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<b>Arch-Const. Cluster Area Description:</b>	<b>CONSTRUCTION</b>
<b>Module Title / #:</b>	<b>CONSTRUCTION TECHNOLOGY</b>

<b>Standards:</b>	<b>1. Demonstrate Knowledge Regarding the interpretation of information from drawings used for construction planning and layout procedures.</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Describe the impact of globalization on construction technology.</li> <li>2. Identify and describe the pre-construction processes that relate to the function of construction systems.</li> <li>3. Utilize English Language Arts skills to read and interpret drawings and technical specifications.</li> <li>4. Utilize a combination of measurement and mathematical processes to solve lineal and solid shape problems.</li> </ol>

<b>Standards:</b>	<b>2. Demonstrate Knowledge Regarding the Site Layout one: Distance Measurement and Leveling</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Describe the major responsibilities of the carpenter relative to site layout.</li> <li>2. Convert measurements stated in feet and inches to equivalent measurements stated in decimal feet, and vice versa.</li> <li>3. Use and properly maintain tools and equipment associated with taping.</li> <li>4. Use manual or electronic equipment and procedures to make distant measurements and perform site layout tasks.</li> <li>5. Determine approximate distances by pacing.</li> <li>6. Recognize, use, and properly care for tools and equipment associated with differential leveling.</li> <li>7. Use a builder's level and differential leveling procedures to determine site and building elevations.</li> <li>8. Record site layout data and information in field notes using accepted</li> </ol>

<b>Standards:</b>	<b>3. Demonstrate an Understanding of Concrete, Reinforcing Materials, and Forms</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Identify the properties of cement.</li> <li>2. Describe the composition of concrete.</li> <li>3. Describe the various concrete mix designs and explain their purpose.</li> <li>4. Describe the tests used to determine the quality and strength of concrete.</li> <li>5. Perform volume estimates for concrete quantity requirements.</li> <li>6. Identify types of concrete reinforcement materials and describe their uses.</li> <li>7. Identify various types of footings and explain their uses.</li> <li>8. Identify the parts of various types of forms.</li> <li>9. Explain the safety procedures associated with the construction and use of concrete forms.</li> <li>10. Erect, plumb, and brace a simple concrete form with reinforcement.</li> </ol>

<b>Standards:</b>	<b>4. Demonstrate Knowledge of the Proper Handling and Placing Concrete</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Recognize the various equipment used to transport and place concrete.</li> <li>2. Describe the factors that contribute to the quality of concrete placement.</li> <li>3. Explain the necessity of a pre-pour checklist.</li> <li>4. Demonstrate the correct methods for placing and consolidating concrete into forms.</li> <li>5. Demonstrate how to use a screed to strike off and level concrete to the proper grade in a form.</li> <li>6. Demonstrate how to use tools for placing, floating, and finishing concrete.</li> <li>7. Determine when conditions permit the concrete finishing operation to start.</li> <li>8. Name the factors that affect the curing of concrete and describe the methods used to achieve proper curing.</li> <li>9. Properly care for and safely use hand and power tools used when working with concrete.</li> </ol>

<b>Standards:</b>	<b>5. Demonstrate Knowledge of the Basic Masonry Industry, Applications, and Work Processes</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Discuss the history of masonry.</li> <li>2. Describe modern masonry materials and methods.</li> <li>3. Explain career ladders and advancement possibilities in masonry work.</li> <li>4. Describe the skills, attitudes, and abilities needed to work as a mason.</li> <li>5. State the safety precautions that must be practiced at a work site, including the following: <ul style="list-style-type: none"> <li>• Safety practices</li> <li>• Fall-protection procedures</li> <li>• Forklift-safety operations</li> </ul> </li> <li>6. Perform the following basic bricklaying procedures: <ul style="list-style-type: none"> <li>• Mixing of mortar</li> <li>• Laying a mortar bed</li> <li>• Laying bricks</li> </ul> </li> <li>7. Put on eye protection, respiratory protection, and a safety harness.</li> <li>8. Use the correct procedures for fueling and starting a gasoline-powered tool.</li> </ol>

<b>Standards:</b>	<b>6. Demonstrate Knowledge Regarding Masonry Units and Installation Techniques</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Describe the most common types of masonry units.</li> <li>2. Describe and demonstrate how to set up a wall.</li> <li>3. Lay a dry bond.</li> <li>4. Spread and furrow a bed joint, and butter masonry units.</li> <li>5. Describe the different types of masonry bonds.</li> <li>6. Cut brick and block accurately.</li> <li>7. Lay masonry units in a true course.</li> </ol>

