



EDUCATIONAL FOUNDATION

## Assessment Blueprint

# PHCC Educational Foundation Plumbing Year 4



Post-Test Code: 7664

## General Assessment Information

### Blueprint Contents

General Assessment Information  
Written Assessment Information

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**Test Type:** This PHCC Educational Foundation certification assessment is a customized assessment for the Plumbing-Heating-Cooling Contractors (PHCC). This assessment measures technical skills at the occupational level and includes items which gauge factual and theoretical knowledge. This assessment offers a written component and can be used at the secondary and post-secondary levels. This assessment can be delivered in an online or paper/pencil format.

**Revision Team:** The assessment content is based on input from plumbing contractors, inspectors, and educators from the states of Maryland, New Jersey, Nevada, Ohio, Tennessee, and Virginia.



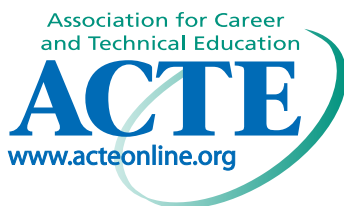
46.0503 – Plumbing  
Technology/Plumber



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!

## Written Assessment

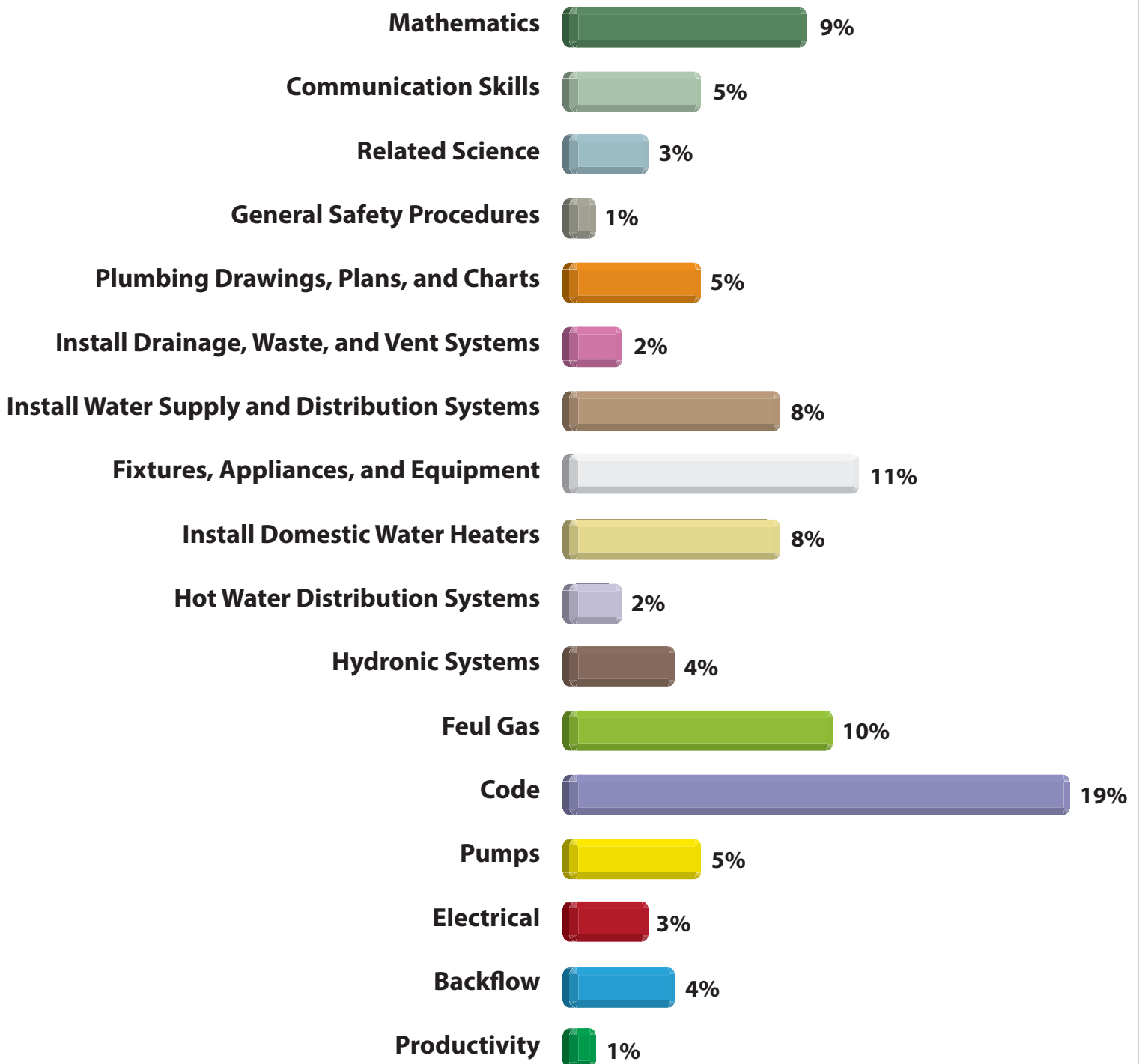
This written assessment consists of questions to measure an individual's factual theoretical knowledge.

