CAA-Unit-Plan-4B-Curriculum-Residential Plumbing

Content Area: **CTE**
Course(s): **Computer Aided Architecture**
Time Period: **September**
Length: **1**
Status: **Published**

Enduring Understandings

1. Discuss the purpose of a residential plumbing system.
2. Identify the elements contained in a residential water supply system.
3. Identify the elements of a residential water and waste removal system.
4. Explain the operation of various in-house water treatment systems.
5. Explain the layout of a private sewage disposal system.

Essential Questions

1. Explain the purpose of a plumbing plan.
2. Name two major considerations in planning the waste lines.
3. The part of the plumbing system usually designed first is _____.
4. The plumbing fixture that requires a main stack is a(n)___.
5. A water closet requires a waste line that is a minimum of ___in diameter.
6. The force that carries waste and water down the waste lines is ___.
7. Most house mains for the water supply stem are ___ in diameter.
8. Floor drains are usually connected to a dry well or ___.
9. Identify four factors that affect the size of pipe required for a given situation.
10. The nominal diameter of copper pipe refers to the dimension.
11. The type of copper pipe usually used for drains, vents, and waste lines is ____.
12. The feature on the plumbing plan that shows the name of plumbing fixtures, manufacturer's catalog number, pipe connection sizes, remarks, and identification symbols for plumbing fixtures is called the _____.
13. To what does DWV refer?
14. What is the main advantage of specialized CADD software for piping drafting?
15. List two features that may be found on a plumbing plan that are not the waste system, supply system or plumbing fixtures.

Standards/Indicators/Student Learning Objectives (SLOs)

ARCH.9-12.9.4.12.B.1	Demonstrate language arts knowledge and skills requ
ARCH.9-12.9.4.12.B.6	Select and employ appropriate reading and communi
ARCH.9-12.9.4.12.B.8	Locate, organize, and reference written information f
ARCH.9-12.9.4.12.B.9	Evaluate and use information resources to accomplis
ARCH.9-12.9.4.12.B.10	Use correct grammar, punctuation, and terminology t
ARCH.9-12.9.4.12.B.17	Use vocabulary and visual cues commonly used in de
ARCH.9-12.9.4.12.B.21	Conduct technical research to gather information nec

ARCH.9-12.9.4.12.B.26	Operate Internet applications to perform tasks.
ARCH.9-12.9.4.12.B.27	Operate writing and publishing applications to prepar
ARCH.9-12.9.4.12.B.(1).1	Demonstrate communication skills and strategies that
ARCH.9-12.9.4.12.B.(1).6	Appreciate the diversity of needs, values, and social p

