCTION MATH

MAT1 Add, subtract, multiply, and divide whole numbers, with and without a calculator.
MAT2 Use a standard ruler and a metric ruler to measure.
MAT3 Add, subtract, multiply, and divide fractions.
MAT4 Add, subtract, multiply, and divide decimals, with and without a calculator.
MAT5 Convert decimals to percents and percents to decimals.
MAT6 Convert fractions to decimals and decimals to fractions.
MAT7 Explain what the metric system is and how it is important in the construction trade.
MAT8 Recognize and use metric units of length, weight, volume, and temperature.
MAT9 Recognize some of the basic shapes used in the construction industry and apply basic geometry to measure them.

INTRODUCTION TO HAND TOOLS

HTO1 Recognize and identify some of the basic hand tools used in the construction trade.
HTO2 Use these tools safely.
HTO3 Describe the basic procedures for taking care of these tools.

INTRODUCTION TO POWER TOOLS

PTO1 Identify commonly used power tools of the construction trade.
PTO2 Use power tools safely.
PTO3 Explain how to maintain power tools properly.

INTRODUCTION TO BLUEPRINTS

BLU1 Recognize and identify basic blueprint terms, components, and symbols.

[1] *Contren learning series.* Retrieved October 7, 2004, from http://www.nccer.org/

BLU2 Relate information on blueprints to actual locations on the print.
BLU3 Recognize different classifications of drawings.
BLU4 Interpret and use drawing dimensions.

BASIC RIGGING

RIG1 Identify and describe the use of slings and common rigging hardware.
RIG2 Describe the basic inspection techniques and rejection criteria used for slings and hardware.
RIG3 Describe the basic hitch configurations and their proper connections.
RIG4 Describe basic load-handling safety practices.
RIG5 Demonstrate proper use of American National Standards Institute (ANSI) hand signals.

COMMUNICATION SKILLS

COM1 Demonstrate the ability to understand information and instructions that are presented in both written and verbal form.
COM2 Demonstrate the ability to communicate effectively in on-the-job situations using written and verbal skills.

EMPLOYABILITY SKILLS

EMP1 Explain the construction industry, the role of the companies that make up the industry, and the role of individual professionals in the industry.
EMP2 Demonstrate critical thinking skills and the ability to solve problems using those skills.
EMP3 Demonstrate knowledge of computer systems and explain common uses for computers in the construction industry.
EMP4 Demonstrate effective relationship skills with teammates and supervisors, exhibit the ability to work on a team, and demonstrate appropriate leadership skills.
EMP5 Be aware of workplace issues such as sexual harassment, stress, and substance abuse.

Level I

INTRODUCTION TO MASONRY

ITM1 Discuss the history of masonry.
ITM2 Describe modern masonry materials and methods.
ITM3 Explain career ladders and advancement possibilities in masonry work.
ITM4 Describe the skills, attitudes, and abilities needed to work as a mason.
ITM5 State the safety precautions that must be practiced at a work site, including the following:
- Safety practices
- Fall-protection procedures
- Forklift-safety operations

ITM6 Perform the following basic bricklaying procedures:

- Mixing of mortar
- Laying a mortar bed
- Laying bricks

ITM7 Put on eye protection, respiratory protection, and a safety harness.
ITM8 Use the correct procedures for fueling and starting a gasoline-powered tool.

SAFETY REQUIREMENTS

SAR1 Identify and name the tools used in performing masonry work.
SAR2 Identify and name the equipment used in performing masonry work.
SAR3 Describe how each tool is used.
SAR4 Describe how the equipment is used.
SAR5 Associate trade terms with the appropriate tools and equipment.
SAR6 Demonstrate the correct procedures for assembling and disassembling scaffolding according to federal safety regulations, under the supervision of a competent person.

MEASUREMENTS, DRAWINGS, AND SPECIFICATIONS

MDS1 Work with denominate numbers.
MDS2 Read a mason's measure.
MDS3 Convert measurements in the U.S. Customary (English) system into their metric equivalents.
MDS4 Recognize, identify, and calculate areas, circumferences, and volumes of basic geometric shapes.
MDS5 Identify the basic parts of a set of drawings.
MDS6 Discuss the different types of specifications used in the building industry and the sections that pertain to masonry.

MORTAR

MOR1 Name and describe the primary ingredients in mortar and their properties.
MOR2 Identify the various types of mortar used in masonry work.
MOR3 Describe the common admixtures and their uses.
MOR4 Identify the common problems found in mortar application and their solutions.
MOR5 Properly set up the mortar mixing area.
MOR6 Properly mix mortar by hand.
MOR7 Properly mix mortar with a mechanical mixer.

