Intermediate Plumbing Unit 1

Content Area: **CTE**
Course(s):
Time Period: **September**
Length: **MP 1 (45 Days)**
Status: **Published**

Unit Overview:

Unit 1 Overview: Introduction to Plumbing, Career Paths, and Safety

In this unit, students will take their first steps into the Intermediate Plumbing course by learning about plumbing's history, career options, and the importance of staying safe on the job. Over 45 days, they will explore how plumbing has shaped society and improved public health, helping them understand why the trade is so important in today's world.

Students will also dive into plumbing careers, discovering the wide variety of jobs available—from fixing pipes in homes to designing big commercial systems. They'll learn about what each job involves, the skills needed, and how to improve the resumes they started in the first-year Exploratory Plumbing course. This will help them get ready for future job opportunities in plumbing.

Safety is a major focus of this unit. Students will learn how to avoid accidents by using personal protective equipment (PPE), recognizing hazard signs, and practicing ladder safety. Hands-on activities will let them practice these skills so they're prepared to stay safe on the job. This unit blends history, career planning, and practical safety training to give students a strong start in their plumbing education and future careers.

Essential Questions:

1. How has the plumbing trade evolved, and why is it important?

2. What career opportunities are available in plumbing?

3. How do safety protocols protect plumbers on the job?

Enduring Understandings:

1. Plumbing has a rich history and continues to be essential to modern infrastructure.

2. Plumbing offers diverse career paths requiring technical expertise and safety awareness.

3. Safety protocols and PPE are vital for workplace safety and accident prevention.

Standards/Indicators/Student Learning Objectives (SLOs):

9.3.12.AC	Architecture & Construction
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.4	Evaluate the nature and scope of the Architecture & Construction Career Cluster and the role of architecture and construction in society and the economy.
9.3.12.AC.5	Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.
9.3.12.AC.7	Describe career opportunities and means to achieve those opportunities in each of the Architecture & Construction Career Pathways.
9.3.12.AC-CST	Construction
9.3.12.AC-CST.5	Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.9	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
9.3.12.AC-DES	Design/Pre-Construction
9.3.12.AC-MO	Maintenance/Operations
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.6	Maintain and inspect building systems to achieve safe and efficient operation of buildings.

Lesson Titles:

1. The Origins of Plumbing: Innovations That Shaped History
   Focus: Exploring the history and evolution of plumbing systems.

2. The Role of Plumbing in Modern Infrastructure
   Focus: Understanding the societal impact and importance of plumbing today.

3. Career Paths in Plumbing: Opportunities and Growth
   Focus: Identifying various roles and responsibilities in the plumbing industry.

4. Building a Career in Plumbing: Essential Skills and Traits
   Focus: Exploring the skills and attributes needed for success in plumbing.

5. Creating a Professional Resume for the Plumbing Trade
   Focus: Enhancing students' resumes to reflect plumbing-related skills and experiences.

6. Understanding Plumbing Safety: Common Accidents and Prevention

   Focus: Analyzing plumbing-related accidents and best practices for safety.

7. The Essentials of PPE: Identifying and Using Protective Equipment
   Focus: Learning about personal protective equipment and its proper use.

8. Hazard Signs and Workplace Safety Protocols
   Focus: Recognizing and interpreting hazard signs to maintain safety on job sites.

9. Ladder Safety in the Plumbing Trade: Best Practices and Techniques
   Focus: Practicing safe ladder usage to prevent workplace injuries.

10. Applying Safety and Career Knowledge in the Plumbing Trade
    Focus: Integrating knowledge of safety protocols, tools, and career opportunities through hands-on activities.

These lesson titles provide a clear structure for addressing the essential questions and enduring understandings while aligning with the weekly breakdown and NJDOE standards.

Career Readiness, Life Literacies, & Key Skills:

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).
TECH.9.4.12.CT.2	Explain the potential benefits of collaborating to enhance critical thinking and problem

	solving (e.g., 1.3E.12profCR3.a).
TECH.9.4.12.DC.6	Select information to post online that positively impacts personal image and future college and career opportunities. Innovative ideas or innovation can lead to career opportunities.

Inter-Disciplinary Connections:

1. History/Social Studies

- Exploring the history of plumbing and its role in shaping civilizations.
- Discussing societal impacts of plumbing advancements and infrastructure development.

2. Math

- Using measurements and calculations to understand safety protocols (e.g., ladder angles, PPE fit).
- Reviewing basic math skills required for plumbing tasks, like scaling and blueprint reading.

3. Science

- Understanding plumbing systems' principles of water flow, pressure, and gravity.
- Exploring material properties of pipes, fixtures, and tools related to durability and safety.

4. English Language Arts (ELA)

- Writing and revising resumes tailored to plumbing careers
- Reading and analyzing technical manuals, safety guidelines, and hazard signs.
- Engaging in discussions and presentations about career opportunities and safety protocols.