ARCH.9-12.3	Maintenance and Operations
ARCH.9-12.9.4.12.B.(2).4	Identify project turnover procedures needed to successfully manage construction projects.
ARCH.9-12.9.4.12.B.(2).5	Plan building in accordance with contracts to meet budget and schedule.
ARCH.9-12.9.4.12.B.(2).6	Describe testing and inspection procedures used to ensure successful completion of construction projects.
ARCH.9-12.9.4.12.B.(2).7	Assess the purpose for scheduling as it relates to successful completion of construction projects.
ARCH.9-12.9.4.12.B.(2).8	Identify closeout procedures needed to effectively complete construction projects.
ARCH.9-12.9.4.12.B.(2).9	Demonstrate understanding of risk management principles and other strategies and tactics used to maintain, increase, or decrease risk.
ARCH.9-12.9.4.12.B.(2).10	Create a jobsite safety program to ensure safe practices and procedures.
ARCH.9-12.9.4.12.B.(2).12	Describe procedures for jobsite security to prevent liability.
ARCH.9-12.9.4.12.B.(2).15	Demonstrate knowledge of proper changeover procedures for successful completion of a construction project.
ARCH.9-12.9.4.12.B.(2).16	Examine building systems and components to evaluate their usefulness to construction projects.
ARCH.9-12.9.4.12.B.(2).17	Use craft skills to meet or exceed teacher and/or employer expectations.
ARCH.9-12.9.4.12.B.(3).1	Recognize and employ universal construction signs and symbols to function safely.
ARCH.9-12.9.4.12.B.(3).2	Use troubleshooting procedures when solving a maintenance problem to maintain project.
ARCH.9-12.9.4.12.B.(3).3	Apply construction skills when completing classroom projects and/or repairing, restoring, or renovating existing worksite structures to ensure long-term use of buildings and structures.
ARCH.9-12.9.4.12.B.(3).4	Evaluate and assess an existing structure to determine the repairs or renovations required to restore operation of the structure.
ARCH.9-12.9.4.12.B.(3).5	Plan and practice preventive maintenance activities to service existing structures.
ARCH.9-12.9.4.12.B.1	Demonstrate language arts knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
ARCH.9-12.9.4.12.B.2	Demonstrate mathematics knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
ARCH.9-12.9.4.12.B.3	Demonstrate science knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
ARCH.9-12.9.4.12.B.4	Perform math operations, such as estimating and distributing materials and supplies, to complete classroom/workplace tasks.
ARCH.9-12.9.4.12.B.5	Apply principles of physics, as they relate to worksite/jobsite situations, to work with materials and load applications.
ARCH.9-12.9.4.12.B.7	Demonstrate use of the concepts, strategies, and systems for obtaining and conveying ideas and information to enhance communication.
ARCH.9-12.9.4.12.B.8	Locate, organize, and reference written information from various sources to communicate with others.
ARCH.9-12.9.4.12.B.9	Evaluate and use information resources to accomplish specific occupational tasks.

Roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment impact business operations. Key organizational systems impact organizational performance and the quality of products and services. Understanding the global context of 21st-century industries and careers impacts business operations.

All clusters rely on effective oral and written communication strategies for creating, expressing, and interpreting information and ideas that incorporate technical terminology and information.

Academic concepts lay the foundation for the full range of career and post-secondary education opportunities within the career cluster.

Lesson Titles

1. Residential plumbing system.
2. Elements contained in a residential water supply system.
3. Elements of a residential water and waste removal system.
4. Operation of various in-house water treatment systems.
5. Layout of a private sewage disposal system.

21st Century Skills and Career Ready Practices

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.9	Analyze the correlation between personal and financial behavior and employability.

Inter-Disciplinary Connections

- Applied **Mathematics**
- **Arts** Related to Product "Form"
- **Historical** References & Perspectives
- Technical **Literacy**
- Applied **Sciences**

0x Connections to Equations.

0x	During high school, students begin to formalize their geometry experiences from elementary and middle school, using more precise definitions and developing careful proofs. Later in college some students develop Euclidean and other geometries carefully from a small set of axioms.
0x	In real world problems, the answers are usually not numbers but quantities: numbers with units, which involves measurement. In their work in measurement up through Grade 8, students primarily measure commonly used attributes such as length, area, and volume. In high school, students encounter a wider variety of units in modeling, e.g., acceleration, currency conversions, derived quantities such as person-hours and heating degree days, social science rates such as per-capita income, and rates in everyday life such as points scored per game or batting averages. They also encounter novel situations in which they themselves must conceive the attributes of interest. For example, to find a good measure of overall highway safety, they might propose measures such as fatalities per year, fatalities per year per driver, or fatalities per vehicle-mile traveled. Such a conceptual process is sometimes called quantification. Quantification is important for science, as when surface area suddenly "stands out" as an important variable in evaporation. Quantification is also important for companies, which must conceptualize relevant attributes and create or choose suitable measures for them.
LA.9-0x10.RH.9-10.3	Analyze in detail a series of events described in a text; draw connections between the events, to determine whether earlier events caused later ones or simply preceded them.
LA.9-0x10.RH.9-10.9	Compare and contrast treatments of the same topic, or of various perspectives, in several primary and secondary sources; analyze how they relate in terms of themes and significant historical concepts.
LA.9-0x10.RST.9-10.5	Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

