

Specific Competencies and Skills Tested in this Assessment:

Safety

- Demonstrate personal safety, including PPEs
- Demonstrate work environment safety
- Demonstrate tool safety
- Demonstrate proper trenching methods

Plumbing Math

- Use formulas
- Add, subtract, multiply, and divide whole numbers and fractions
- Convert measurements
- Calculate slope and angles with a builder's level/laser
- Size drain/waste lines and storm drains



General Plumbing Practices

- Identify and use plumbing tools
- Demonstrate blueprint reading
- Interpret an isometric view of a drain, waste, and vent (DWV) system
- Identify plumbing materials and fittings
- Identify plumbing pipe protection methods (i.e., fire caulk, nail plates)
- Interpret and comply with general plumbing practices
- Interpret manufacturer's specifications
- Testing of plumbing systems
- Identify plumbing terminology
- Identify plumbing symbols

Joining Pipes and Fittings

- Join copper pipe, tubes, and fittings
- Join plastic pipes, tubes, and fittings
- Join steel pipes and fittings
- Join cast iron pipes and fittings
- Join dissimilar materials



Specific Competencies and Skills continued:

Drainage

- Install drain/waste lines and storm drains (i.e., interior and exterior)
- Describe sizing of basic drainage systems
- Calculate proper pitch
- Describe purpose and appropriate locations for clean-out



Vent Installation

- Install a vent system for soil or waste drainage
- Differentiate between types of vents and venting systems



Water Supply and Distribution

- Layout/rough-in water service and distribution lines
- Install water lines, including water hammer arrestors and/or air chambers
- Identify various valve types and required locations
- Identify cross-connection and back-flow devices and functions

Hot Water Systems

- Install basic types of water heaters (i.e., electric and gas)
- Install and identify purpose of pressure/temperature relief valve on a water heater
- Identify water heater components (i.e., electric and gas)
- Display proper venting of a gas water heater



Specific Competencies and Skills continued:

Traps

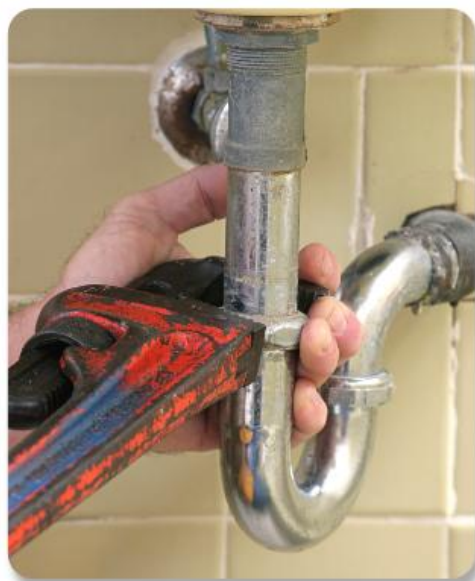
- Exhibit knowledge of trap function, installation, and placement
- Distinguish between approved and non-approved traps
- Identify trap components
- Identify causes and prevention for trap seal loss