5. Health and Physical Education

- Emphasizing physical safety practices, including proper lifting techniques and ergonomic tool use.
- Discussing workplace health, such as the importance of hydration and PPE.

6. Career Education

- Developing employability skills, including teamwork, problem-solving, and ethical decision-making.
- Exploring career pathways within the plumbing industry and related fields.

7. Art

- Interpreting and designing blueprints with visual clarity and accuracy.
- Using creative thinking for layout planning in residential or commercial plumbing projects.

These connections provide a well-rounded learning experience by integrating knowledge and skills from multiple disciplines into the plumbing curriculum.

Summative Assessment:

High-Stakes Assessments:

- Comprehensive Exams: Final exams covering a broad range of course material can assess students' understanding of key concepts and principles.
- Capstone Project Presentations: Formal presentations showcase students' project management skills, decision-making, and communication abilities.

Performance-Based Assessments:

- Project Portfolio Reviews: A portfolio compiled throughout the program can demonstrate a student's growth, technical skills, and problem-solving abilities in various areas of the plumbing trade.
- Simulated Project Management Tasks: Students could be presented with a realistic construction scenario where they must apply their knowledge and skills to develop solutions or make critical decisions.

Industry-Standard Certifications:

- Encouraging students to pursue industry certifications relevant to plumbing can demonstrate their commitment to the field and mastery of specific skills.

Considerations for Choosing Summative Assessments:

- Alignment with Learning Outcomes: Ensure the chosen assessments directly measure the program's overall learning objectives and desired competencies.
- Depth vs. Breadth: Balance the need to assess a broad range of knowledge with in-depth exploration of critical skills.
- Authenticity: Choose assessments that reflect real-world scenarios and tasks a plumber encounters.
- Multiple Measures: Utilize a combination of assessments to provide a holistic picture of student learning.
- Faculty Collaboration: Ensure consistency and fairness in assessments across different courses within the program.

Additional Tips:

- Develop clear rubrics outlining specific criteria for evaluating performance on each summative assessment.
- Provide students ample opportunities to practice and refine their skills before summative assessments.
- Offer feedback on summative assessments to help students identify areas for improvement and guide their future learning.

- Alternate Assessment
- Benchmark
- Group Project Assessment
- Individual Project Assessment
- Marking Period Assessment
- Module Section Assessment

Resources & Materials:

Plumbing Level 1 Book NCCER Fifth Edition

Google Classroom

Promethean Board

Canva

Kahoot

https://www.youtube.com/

CBS Plumbing Trade

https://www.cbsnews.com/video/plying-their-trades/#

Run Time 7:20

Toilet

How The Toilet Changed History

Run Time 7:15

Toilet Parts: What They Are and Common Fixes (DIY) | Family Handyman.

Workplace Hazards Video Run Time

Top 6 Workplace Hazards Identified

Run Time 8:11

PPE Video

PPE - Safety Training Video Course - SafetyInfo.com

Run Time 10:49

NJ Master Plumbers Information

New Jersey Plumbing License Requirements

NJ Plumbing Wages

Plumber salary in New Jersey

Plumbing Trade Video

6 Lessons I Learned as a Plumbing Apprentice

Time 9:03

Plumbing Trade Video

Plumbers Can SPECIALISE In Many Area... Here Are The Different Types!

Run Time 8:23

Mike Rowe On The Trades

https://youtu.be/3h_pp8CHEQ0

Run Time 8:25

PPE

Plumbing PPE Plumbers Must NEVER Work Without!

Run Time 9:04

FATAL Plumbing Mistakes EVERY Plumber Needs To Know About!

Run Time 8:09

NJ One Call

New Jersey One Call

Power Tools

Let's learn about a couple of plumbing power tools - Plumbing Power Tools

Run Time 12:34

Types Of Hot/Cold Water Pipes And Fittings

PEX vs COPPER vs CPVC plumbing pipes

Run Time 16:55

Plastic Pipe

Gluing PVC Pipe & ABS Pipe [How To]

Run Time 8:16

Plastic Pipe

10 MISTAKES When Working With Plastic Pipes (PVC, CPVC & ABS) | GOT2LEARN

Run Time 8:26

IPS

When to Use Pipe dope, Teflon Tape, Neither or Both for Threaded Connection

Run Time 3:54

IPS

How to Use a Pipe Wrench

Run Time 4:31

IPS

RIDGID 300 Compact Threading Machine

Run Time 18:26

OSHA

Top OSHA 10 OSHA Violations of 2023 | And how to prevent similar citations.

Run Time 8:51

Ladder Safety

Run Time 4:33

Personal Protective Equipment Milwaukee

Old vs. new growth trees and the wood products they make

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

Instructional Strategies

1. Direct Instruction: Use multimedia presentations to introduce the history of plumbing and its societal impact.
2. Collaborative Learning: Group discussions on career paths in plumbing, including brainstorming potential roles and responsibilities.
3. Project-Based Learning: Students create or enhance resumes reflecting plumbing career goals.
4. Inquiry-Based Learning: Analyze case studies of plumbing safety incidents to identify causes and prevention strategies.
5. Demonstration and Practice: Hands-on activities to practice using PPE, identifying hazard signs, and ensuring ladder safety.