Anticipatory Set

Possibilities of short activities that will focus the student's attention before the actual lesson begins:

1. **Vocabulary connections-** terms and definitions in a short game of "Trash-ketball"
2. **Challenge**- Offer students sketching task and let them try to solve it as a group then present it to the class.
3. **Challenge**- Offer a volunteer student a CAD task and let him/ her solve it on the board.
4. **Use manipulatives or models**

- **Description:** Teacher will use physical models to prepare students to learn a specific concept or better highlight the critical attributes of new concepts. Teacher will use a variety of models of two or three-dimensional shapes.

1. **Show & Tell**: Use a prop from an article students are about to read related to industry. Examples: Professional drawings - Architectural, Interior Design, Engineering.
2. **Use a visual**- Teacher will use visual aides to encourage students to better connect to new concepts. Examples: Real drawings used in industry- Architectural, Interior Design, Engineering. The teacher will tell students that they have thirty seconds to remember everything they can about the drawing. After the thirty seconds, the teacher will remove the drawings and ask students to recall all they can about them. The teacher will solicit ideas and use this to introduce distinguishing between main idea and supporting details.

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

Direct Instruction

- **Possibilities include**
  - Structured Overview
  - Lecture
  - Explicit Teaching
  - Drill & Practice
  - Compare & Contrast
  - Didactic Questions
  - Demonstrations
  - Guided & Shared - reading, listening, viewing, thinking

Interactive Instruction

- **Possibilities include**
  - Debates
  - Role Playing
  - Panels
  - Brainstorming
  - Peer Partner Learning
  - Discussion
  - Laboratory Groups
  - Think, Pair, Share
  - Cooperative Learning Groups
  - Jigsaw
  - Problem Solving
  - Structured Controversy
  - Tutorial Groups
  - Interviewing
  - Conferencing

Indirect Instruction

- **Possibilities include**
  - Problem Solving
  - Case Studies
  - Reading for Meaning
  - Inquiry
  - Reflective Discussion
  - Writing to Inform
  - Concept Formation
  - Concept Mapping
  - Concept Attainment

- Cloze Procedure

Independent Study

- **Possibilities include**
  - Essays
  - Computer Assisted Instruction
  - Journals
  - Learning Logs
  - Reports
  - Learning Activity Packages
  - Correspondence Lessons
  - Learning Contracts
  - Homework
  - Research Projects
  - Assigned Questions
  - Learning Centers

Experiential Learning

- **Possibilities include**
  - Field Trips
  - Narratives
  - Conducting Experiments
  - Simulations
  - Games
  - Storytelling
  - Focused Imaging
  - Field Observations
  - Role-playing
  - Model Building
  - Surveys

Instructional Skills

- **Possibilities include**
  - Explaining
  - Demonstrating
  - Questioning
  - Questioning Technique
  - Wait Time
  - Levels of Questions

Modifications

Instructor implements the following teaching strategies with students who need special accommodations. Instructor also implements specific requirements from the students' individual reports.

- Classroom:
    - Seat student near instruction, avoid distracting stimuli
    - Clarify that student understands directions
    - Cuing student to refocus (verbal/nonverbal)
    - Praise for positive behaviors.
    - Study guides provided, when available. Prior knowledge to upcoming quizzes/tests.
- Standardized Testing:
    - Extra Time
    - Repeating, clarifying, or rewording directions.
- Delsea One – Students benefit from increased opportunities for enrichment and tutoring during Delsea One Tutoring.

Formative Assessment

- 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.

Summative Assessment

- Quiz, Test, MP Assessments about the specified lesson:**Residential Plumbing**
- Final examination (a truly summative assessment) about the specified lesson.
- Projects (project phases submitted at various completion points could be formatively assessed) about the specified lesson.
- Portfolio that include all class assignments.
- Student evaluation of the lesson (teaching effectiveness).
- Instructor self-evaluation about the current lesson
- By Rubric shown below.

