

# Y2 Q3 Unit 8 Plumbing Systems

Content Area: **Integrated Technical Arts**  
Course(s): **Building and Construction: Building Technology**  
Time Period: **February**  
Length: **11 weeks**  
Status: **Published**

## Unit Overview & Pacing Outline

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In this unit of study, students will explore the use of hand tools and become acimated to their applications in and around the home.

- Personal and lab safety will be emphasized as various tools are introduced into lab sessions.
- Students will engage in career research relative to this unit of study.
- Environmentally friendly themes are discussed in this unit.

**Topics & Pacing:**

|                                    |                                                  |
|------------------------------------|--------------------------------------------------|
| Introduction to Plumbing           | Plumbing System Design and installation          |
| 1. Safety                          | 17. Designing Plumbing Systems                   |
| 2. Plumbing Tools                  | 18. Preparing for Plumbing System Installation   |
| 3. Leveling Instruments            | 19. DWV Pipe and Fitting Installation            |
| 4. Mathematics for Plumbers        | 20. Installing Water Supply Piping               |
| 5. Hydraulics and Pneumatics       | 21. Supporting and Testing Pipe                  |
| 6. Print Reading and Sketching     | 22. Installing Fixtures, Faucets, and Appliances |
| 7. Rigging and Hoisting            | 23. Septic Systems                               |
| 8. Building and Plumbing Codes     | 24. Storm Water and Sumps                        |
| 9. Soldering, Brazing, and Welding | 25. Installing HVAC Systems                      |
| 10. Excavating                     | 26. Swimming Pools, Hot Tubs, and Spas           |
|                                    | 27. Irrigation Systems                           |
|                                    | Plumbing Services                                |
| Plumbing Systems                   | 28. Repairing DWV Systems                        |
| 11. Water Supply Systems           | 29. Repairing Water Supply Systems               |
| 12. Water Treatment                | 30. Remodeling                                   |
| 13. Plumbing Fixtures              |                                                  |
| 14. Piping Materials and Fittings  | Career Development and Plumbing History          |
| 15. Valves and Meters              | 31. Job Organization                             |
| 16. Water Heaters                  | 32. Plumbing Career Opportunities                |
|                                    | 33. Plumbing History                             |

## Enduring Understandings

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Through the delivery of the unit outlined above, students will understand:

- the contractual relationships between all parties involved in the building process.
- scheduling practices which ensure the successful completion of a construction project.
- the importance of maintaining jobsite safety.
- how to safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
- troubleshooting procedures when solving a maintenance problem in buildings.

- the importance of preventative maintenance activities to service existing buildings.

## **Essential Questions & Skills**

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What are the safety concerns to be considered when working in a lab setting in school or on the job?

What protection can be used in a laboratory environment? What should be part of an effective safety program?  
What characteristics are essential to a functional team?

What are the benefits of working in a team environment as opposed to individually?

Why is planning an important aspect to project work?

How does planning influence efficiency?

Why is planning vital to material usage and construction?

How is the design of a product influenced by planning?

## **Standards/Indicators & SLOs**

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### **PATHWAY: CONSTRUCTION (AC-CST)**

- 9.3.12.AC-CST.1 Describe contractual relationships between all parties involved in the building process.
- 9.3.12.AC-CST.2 Describe the approval procedures required for successful completion of a construction project.
- 9.3.12.AC-CST.3 Implement testing and inspection procedures to ensure successful completion of a construction project.
- 9.3.12.AC-CST.4 Apply scheduling practices to ensure the successful completion of a construction project.
- 9.3.12.AC-CST.5 Apply practices and procedures required to maintain jobsite safety.
- 9.3.12.AC-CST.6 Manage relationships with internal and external parties to successfully complete construction projects.
- 9.3.12.AC-CST.7 Compare and contrast the building systems and components required for a construction project.
- 9.3.12.AC-CST.8 Demonstrate the construction crafts required for each phase of a construction project.
- 9.3.12.AC-CST.9 Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.

