Building Management III

8592 36 weeks / 280 hours

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Acknowledgments

The following educators served on the curriculum development team:

Barry Calloway, Bedford Science and Technology Center, Bedford County Public Schools
Michael J. Gelbaugh, BMR/HVAC Program Coordinator, Tidewater Tech, Norfolk
Mary L. Gresham, Richmond Technical Center, Richmond City Public Schools
James Simone, The Renaissance Academy, Virginia Beach City Public Schools
James Wright, Greensville County High School, Greensville County Public Schools
Course Description

Suggested Grade Level: 12  
Prerequisites: 8591

Building Management III is offered as a capstone course for high school. Students apply the knowledge and skills to perform advanced maintenance and upkeep of commercial and public buildings and grounds through specific hands-on training in cleaning operations, building repairs, electrical work, plumbing, and grounds maintenance.

“Building Management III” may be offered as a complement to an existing concentration sequence in any CTE program area. In some instances, where noted, it may be combined with specific courses to create concentration sequences.

As noted in Superintendent's Memo #058-17 (2-28-2017), this Career and Technical Education (CTE) course must maintain a maximum pupil-to-teacher ratio of 20 students to one teacher, due to safety regulations. The 2016-2018 biennial budget waiver of the teacher-to-pupil ratio staffing requirement does not apply.

Task Essentials List

- Tasks/competencies designated by plus icons (➕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (⭕) are optional
- Tasks/competencies designated by minus icons (➖) are omitted
- Tasks marked with an asterisk (*) are sensitive.
<table>
<thead>
<tr>
<th>Task Number</th>
<th>8592</th>
<th>Tasks/Competencies</th>
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<tbody>
<tr>
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<tr>
<td>39</td>
<td>+</td>
<td>Comply with federal, state, and local safety legal requirements, including OSHA, VOSHA, and EPA.</td>
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<tr>
<td>40</td>
<td>+</td>
<td>Inspect and maintain a safe working environment.</td>
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<tr>
<td>41</td>
<td>+</td>
<td>Explain safe working practices around electrical hazards.</td>
</tr>
<tr>
<td>42</td>
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<td>Identify emergency first-aid procedures.</td>
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<tr>
<td>43</td>
<td>+</td>
<td>Identify the types of fires and the methods used to extinguish them.</td>
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<tr>
<td>44</td>
<td>+</td>
<td>Identify PPE (personal protective equipment) requirements.</td>
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<tr>
<td>45</td>
<td>+</td>
<td>Inspect course-specific hand and power tools to visually identify defects.</td>
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<tr>
<td>46</td>
<td>+</td>
<td>Demonstrate lifting and carrying techniques.</td>
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<td>47</td>
<td>+</td>
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<tr>
<td>48</td>
<td>+</td>
<td>Demonstrate safe scaffolding techniques.</td>
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<td>49</td>
<td>+</td>
<td>Report injuries.</td>
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<tr>
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<td>Report personal, environmental, and equipment safety violations to the appropriate authority.</td>
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<td>Pass safety exam.</td>
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<tr>
<td>52</td>
<td>+</td>
<td>Demonstrate power-washing techniques.</td>
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<td>+</td>
<td>Clean guttering and downspouts.</td>
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<td>54</td>
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<td>Clean industrial kitchens (e.g., vents, hoods, floors).</td>
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<td>Rebuild a stair step.</td>
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<td>Remove door and blend space into existing wall.</td>
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<tr>
<td>58</td>
<td>o</td>
<td>Float concrete.</td>
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<tr>
<td>59</td>
<td>o</td>
<td>Mix concrete, using a concrete mixer.</td>
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<tr>
<td>60</td>
<td>o</td>
<td>Mix concrete, using a mortar box/wheelbarrow.</td>
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<tr>
<td>61</td>
<td>o</td>
<td>Edge and joint concrete.</td>
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<tr>
<td>62</td>
<td>o</td>
<td>Fill cracks in a masonry surface.</td>
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<tr>
<td>63</td>
<td>o</td>
<td>Strike off excess concrete.</td>
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<tr>
<td>64</td>
<td>+</td>
<td>Install floor coverings.</td>
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</tbody>
</table>

Maintaining Walls

| 65          | o    | Prepare surface for wallpaper.              |
| 66          | o    | Hang wallpaper.                             |
| 67          | o    | Join wallpaper seams.                       |

Maintaining Windows

| 68          | +    | Replace window apron.                       |
| 69          | +    | Replace window casing.                      |
| 70          | +    | Replace window stool.                       |
| 71          | +    | Describe procedures for removing drapes.    |

Demonstrating Electrical Maintenance of Buildings
<table>
<thead>
<tr>
<th>Task Number</th>
<th>Tasks/Competencies</th>
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</thead>
<tbody>
<tr>
<td>72</td>
<td>Make a 90-degree turn in conduit, using a conduit bender.</td>
</tr>
<tr>
<td>73</td>
<td>Replace electrical cables in old conduit.</td>
</tr>
<tr>
<td>74</td>
<td>Replace ballast.</td>
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</tbody>
</table>

