

**CONCRETE AND CEMENT MASONRY: BOOK ONE
PROFILE OF TRAINING MASTERY**

Instructor _____

Date _____

Program _____

Grade _____ School _____

Name _____ Soc. Sec. No. _____

Address _____ Phone _____

In Case of Emergency, Contact _____

Address _____ Phone _____

Allergies/Disabilities that might require special accommodation for training (please specify) _____

The above information can be used for school records and/or to ensure safety of students. This confidential information is not to be released to employers or the general public.

Date of Enrollment ____ - ____ - ____ Total Class Hours _____ Total Hours Absent _____

Date of Withdrawal ____ - ____ - ____ Total On-the-Job Training Hours _____ Total Hours Tardy _____

Date of Completion ____ - ____ - ____ Total Lab Hours _____

ON-THE-JOB TRAINING/WORK EXPERIENCE

Duration of Employment _____ Job Title _____ Supervisor's Name _____

Address of Employer _____ Phone _____

Duration of Employment _____ Job Title _____ Supervisor's Name _____

Address of Employer _____ Phone _____

Use of This Document

This document can be used to record information about the student and skills mastered. This information is useful in documenting student progress during training and in providing information about the student's qualifications to potential employers and/or for entry into advanced training programs. Instructors using these materials are authorized to reproduce this document as required for use in their training programs.



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Curriculum and Instructional Materials Center, Oklahoma Department of Career and Technology Education
1500 West Seventh Avenue, Stillwater, Oklahoma 74074-4364 1-800-654-4502 Fax 405-743-5154

SPECIFIC JOB COMPETENCIES

Instructor: As each competency is mastered, place your initials and the date in the blank on the left. This will verify that the student can perform the skill with a minimum of supervision.