MASONRY UNITS AND INSTALLATION TECHNIQUES

MIT1 Describe the most common types of masonry units.
MIT2 Describe and demonstrate how to set up a wall.
MIT3 Lay a dry bond.
MIT4 Spread and furrow a bed joint, and butter masonry units.
MIT5 Describe the different types of masonry bonds.
MIT6 Cut brick and block accurately.

MIT7 Lay masonry units in a true course.

Level II

RESIDENTIAL PLANS AND DRAWING INTERPRETATION

RPD1 Understand the organization of residential plans and drawings.
RPD2 Interpret dimensions and scales on drawings.
RPD3 Interpret information on residential plans.
RPD4 Estimate materials quantities from plans and drawings.

RESIDENTIAL MASONRY

REM1 Understand the requirements for construction of various types of residential foundations.
REM2 Identify and explain the characteristics, uses, and installation techniques for brick pavers.
REM3 Lay out and construct steps, patios, and decks made from masonry units.
REM4 Lay out and construct chimneys and fireplaces.

GROUT AND OTHER REINFORCEMENT

GOR1 Name and describe the primary ingredients in grout and their properties.
GOR2 Identify the different types of grout used in masonry work.
GOR3 Describe the common admixtures and their uses.
GOR4 Describe the use of steel bar reinforcement in masonry construction.
GOR5 Use the proper techniques to apply grout in low and high lifts.

METAL WORK IN MASONRY

MWM1 Describe the uses and installation of vertical reinforcement.
MWM2 Describe the uses and installation of different types of horizontal joint reinforcements and ties.
MWM3 Describe the uses and installation of different anchors, fasteners, and embedded items.
MWM4 Describe the installation of hollow metal frames.
MWM5 Describe the functions and installations of sills and lintels.

ADVANCED LAYING TECHNIQUES

ALT1 Recognize the structural principles and fundamental uses of basic types of walls.
ALT2 Recognize the requirement for, and function of, control joints and expansion joints.
ALT3 Construct various types of walls using proper reinforcement, jointing, and bonding techniques.
ALT4 Construct speciality structures such as manholes, segmented block walls, and screens.
ALT5 Identify and explain the different types of masonry arches used today.

ALT6 Construct a semicircular and jack arch.

CONSTRUCTION TECHNIQUES AND MOISTURE CONTROL

CTM1 Explain and demonstrate techniques for constructing masonry around windows, doors, and other openings.
CTM2 Explain the requirements for wall bracing and demonstrate the techniques used to construct pilasters and other types of bracing.
CTM3 Identify the various types of insulation used in conjunction with masonry construction and explain installation techniques.
CTM4 Identify the need for moisture control in various types of masonry construction and demonstrate the techniques used to eliminate moisture problems.

ELEVATED WORK

ELW1 Describe the appropriate steps necessary for setting up and maintaining elevated workstations.
ELW2 Properly operate material handling and hoisting equipment.
ELW3 Describe the safety requirements and guidelines employed in elevated and high-rise construction.
ELW4 Describe basic activities that can be used on the job to prevent elevated workstation accidents.
ELW5 Understand scaffolding positioning and how it affects laying technique.

CONSTRUCTION INSPECTION AND QUALITY CONTROL

CIQ1 Discuss industry standards for quality control.
CIQ2 Build masonry sample panels and prisms.
CIQ3 Perform field tests on mortar.
CIQ4 Discuss and perform field inspections.

Appendix B: Academic Standards

Algebra I[2]

Competencies and Suggested Objective(s)

A1 Recognize, classify, and use real numbers and their properties.
- a. Describe the real number system using a diagram to show the relationships of component sets of numbers that compose the set of real numbers.
- b. Model properties and equivalence relationships of real numbers.
- c. Demonstrate and apply properties of real numbers to algebraic expressions.
- d. Perform basic operations on square roots excluding rationalizing denominators.

A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- a. Analyze relationships between two variables, identify domain and range, and determine whether a relation is a function.
- b. Explain and illustrate how change in one variable may result in a change in another variable.
- c. Determine the rule that describes a pattern and determine the pattern given the rule.
- d. Apply patterns to graphs and use appropriate technology.

A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
- a. Solve, check, and graph linear equations and inequalities in one variable, including rational coefficients.
- b. Graph and check linear equations and inequalities in two variables.
- c. Solve and graph absolute value equations and inequalities in one variable.
- d. Use algebraic and graphical methods to solve systems of linear equations and inequalities.
- e. Translate problem-solving situations into algebraic sentences and determine solutions.