**Administration Time:** 3 hours

**Number of Questions:** 176

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

### Areas Covered



## Specific Competencies and Skills Tested in this Assessment

### **Mathematics**

- Measure and calculate linear distances, circles, angles, and radii
- Identify common geometric shapes and compute volumes using basic geometry
- Measure water weight, volume, and pressure
- Calculate end-to-end and center-to-center measurements
- Solve multi-step problems using basic applied formulas
- Calculate grade, percent grade, drop, and run of piping

### **Communication Skills**

- Communicate with other trades and professionals
- Written Communication
- Display professionalism

### **Related Science**

- Define goals of plumbing, water sources and waste disposal
- Understand and apply basic principles of heat transfer and combustion

### **General Safety Procedures**

- Understand and apply OSHA regulations that cover plumbing practices

### **Plumbing Drawings, Plans, and Charts**

- Interpret symbols, dimensions and placement of plumbing fixtures and piping on isometric drawing
- Sketch plan view and isometric drawings using standard plumbing fixture and piping symbols
- Read plan view and isometric drawings using standard plumbing fixture and piping symbols

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## Specific Competencies and Skills (continued)

### **Install Drainage, Waste, and Vent Systems**

- Layout and size the drainage systems
- Diagnosing and repairing drainage and vent systems

### **Install Water Supply and Distribution Systems**

- Sizing the water supply systems
- Roughing-in for water supply and distribution systems
- Cross connections
- Water and hydrostatic pressure testing
- Diagnosing and repairing water distribution systems

### **Fixtures, Appliances, and Equipment**

- Fixture rough-in
- Faucets
- Tubs and showers
- Strainers and port openings or pop-ups
- Water closets, urinals, and bidets
- Trap and faucet connections
- Ejector systems
- Sump pumps
- Handicapped-accessible fixtures
- Institutional fixtures and systems
- Emergency showers and eye wash stations
- Commission fixture appliances and equipment
- Diagnosing and repairing fixtures and appliances



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## Specific Competencies and Skills (continued)

### Install Domestic Water Heaters

- Domestic water heater components and operation
- Gas water heaters
- Electric water heaters
- Oil water heaters
- Point-Of-Use water heaters
- Tankless water heaters and systems
- Solar water heaters
- Domestic hot water boilers
- Indirect fired water heaters

### Hot Water Distribution Systems

- Diagnosing and repairing domestic water heating systems

### Hydronic Systems

- Principles of hydronic systems
- Install hydronic heating systems
- Hydronic heating systems startup

### Fuel Gas

- Demonstrate knowledge of fuel gas code, materials, and types of fuel gases
- Define fuel gas pipe sizing
- Define fuel gas piping, fittings, and connections
- Fuel gas piping, corrosion, and corrosion protection
- Diagnosing and repairing fuel gas systems



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## Specific Competencies and Skills (continued)

### Code

- Administration and basic principles, plumbing code definitions and general regulations
- Materials
- Joints and connections, fittings and appurtenances
- Plumbing fixtures and minimum fixture requirements
- Hangers and supports, indirect waste piping and special waste
- Water supply and distribution
- DWV and storm drain systems
- Medical care facility plumbing equipment
- Tests and maintenance
- Individual sewage disposal systems
- Potable water supply systems
- Mobil home and travel trailer plumbing standards

### Pumps

- Hydraulic and Pump Theory
- Pump types, pump uses, and piping design
- Pump performance curves, installation, and maintenance

### Electrical

- Demonstrate knowledge of basic electricity, electric current, and electric motors
- Demonstrate knowledge of electric circuits, circuit protection, and electrical safety
- Electric circuit troubleshooting
- Control wiring

### Backflow

- Define backflow
- Describe mechanical equipment for cross-connection control

### Productivity

- Identify factors that enhance productivity



## Sample Questions

**If a 6 inch building drain is run 126 feet at 1 percent grade, what is the total fall?**

- A. 1.26 inches
- B. 6.3 inches
- C. 12.6 inches
- D. 15.75 inches

**When writing a resume, it is best to**

- A. prepare a single handwritten page
- B. accurately list education and work history
- C. use double-spacing
- D. use only Times Roman font

**Submerged coils are an example of which method of heat transfer?**

- A. radiation
- B. conduction
- C. convection
- D. radiation and convection

**Trench work shoring over 20 feet should be designed by the**

- A. contractor
- B. building code official
- C. owner
- D. licensed engineer

**The best tool to draw an isometric drawing is a**

- A. 45 triangle
- B. 30/60 triangle
- C. french curve
- D. straight edge

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### Sample Questions (continued)

**In a hot water hydronic system, it is possible to prevent gravity circulation of hot water when the pump is off, by installing a/an \_\_\_\_\_ in the pump discharge line.**

- A. balancing cock
- B. angle valve
- C. check valve
- D. butterfly valve

**A grid or perforated strainer is usually required on a**

- A. public lavatory
- B. pot sink
- C. residential lavatory
- D. floor sink

**What determines the firing rate of a boiler?**

- A. pulverizer
- B. coal feeders
- C. water level
- D. demand on boiler

**What is the appropriate colored paint to identify gas piping?**

- A. yellow
- B. red
- C. orange
- D. green

**Thrust blocks are required for pressure piping with \_\_\_\_\_ joints.**

- A. flanged
- B. rubber ring
- C. threaded
- D. butt welded