Date/Initials	Date/Initials
UNIT 1 — INDUSTRY ORIENTATION	
_____ 1. Discuss the outlook for careers in the concrete and cement industry.	_____ 4. Add whole numbers.
_____ 2. Describe the work of cement masons.	_____ 5. Subtract whole numbers.
_____ 3. List the skills that cement masons must have.	_____ 6. Multiply whole numbers.
_____ 4. List the skills that employers want.	_____ 7. Divide whole numbers.
_____ 5. Explore the concrete industry.	_____ 8. Distinguish among types of fractions.
_____ 6. Describe the relationship between employers and employees.	_____ 9. Reduce fractions to lowest terms.
_____ 7. Compare the general purposes of industry associations and union organizations.	_____ 10. Convert mixed numbers to improper fractions.
_____ 8. Describe apprenticeship programs.	_____ 11. Convert improper fractions to mixed numbers.
_____ 9. Profile an organization related to the concrete industry.	_____ 12. Add fractions.
_____ 10. Identify federal laws that have influenced the labor-management relationship.	_____ 13. Subtract fractions.
_____ 11. Profile a period in labor history.	_____ 14. Multiply fractions.
_____ 12. List characteristics of a good employee.	_____ 15. Label the place values of a decimal number.
_____ 13. List reasons people lose jobs.	_____ 16. Add decimal numbers.
_____ 14. State guidelines for communicating a positive work ethic.	_____ 17. Subtract decimal numbers.
_____ 15. Respond to scenarios involving ethical conflicts.	_____ 18. Multiply decimal numbers.
	_____ 19. Divide decimal numbers.
	_____ 20. Convert decimal fractions to common fractions.
	_____ 21. Convert common fractions to decimal numbers and percentages.
	_____ 22. Identify decimal and fractional equivalents.
	_____ 23. Convert percentages to fractions and decimal numbers.
	_____ 24. Solve percentage problems.
	_____ 25. Match terms used in geometry to their correct descriptions.
	_____ 26. Match types of geometric figures to their correct descriptions.
	_____ 27. Match units of measure to their correct equivalents.
	_____ 28. Calculate the area of geometric figures.
	_____ 29. Calculate volume of solid figures.
	_____ 30. Estimate cubic yards.
	_____ 31. Solve basic ratio and proportion problems.
	_____ 32. Add whole numbers.
	_____ 33. Subtract whole numbers.
	_____ 34. Multiply whole numbers.
	_____ 35. Divide whole numbers.
	_____ 36. Distinguish among types of fractions.
	_____ 37. Reduce fractions to lowest terms.
	_____ 38. Convert mixed numbers to improper fractions.
	_____ 39. Convert improper fractions to mixed numbers.
	_____ 40. Add fractions.
	_____ 41. Subtract fractions.
	_____ 42. Multiply fractions.
	_____ 43. Add decimal numbers.
	_____ 44. Subtract decimal numbers.
	_____ 45. Multiply decimal numbers.
	_____ 46. Divide decimal numbers.
	_____ 47. Convert common fractions to decimal numbers and percentages.
	_____ 48. Solve percentage problems.
	_____ 49. Calculate the area of geometric figures.
	_____ 50. Calculate volume of solid figures.
	_____ 51. Estimate cubic yards.
	_____ 52. Solve basic ratio and proportion problems.
	UNIT 5 — MEASURING
	_____ 1. Identify basic measuring tools used by cement masons.
	_____ 2. List common errors that contribute to incorrect measurements.
	_____ 3. Identify graduations on a folding rule.
	_____ 4. Read a folding rule to the nearest fraction of an inch.
	_____ 5. Convert fractional inches to hundredths of a foot.
	_____ 6. Identify graduations on an engineer's rule.
	_____ 7. Read an engineer's rule to the nearest hundredth of a foot.
	_____ 8. Identify graduations on a tape.
	_____ 9. Read a tape to the nearest fraction of an inch.
	_____ 10. Discuss measuring methods used to square lines.
	_____ 11. Read measurements on folding and engineer's rules.
	_____ 12. Measure dimensions of objects.
	_____ 13. Convert fractional inches to hundredths of a foot.
	_____ 14. Read measurements on tapes.
	_____ 15. Use basic measuring tools and 3-4-5 method to lay out the perimeter of a building on a concrete slab.
UNIT 2 — PRODUCTION AND HISTORY OF CEMENT	
_____ 1. Distinguish between concrete and cement.	
_____ 2. Describe the stages in making portland cement.	
_____ 3. Identify key points in the history of cement.	
_____ 4. Profile a structure built from concrete.	
UNIT 3 — WORKPLACE SAFETY AND HEALTH	
_____ 1. Explain the importance of working safely.	
_____ 2. Identify sources of safe work practices in the concrete industry.	
_____ 3. State the responsibilities of employees according to OSHA.	
_____ 4. State guidelines for personal safety.	
_____ 5. State rules for working safely.	
_____ 6. Interpret the safety color code.	
_____ 7. Properly lift an object.	
_____ 8. Describe ways of extinguishing a fire.	
_____ 9. Distinguish among the basic classes of fire.	
_____ 10. Use a fire extinguisher.	
_____ 11. List characteristics of hazardous material.	
_____ 12. Recognize the dangers from toxic substances on the job.	
_____ 13. List characteristics and symptoms of contact and allergic dermatitis.	
_____ 14. List steps for prevention and treatment of contact dermatitis.	
_____ 15. Interpret the hazard warning system used to classify hazards.	
_____ 16. State guidelines for working with flammable materials and toxic substances.	
_____ 17. Use a material safety data sheet.	
_____ 18. Identify sources of accidents and possible injuries in the workplace.	
_____ 19. Identify types of injuries caused by accidents.	
_____ 20. State guidelines for responding to accidents and emergencies.	
_____ 21. Explain the legal aspects of first aid.	
_____ 22. Complete statements about first-aid kits.	
_____ 23. State guidelines to reduce disease transmission when providing first aid.	
_____ 24. State guidelines for providing first aid for cuts.	
_____ 25. State guidelines for providing first aid for an eye injury.	
_____ 26. Distinguish among signs and symptoms of sprains and fractures.	
_____ 27. State guidelines for providing first aid in response to a poisonous or chemical substance.	
_____ 28. Identify signs and symptoms of a heart attack.	
_____ 29. Analyze work situations to determine correct first-aid responses.	
UNIT 4 — FUNDAMENTAL MATH	
_____ 1. Match terms associated with basic math to their correct definitions.	
_____ 2. Match symbols used in math problems to their correct names.	
_____ 3. Label and place values of a whole number.	

Student ratings on specific competencies evaluated during the course are available upon student's written request and/or by calling the instructor. Parent's or guardian's signature is necessary if student is under 18 years of age.

UNIT 6 — BLUEPRINT READING

1. Match types of drawings usually included in a set of plans to their correct descriptions.
2. List information found on types of drawings in a set of plans.
3. Match lines in the alphabet of lines to their correct uses.
4. Identify lines in the alphabet of lines.
5. Identify selected architectural symbols commonly used to represent materials on plans.
6. Identify selected electrical symbols commonly used on plans.
7. Identify selected mechanical symbols commonly used on plans.
8. Identify selected abbreviations commonly used on plans.
9. Match architect's conventions to their correct representations.
10. State the purposes of written specifications.
11. Select from a list basic information included in a set of written specifications.
12. State the purpose of an engineer's scale.
13. Use an architect's scale.
14. Use an engineer's scale.
15. Read plans.
16. Interpret a finish schedule.
17. Read written specifications.

UNIT 7 — ESTIMATING

1. List methods used to estimate cubic yards of concrete needed for a job.
2. Use a concrete calculator to estimate cubic yards of concrete needed for a job.
3. Use a concrete estimating table to estimate cubic yards of concrete needed for a job.
4. Use the formula for estimating cubic yards of concrete needed for a job.
5. List standard mesh and wire sizes of welded wire fabric.
6. Estimate rolls of welded wire fabric needed for a job.
7. Estimate lineal feet of form lumber needed for a job.
8. Estimate number of form stakes needed for a job.
9. Estimate the materials needed for a concrete job.