**Performing Plumbing Maintenance**

<table>
<thead>
<tr>
<th>Task Number</th>
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</thead>
<tbody>
<tr>
<td>75</td>
<td>Install a vent stack.</td>
</tr>
<tr>
<td>76</td>
<td>Replace pipe hangers.</td>
</tr>
<tr>
<td>77</td>
<td>Cut hole in ceilings, walls, and floors for run of pipe.</td>
</tr>
<tr>
<td>78</td>
<td>Connect ground from washer to water pipe.</td>
</tr>
<tr>
<td>79</td>
<td>Locate piping in walls.</td>
</tr>
<tr>
<td>80</td>
<td>Demonstrate removal of standing water, using a sump pump.</td>
</tr>
<tr>
<td>81</td>
<td>Demonstrate rough-in water supply.</td>
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<tr>
<td>82</td>
<td>Set temperature on water heater.</td>
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<tr>
<td>83</td>
<td>Replace kitchen sink basket strainer.</td>
</tr>
<tr>
<td>84</td>
<td>Demonstrate use of a power auger.</td>
</tr>
<tr>
<td>85</td>
<td>Install plumbing fixtures (i.e., commode, urinal, lavatory, shower).</td>
</tr>
<tr>
<td>86</td>
<td>Cut thread on iron pipe by hand.</td>
</tr>
<tr>
<td>87</td>
<td>Install screw-on fitting on water pipe.</td>
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**Maintaining Interior and Exterior Upkeep**

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<tr>
<th>Task Number</th>
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</thead>
<tbody>
<tr>
<td>88</td>
<td>Replace rotten floor joist.</td>
</tr>
<tr>
<td>89</td>
<td>Patch roof, using asphalt shingles.</td>
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Maintaining Grounds

<table>
<thead>
<tr>
<th>Task Number</th>
<th></th>
<th>Tasks/Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>☑</td>
<td>Rebuild a small engine (e.g., lawnmower engine).</td>
</tr>
<tr>
<td>98</td>
<td>☑</td>
<td>Design a landscape for residential and commercial grounds.</td>
</tr>
<tr>
<td>99</td>
<td>☑</td>
<td>Select equipment and procedures for mowing, trimming, and grounds care.</td>
</tr>
</tbody>
</table>

Legend: ☑ Essential  ☐ Non-essential  ☐ Omitted

**Curriculum Framework**

**Applying Basic Construction Safety Standards (Core Safety)**

**Task Number 39**

Comply with federal, state, and local safety legal requirements, including OSHA, VOSHA, and EPA.
Definition

Compliance should include the identification of the Hazard Communication Standard, the information included on Safety Data Sheets (SDS), and the responsibilities of employers and employees under Hazard Communication regulation.

Process/Skill Questions

- Where should hazardous materials be stored?
- What information can be found on a Safety Data Sheet (SDS)?

Task Number 40

Inspect and maintain a safe working environment.

Definition

Inspection and maintenance should be ongoing and should result in identifying potential hazards on a job site or in the lab, such as unstable or improperly erected scaffolding, electrical hazards, job site debris, improperly stored materials, and air quality hazards and when present, must be remedied by appropriate measures and comply with school and instructor's guidelines.

Process/Skill Questions

- What are some examples of job-site hazards?
- Why is it important to use good housekeeping standards on a job site?
- Why is it important to store materials and tools in their proper place?

Task Number 41

Explain safe working practices around electrical hazards.

Definition

Explanation should include

- identifying equipment used to test electrical circuits
- describing safe working conditions
- demonstrating safe work habits
according to industry standards and instructor's guidelines.

**Process/Skill Questions**

- What is the definition of *proximity work*?
- What are safe working clearances according to the National Electric Code (NEC)?
- What are some examples of safe working conditions and safe working habits?
- What is the unseen hazard with electrical work?

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**Task Number 42**

**Identify emergency first-aid procedures.**

**Definition**

Identification should include first-aid procedures for accidents involving

- bodily fluids
- electrical injuries
- eye injuries
- falls
- burns

according to standard first-aid and school policies.

**Process/Skill Questions**

- What are the steps that should be followed in the event of an accident?
- Why is knowing CPR an important skill within the electrical trades?
- Why is it important to be certified to administer first aid?
- What are the different classifications (degrees) of electrical burns?

---

**Task Number 43**

**Identify the types of fires and the methods used to extinguish them.**

**Definition**
Identification should include the classifications of fires (A, B, C, D, and K), causes and prevention of fires, types of extinguishers, and, when possible, the demonstrated use of a fire extinguisher, in accordance with government regulations and instructor's guidelines.

**Process/Skill Questions**

- Why do fires have different classifications, and what are they?
- What is the fire triangle?
- What are the three things necessary to start a fire?
- Why is it important to know the classification of fire when trying to extinguish it?
- Why and how often should fire extinguishers be inspected?
- What are the classifications of extinguishers?

---

**Task Number 44**

**Identify PPE (personal protective equipment) requirements.**

**Definition**

Identification should include procedures for properly putting on, wearing, removing, and maintaining PPE and inspecting PPE to determine if it is safe to use. Appropriate PPE may include eye protection, respirator, hard hat, gloves, safety harness, hearing protection, and safety shoes.

**Process/Skill Questions**

- What are some dangerous effects of sun exposure, and how can one prevent these effects?
- Why is wearing jewelry prohibited while in the lab or on the job site?

