

PLUMBING/1 (180 Hours)

Course No.: 71-45-70

COMPETENCY CHECKLIST

Student Name _____

Teacher Name _____ School Site _____

Start Date _____ Completion Date _____ Certificate Date _____

Teacher Signature _____ Student Signature _____

(Signatures verify completion of course competencies)

A. **ORIENTATION AND SAFETY** (6 hrs)

- _____ 1. Scope and purpose of course
- _____ 2. Course content as part of Linked Learning
- _____ 3. Classroom policies and procedures
- _____ 4. Class/work first aid/emergency procedures
- _____ 5. Jobs in industry sector that impact plumbers
- _____ 6. Promoting gender equity & non-trad hiring
- _____ 7. Legislative mandates that impact plumbing
- _____ 8. Cal/OSHA laws governing plumbers
- _____ 9. EPA laws impact on building industry
- _____ 10. Hazardous materials disposal/EPA standards
- _____ 11. MSDS as it applies to plumbing trade
- _____ 12. Energy/environmental design LEED system
- _____ 13. CA Title 24 and building trades/construction
- _____ 14. Pass the safety test with 100% accuracy

B. **RESOURCE MANAGEMENT** (3 hrs)

- _____ 1. Define terms related to topic
- _____ 2. Management of resources in plumbing
- _____ 3. CPM: impact on project management
- _____ 4. Examples of effective resource management
- _____ 5. Benefits of effective resource management
- _____ 6. Economic/environmental benefits/liabilities

C. **TRADE MATHEMATICS** (10 hrs)

- _____ 1. Application of math in construction industry
- _____ 2. Problem-solving involving whole number
- _____ 3. Problem-solving involving fractions
- _____ 4. Problem-solving involving decimals
- _____ 5. Changing fractions to decimals
- _____ 6. Changing decimals to fractions
- _____ 7. English/metric systems of measuring length
- _____ 8. English/metric systems of measuring weight
- _____ 9. English/metric systems of measuring volume
- _____ 10. Solve English/metric measuring problems
- _____ 11. Measure objects w/tools common to trade

- _____ 12. Metric in ascending/descending powers of ten
- _____ 13. Convert English numbering system to metric
- _____ 14. Convert metric numbering system to English
- _____ 15. Calculate square roots of English numbers
- _____ 16. Solving techniques for geometric problems
- _____ 17. Solving techniques for algebraic problems
- _____ 18. Problem-solving using percentages
- _____ 19. Techniques for interpreting graphs
- _____ 20. Techniques for using a calculator

D. **MATERIALS** (15 hrs)

- _____ 1. Features/functions of listed materials
- _____ 2. Different pipe colors for plastic pipes
- _____ 3. Safe use/maintenance/storage of plastic pipe
- _____ 4. Purpose of various types of plastic fittings
- _____ 5. Features/functions of listed pipes/fittings
- _____ 6. Safe use/maintenance/storage of copper pipe
- _____ 7. Purpose of types of copper fittings
- _____ 8. Differences between listed joint fittings
- _____ 9. Features/functions of cast iron soil pipe/gasket
- _____ 10. Use/maintenance/storage of cast iron soil pipe
- _____ 11. Purpose of types of cast iron fittings
- _____ 12. Codes that specify use of pipe/fitting type
- _____ 13. Plastic pipe/fittings vs. copper vs. cast iron soil
- _____ 14. Features/functions of listed fittings/valves
- _____ 15. Safe use/maintenance/storage of valves
- _____ 16. Purpose of different types of valves
- _____ 17. Impact of using LEED plumbing materials
- _____ 18. Code specifications for use of plumbing valves

E. **TOOLS** (15 hrs)

- _____ 1. Tools: hand/power/electric/stationary power
- _____ 2. Layout and measuring tools
- _____ 3. Slip-joint pliers and pipe valves
- _____ 4. Various cutting and drilling tools
- _____ 5. Plastic pipe tools and equipment
- _____ 6. Copper pipe tools and equipment

- ___ 7. Cast iron soil pipe tools and equipment
- ___ 8. Finishing, specialty, and cutting tools
- ___ 9. Mechanical/inflatable test plugs, cap, gauge
- ___ 10. Various digging and lifting tools
- ___ 11. OSHA regulations: trenching and excavations

F. PIPEFITTING (35 hrs)

- ___ 1. Define listed terms related to topic
- ___ 2. Difference in pipe joining methods
- ___ 3. Precautions w/using primer/solvent cement
- ___ 4. Prep/assembly of plastic pipe and fittings
- ___ 5. Installing expanded & crimped PEX tubing
- ___ 6. 95-5 solder/lead-free/flux/soldering/brazing
- ___ 7. Prep/assembly of listed joints/fittings
- ___ 8. Threaded pipe joint vs. cut groove pipe joint
- ___ 9. Installing and supporting pipe correctly
- ___ 10. Installing underground pipe
- ___ 11. Proper anchors & anchoring accessories
- ___ 12. Proper support brackets
- ___ 13. Horizontal/ vertical
- ___ 14. Accessories to align/support pipe
- ___ 15. Hanging and supporting aboveground pipe
- ___ 16. Code procedures for listed pipe and fittings