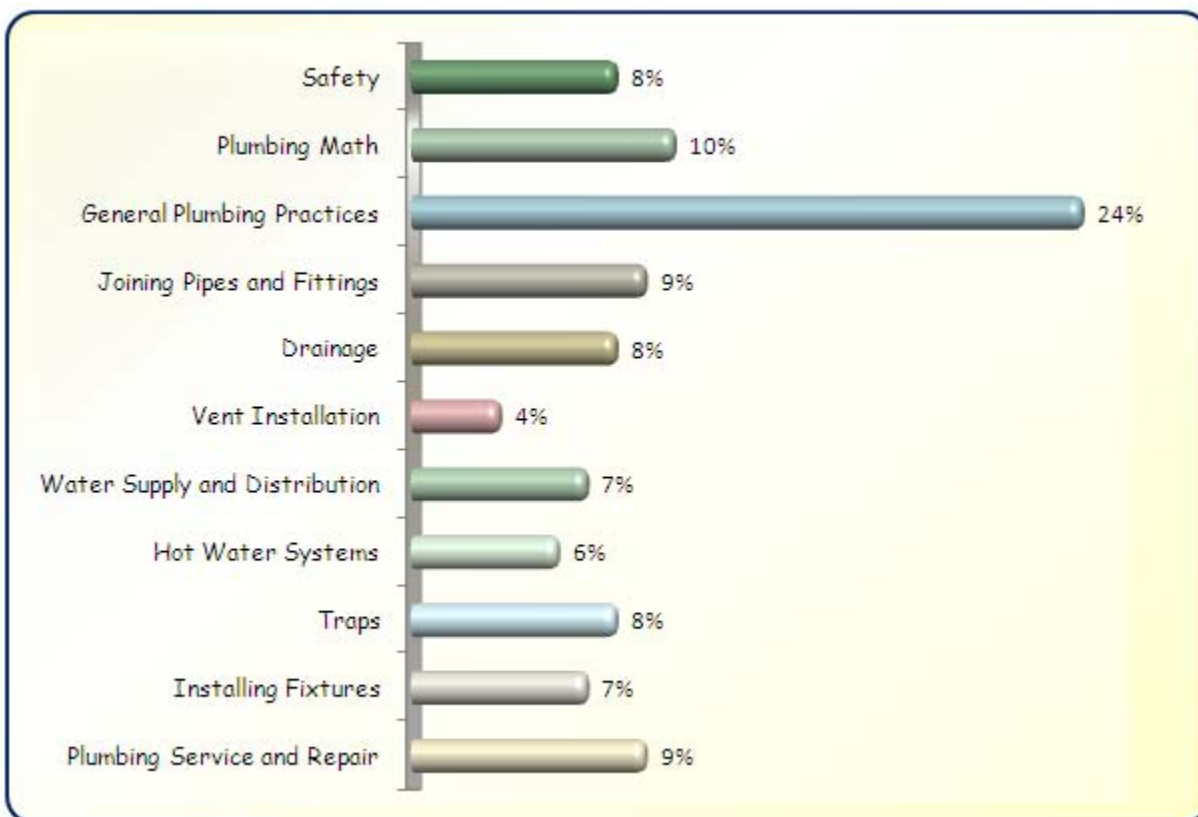
Installing Fixtures

- Install kitchen and lavatory fixtures
- Install water closets
- Install bathtub/shower
- Install faucets
- Install urinals

Plumbing Service and Repair

- Repair washer and washerless type faucets
- Display ethical practices in service and repair
- Replace ball cocks and flush valves
- Unclog drains and traps
- Replace kitchen plumbing appliances



Written Assessment:**Administration Time:** 3 hours**Number of Questions:** 173**Areas Covered:**

Sample Questions:

The weight of a cubic foot of water is

- A. 6.24 pounds
- B. 8.33 pounds
- C. 27 pounds
- D. 62.4 pounds

PVC and ABS are what type of pipe material?

- A. steel
- B. plastic
- C. cooper
- D. brass

PVC cement joints shall be made while the cement is

- A. dry
- B. partially dry
- C. wet
- D. heated

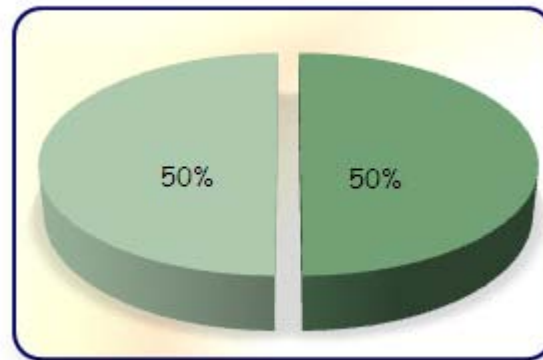
Clean outs are used at the base of a stack to

- A. make the turn more gradual
- B. let the plumber know where the stack base is located
- C. allow the cleaning of a blockage
- D. check for effluent leakage

Water hammer arrestors have a cushion of air or gas to absorb

- A. sediment
- B. moisture
- C. shock
- D. bacteria



Performance Assessment:**Administration Time:** 3 hours**Number of Jobs:** 2**Areas Covered:****50% Install and Prepare to Leak Test a DWV System**

Selection of tools/materials, safe handling of tools and equipment, rough-in: lavatory #1 (vertical and horizontal), rough-in lavatory #2 (vertical and horizontal), techniques for joining pipe and fittings, installation techniques, accuracy of fittings chosen, workstation left in good condition, adhere to local plumbing code, leak test, and time to complete Job 1.

50% Install and Prepare to Leak Test a Water Supply System

Selection of tools/materials, safe handling of tools and equipment, rough-in: lavatory #1 (vertical and horizontal), rough-in lavatory #2 (vertical and horizontal), techniques for joining pipe and fittings, installation techniques, accuracy of fittings chosen, workstation left in good condition, adhere to local plumbing code, leak test, and time to complete Job 2.

Sample Job: Install and Prepare to Leak Test a Water Supply System

Maximum Time: 1 hour and 30 minutes

Participant Activity: The participant will study a rough-in sketch and drawings to install a water supply system, measure and cut the pipe to correct size, connect all pipe and fittings per rough-in dimensions, install appropriate nail plates, and prepare the system for leak testing.



The Association for Career and Technical Education (ACTE), the leading professional

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organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!



The Pennsylvania Builder's Association utilizes this assessment to assist in determining competencies for granting skill certificates to students graduating from Pennsylvania secondary trade programs that have been endorsed by the Pennsylvania Builders Association (PBA).

PBA's services include support to workforce training and education by linking industry employers with educators to grow the workforce of tomorrow. PBA serves Pennsylvania communities and consumers through its steadfast efforts to protect homeownership rights and advocate for affordable housing options. PBA is affiliated with the National Association of Home Builders.