---

**Task Number 45**

**Inspect course-specific hand and power tools to visually identify defects.**

**Definition**

Inspection of power tools should include
• identifying components of machinery (e.g., guards, blades, moving parts, start/stop switches, cords)
• identifying standard safety procedures (i.e., shop practices, manufacturer's recommendations)
• observing a demonstration of the safe operation and use of each piece of machinery in the shop.

Inspection of hand tools should include identification of tool defects.

**Process/Skill Questions**

- What are some of the basic power tools used in construction?
- What are the proper actions to take before using a power circular saw?
- Why should a power tool always be grounded?

---

**Task Number 46**

**Demonstrate lifting and carrying techniques.**

**Definition**

Demonstration should involve lifting and carrying materials and equipment based on the principles of

- lifting with legs
- keeping back straight
- holding load close to the body
- getting help, if necessary

in accordance with government regulations and instructor's guidelines.

**Process/Skill Questions**

- What are common injuries associated with improper lifting techniques?
- What can one do to prevent injury?
- How does proper positioning affect proper technique?

---

**Task Number 47**

**Demonstrate safe laddering techniques.**
Definition

Demonstration should involve using appropriate conduct and safety procedures while using ladders (e.g., three-point contact), while carrying ladders (e.g., two people at all times), and while erecting and setting ladders. Identification of additional ladder types may include

- wall (straight) ladder
- extension ladder
- roof ladder
- attic ladder
- special purpose ladders (e.g., "A" ladder, folding ladder, pompier ladder)
- solid beam ladder
- truss beam wood ladder
- aluminum ladder
- wood and aluminum truss ladder
- fiberglass ladder

and the parts and safety features of each.

Process/Skill Questions

- Why are ladders rated for certain weights?
- Why is the apex of a stepladder not considered a step?

Task Number 48

Demonstrate safe scaffolding techniques.

Definition

Demonstration should include inspecting settings, duty ratings, and safety tags.

Process/Skill Questions

- How can one determine the safe weight limit of any particular scaffolding?
- What are some examples of situations in which scaffolding is preferred or required?

Task Number 49

Report injuries.
Definition

Report should consist of an immediate oral statement of the job-related or non-job-related injury to the instructor or supervisor, and may be followed by a written confirmation reporting date, extent of injury, and circumstances of the accident.

Process/Skill Questions

- Why is it important to report injuries?
- What are common reporting procedures?
- Why is it important to report an injury promptly? Before leaving the job site?
- What is worker's compensation?
- What are the key components of a report?

Task Number 50

Report personal, environmental, and equipment safety violations to the appropriate authority.

Definition

Report should include an oral or written statement identifying the violation and the date it was observed and should be given to the instructor, supervisor, or the local OSHA inspectors.

Process/Skill Questions

- What ethical considerations might be involved when reporting coworkers?
- Why is it important to follow reporting procedures?
- What is liability?

Task Number 51

Pass safety exam.

Definition

Assessment must measure participation in safety training programs, including attending safety meetings and completing periodic demonstration of knowledge and skills gained from program topics (e.g., interpretation of Safety Data Sheets).
Process/Skill Questions

- How often should one participate in safety training programs? Why?
- How does insurance impact the requirement of continuous retraining for safety?

Performing Cleaning Operations

Task Number 52

Demonstrate power-washing techniques.

Definition

Demonstration should include

- selecting PPE, equipment, and cleaning solutions
- operating equipment according to manufacturer's instructions
- cleaning and storing equipment according to manufacturer's instructions.

Process/Skill Questions

- What does PSI refer to, with respect to power washers?
- What are the various types of power washers? In what situations would you use each?
- What cleaning solutions can be used with power washers? Why?

Task Number 53

Clean guttering and downspouts.

Definition

Cleaning should include

- selecting PPE and equipment
- using appropriate laddering techniques
- removing debris from gutters and downspouts
- rinsing gutters and downspouts
- disposing of debris.

Process/Skill Questions
What PPE should be worn when cleaning gutters?
What safety guidelines should be followed when cleaning gutters?
What equipment is needed for cleaning gutters and downspouts?
Where should debris be disposed of after gutter cleaning?

Task Number 54

Clean industrial kitchens (e.g., vents, hoods, floors).

Definition

Cleaning should include

- selecting PPE, tools, and equipment (e.g., ladder, power washer, lights, buffing machines, brushes)
- selecting cleaning solutions
- using cleaning methods appropriate for the area or equipment being cleaned
- sanitizing surfaces.

Process/Skill Questions

- What are some types of surfaces that may need to be cleaned in an industrial kitchen?
- What tools, equipment, and supplies are needed to clean an industrial kitchen?
- What chemicals and cleaning solutions are safe to use in the kitchen area? Why?
- What sanitation procedures must be considered when cleaning an industrial kitchen? Why?

Performing General Building Maintenance

Task Number 55

Rebuild a stair step.

Definition

Rebuilding should include

- selecting PPE, materials, and tools
- removing the old stair step
- installing the new stair step.
Process/Skill Questions

- What are the relevant safety precautions/procedures to follow when rebuilding stair steps?
- What PPE and tools are required when rebuilding a stair step?
- What is the difference between the tread and the riser?

---

Task Number 56

Remove door and blend space into existing wall.

