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# Plumbing

## General Assessment Information

### Blueprint Contents

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| General Assessment Information            | Sample Written Items               |
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**Test Type:** The Plumbing assessment is included in NOCTI's Job Ready industry-based credential battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

**Revision Team:** The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of Connecticut, Michigan, Pennsylvania, and Tennessee.



46.0503- Plumbing Technology/  
Plumber



Career Cluster 2- Architecture  
and Construction



47-2152.02- Plumbers



The Association for Career and Technical Education (ACTE), the leading professional 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 Builder's 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.



Home Builders Institute (HBI), an affiliate of the National Association of Home Builders (NAHB), is a national leader for career training in the building industry. HBI's educational materials are designed to be relevant in today's rapidly changing environment, bringing increased professionalism, competency and effectiveness to those entering the residential construction workforce.

HBI/NAHB assessments are based on national skill standards set by NAHB industry professionals and educators as are the materials contained in the Residential Construction Academy Series. Participants passing the assessments are eligible for certification through HBI/NAHB at the entry, semi-skilled or skilled levels.

**NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE**  
University of the State of New York - Regents Research Fund

In the lower division  
baccalaureate/associate degree  
category, 3 semester hours in  
Plumbing or General Technology.

## Written Assessment

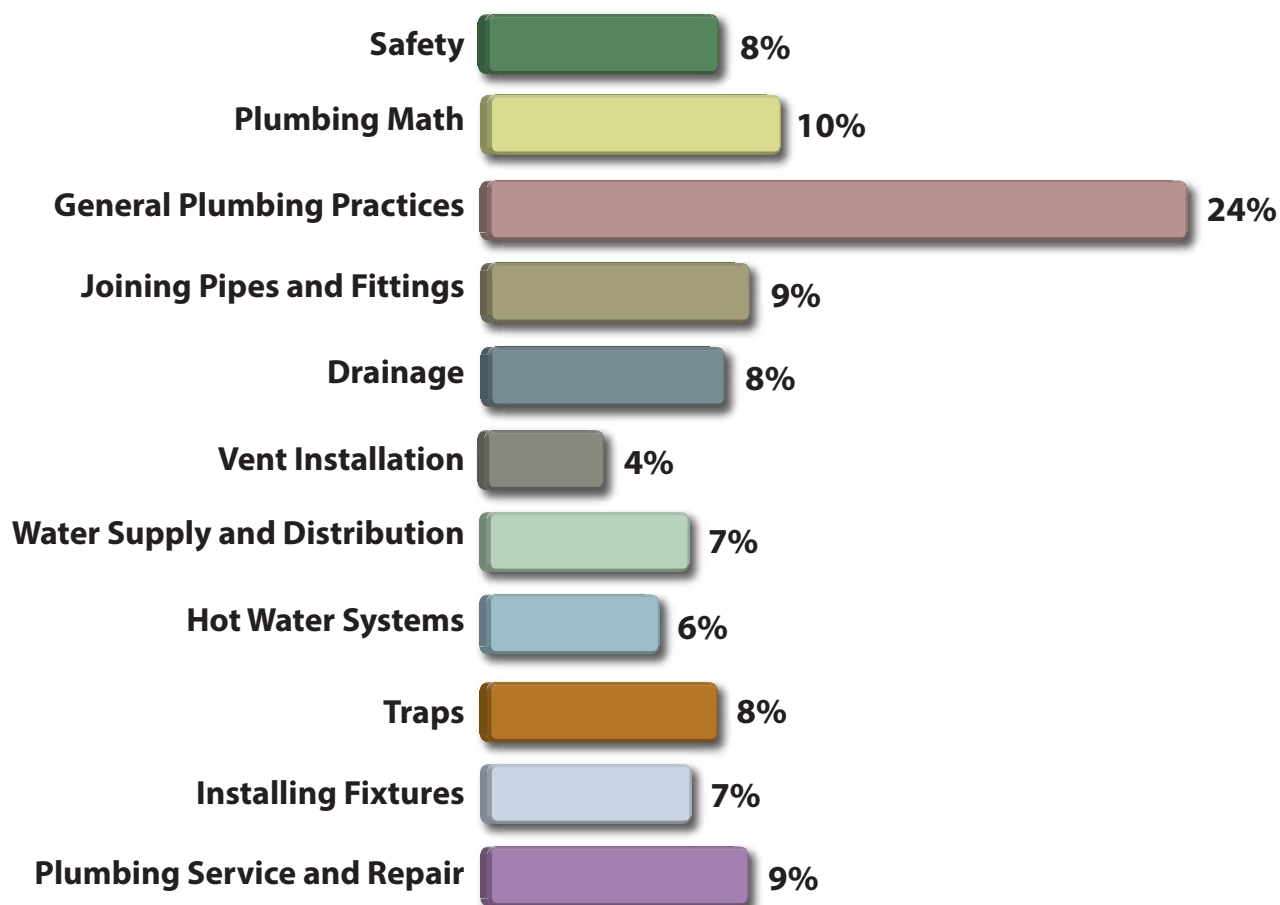
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