A4 Explore and communicate the characteristics and operations of polynomials.
- a. Classify polynomials and determine the degree.
- b. Add, subtract, multiply, and divide polynomial expressions.
- c. Factor polynomials using algebraic methods and geometric models.
- d. Investigate and apply real-number solutions to quadratic equations algebraically and graphically.
- e. Use convincing arguments to justify unfactorable polynomials.
- f. Apply polynomial operations to problems involving perimeter and area.

A5 Utilize various formulas in problem-solving situations.
- a. Evaluate and apply formulas (e.g., circumference, perimeter, area, volume, Pythagorean Theorem, interest, distance, rate, and time).
- b. Reinforce formulas experimentally to verify solutions.
- c. Given a literal equation, solve for any variable of degree one.

[2] *Mississippi mathematics framework—Algebra I.* (2003). Retrieved September 10, 2003, from http://marcopolo.mde.k12.ms.us/frameworks/mathematics/ma_algebra_i.html

d. Using the appropriate formula, determine the length, midpoint, and slope of a segment in a coordinate plane.
e. Use formulas (e.g., point-slope and slope-intercept) to write equations of lines.

A6 Communicate using the language of algebra.
a. Recognize and demonstrate the appropriate use of terms, symbols, and notations.
b. Distinguish between linear and non-linear equations.
c. Translate between verbal expressions and algebraic expressions.
d. Apply the operations of addition, subtraction, and scalar multiplication to matrices.
e. Use scientific notation to solve problems.
f. Use appropriate algebraic language to justify solutions and processes used in solving problems.

A7 Interpret and apply slope as a rate of change.
a. Define slope as a rate of change using algebraic and geometric representations.
b. Interpret and apply slope as a rate of change in problem-solving situations.
c. Use ratio and proportion to solve problems including direct variation (y=kx).
d. Apply the concept of slope to parallel and perpendicular lines.

A8 Analyze data and apply concepts of probability.
a. Collect, organize, graph, and interpret data sets, draw conclusions, and make predictions from the analysis of data.
b. Define event and sample spaces and apply to simple probability problems.
c. Use counting techniques, permutations, and combinations to solve probability problems.

Biology I[3]

Competencies and Suggested Objective(s)

B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
a. Demonstrate the proper use and care for scientific equipment used in biology.
b. Observe and practice safe procedures in the classroom and laboratory.
c. Apply the components of scientific processes and methods in the classroom and laboratory investigations.
d. Communicate results of scientific investigations in oral, written, and graphic form.

B2 Investigate the biochemical basis of life.
a. Identify the characteristics of living things.
b. Describe and differentiate between covalent and ionic bonds using examples of each.
c. Describe the unique bonding and characteristics of water that makes it an essential component of living systems.
d. Classify solutions using the pH scale and relate the importance of pH to organism survival.

[3] *Mississippi science framework—Biology I*. (2003). Retrieved September 10, 2003, from http://marcopolo.mde.k12.ms.us/frameworks/science/sci_biology_I.html

e. Compare the structure, properties and functions of carbohydrates, lipids, proteins and nucleic acids in living organisms.
f. Explain how enzymes work and identify factors that can affect enzyme action.

B3 Investigate cell structures, functions, and methods of reproduction.
a. Differentiate between prokaryotic and eukaryotic cells.
b. Distinguish between plant and animal (eukaryotic) cell structures.
c. Identify and describe the structure and basic functions of the major eukaryotic organelles.
d. Describe the way in which cells are organized in multicellular organisms.
e. Relate cell membrane structure to its function in passive and active transport.
f. Describe the main events in the cell cycle and cell mitosis including differences in plant and animal cell divisions.
g. Relate the importance of meiosis to sexual reproduction and the maintenance of chromosome number.
h. Identify and distinguish among forms of asexual and sexual reproduction.

B4 Investigate the transfer of energy from the sun to living systems.
a. Describe the structure of ATP and its importance in life processes.
b. Examine, compare, and contrast the basic processes of photosynthesis and cellular respiration.
c. Compare and contrast aerobic and anaerobic respiration.

B5 Investigate the principles, mechanisms, and methodology of classical and molecular genetics.
a. Compare and contrast the molecular structures of DNA and RNA as they relate to replication, transcription, and translation.
b. Identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes.
c. Analyze the applications of DNA technology (forensics, medicine, agriculture).
d. Discuss the significant contributions of well-known scientists to the historical progression of classical and molecular genetics.
e. Apply genetic principles to solve simple inheritance problems including monohybrid crosses, sex linkage, multiple alleles, incomplete dominance, and codominance.
f. Examine inheritance patterns using current technology (gel electrophoresis, pedigrees, karyotypes).