Definition

Process should include

- selecting PPE, materials, and tools
- removing the door from the jamb
- removing the casings from the door jamb and removing the door jamb
- installing a plate at the bottom of the opening
- cutting and installing studs
- finishing the wall material to match the existing wall and base material
- painting or finishing to match the existing wall.

Process/Skill Questions

- What are the relevant safety precautions/procedures for removing a door and blending space into the existing wall?
- What PPE and tools are required when removing a door and blending the space into the wall?
- What work skills are required in each step of removing a door?

---

Task Number 57

Make door openings in partitions.

Definition

Making door openings in partitions should include

- selecting PPE, materials, and tools
• framing the door opening
• installing the door and jamb
• checking that the door jamb is plumb and square
• using shims to adjust the nail through the jamb and shim into stud
• trimming the shims flush with the wall
• replacing the casing and door.

Process/Skill Questions

• What does the phrase *plumb and square* mean?
• What factors may account for a door unit being loose in a partition?
• What tools and materials are required for correcting loose door units?

---

**Task Number 58**

**Float concrete.**

**Definition**

Floating concrete should include

• selecting PPE, materials, and tools
• using a bull float and/or darby sparingly after screeding to work the concrete
• beginning second floating after the water sheen disappears
• removing indentations and humps until the desired surface is obtained.

**Process/Skill Questions**

• What are the relevant safety precautions/procedures to follow when floating concrete?
• What PPE, tools, and materials are required when floating concrete?
• What is the purpose of floating concrete?

---

**Task Number 59**

**Mix concrete, using a concrete mixer.**

**Definition**

Mixing concrete should include
• selecting PPE, materials, and tools
• using a concrete mixer to create a workable consistency
• adding correct proportions of sand, cement, water, and aggregate
• following manufacturer's instructions for mixing.

Process/Skill Questions

• What are the relevant safety precautions/procedures to follow when mixing concrete in a concrete mixer?
• What are the ingredients in a concrete mix? How are they batched and mixed?
• What is the desired consistency for the finished product?

Task Number 60

Mix concrete, using a mortar box/wheelbarrow.

Definition

Mixing concrete should include

• selecting PPE, materials, and tools
• creating a workable consistency by adding correct proportions of sand, cement, water, and aggregate.

Process/Skill Questions

• What are the ingredients of a concrete mix?
• What are the characteristics of properly mixed concrete?
• How does using a mortar box to mix concrete compare to using an electric mixer?

Task Number 61

Edge and joint concrete.

Definition

Process should include

• selecting PPE, materials, and tools
• cutting expansion joints
• dressing edges to prevent cracking during expansion.

Process/Skill Questions

• What PPE is required when jointing concrete?
• What are the features of edging and jointing tools used for dressing concrete?
• What is the process for cutting joints?
• What are the maintenance requirements for tools used to work concrete?

Task Number 62

Fill cracks in a masonry surface.

Definition

Filling cracks should include

• selecting PPE, materials, and tools
• cleaning the crack in the masonry surface
• chiseling a v-shaped groove into the crack
• masking off the area along each edge of the crack
• mixing the filling product
• filling the crack and allowing it to set
• removing the masking tape.

Process/Skill Questions

• What PPE should be used when filling cracks in masonry surfaces?
• What are the tools and materials required for filling cracks in masonry walls?
• How can you determine whether a crack is refillable?

Task Number 63

Strike off excess concrete.

Definition

Striking off excess concrete should include

• selecting PPE, materials, and tools
- using a straight edge to screed freshly poured concrete.

Process/Skill Questions

- What tools are required for striking (screeding) concrete?
- What is done with the excess concrete from the pour?
- What are the characteristics of a screed board?

Task Number 64

Install floor coverings.

Definition

Installation should include

- selecting PPE, materials, and tools
- selecting floor covering
- following the manufacturer's installation instructions.

Process/Skill Questions

- What safety concerns should be observed when installing floor coverings?
- What is the difference between replacing a damaged section of carpet and splicing carpet?
- What is the procedure for trimming the carpet edges to butt together?

Maintaining Walls

Task Number 65

Prepare surface for wallpaper.

Definition

Preparation should include

- selecting PPE, materials, and tools
- cleaning and smoothing the wall
- applying sizing according to manufacturer's instructions.
Process/Skill Questions

- What conditions must be corrected before applying wallpaper?
- What tools and materials are needed to prepare a surface for wallpaper?
- Should measurements be taken before applying wallpaper? Why, or why not?

Task Number 66

Hang wallpaper.

Definition

Hanging wallpaper should include

- selecting PPE, materials, and tools
- using proper measuring, cutting, and gluing techniques
- applying wallpaper according to manufacturer’s instructions.

Process/Skill Questions

- What ladder safety precautions must be taken when hanging wallpaper?
- What tools do you need to hang wallpaper?
- What is the work sequence for hanging wallpaper?
- What are the types, sizes, costs, and properties of different wallpaper products?

Task Number 67

Join wallpaper seams.

Definition

Joining wallpapers seams should include

- selecting PPE, materials, and tools
- ensuring all seams and lines in the wallpaper are perpendicular to the floor.