<b>Standards:</b>	<b>7. Demonstrate Knowledge Regarding Floor Systems</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Identify the different types of framing systems.</li> <li>2. Read and interpret drawings and specifications to determine floor system requirements.</li> <li>3. Identify floor and sill framing and support members.</li> <li>4. Name the methods used to fasten sills to the foundation.</li> <li>5. Given specific floor load and span data, select the proper girder/beam size from a list of available girders/beams.</li> <li>6. List and recognize different types of floor joists.</li> <li>7. Given specific floor load and span data, select the proper joist size from a list of available joists.</li> <li>8. List and recognize different types of bridging.</li> <li>9. List and recognize different types of flooring materials.</li> <li>10. Explain the purposes of subflooring and underlayment.</li> <li>11. Match selected fasteners used in floor framing to their correct uses.</li> <li>12. Estimate the amount of material needed to frame a floor assembly.</li> <li>13. Demonstrate the ability to: <ul style="list-style-type: none"> <li>• Lay out and construct a floor assembly</li> <li>• Install bridging</li> <li>• Install joists for a cantilever floor</li> <li>• Install a subfloor using butt-joint plywood/OSB panels</li> <li>• Install a single floor system using tongue-and-groove plywood/OSB panels</li> </ul> </li> </ol>

<b>Standards:</b>	<b>8. Demonstrate Knowledge Regarding Wall and Ceiling Framing</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Identify the basic principles of optimal value engineering/advanced framing.</li> <li>2. Identify the components of a wall and ceiling layout.</li> <li>3. Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and firestops.</li> <li>4. Describe the correct procedure for assembling and erecting an exterior wall.</li> <li>5. Identify the common materials and methods used for installing sheathing on walls.</li> <li>6. Lay out, assemble, erect, and brace exterior walls for a frame building.</li> <li>7. Describe wall framing techniques used in masonry construction.</li> <li>8. Explain the use of metal studs in wall framing.</li> <li>9. Describe the correct procedure for laying out ceiling joists.</li> <li>10. Cut and install ceiling joists on a wood frame building.</li> <li>11. Estimate the materials required to frame walls and ceilings.</li> </ol>

<b>Standards:</b>	<b>9. Demonstrate Knowledge Regarding Roof Framing</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Understand the terms associated with roof framing.</li> <li>2. Identify the roof framing members used in gable and hip roofs.</li> <li>3. Identify the methods used to calculate the length of a rafter.</li> <li>4. Identify the various types of trusses used in roof framing.</li> <li>5. Use a rafter framing square, speed square, and calculator in laying out a roof.</li> <li>6. Identify various types of sheathing used in roof construction.</li> <li>7. Frame a gable roof with vent openings.</li> <li>8. Frame a roof opening.</li> <li>9. Erect a gable roof using trusses.</li> <li>10. Estimate the materials used in framing and sheathing a roof.</li> </ol>

<b>Standards:</b>	<b>10. Demonstrate Knowledge Regarding Roofing Applications</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Identify the materials and methods used in roofing.</li> <li>2. Explain the safety requirements for roof jobs.</li> <li>3. Install fiberglass shingles on gable and hip roofs.</li> <li>4. Close up a valley using fiberglass shingles.</li> <li>5. Explain how to make various roof projections watertight when using fiberglass shingles.</li> <li>6. Complete the proper cuts and install the main and hip ridge caps using fiberglass shingles.</li> <li>7. Lay out, cut, and install a cricket or saddle.</li> <li>8. Install wood shingles and shakes on roofs.</li> <li>9. Describe how to close up a valley using wood shingles and shakes.</li> <li>10. Explain how to make roof projections watertight when using wood shakes and shingles.</li> <li>11. Complete the cuts and install the main and hip ridge caps using wood shakes/shingles.</li> <li>12. Demonstrate the techniques for installing other selected types of roofing materials.</li> </ol>

<b>Standards:</b>	<b>11. Demonstrate Knowledge Regarding Exterior Finishes</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Describe the purpose of wall insulation and flashing.</li> <li>2. Install selected common cornices.</li> <li>3. Demonstrate lap and panel siding estimating methods.</li> <li>4. Describe the types and applications of common wood siding.</li> <li>5. Describe fiber-cement siding and its uses.</li> <li>6. Describe the types and styles of vinyl and metal siding.</li> <li>7. Describe the types and applications of stucco and masonry veneer finishes.</li> <li>8. Describe the types and applications of special exterior finish systems.</li> </ol>