B6 Investigate concepts of natural selection as they relate to diversity of life.
a. Analyze how organisms are classified into a hierarchy of groups and subgroups based on similarities and differences.
b. Identify characteristics of kingdoms including monerans, protists, fungi, plants and animals.
c. Differentiate among major divisions of the plant and animal kingdoms (vascular/non-vascular; vertebrate/invertebrate).
d. Compare the structures and functions of viruses and bacteria relating their impact on other living organisms.
e. Identify evidence of change in species using fossils, DNA sequences, anatomical and physiological similarities, and embryology.

f. Analyze the results of natural selection in speciation, diversity, adaptation, behavior and extinction.

B7 Investigate the interdependence and interactions that occur within an ecosystem.

a. Analyze the flow of energy and matter through various cycles including carbon, oxygen, nitrogen and water cycles.
b. Interpret interactions among organisms in an ecosystem (producer/consumer/decomposer, predator/prey, symbiotic relationships and competitive relationships).
c. Compare variations, tolerances, and adaptations of plants and animals in major biomes.
d. Investigate and explain the transfer of energy in an ecosystem including food chains, food webs, and food pyramids.
e. Examine long and short-term changes to the environment as a result of natural events and human actions.

English II[4]

Competencies and Suggested Objective(s)

E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.

a. Produce individual and/or group compositions and/or projects to persuade, tell a story, describe, create an effect, explain or justify an action or event, inform, entertain, etc.
b. Produce writing typically used in the workplace such as social, business, and technical correspondence; explanation of procedures; status reports; research findings; narratives for graphs; justification of decisions, actions, or expenses; etc.
c. Write a response, reaction, interpretation, analysis, summary, etc., of literature, other reading matter, or orally presented material.
d. Revise to ensure effective introductions, details, wording, topic sentences, and conclusions.

E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.

a. Listen to determine the main idea and supporting details, to distinguish fact from opinion, and to determine a speaker's purpose or bias.
b. Speak with appropriate intonation, articulation, gestures, and facial expression.
c. Speak effectively to explain and justify ideas to peers, to inform, to summarize, to persuade, to entertain, to describe, etc.

E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.

a. Read, view, and listen to distinguish fact from opinions and to recognize persuasive and manipulative techniques.
b. Access both print and non-print sources to produce an I-Search paper, research paper, or project.

[4] *Mississippi language arts framework—English II*. (2003). Retrieved September 10, 2003, from http://marcopolo.mde.k12.ms.us/frameworks/language_arts/la_10.html

c. Use computers and audio-visual technology to access and organize information for purposes such as resumes, career search projects, and analytical writings, etc.
d. Use reference sources, indices, electronic card catalog, and appropriate research procedures to gather and synthesize information.

E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
a. Interact with peers to examine real world and literary issues and ideas.
b. Show growth in critical thinking, leadership skills, consensus building, and self-confidence by assuming a role in a group, negotiating compromise, and reflecting on individual or group work.

E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
a. Share, critique, and evaluate works in progress and completed works through a process approach.
b. Communicate effectively in a group to present completed projects and/or compositions.
c. Edit oral and written presentations to reflect correct grammar, usage, and mechanics.

E6 Explore cultural contributions to the history of the English language and its literature.
a. Explore a variety of works from various historical periods, geographical locations, and cultures, recognizing their influence on language and literature.
b. Identify instances of dialectal differences which create stereotypes, perceptions, and identities.
c. Recognize root words, prefixes, suffixes, and cognates.
d. Relate how vocabulary and spelling have changed over time.

E7 Discover the power and effect of language by reading and listening to selections from various literary genres.
a. Listen to and read aloud selected works to recognize and respond to the rhythm and power of language to convey a message.
b. Read aloud with fluency and expression.
c. Analyze the stylistic devices, such as alliteration, assonance, word order, rhyme, onomatopoeia, etc., that make a passage achieve a certain effect.
d. Demonstrate how the use of language can confuse or inform, repel or persuade, or inspire or enrage.
e. Analyze how grammatical structure or style helps to create a certain effect.