Process/Skill Questions

- What tools are needed when joining wallpaper seams?
- What are the available wallpaper widths and seams allowances?
• What is the work sequence for joining wallpaper seams, using the lap method?

Maintaining Windows

Task Number 68

Replace window apron.

Definition

Replacement should include

• selecting PPE and tools
• demonstrating the procedures used to replace a damaged or rotten window apron with a new one.

Process/Skill Questions

• Where is the apron of a window located?
• What are some conditions that would require the replacement of a window apron?
• Why are pre-drilled holes at nail installation points important?

Task Number 69

Replace window casing.

Definition

Replacement should include

• selecting PPE and tools
• demonstrating the steps and procedures used to replace the casing around a window.

Process/Skill Questions

• What is the purpose of the window casing?
• What tools are used in the replacement of a window casing?
• To what should the casing be nailed? Why?
Task Number 70

Replace window stool.

Definition

Replacement should include

- selecting PPE and tools
- demonstrating the steps and procedures used to replace a damaged or rotten window stool with a new one.

Process/Skill Questions

- What are the conditions that would require a window stool to be replaced?
- What parts of the wood must be removed before the window stool can be removed?
- What are the procedures for cutting a new window stool?

Task Number 71

Describe procedures for removing drapes.

Definition

Description should include procedures for

- selecting PPE and tools, including ladder
- marking the original placement of drapes
- removing drapes.

Process/Skill Questions

- What PPE and tools are needed when removing drapes?
- Why is it important to mark the original placement of the drapes?

Demonstrating Electrical Maintenance of Buildings

Task Number 72
Make a 90-degree turn in conduit, using a conduit bender.

Definition

Making a 90-degree turn should include

- marking a place on the tubing for the bend
- placing the bender on the bench or floor, handle up
- inserting tubing into the bender until desired fit is achieved
- engaging clamps
- forming the bend by moving the handle
- checking the bend angle.

Process/Skill Questions

- What are relevant safety precautions/procedures for making a 90-degree turn in conduit, using a conduit bender?
- What are the points of reference on a conduit bender?
- What are some materials that can be bent with a conduit bender?

---

Task Number 73

Replace electrical cables in old conduit.

Definition

Replacement should include

- examining the situation (if old wires cannot be removed, render the piece of equipment unusable by cutting the conductors back to the point where they cannot be reconnected and run new wires alongside)
- disconnecting all old wires from the power source and fixtures
- attaching new wires to the old wires
- pulling the old wires while working new wires into conduit
- connecting new wires to the fixtures and power source
- turning on power
- checking the wiring.

Process/Skill Questions

- What are the relevant safety precautions/procedures for replacing electrical cables in old conduit?
- What is the purpose of electric cables being housed in conduit?
- What tools and materials are required for running cables through conduit?

---

**Task Number 74**

**Replace ballast.**

**Definition**

Replacement should include

- shutting off power to the light fixture at the circuit breaker
- cutting the wires close to the old ballast and removing the ballast
- trimming the wires from the new ballast
- stripping the new ballast and lamp-holder wire ends
- connecting the new ballast wires to the lamp-holder wires with wire connectors.

**Process/Skill Questions**

- What are the relevant precautions/safety procedures for changing a ballast?
- What tools are needed for changing a ballast?
- How are the wire colors relevant when changing a ballast?

---

**Performing Plumbing Maintenance**

**Task Number 75**

**Install a vent stack.**

**Definition**

Installation should include the following steps:

- Assemble tools and equipment.
- Secure rough-in plans.
- Lay out the waste lines from the main sewer to each drain terminal.
- Assemble piping with proper fittings.
- Align and support the pipe.
- Run a vent line from the sewer pipe to re-vent line or run a separate vent line through the roof.
- Assemble the pipe in place, leaving cleanout and vent openings.
• Locate and cut a vent hole in the roof.
• Connect the vent pipe section from waste line through the roof.

Process/Skill Questions

• What are the relevant safety precautions/procedures for installing a vent stack?
• What is the function of a vent stack?
• What tools should be used when installing a vent stack?

Task Number 76

Replace pipe hangers.

Definition

Replacement should include the following steps:

• Locate sagging pipes or broken hangers.
• Gather tools and equipment and move to the first flag, taking extreme care when working with steam pipes or pipes carrying chemicals.
• Set the jack and remove weight from pipes.
• Remove the old hanger.
• Where necessary, set molly anchors or toggle bolts.
• Replace the hanger.
• Lower the jack and move to the next hanger.

Process/Skill Questions

• What are the relevant safety precautions/procedures for replacing pipe hangers?
• What are some conditions that justify the replacement of pipe hangers?
• What tools and materials are required for replacing pipe hangers?

Task Number 77

Cut hole in ceilings, walls, and floors for run of pipe.

Definition

Cutting holes for run of pipe should include the following steps:
• Assemble tools and equipment.
• Locate the ceiling and floor joists and wall stud locations.
• Mark the specified location for the pipe on the floor, joists, and studs.
• Use tape or a folding ruler to line up the holes for drilling.
• Drill holes in the floor, joists, and studs as needed.

Process/Skill Questions

• What are the relevant safety precautions/procedures for marking ceilings, walls, and floors for vertical and horizontal run of pipe?
• What tools are required for layout work when locating a vertical and horizontal run of pipe?
• What are the access areas for floor and ceiling observations?