G. SANITARY DRAINAGE, VENT, AND STORM WATER DRAINAGE (DWV) SYSTEMS (35 hrs)

- ___ 1. Sanitary drainage/vent/storm water
- ___ 2. Purpose of each listed draining system
- ___ 3. Using ABS & PVC materials for DWV piping
- ___ 4. Factors that influence design of systems
- ___ 5. Features/functions of listed components
- ___ 6. DFU valves for common plumbing fixtures
- ___ 7. Use sizing table to calculate drain size
- ___ 8. Order in which building drains are sized
- ___ 9. Factors in designing horizontal waste pipe
- ___ 10. Sketch/calculate load for drain example
- ___ 11. Sanitary drainage piping installation terms
- ___ 12. Factors that affect horizontal drainage
- ___ 13. Proper fittings for changes in direction
- ___ 14. Sketch DWV system with proper fittings
- ___ 15. Proper locations for cleanouts
- ___ 16. Code procedures for sanitary drainage piping
- ___ 17. Sanitary drainage piping venting terms
- ___ 18. Features/functions of vent pipes
- ___ 19. Fully-functioning vent system
- ___ 20. Atmospheric pressure and drainage systems
- ___ 21. Trap seal loss/siphonage/back pressure
- ___ 22. Causes of retarded flow in drainage system
- ___ 23. Effect of sewer gas/method to reduce effect
- ___ 24. Function of the stack vent and the vent stack
- ___ 25. Developed length of a vent pipe

- ___ 26. How vent pipes are sized
- ___ 27. Sizing/length of vent stacks based on factors
- ___ 28. Sizing/length of listed stacks based on DFU
- ___ 29. Installing a stack terminal
- ___ 30. Proper trap-to-vent distance
- ___ 31. Functions of various listed vent types
- ___ 32. Set-up of combination vent piping system
- ___ 33. Storm water drainage vs. sewage system
- ___ 34. Storm water and sanitary drainage systems
- ___ 35. Roof drains and storm drain traps
- ___ 36. Projected roof area and rainwater leader
- ___ 37. Factors: sizing/length of horizontal storm drain
- ___ 38. Green/sustainable storm drainage systems
- ___ 39. Sketch/set-up a storm water drainage system
- ___ 40. Current plumbing code procedures for vents

H. SIZING SANITARY DRAINAGE AND VENT PIPING (30 hrs)

- ___ 1. Current code for sanitary fixtures/systems
- ___ 2. Current code for sanitary drainage piping
- ___ 3. Symbols used in piping drawings
- ___ 4. Features/functions of listed dwelling types
- ___ 5. Perform tasks: one-story, one-family dwelling
- ___ 6. Perform tasks: two story, one-family dwelling
- ___ 7. Performs tasks for a duplex residence

I. PLUMBING TRAPS (25 hrs)

- ___ 1. Features/functions of trap and trap seal
- ___ 2. How vent system makes a trap more efficient
- ___ 3. Parts of a trap
- ___ 4. How traps are sized based on DFU
- ___ 5. Function of a cleanout for a trap
- ___ 6. Features/functions of various trap types
- ___ 7. Advantages/disadvantages of deep-seal P-trap
- ___ 8. P-traps descriptions
- ___ 9. Anti-siphon trap and a drum trap
- ___ 10. List/describe prohibited traps
- ___ 11. How trap seal loss can occur
- ___ 12. Concept of trap siphonage
- ___ 13. Self-siphonage & siphonage by momentum
- ___ 14. How back pressure can occur
- ___ 15. How evaporation can occur
- ___ 16. How trap primer can prevent trap seal loss
- ___ 17. Testing and protecting a trap against leaks
- ___ 18. Effect of high-velocity wind on trap seal
- ___ 19. Current code procedures for traps
- ___ 20. Perform tasks as listed

J. EMPLOYABILITY SKILLS (6 hrs)

- ___ 1. Employer requirements in employee
- ___ 2. Potential employers thru internet sources
- ___ 3. Electronic social networking in job search

- _____ 4. Design sample resumes and cover letters
- _____ 5. Filling out job application legibly/accurately
- _____ 6. Complete sample job application forms
- _____ 7. Enthusiasm on a job
- _____ 8. Appearance on a job
- _____ 9. Continuous upgrading of job skills
- _____ 10. Customer service to build business
- _____ 11. Demo interview techniques
- _____ 12. Info/materials for a successful interview
- _____ 13. Design sample follow-up letters
- _____ 14. Appropriate follow-up procedures