E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
a. Read and explore increasingly complete works, both classic and contemporary, for oral discussion and written analysis.
b. Read, discuss, and interpret literature to make connections to life.
c. Read from a variety of genres to understand how the literary elements contribute to the overall quality of the work.
d. Identify qualities in increasingly complex literature that have produced a lasting impact on society.

e. Read for enjoyment, appreciation, and comprehension of plot, style, vocabulary, etc.

E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.

a. Infuse the study of grammar and vocabulary into written and oral communication.
b. Demonstrate, in the context of their own writing, proficient use of the conventions of standard English, including, but not limited to, the following: complete sentences, subject-verb agreement, plurals, spellings, homophones, possessives, verb forms, punctuation, capitalization, pronouns, pronoun-antecedent agreement, parallel structure, and dangling and misplaced modifiers.
c. Give oral presentations to reinforce the use of standard English.
d. Employ increasingly proficient editing skills to identify and solve problems in grammar, usage, and structure.

E10 Use language and critical thinking strategies to serve as tools for learning.

a. Use language to facilitate continuous learning, to record observations, to clarify thought, to synthesize information, and to analyze and evaluate language.
b. Interpret visual material orally and in writing.

U. S. History from 1877[5]

Competencies and Suggested Objective(s)

H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.

a. Apply economic concepts and reasoning when evaluating historical and contemporary social developments and issues (e.g., gold standard, free coinage of silver, tariff issue, laissez faire, deficit spending, etc.).
b. Explain the emergence of modern America from a domestic perspective (e.g., frontier experience, Industrial Revolution and organized labor, reform movements of Populism and Progressivism, Women's Movement, Civil Rights Movement, the New Deal, etc.).
c. Explain the changing role of the United States in world affairs since 1877 through wars, conflicts, and foreign policy (e.g., Spanish-American War, Korean conflict, containment policy, etc.).
d. Trace the expansion of the United States and its acquisition of territory from 1877 (e.g., expansionism and imperialism).

H2 Describe the impact of science and technology on the historical development of the United States in the global community.

a. Analyze the impact of inventions on the United States (e.g., telephone, light bulb, etc.).
b. Examine the continuing impact of the Industrial Revolution on the development of our nation (e.g., mass production, computer operations, etc.).
c. Describe the effects of transportation and communication advances since 1877.

H3 Describe the relationship of people, places, and environments through time.

[5] *Mississippi social studies framework—U.S. History from 1877*. (2003). Retrieved September 10, 2003, from http://marcopolo.mde.k12.ms.us/frameworks/social_studies/ss_us_history.html

a. Analyze human migration patterns since 1877 (e.g., rural to urban, the Great Migration, etc.).
b. Analyze how changing human, physical, geographic characteristics can alter a regional landscape (e.g., urbanization, Dust Bowl, etc.).

H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).
a. Interpret special purpose maps, primary/secondary sources, and political cartoons.
b. Analyze technological information on graphs, charts, and timelines.
c. Locate areas of international conflict (e.g., Caribbean, Southeast Asia, Europe, etc.).

H5 Analyze the contributions of Americans to the ongoing democratic process to include civic responsibilities.
a. Examine various reform movements (e.g., Civil Rights, Women's Movement, etc.).
b. Examine the government's role in various movements (e.g., arbitration, 26th Amendment, etc.).
c. Examine the role of government in the preservation of citizens' rights (e.g., 19th Amendment, Civil Rights Act of 1964).
d. Examine individuals' duties and responsibilities in a democratic society (e.g., voting, volunteerism, etc.).

Appendix C: Workplace Skills for the 21st Century[6]

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.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

[6] *Secretary's commission on achieving necessary skills*. Retrieved July 13, 2004, from http://wdr.doleta.gov/SCANS/

Appendix D: National Educational Technology Standards for Students[7]

T1 Basic operations and concepts
- Students demonstrate a sound understanding of the nature and operation of technology systems.
- Students are proficient in the use of technology.

T2 Social, ethical, and human issues
- Students understand the ethical, cultural, and societal issues related to technology.
- Students practice responsible use of technology systems, information, and software.
- Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.

T3 Technology productivity tools
- Students use technology tools to enhance learning, increase productivity, and promote creativity.
- Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.

T4 Technology communications tools
- Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
- Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.

T5 Technology research tools
- Students use technology to locate, evaluate, and collect information from a variety of sources.
- Students use technology tools to process data and report results.
- Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

T6 Technology problem-solving and decision-making tools
- Students use technology resources for solving problems and making informed decisions.
- Students employ technology in the development of strategies for solving problems in the real world.

[7] *ISTE: National educational technology standards (NETS).* Retrieved July 13, 2004, from http://cnets.iste.org/