

**EXAM INFORMATION****Items**

65

**Points**

68

**Prerequisites**

NONE

**Grade Level**

10-12

**Course Length**

ONE SEMESTER

**Career Cluster**

ARCHITECTURE AND CONSTRUCTION

**Performance Standards**

INCLUDED

**Certificate Available**

YES

**DESCRIPTION**

This is the first course in a sequence that prepares individuals to apply technical knowledge and skill to lay out, assemble, install, and maintain piping, fixtures, and piping systems for steam, hot water, heating, cooling, draining, lubricating, sprinkling, and industrial processing systems. Includes instruction in material selection and use of tools to cut, bend, join, and weld pipes. This course is based on the current National Center for Construction Education and Research (NCCER) task list.

**EXAM BLUEPRINT****STANDARD****PERCENTAGE OF EXAM**

1- Plumbing Trade	10%
2- Plumbing Tools	10%
3- Plumbing Math	10%
4- Plumbing Drawings	6%
5- Plastic Pipe & Fittings	15%
6- Copper Pip & Fittings	13%
7- DWV	10%
8- Water Distribution Systems	12%
9- Fixtures & Faucets	12%
10- Professional Skills	2%



## STANDARD 1

STUDENTS WILL RECEIVE AN ORIENTATION TO THE PLUMBING TRADE.

- Objective 1 Describe the history of the plumbing trade.
- Objective 2 Identify the stages of progress within the plumbing trade.
- Objective 3 Identify the responsibilities of a person working in the construction industry.
- Objective 4 Explain the importance of safety in the construction industry.

Standard 1 Performance Evaluation included below (Optional)

## STANDARD 2

STUDENTS WILL BE ABLE TO UNDERSTAND AND DEMONSTRATE THE USE OF PLUMBING TOOLS.

- Objective 1 Identify the basic hand and power tools used in the plumbing trade.
- Objective 2 Demonstrate the proper maintenance procedures to be used for hand and power tools.
- Objective 3 Explain safety as it applies to plumbing tools

Standard 2 Performance Evaluation included below (Optional)

## STANDARD 3

STUDENTS WILL BE ABLE TO UNDERSTAND AND DEMONSTRATE THE USE OF PLUMBING MATH.

- Objective 1 Identify the parts of a fitting and use common pipe measuring techniques.
- Objective 2 Use fitting dimension tables and a framing square to determine fitting allowances and pipe makeup.
- Objective 3 Calculate end-to-end measurements by figuring fitting allowances and pipe makeup.
- Objective 4 Use a framing square to find the center of fittings.
- Objective 5 Figure 45-degree offsets and travel using the Pythagorean Theorem.
- Objective 6 Figure 45-degree offsets and travel using a framing square or tape measure.
- Objective 7 Identify the correct increments on ruler.

Standard 3 Performance Evaluation included below (Optional)

## STANDARD 4

STUDENTS WILL BE ABLE TO UNDERSTAND AND USE PLUMBING DRAWINGS.

- Objective 1 Identify pictorial (isometric and oblique), schematic, and orthographic drawings, and discuss how different views are used to depict information about objects.
- Objective 2 Explain the types of drawings that may be included in a set of plumbing drawings and the relationship between the different drawings.



- Objective 3 Interpret plumbing-related information from a set of plumbing drawings.
- Objective 4 Use an architect's scale to draw lines to scale and to measure lines drawn to scale.
- Objective 5 Discuss how local code requirements apply to certain drawings.

Standard 4 Performance Evaluation included below (Optional)

## **STANDARD 5**

STUDENTS WILL BE ABLE TO UNDERSTAND AND DEMONSTRATE THE USE OF PLASTIC PIPE AND FITTINGS.

- Objective 1 Identify the common types of materials and schedules of plastic piping.
- Objective 2 Identify the common types of fittings used with plastic piping.
- Objective 3 Identify and determine the kinds of hangers and supports needed for plastic piping.
- Objective 4 Identify the various techniques used in hanging and supporting plastic piping.
- Objective 5 Demonstrate the ability to properly measure, cut, and join plastic piping
- Objective 6 Follow basic safety precautions for the installation, operation, and maintenance of plastic tubing.
- Objective 7 Identify the hazards and safety precautions associated with plastic piping.