<b>Standards:</b>	<b>12. Demonstrate Knowledge Regarding Basic Stair Layout</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Identify the various types of stairs.</li> <li>2. Identify the various parts of stairs.</li> <li>3. Identify the materials used in the construction of stairs.</li> <li>4. Interpret construction drawings of stairs.</li> <li>5. Calculate the total rise, number and size of risers, and number and size of treads required for a stairway.</li> <li>6. Lay out and cut stringers, risers, and treads.</li> <li>7. Build a small stair unit with a temporary handrail.</li> </ol>

<b>Standards:</b>	<b>13. Demonstrate Knowledge Regarding Electrical Safety</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Recognize safe working practices in the construction environment.</li> <li>2. Explain the purpose of OSHA and how it promotes safety on the job.</li> <li>3. Identify electrical hazards and how to avoid or minimize them in the workplace.</li> <li>4. Explain safety issues concerning lockout/tagout procedures, confined space entry, respiratory protection, and fall protection systems.</li> <li>5. Develop a task plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task.</li> </ol>

<b>Standards:</b>	<b>14. Demonstrate Knowledge Regarding Residential Electrical Services</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Explain the role of the National Electrical Code® in residential wiring and describe how to determine electric service requirements for dwellings.</li> <li>2. Explain the grounding requirements of a residential electric service.</li> <li>3. Calculate and select service-entrance equipment.</li> <li>4. Select the proper wiring methods for various types of residences.</li> <li>5. Compute branch circuit loads and explain their installation requirements.</li> <li>6. Explain the types and purposes of equipment grounding conductors.</li> <li>7. Explain the purpose of ground fault circuit interrupters and tell where they must be installed.</li> <li>8. Size outlet boxes and select the proper type for different wiring methods.</li> <li>9. Describe rules for installing electric space heating and HVAC equipment.</li> <li>10. Describe the installation rules for electrical systems around swimming pools, spas, and hot tubs.</li> <li>11. Explain how wiring devices are selected and installed.</li> <li>12. Describe the installation and control of lighting fixtures.</li> </ol>

<b>Standards:</b>	<b>15. I Demonstrate Knowledge of the Basic HVAC Industry, Applications, and Work Processes</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Explain the basic principles of heating, ventilating, and air conditioning.</li> <li>2. Identify career opportunities available to people in the HVAC trade.</li> <li>3. Explain the purpose and objectives of an apprentice training program.</li> <li>4. Describe how certified apprentice training can start in high school.</li> <li>5. Describe what the Clean Air Act means to the HVAC trade.</li> <li>6. Describe the types of regulatory codes encountered in the HVAC trade.</li> <li>7. Identify the types of schedules/drawings used in the HVAC trade.</li> </ol>

<b>Standards:</b>	<b>16. Demonstrate Basic Knowledge of Plumbing - Drain, Waste, and Vent (DWV) Systems</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Explain how waste moves from a fixture through the drain system to the environment.</li> <li>2. Identify the major components of a drainage system and describe their functions.</li> <li>3. Identify the different types of traps and their components, explain the importance of traps, and identify the ways that traps can lose their seals.</li> <li>4. Identify the various types of drain, waste, and vent (DWV) fittings and describe their applications.</li> <li>5. Identify significant code and health issues, violations, and consequences related to DWV systems.</li> </ol>

<b>Standards:</b>	<b>17. Demonstrate Basic Knowledge of Plumbing - Plastic Pipes and Fittings</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Identify types of materials and schedules of plastic piping.</li> <li>2. Identify proper and improper applications of plastic piping.</li> <li>3. Identify types of fittings and valves used with plastic piping.</li> <li>4. Identify and determine the kinds of hangers and supports needed for plastic piping.</li> <li>5. Identify the various techniques used in hanging and supporting plastic piping.</li> <li>6. Properly measure, cut, and join plastic piping.</li> <li>7. Explain proper procedures for the handling, storage, and protection of plastic pipes.</li> </ol>

<b>Standards:</b>	<b>18. Demonstrate Basic Knowledge of Plumbing - Cooper Pipe Fittings</b>
<b>Performance</b>	<ol style="list-style-type: none"> <li>1. Identify the types of materials and schedules used with copper piping.</li> <li>2. Identify the material properties, storage, and handling requirements of copper piping.</li> <li>3. Identify the types of fittings and valves used with copper piping.</li> <li>4. Identify the techniques used in hanging and supporting copper piping.</li> <li>5. Properly measure, ream, cut, and join copper piping.</li> <li>6. Identify the hazards and safety precautions associated with copper piping.</li> </ol>