Learning Activities

1. Timeline Creation: Students construct a timeline of plumbing's history to connect advancements with societal needs (Week 1).
2. Career Pathway Posters: Groups design posters highlighting various roles in the plumbing trade, including responsibilities and required skills (Week 2).
3. Resume Workshop: Students refine their resumes with instructor guidance, incorporating technical and soft skills (Week 3).
4. Safety Analysis: Small groups review accident scenarios and propose solutions to prevent similar incidents (Week 4).

5. PPE and Hazard Drill: Students participate in a practical drill, correctly identifying and using PPE and recognizing workplace hazard signs (Week 5).

Levels of Bloom's Taxonomy/DOK

1. Remembering (DOK 1):
    - Recall key dates and events in plumbing history.
    - List essential PPE and hazard signs.
2. Understanding (DOK 2):
    - Explain the importance of safety protocols in plumbing.
    - Summarize the roles and responsibilities in different plumbing careers.
3. Applying (DOK 2):
    - Apply resume-writing techniques to enhance career readiness.
    - Demonstrate proper use of PPE and ladder safety techniques.
4. Analyzing (DOK 3):
    - Analyze plumbing safety case studies to identify underlying risks.
    - Compare various career paths in plumbing based on skill requirements and opportunities.
5. Creating (DOK 4):
    - Design a timeline or visual aid connecting plumbing history to modern advancements.
    - Develop a capstone project incorporating learned safety protocols in a simulated worksite scenario.

This combination of strategies, activities, and cognitive levels ensures students develop foundational knowledge and practical skills, fostering engagement and career readiness.

Formative Assessment:

In-Class Activities:

- Quick Quizzes: Short, unannounced quizzes at the beginning or end of class can assess comprehension of key concepts from previous lessons or gauge readiness for new material..
- Think-Pair-Share: Encourage individual reflection followed by partnered discussions and sharing key takeaways with the class. This promotes active learning and identifies common misconceptions.
- Minute Papers: Have students write a one-minute summary of the main points learned or lingering

questions they have. This helps identify areas needing clarification.

Classroom Discussions & Activities:

- Open-ended Questions: Encourage students to think critically and elaborate on their understanding by posing open-ended questions throughout lessons.
- Case Studies & Problem-solving: Present real-world plumbing scenarios or problems for students to analyze and propose solutions. This assesses critical thinking and application of knowledge.
- Role-playing Activities: Simulate real-world situations like project meetings or client interactions to practice communication, negotiation, and problem-solving skills.

Peer-Based Assessment:

- Peer Reviews: Students can review each other's work, providing constructive feedback on project plans, presentations, or technical drawings. This fosters collaboration and self-assessment skills.
- Group Work & Discussions: Collaborative activities encourage students to explain concepts to one another, solidifying their understanding and identifying areas where they can learn from peers.

Technology-assisted Assessments:

- Online Quizzes & Polls: Utilize online platforms for short quizzes, polls, or concept checks to gauge student understanding in real-time and adjust instruction accordingly.
- Self-assessment Tools: Provide online quizzes or exercises where students can assess their own understanding of key concepts and identify areas for self-directed learning.

Benefits of Formative Assessment:

- Improved Student Learning: Provide ongoing feedback that helps students identify strengths, weaknesses, and adjust their learning strategies.
- Informed Instruction: Instructors gain valuable insights into student understanding, allowing them to adapt teaching methods and address misconceptions promptly.
- Increased Student Engagement: Active participation in formative assessments keeps students engaged and invested in the learning process.
- Promotes Self-reflection: Encourage students to reflect on their learning journey, identify areas for improvement, and take ownership of their learning.

- Anticipatory Set
- Exit Tickets
- Hands-On Activities (Individual & Groups)
- Hands-On Observations (Individual & Groups)
- Questioning, Scenarios, and Problem-Solving (Open Ended and Multiple Choice)
- Warm-Up

Modifications

ELL Modifications:

- 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

G&T Modifications:

- 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

At Risk Modifications

The possible list of modifications/accommodations identified for Special Education students can be utilized for At-Risk students. Teachers should utilize ongoing methods to provide instruction, assess student needs, and utilize modifications specific to the needs of individual students. In addition, the following may be considered:

- 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

IEP & 504 Modifications:

*All teachers of students with special needs must review each student's IEP. Teachers must then select the appropriate modifications and/or accommodations necessary to enable the student to appropriately progress in the general curriculum.

Possible Modifications/Accommodations: (See listed items below):

- 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

Technology Materials and Standards

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and

	synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
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.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.