Task Number 78

Connect ground from washer to water pipe.

Definition

Connection should include the following steps:

• Assemble tools and equipment.
• Disconnect power from the washer.
• Clean the connecting point on the washer case.
• Attach the ground wire to the metal washer case.
• Clean the connecting point on the cold water pipe.
• Clamp the grounding wire to the metal water pipe and tighten.

Process/Skill Questions

• What are the relevant safety precautions/procedures for connecting ground from washer to water pipe?
• What is the purpose of ground connections on appliances such as washers and dryers?
• What tools and materials are required for grounding a washer to a water pipe?

Task Number 79

Locate piping in walls.
Definition

Locating piping in walls should include the following steps:

- Assemble tools and equipment.
- Make a visual inspection beneath the floor and in the attic.
- Make a visual inspection of fixtures that the pipe feeds.
- Cut the wall as needed to expose the pipe.

Process/Skill Questions

- What are the relevant safety precautions/procedures for locating piping in walls?
- What conditions might require locating piping in walls?
- How should walls be cut (if needed) for easy repair so pipes can be exposed?

Task Number 80

Demonstrate removal of standing water, using a sump pump.

Definition

Demonstration should include the following steps:

- Assemble tools and equipment.
- With a shovel, hollow out a low place at the lowest point to locate the pump or suction line of pump.
- Place the pump, ensuring all electrical equipment is grounded.
- Place the discharge hose so as not to get run-back.
- Cut grooves and ditches to drain the pockets.

Process/Skill Questions

- What are the relevant safety precautions/procedures for removing standing water, using a sump pump?
- What are some conditions that might require the use of a sump pump?

Task Number 81
Demonstrate rough-in water supply.

Definition

Demonstration should include the following steps:

- Assemble tools and equipment.
- Mark the location of pipe routes from the source to outlets.
- Shut off water pressure and drain the lines.
- Cut the main line and solder or glue the tee into place.
- Cut the main line and install branch tees.

Process/Skill Questions

- What rules should be followed when roughing-in water supply lines?
- What safety precautions should be followed when roughing-in water supply?
- What tools and materials are required for roughing-in water supply?

Task Number 82

Set temperature on water heater.

Definition

Setting the temperature should include the following steps:

- Measure the water temperature at outlets and calculate average temperature.
- Adjust the thermostat to the appropriate temperature.
- Activate the heater unit and wait until the unit goes off.
- Repeat the first step.

Process/Skill Questions

- What safety precautions should be followed when setting the temperature on a water heater?
- What are the parts of a water heater?
- What is the function of the thermostat?

Task Number 83
Replace kitchen sink basket strainer.

Definition

Replacement should include the following steps:

- Loosen lock nuts on the P-trap.
- Slip the P-trap to the side.
- Remove the drain flange.
- Clean the drain hole top and bottom.
- Apply putty to the bottom of the new basket strainer flange.
- Set the new flange into the top of the sink drain hole.
- Place the new washer on the lock nut and tighten the drain flange securely into place.
- Replace the tail piece and recouple the P-trap.

Process/Skill Questions

- What safety precautions/procedures should be followed when replacing a kitchen sink basket strainer?
- What are the parts in a sink drain line system?
- What is the function of the parts in a sink drain line system?
- What tools and materials are required for replacing a kitchen sink basket strainer?

Task Number 84

Demonstrate use of a power auger.

Definition

Demonstration should include the following steps:

- Locate the drain cleanout.
- Insert the end of the auger until the blockage is reached.
- Bump the end of the auger hard against the blockage.
- Start the power auger.
- Insert the pilot and extend to the blockage.
- Retract the pilot.
- Test the sewer line.

Process/Skill Questions

- What safety procedures should be followed when using a powered sewer auger?
• How do you test a sewer line to show it is clear?
• What tools and equipment are required for cleaning sewage, using a powered sewer auger?

Task Number 85

Install plumbing fixtures (i.e., commode, urinal, lavatory, shower).

Definition

Installation of a commode should include the following steps:

• Assemble tools and equipment. Install the closet flange by gluing to 3” PVC waste pipe.
• Insert the closet bolts into the collar.
• Place the wax ring seal over the commode collar.
• Place the commode assembly over the drain.
• Tighten the closet bolts.
• Connect the water supply line.
• Check for leaks and make adjustments.

Installation of a urinal should include the following steps:

• Assemble tools and equipment.
• Check the location.
• Install the hangers, ensuring they are level.
• Hang the urinal on the hangers.
• Connect the trap.
• Connect the water.
• Check for leaks and adjust.

Installation of a lavatory should include the following steps:

• Assemble tools and equipment.
• Mount sink brackets.
• Fit the lavatory into the brackets, sealing around the edges if the lavatory is to rest on a cabinet.
• Attach the lavatory to the rim.
• Coat the flange of pull-out plug with plumber's putty and set the plug in the lavatory.
• Coat the faucet flanges with plumber's putty and connect the faucets.
• Connect the water supply.
• Connect the drain line to lavatory.
• Check for leaks and adjust.
Installation of a shower should include the following steps:

- Assemble tools and equipment.
- Place thread-seal tape on the control valve heads and the shower pipe stub.
- Attach the shower head and valve to the shower pipe.
- Slide the escutcheon onto the shower pipe.
- Attach the shower pipe end to the roughed-in wall stub.
- Press the escutcheon against the wall covering hole and stub.
- Place the escutcheon over the water control valves and press against the wall.
- Attach the control valve handles with a screwdriver.
- Connect water and check for leaks.