Computer Aided Design Evaluation Rubric

Category	1 **Does Not Meet Expectations** (0-25% of points)	2 **Attempted to Meet Expectations** (25-50% of points)	3 **Meets Expectations** (50-75% of points)
Defining the Problem	Offers an unclear statement of the problem. There is no support, documentation, or need for development. Little or no work is evident.	A short description and explanation is offered to the problem without any support and specifications for development pursuits.	A good statement and support/documentation is given to suggest the need to develop the product. Design specifications and constraints are also noted.
Research, Brainstorming, and Developing Ideas	Little research and brainstorming accomplished. Ideas generated are not original.	Research is evident as an outcome of brainstorming. Ideas generated are a result of the brainstorming process and not original.	Ideas generated are new and original as an outcome of brainstorming and research. Little suggestions are offered for the rest of the design process if any.
Conceptual Design and Sketching	Only one sketch is offered for a design review.	At least two sketches are offered for a review. The sketches offer no design specifications or annotation.	More than two sketches are offered for a review. The sketches include design specifications and annotation for developing the design.

Category	1 **Does Not Meet Expectations** (0-25% of points)	2 **Attempted to Meet Expectations** (25-50% of points)	3 **Meets Expectations** (50-75% of points)
Developing the Design	A set of sketched working drawings without an assembly drawing. 3D representations of each part of the assembly on the working drawings are missing. Annotations, dimensioning and blocks are not accurate.	A set of production drawings with an assembly and working drawings. Each orthographic drawing includes a 3D representation. Annotations, notations, blocks, and dimensioning are inaccurate.	A set of production drawings with an assembly and workin drawings. Mulitview drawings are added additiona to orthographic drawings. A 3D representation is included on all multiview drawings. Annotations, notations, blocks, and dimensioning are slightly inaccurate.
Making a Model or	Model is missing or does not	Model is proportional to	Model is accurate in

Prototype	look like concept sketches.	sketches, inaccurate in scale, and dimensioning does not follow industry standards.	proportion and dimensioning according to concept sketches and industry standards.
Engineering Testing and Evaluating the Design	Testing and evaluating designs/model are missing or not checked/approved.	Testing and verification attempted by checks and approvals without results.	Testing and verification are complete with checks/approvals and detailed results are not following industry standards.

Category	1 **Did Not Meet Expectations** (0-25% of points)	2 **Attempted to Meet Expectations** (25-50% of points)	3 **Meets Expectations** (50-75% of points)
Revising the Design	No attempt made to revise the design. Revision blocks not completed.	Designs revised without revision blocks completed.	Designs revised according to change requests and revision blocks filled out appropriately, but no approval or checking sought after the first revision.
Creating a Final Model, Prototype, or Mockup	Missing prototype model or mockup.	Mockup or prototype model is not accurate according to production drawings	Prototype model or mockup is accurate according to production drawing and created out of materials not specified.
Presentation	A presentation given without preparation and an outline.	A presentation given without a professional presence, good public speaking and a well thought out organized outline.	An organized outlined presentation with a professional presence, a written proposal, good public speaking and visual aids.

Resources & Materials

- Residential Housing and Interiors, 4th Edition b**y:** Clois E. Kicklighter, Ed. D. and Joan C. Kicklighter
- Housing and Interior Design By: Evelyn L. Lewis, Ed.D., Carolyn Turner Smith, Ph.D
- Interior Design By : Stephanie Clemons
- Glencoe Mechanical Drawing: Board and CAD Techniques, Student Edition: 1st (First) Edition by Glencoe McGraw-Hill
- Basic Technical Drawing by Spencer, Dygon, Novak Glencoe McGraw-Hill
- Exploring Drafting, Instructor's Manual Instructor's Manual, 10th Edition by John R. Walker (Author), Bernard D. Mathis