Standard 5 Performance Evaluation included below (Optional)

## **STANDARD 6**

STUDENTS WILL BE ABLE TO UNDERSTAND AND DEMONSTRATE THE USE OF COPPER PIPE AND FITTINGS.

- Objective 1 Select the correct types of materials for copper piping systems.
- Objective 2 Identify types of fittings and valves and their uses
- Objective 3 Select the correct hanger or support for the application.
- Objective 4 Select the appropriate personal protective equipment for working with copper piping.
- Objective 5 Correctly measure, cut, ream, and join copper piping.

Standard 6 Performance Evaluation included below (Optional)

## **STANDARD 7**

STUDENTS WILL BE ABLE TO UNDERSTAND DRAIN, WASTE AND VENT (DWV) SYSTEMS.

- Objective 1 Explain how waste moves from a fixture through the drain system to the environment.
- Objective 2 Identify the major components of a drainage system and describe their functions.
- Objective 3 Identify types and parts of traps and explain the importance of traps, and how traps lose their seals.
- Objective 4 Identify the various types of DWV fittings and describe their application.



Standard 7 Performance Evaluation included below (Optional)

### STANDARD 8

STUDENTS WILL BE ABLE TO UNDERSTAND WATER DISTRIBUTION SYSTEMS.

- Objective 1 Discuss how water moves from the source, through the water distribution system, and to the fixture.
- Objective 2 Identify the major components of water distribution system and describe the function of each component.
- Objective 3 Explain the relationships between the components of a water distribution system.

Standard 8 Performance Evaluation included below (Optional)

### STANDARD 9

STUDENTS WILL BE ABLE TO UNDERSTAND AND DEMONSTRATE THE USE OF FIXTURES AND FAUCETS.

- Objective 1 Identify the basic types of materials used in the manufacture of plumbing fixtures.
- Objective 2 Discuss common types of sinks, lavatories, and faucets.
- Objective 3 Discuss common types of bathtubs, bath-shower modules, shower stalls, and shower baths.
- Objective 4 Discuss common types of toilets, urinals, and bidets.
- Objective 5 Discuss common types of drinking fountains and water coolers.
- Objective 6 Discuss common types of garbage disposals and domestic dishwashers.

Standard 9 Performance Evaluation included below (Optional)

### STANDARD 10

STUDENTS WILL BE ABLE TO GAIN AN UNDERSTANDING OF PLUMBING AS A PROFESSION AND WILL DEVELOP PROFESSIONAL SKILLS FOR THE WORKPLACE.

- Objective 1 As a participating member of the SkillsUSA student organization completes the SkillsUSA Level I Professional Development Program.
  1. Complete a self-assessment inventory and identify individual learning styles.
  2. Discover self-motivation techniques and establish short-term goals.
  3. Determine individual time-management skills.
  4. Define future occupations.
  5. Define awareness of cultural diversity and equity issues.
  6. Recognize the benefits of conducting a community service project.
  7. Demonstrate effective communication skills with others.
  8. Participate in a shadowing activity.
  9. Identify components of an employment portfolio.
  10. Demonstrate proficiency in program competencies.
  11. Explore what is ethical in the workplace or school.
  12. Master a working knowledge of SkillsUSA.
    1. State the SkillsUSA motto.



2. State the SkillsUSA creed.
3. Learn the SkillsUSA colors.
4. Describe the official SkillsUSA dress.
5. Describe the procedure for becoming a SkillsUSA officer

**Objective 2** Understand the use of tools and equipment in the plumbing trade and how they relate to career opportunities.

**Objective 3** Display a professional attitude toward the instructor and peers.

\*SkillsUSA PDP requirements - recommended



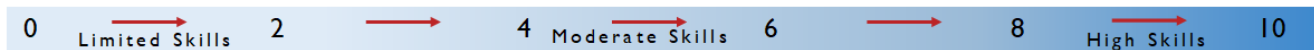
## Plumbing Performance Standards (Optional)

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of **8 or higher** on the rating scale. Students may be encouraged to repeat the objectives until they average **8 or higher**.