**Administration Time:** 3 hours

**Number of Questions:** 173

**Number of Sessions:** This assessment may be administered in one, two, or three sessions.

### Areas Covered



## Specific Standards and Competencies Included in this Assessment

### Safety

- Demonstrate personal safety, including personal protective equipment (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

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## Specific Standards and Competencies (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

- Lay out/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



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## Specific Standards and Competencies (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



## 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. copper
- 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

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## Sample Questions (continued)

**If a drain pipe is 28 feet long, calculate the total drop at 1/8-inch fall per foot.**

- A. 3 inches
- B. 3-1/2 inches
- C. 8 inches
- D. 8-1/2 inches

**The minimum size drain pipe for a residential gravity-flush water closet is**

- A. 2 inches
- B. 3 inches
- C. 4 inches
- D. 6 inches

**DWV piping systems operate on gravity, a drop of \_\_\_\_\_ is considered adequate.**

- A. 1/8 to 1/2 inch per foot
- B. 1/4 to 1 inch per foot
- C. 1/2 to 3/4 inch per foot
- D. 3/4 to 2 inches per foot

**When installing a main water shut-off valve in a water service line, the plumber should first**

- A. make sure that the trench is straight and deep
- B. have the water main turned off
- C. have the water main turned on
- D. install insulation around the pipe

**The anode rod prevents \_\_\_\_\_ in a domestic hot water heater.**

- A. overheating
- B. corrosion
- C. a downdraft
- D. soot accumulation



## Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

**Administration Time:** 3 hours

**Number of Jobs:** 2

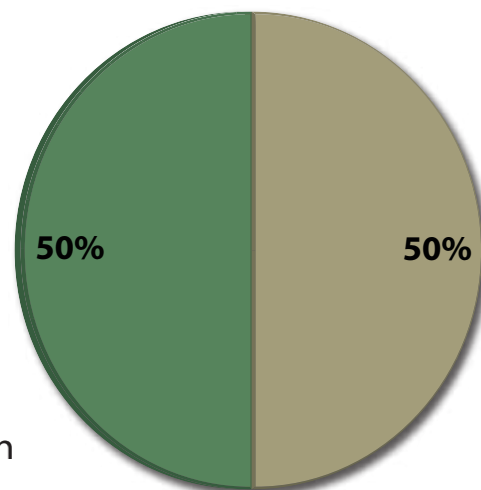
### Areas Covered:

#### **50% Install and Prepare to Leak Test a DWV System**

Participants will select tools and materials and safely handle them to rough in lavatories 1 & 2, properly join pipe and fittings, install accurate fittings, leave workstation in good condition, adhere to the local plumbing code and perform a leak test.

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

Participants will select tools and materials and safely handle them to rough in lavatories 1 & 2, properly join pipe and fittings, install accurate fittings, leave workstation in good condition, adhere to the local plumbing code and perform a leak test.



## 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.