UNIT 8 — CONCRETE INGREDIENTS

1. State the components of concrete and their proportions.
2. Identify types of portland cement and their uses.
3. Explain the importance of proportioning and mixing.
4. Explain how concrete sets.
5. Identify the characteristics of ingredients suitable for concrete.
6. Describe the categories of aggregate.
7. Test aggregates for quality using a silt test and a colorimetric test.

UNIT 9 — DESIGNING CONCRETE MIXES

1. Discuss the objectives of concrete-mix design.
2. List the characteristics of quality hardened concrete, workable fresh concrete, and an economical concrete mix.
3. State steps in determining optimum concrete-mix design.
4. Select from a list job requirements that must be determined before a concrete mix is designed.
5. Name concrete-mix design factors determined to meet job requirements.
6. State the rule used to determine maximum coarse-aggregate size.
7. Name the methods used to determine optimum mix proportions.
8. Describe air-entrained concrete and its uses.
9. State types of mix designs and their definitions.
10. Match types of concretes to their correct definitions.
11. State factors used in selecting aggregate for heavyweight concrete.
12. Match types of concretes to their correct use.
13. State standard mixing requirements for the stationary mixers with up to 1-cubic-yard capacities and for truck mixers with Truck Mixer Manufacturers' Bureau-rated capacity for the size of the mixer being used.
14. State standard delivery and discharge times for stationary and truck mixers.
15. Give reasons why admixtures are useful ingredients in concrete.
16. Identify the classes of admixtures.
17. Demonstrate the effects of admixtures.

UNIT 10 — SPECIFICATIONS AND TESTING

1. Describe a specification.
2. List common sources of specifications and standards.
3. Recognize common ASTM sampling and testing procedures for plastic (fresh) concrete.
4. Recognize common ASTM sampling and testing procedures for hardened concrete.
5. Profile a specification that applies to concrete construction.
6. Obtain representative test samples of fresh concrete.
7. Perform a slump test.
8. Make a cylinder-mold test specimen.
9. Make a beam-mold test specimen.
10. Perform a volumetric-method air content test.
11. Perform a pressure-method air content test using a Type B air meter.
12. Perform a temperature test.
13. Perform a unit weight, yield, and air content test.

UNIT 11 — FORMING TOOLS

1. State rules for using and maintaining hand tools.
2. State rules for safe use of portable circular saws.
3. Use a portable electric saw to perform straight, angle, and beveled cut-off operations.
4. State rules for proper care of leveling instruments.
5. Identify types of leveling instruments.
6. Use a level.
7. Identify types of hammers.
8. Match types of nails to their recommended uses.
9. Set and drive nails with a nail hammer.
10. Identify types of saws.
11. Use a crosscut hand-saw.
12. Use a hacksaw.
13. Identify types of squares.
14. Use a framing square and rule to lay out a square corner.
15. Identify types of measuring tools.
16. Identify miscellaneous forming tools and equipment.
17. Use a rebar cutter to cut rebar.

UNIT 12 — HAND TOOLS: SPECIAL TOOLS

1. State guidelines for care and safe use of hand tools.
2. State specific uses of hand tools used for placing and finishing fresh concrete.
3. Identify hand tools used for placing and finishing fresh concrete.
4. Label hand tools used for patching and mixing concrete.
5. Label hand tools used for working with hardened concrete.
6. Label miscellaneous hand tools and equipment.
7. Use a bull float.
8. Use a hand float and a finishing trowel.
9. Use an edger.

UNIT 13 — SURFACE DEFECTS AND TREATMENTS

1. Arrange in order the steps to take when preparing concrete for grinding/rubbing or sacking.
2. Select from a list methods used to rub concrete.
3. Name reasons for rubbing or sacking walls.
4. Discuss briefly proper time to rub and sack concrete.
5. Rub a wall.
6. Sack a wall.
7. Select from a list results of premature grinding.
8. Name reasons for grinding floor.
9. Label types of equipment used for grinding floors.
10. Name reasons for grinding ceilings.
11. Label types of equipment used for grinding ceilings.
12. Name reasons for patching concrete.
13. Name characteristics of a satisfactory concrete repair.
14. Name factors that control the method and/or extent of repairs.
15. Arrange in order steps to take before patching form-tie holes.
16. Select from a list materials used to bond new concrete to old.
17. Name methods used to repair concrete.
18. Name guidelines for matching patch material to original concrete.
19. Patch a deep hole in a wall.
20. Patch a hole in a wall where water pressure exists.
21. Select from a list types of concrete surface defects.
22. State causes of surface defects.
23. List recommended guidelines for preventing surface defects.

- _____ 24. State methods of repairing surface defects.
- _____ 25. Patch a feature strip.
- _____ 26. Patch a champher.
- _____ 27. Repair a spall in a finished floor.

UNIT 14 — PLACING AND LEVELING CONCRETE

- _____ 1. Compare placing and leveling.
- _____ 2. Identify the starting point for placing concrete.
- _____ 3. List items to inspect before placing concrete.
- _____ 4. Distinguish among methods of leveling.
- _____ 5. Identify starting points for placing concrete.