Students Name \_\_\_\_\_

Class \_\_\_\_\_

### PERFORMANCE RATING SCALE



#### STANDARD 1 Plumbing Trade

Score:

- Understand and demonstrate their knowledge of the plumbing trade.
  - Describe the history of the plumbing trade.
  - Identify the stages of progress within the plumbing trade.
  - Identify responsibilities of a person working in the construction industry.
  - Explain the importance of safety in the construction industry.

#### STANDARD 2 Plumbing Tools

Score:

- Understand and demonstrate the use of plumbing tools.
  - Identify the basic hand and power tools used in the plumbing trade.
  - Demonstrate the proper maintenance procedures to be used for hand and power tools.
  - Explain safety as it applies to plumbing tools.

#### STANDARD 3 Plumbing Math

Score:

- Understand and demonstrate the use of plumbing math.
  - Identify the parts of a fitting and use common pipe measuring techniques.
  - Use fitting dimension tables and a framing square to determine fitting allowances and pipe makeup.
  - Calculate end-to-end measurements by figuring fitting allowances and pipe makeup.
  - Use a framing square to find the center of fittings.
  - Figure 45-degree offsets and travel using the Pythagorean Theorem.
  - Figure 45-degree offsets and travel using a framing square or tape measure.
  - Use a ruler or measuring tape to measure within a sixteenth ( $1/16$ ) of an inch.

#### STANDARD 4 Plumbing Drawings

Score:

- Understand and use plumbing drawings.
  - Identify pictorial (isometric and oblique), schematic, and orthographic drawings, and discuss how different views are used to depict information about objects.



- Explain the types of drawings that may be included in a set of plumbing drawings and the relationship between the different drawings.
- Interpret plumbing-related information from a set of plumbing drawings.
- Use an architect's scale to draw lines to scale and to measure lines drawn to scale.
- Discuss how local code requirements apply to certain drawings.

## **STANDARD 5 Plastic Pipe & Fittings**

**Score:**

- Understand and demonstrate the use of plastic pipe and fittings.
  - Identify the common types of materials and schedules of plastic piping.
  - Identify the common types of fittings used with plastic piping.
  - Identify and determine the kinds of hangers and supports needed for plastic piping.
  - Identify the various techniques used in hanging and supporting plastic piping.
  - Demonstrate the ability to properly measure, cut, and join plastic piping.
  - Follow basic safety precautions for the installation, operation, and maintenance of plastic tubing.
  - Identify the hazards and safety precautions associated with plastic piping

## **STANDARD 6 Copper Pipe & Fittings**

**Score:**

- Understand and demonstrate the use of copper pipe and fittings.
  - Select the correct types of materials for copper piping systems.
  - Identify types of fittings and valves and their uses.
  - Select the correct hanger or support for the application.
  - Select the appropriate personal protective equipment for working with copper piping.
  - Correctly measure, cut, ream, and join copper piping.

## **STANDARD 7 DWV**

**Score:**

- Understand drain, waste, and vent (DWV) systems.
  - Explain how waste moves from a fixture through the drain system to the environment.
  - Identify the major components of a drainage system and describe their functions.
  - Identify types and parts of traps and explain the importance of traps and how traps lose their seals.
  - Identify the various types of DWV fittings and describe their application.

## **STANDARD 8 Water Distribution Systems**

**Score:**

- Understand water distribution systems.
  - Discuss how water moves from the source, through the water distribution system, and to the fixture.
  - Identify the major components of water distribution systems and describe the function of each component.
  - Explain the relationships between the components of a water distribution system



**STANDARD 9 Fixture & Faucets**

**Score:**

- Understand and demonstrate the use of fixtures and faucets.
  - Identify the basic types of materials used in the manufacture of plumbing fixtures.
  - Discuss common types of sinks, lavatories, and faucets.
  - Discuss common types of bathtubs, bath-shower modules, shower stalls, and shower baths.
  - Discuss common types of toilets, urinals, and bidets.
  - Discuss common types of drinking fountains and water coolers.
  - Discuss common types of garbage disposals and domestic dishwashers.

**PERFORMANCE STANDARD AVERAGE SCORE:**