### **PATHWAY: MAINTENANCE/OPERATIONS (AC-MO)**

- 9.3.12.AC-MO.1 Recognize and employ universal construction signs and symbols to function safely in the workplace.
- 9.3.12.AC-MO.2 Use troubleshooting procedures when solving a maintenance problem in buildings.
- 9.3.12.AC-MO.3 Apply construction skills when repairing, restoring or renovating existing buildings.
- 9.3.12.AC-MO.4 Determine work required to repair or renovate an existing building.
- 9.3.12.AC-MO.5 Plan and practice preventative maintenance activities to service existing buildings.
- 9.3.12.AC-MO.6 Maintain and inspect building systems to achieve safe and efficient operation of buildings.

## **Lesson Titles**

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## Plumbing Tools

Leveling Instruments

Mathematics for Plumbers

Hydraulics and Pneumatics

Print Reading and Sketching

Rigging and Hoisting

Building and Plumbing Codes

Soldering, Brazing, and Welding

Excavating

Plumbing Systems

Water Supply Systems

Water Treatment

Plumbing Fixtures

Piping Materials and Fittings

Valves and Meters

Water Heaters

Plumbing System Design and installation

Designing Plumbing Systems

Preparing for Plumbing System Installation

DWV Pipe and Fitting Installation Installing Water Supply Piping

Supporting and Testing Pipe

Installing Fixtures, Faucets, and Appliances

Septic Systems

Storm Water and Sumps

Installing HVAC Systems

Swimming Pools, Hot Tubs, and Spas

Irrigation Systems

Plumbing Services

Repairing DWV Systems

Repairing Water Supply Systems

Remodeling

## Career Readiness, Life Literacies, & Key Skills

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|------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| TECH.9.4.12.CI.1 | Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).                              |
| TECH.9.4.12.CI.2 | Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).                |
| TECH.9.4.12.CI.3 | Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).                  |
| TECH.9.4.12.CT.1 | Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3). |

## Inter-Disciplinary Connections

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|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAEP.9.2.12.C   | Career Preparation                                                                                                                                                                  |
| CAEP.9.2.12.C.1 | Review career goals and determine steps necessary for attainment.                                                                                                                   |
| CAEP.9.2.12.C.2 | Modify Personalized Student Learning Plans to support declared career goals.                                                                                                        |
| CAEP.9.2.12.C.3 | Identify transferable career skills and design alternate career plans.                                                                                                              |
| CAEP.9.2.12.C.4 | Analyze how economic conditions and societal changes influence employment trends and future education.                                                                              |
| CAEP.9.2.12.C.5 | Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.                                                       |
| CAEP.9.2.12.C.6 | Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business. |
| CAEP.9.2.12.C.7 | Examine the professional, legal, and ethical responsibilities for both employers and employees in the global workplace.                                                             |

CAEP.9.2.12.C.8

Assess the impact of litigation and court decisions on employment laws and practices.

CAEP.9.2.12.C.9

Analyze the correlation between personal and financial behavior and employability.

## **Anticipatory Set**

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Stated in daily lesson plans and posted via Smartboard, blackboard, or as per teacher instructions.

## **Instructional Strategies, Learning Activities, and Levels of Blooms/DOK**

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Group students based on topic knowledge

Create pods with student captains

Create tiered lessons

Create handouts for common questions

Include hands-on activities and projects

Provide study guides, worksheets, and notes

Flip your classroom

Use the Think-Pair-Share method

Try digital curriculum

### **Modifications: At Risk Learner**

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- Additional time for assignments .
- Adjusted assignment timelines .
- Agenda book and checklists .
- Answers to be dictated .
- Assistance in maintaining uncluttered space .
- Books on tape .
- Concrete examples .
- Extra visual and verbal cues and prompts .
- Follow a routine/schedule .
- Graphic organizers .
- Have students restate information .
- No penalty for spelling errors or sloppy handwriting .
- Peer or scribe note-taking .
- Personalized examples .
- Preferential seating .
- Provision of notes or outlines .
- Reduction of distractions .
- Review of directions .
- Review sessions .
- Space for movement or breaks .
- Support auditory presentations with visuals .
- Teach time management skills .
- Use of a study carrel .
- Use of mnemonics .
- Varied reinforcement procedures .
- Work in progress check .