Process/Skill Questions

- What are the relevant safety precautions/procedures for installing plumbing fixtures (i.e., commode, urinal, lavatory, shower)?
- Why is it necessary to handle porcelain and chrome fixtures with extreme care?
- What are the basic considerations for locating and installing a urinal?
- What precautions should be taken when working with chrome finishes?

Task Number 86

Cut thread on iron pipe by hand.

Definition

Cutting thread should include the following steps:

- Assemble tools and equipment.
- Place the pipe in a vise.
- Remove burrs from the inside end of the pipe.
- Place the die in the handle.
- Hold the die against the end of pipe and turn the handle clockwise to start the die.
- Apply cutting oil to die cutters.
- Continue to turn the handle in a clockwise fashion and add cutting oil.

Process/Skill Questions

- What are the relevant safety precautions/procedures for cutting thread on an iron pipe by hand?
- How far up should the pipe be threaded? Why?
- What is the necessity of constantly oiling the pipe during the threading operation?
Task Number 87

Install screw-on fitting on water pipe.

Definition

Installation should include the following steps:

• Assemble tools and equipment.
• Turn off water.
• Clean threads and check for damage.
• Apply pipe thread sealant or thread-seal tape to threads on the pipe.
• Start fitting by hand, turning clockwise.
• Finish tightening with a pipe wrench.

Process/Skill Questions

• What are the relevant safety precautions/procedures for installing a screw-on fitting on a water pipe?
• What tools are required to install a screw-on fitting on a water pipe?
• What is the purpose of using pipe thread sealant or thread-seal tape on threaded joints?

Maintaining Interior and Exterior Upkeep

Task Number 88

Replace rotten floor joist.

Definition

Replacement should include the following steps:

• Remove external sheathing.
• Evaluate the damage.
• Remove the rotted joist.
• Measure and cut the new joist.
• Replace the joist and sheathing.

Process/Skill Questions

• What safety procedures should be followed when replacing a rotted floor joist?
• What factors may account for the need to replace a rotted floor joist or joists?
• What is a ledger joist?
• What is a header (rim) joist?

Task Number 89

Patch roof, using asphalt shingles.

Definition

Patching should include the following steps:

• Lift the shingles in the course (row) above the damaged tiles and remove the nails holding the damaged shingle.
• Locate the damaged area of roofing paper (underlayment) and repair it, using roof cement.
• Replace the lowest course of damaged shingles first, ensuring that the existing pattern is not interrupted.
• Lift the ends of the upper course shingles above the patch area to nail the replacement shingles into place.
• If replacement shingles are not self-sealing, apply dabs of roof cement under each tab to secure the shingle.

Process/Skill Questions

• What are the relevant safety precautions/procedures for patching a roof, using asphalt shingles?
• What are some conditions that would contribute to shingle deterioration and roofing problems?
• What tools and materials are required for patching an asphalt-shingled roof?

Task Number 90

Patch roof, using rolled roofing.

Definition

Patching should include the following steps:

• Measure and cut the amount of roofing material needed to repair the damaged area.
• Cut a slit in the existing roofing material above the damaged area.
• Slide the new piece of material into the slit.
• Holding the slit edge and remaining edges of the new roofing material up, apply cold tar or roof cement and press the edges down.
• Nail the edges.
• Cover nail heads and edges of patch with roofing tar or sealer.

Process/Skill Questions

• What safety precautions should be followed when using rolled-roofing material?
• What are some factors that account for roof damage and material deterioration?
• What tools and materials are required for patching a roof, using rolled-roofing material?

Task Number 91

Replace vent pipe flashings on roof.

Definition

Replacement should include the following steps:

• Remove the shingles from around the vent pipe flashing.
• Use a pry bar to remove old flashing.
• Remove or drive loose nails down.
• Cover the area with new tar or roof cement.
• Replace the flashing.
• Replace the shingles.

Process/Skill Questions

• What safety precautions should be followed when replacing vent pipe flashing on a roof?
• What are the characteristics of defective vent pipe flashing?
• What tools and materials are required for replacing vent pipe flashing?

Task Number 92

Replace damaged roof section.

Definition
Replacement should include the following steps:

- Square off the section of roof surrounding the damaged area.
- Remove the roof shingle, felt paper, and damaged sheeting.
- Replace rotted or damaged rafters.
- Cut and install new sheeting and felt paper.
- Replace the shingles.

Process/Skill Questions

- Why is a fall-prevention plan needed when working on a roof?
- What tools and materials are required for roof repair?
- What factors can cause roof damage?
- How can you identify roof rot?

Task Number 93

Repair or replace gutters and downspouts.

Definition

Process should include the following steps:

- Measure the gutters for proper fit.
- Install the gutters.
- Install the downspouts.

Process/Skill Questions

- What safety precautions should be taken when repairing or replacing gutters and downspouts?
- Why are gutters used on homes and businesses?