### **Modifications: ELL**

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- Choice of test format (multiple-choice, essay, true-false)
- Continue practicing vocabulary
- Provide study guides prior to tests
- Read directions to the student
- Read test passages aloud (for comprehension assessment)
- Vary test formats

### **Modifications: 504 & IEP**

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- Allow for redos/retakes
- Assign fewer problems at one time (e.g., assign only odds or evens)
- Differentiated center-based small group instruction
- Extra time on assessments
- Highlight key directions
- If a manipulative is used during instruction, allow its use on a test
- Opportunities for cooperative partner work
- Provide reteach pages if necessary
- Provide several ways to solve a problem if possible
- Provide visual aids and anchor charts
- Test in alternative site
- Tiered lessons and assignments
- Use of a graphic organizer
- Use of concrete materials and objects (manipulatives)
- Use of word processor

### **Modifications: G&T**

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- Alternate assignments/enrichment assignments
- Enrichment projects
- Extension activities
- Higher-level cooperative learning activities
- Pairing direct instruction with coaching to promote self-directed learning
- Provide higher-order questioning and discussion opportunities
- Provide texts at a higher reading level
- Tiered assignments
- Tiered centers

## **Formative Assessment**

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Unit formative assessments are drawn from, but not limited to:

- Observations during in-class activities; of students' non-verbal feedback during lecture.
- Homework exercises as review for exams and class discussions.
- Reflections journals that are reviewed periodically during the semester.
- Question and answer sessions, formal—planned and informal—spontaneous.
- Conferences between the instructor and student at various points in the semester.
- In-class activities where students informally present their results.
- Student feedback collected by periodically answering specific question about the instruction and their self-evaluation of performance and progress.

## **Benchmark Assessments**

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Skills-based assessment

Reading response

Writing prompt

Lab practical

## **Alternative Assessments**

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Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Portfolios



## Summative Assessment

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Summative assessments are related specifically to material covered in the current unit of study.

- Quiz, Test, MP Assessment.
- Final examination (a truly summative assessment).
- Term papers (drafts submitted throughout the semester would be a formative assessment).
- Projects (project phases submitted at various completion points could be formatively assessed).
- Portfolios (could also be assessed during its development as a formative assessment).
- Performances, Speeches, Critiques.
- Student evaluation of the course (teaching effectiveness).
- Instructor self-evaluation.

## Resources & Materials

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- Modern Plumbing, Goodheart-Wilcox, 2015
- Construction Technology 4th Edition
- Core Curriculum 5th Edition
- Hand and Power Tools as Needed
- Instructional videos from various sources

## Technology

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- Chromebooks, Google Drive Storage & Related Google Apps
- MS Office Software as Needed
- SmartBoard Presentations and Peripheral Technology
- Smartphones
- Power Tools as Needed

TECH.8.1.12.A.CS1

Understand and use technology systems.

TECH.8.1.12.A.CS2

Select and use applications effectively and productively.

|                   |                                                                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| TECH.8.1.12.B     | Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology. |
| TECH.8.1.12.B.CS1 | Apply existing knowledge to generate new ideas, products, or processes.                                                                              |
| TECH.8.1.12.C.CS2 | Communicate information and ideas to multiple audiences using a variety of media and formats.                                                        |
| TECH.8.1.12.E.CS4 | Process data and report results.                                                                                                                     |
| TECH.8.1.12.F.CS1 | Identify and define authentic problems and significant questions for investigation.                                                                  |
| TECH.8.1.12.F.CS2 | Plan and manage activities to develop a solution or complete a project.                                                                              |