Task Number 94

Replace downspout eaves.

Definition

Replacement should include the following steps:
• Remove the old gutter.
• Measure fascia.
• Assemble entire length of guttering on ground.
• Pop rivet sections together.
• Cut out hole for the downspout.
• Seal all seams with waterproofing material.
• Attach string to fascia to show pitch toward the downspout.
• Place hangers onto fascia.
• Place gutter into position.
• Assemble downspout sections.
• Install hanger bands.

Process/Skill Questions

• What safety precautions should be followed when replacing downspout eaves?
• What are some factors that may account for the need to replace gutters and downspouts?
• What tools and materials are required for replacing gutters and downspouts?

Task Number 95

Replace roof flashings.

Definition

Replacement should include the following steps:

• Remove shingles from along the edge of the flashing.
• Remove the damaged flashing.
• Remove the old nails by pulling them out.
• Remove the damaged felt.
• Check the roof sheething for rot and replace where necessary.
• Replace the section of roofing felt.
• Cut flashing and form into place.
• Remove the flashing and cover the felt with mastic.
• Secure the flashing with nails.
• Replace the shingles.

Process/Skill Questions

• What are the relevant safety precautions/procedures for replacing roof flashing?
• What are some conditions that would justify the replacement of roof flashing?
• What tools are required for replacing roof flashing?
Task Number 96

Replace door seals on a refrigerator.

Definition

Replacement should include the following steps:

- Disconnect power and remove the door from the unit.
- Remove the clips or screws and take off the old seal.
- Clean the door where the new seal will be placed.
- Cut and install the new seal.

Process/Skill Questions

- What safety procedures should be followed when replacing the door seals on a refrigerator?
- What are some conditions that require the replacement of a door seal?
- What kind of test can be performed to see if a new seal should be installed?

Maintaining Grounds

Task Number 97

Rebuild a small engine (e.g., lawnmower engine).

Definition

Rebuilding should include

- identifying model and serial numbers
- locating and reviewing service manual or other documentation
- selecting tools
- disassembling the engine
- inspecting the parts
- replacing parts as needed (e.g., using rebuild kits, ordering replacements)
- reassembling the engine according to manufacturer's specifications
- starting the rebuilt engine.

Process/Skill Questions
- What is the importance of knowing the model and serial numbers when rebuilding an engine?
- Where would you find the specifications for a small engine?
- What should you look for when inspecting the parts of a small engine?
- Why is it important to follow the manufacturer's specifications when rebuilding a small engine?
- What is the importance of pre-lubricating an engine after rebuilding it?

---

**Task Number 98**

**Design a landscape for residential and commercial grounds.**

**Definition**

Design should include

- consideration of site conditions
- use of computer software and/or sketches
- manual layout
- plant selection
- weed control.

**Process/Skill Questions**

- How do site conditions affect landscape design?
- Why are sketches important when designing a landscape?
- What are the advantages of using computer software to design a landscape?
- Why should maintenance requirements be considered when designing a landscape?
- What are annuals, perennial, and biennials?
- What are the advantages of using a weed barrier? Disadvantages?

---

**Task Number 99**

**Select equipment and procedures for mowing, trimming, and grounds care.**

**Definition**

Selection should include consideration of
• the differences between commercial and residential equipment
• the skills required for operation
• characteristics of the area for intended use (e.g., size, terrain, turf, obstacles)
• versatility of the equipment (e.g., seasonal use)
• engine type (e.g., battery powered, two-cycle, four-cycle, gasoline, diesel)
• maintenance requirements.

Process/Skill Questions

• What factors should be considered in selecting equipment for mowing, trimming, and grounds care?
• Why is residential equipment not appropriate for commercial applications?
• What are the advantages of one engine type over another?
• What are the disadvantages of picking equipment that is too small? Too large?
• Why should maintenance requirements be considered during selection?

SOL Correlation by Task

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<td>Pass safety exam.</td>
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<td>Demonstrate power-washing techniques.</td>
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### Customer Service Infusion Units

Customer Service Infusion Units (CSIU) were designed to be infused with designated CTE courses to help students in those programs achieve additional, focused, validated tasks/competencies in customer service. These units are not mandatory, and, as such, the tasks/competencies are marked as "optional," to be taught at the instructor's discretion. Teachers can find the infusion/unit in the course listing.

### Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.” Teachers can find the infusion/unit in the course listing.
Appendix: Credentials and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- Building Trades Maintenance Assessment
- College and Work Readiness Assessment (CWRA+)
- Customer Service Examination
- Customer Service Specialist (CSS) Examination
- ICC Certificates of Completion Examinations
- National Career Readiness Certificate Assessment
- Pre-Apprenticeship Certificate Training (PACT) Core Examinations
- Professional Communications Certification Examination
- Workplace Readiness Skills for the Commonwealth Examination

Career Cluster Name: Architecture and Construction

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Career Cluster: Hospitality and Tourism

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
</tr>
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<tbody>
<tr>
<td>Lodging</td>
<td>Building Custodian</td>
</tr>
<tr>
<td></td>
<td>Environmental Specialist</td>
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<tr>
<td></td>
<td>Executive Housekeeper</td>
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<tr>
<td></td>
<td>Maintenance Supervisor</td>
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</tbody>
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