The General Trade Knowledge portion of the examination is administered daily in Computer Based Testing (CBT) format. It will consist of 80 equally weighted questions.

The examination will have questions relating to the following content areas and necessary knowledge for each area includes:

- reading and interpreting plans and specifications
- reading and interpreting codes
- basic mathematics (addition, subtraction, multiplication, division, calculations of area and volume, fractions, decimals, percentages, calculating the sides of triangles, square roots, powers of numbers, and solving simple algebraic equations for unknown variables)

You should be prepared to respond to examination questions on any of the content areas listed. Questions asked and content areas tested on previous examinations should not be assumed to be the only possible questions to be asked or content areas to be tested on this examination.

The percentage of questions shown for each content area may vary by as much as plus or minus three (3) percent. Please refer to the Candidate Information Brochure and the Reference List for additional information.

Content Area A
Pre-Installation and Site Preparation

1. Drawing plans that meet job requirements
   - knowledge of local ordinances and setback requirements
   - knowledge of survey restrictions
   - knowledge of environmental requirements
   - knowledge of ANSI 5 design criteria
   - knowledge of ANSI 3 design criteria
   - knowledge of system design
   - knowledge of symbols
   - knowledge of abbreviations
   - knowledge of terminology

Content Area B
Pool and Spa Excavation

1. Locating underground, above ground and overhead obstructions
   - knowledge of where to find information
   - knowledge of job site restrictions
   - knowledge of site conditions
   - knowledge of how to identify obstructions
   - knowledge of when and how to notify appropriate authorities
   - knowledge of permissible working conditions

2. Excavating or clearing sites
   - knowledge of staking out excavation
   - knowledge of determining location of excavation
   - knowledge of shoring
   - knowledge of soil conditions
   - knowledge of invert elevations
   - knowledge of basic surveying
   - knowledge of layout methods

knowledge of site dimensions
knowledge of scale dimensions
knowledge of soil types

2. Determine appropriate equipment needed for jobs
   - knowledge of Florida Building Code and any local amendments
   - knowledge of site conditions
   - knowledge of availability of utilities
   - knowledge of subsoil conditions
   - knowledge of water tables
   - knowledge of characteristics of gunite, tile, steel, fiberglass, vinyl, concrete piping, and wiring

3. Complying with building department requirements
   - knowledge of permitting requirements
   - knowledge of required inspections
   - knowledge of life safety issues

Content Area B
Pool and Spa Excavation

15%

1. Locating underground, above ground and overhead obstructions
   - knowledge of where to find information
   - knowledge of job site restrictions
   - knowledge of site conditions
   - knowledge of how to identify obstructions
   - knowledge of when and how to notify appropriate authorities
   - knowledge of permissible working conditions

2. Excavating or clearing sites
   - knowledge of staking out excavation
   - knowledge of determining location of excavation
   - knowledge of shoring
   - knowledge of soil conditions
   - knowledge of invert elevations
   - knowledge of basic surveying
   - knowledge of layout methods

knowledge of site dimensions
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   - knowledge of Florida Building Code and any local amendments
   - knowledge of site conditions
   - knowledge of availability of utilities
   - knowledge of subsoil conditions
   - knowledge of water tables
   - knowledge of characteristics of gunite, tile, steel, fiberglass, vinyl, concrete piping, and wiring

3. Complying with building department requirements
   - knowledge of permitting requirements
   - knowledge of required inspections
   - knowledge of life safety issues
knowledge of interpreting plans and specifications
knowledge of surveying and leveling equipment
knowledge of compaction equipment
knowledge of earth moving and excavation equipment

3. **Performing site grading**
knowledge of elevation requirements
knowledge of basic surveying and leveling techniques
knowledge of surveying and leveling equipment
knowledge of identification of obstructions
knowledge of removal of site debris
knowledge of drainage

4. **Determining water tables**
knowledge of subsoil conditions
knowledge of augers
knowledge of aquifers
knowledge of drilling equipment and practices

5. **Determining soil conditions**
knowledge of subsoil conditions
knowledge of excavation
knowledge of sampling
knowledge of soil composition
knowledge of soil testing

6. **Performing de-watering, de-mucking and well-pointing**
knowledge of dewatering equipment
knowledge of piping requirements
knowledge of soils
knowledge of soil permeability
knowledge of excavation equipment
knowledge of excavating techniques and requirements
knowledge of water table
knowledge of well points
knowledge of drawdown
knowledge of pump requirements and techniques

7. **Backfilling and compacting**
knowledge of different types of backfill material
knowledge of surveying and leveling equipment
knowledge of surveying and leveling techniques
knowledge of soil properties
knowledge of tamping

knowledge of correct moisture content
knowledge of percent compaction
knowledge of soil density compaction
knowledge of calculations to determine the amount of dirt to fill

8. **Removing foreign materials and debris**
knowledge of hand tools
knowledge of excavation equipment
knowledge of hauling equipment
knowledge of materials disposal requirements
knowledge of environmental standards protection

**Content Area C**

**Plumbing Work**

1. **Installing recirculating lines**
knowledge of interpreting plans and specifications
knowledge of piping materials and applications
knowledge of placement
knowledge of associated fittings
knowledge of valve requirements
knowledge of related components

2. **Pressure testing recirculating lines**
knowledge of theory
knowledge of psi’s
knowledge of hook-up and placement
ability to understand test results
knowledge of dangers of pressure plugs
knowledge of pressure testing techniques
knowledge of the dangers of pressurized lines

3. **Installing filter equipment**
knowledge of filtration requirements
knowledge of manufacturer’s specifications
knowledge of type of filters
knowledge of gauges and valves
knowledge of placement of pumps
knowledge of types and capacities of motors
knowledge of flow rates and piping pressures
knowledge of ANSI 7 requirements
knowledge of inlets and outlets
4. Installing pumps
   knowledge of filtration requirements
   knowledge of types of pumps and pump loads
   knowledge of grounding
   knowledge of piping techniques and requirements
   knowledge of pressures and flow requirements
   knowledge of manufacturer’s specifications
   knowledge of hydraulics

5. Installing skimmers
   knowledge of filtration requirements
   knowledge of types of skimmers
   knowledge of skimmer housings
   knowledge of strainer baskets
   knowledge of weirs and valves
   knowledge of vacuum cleaning connections
   knowledge of flow rates, pressures, and overflow systems

6. Installing solar heaters
   knowledge of solar heating requirements and practices
   knowledge of roof penetrations
   knowledge of solar collectors
   knowledge of piping techniques and requirements
   knowledge of pipe fittings
   knowledge of control requirements
   knowledge of pump requirements

7. Installing conventional heaters (gas, heat pump, electric)
   knowledge of state and local codes
   knowledge of location requirements
   knowledge of fire and gas codes
   knowledge of sizing and flow rates
   knowledge of heat exchangers for gas heaters
   knowledge of location of L.P. Gas tanks for gas heaters
   knowledge of heat pumps for electric heaters
   knowledge of immersion elements for electric heaters
   knowledge of manufacturer’s specifications

8. Installing automatic cleaners
   knowledge of piping requirements
   knowledge of safety requirements
   knowledge of pipe fitting
   knowledge of fittings
   knowledge of pumps

   knowledge of filtration requirements
   knowledge of materials
   knowledge of manufacturer’s specifications
   knowledge of processes for automatic feeders

9. Installing automatic feeders
   knowledge of piping techniques and requirements
   knowledge of pipe fitting requirements
   knowledge of pipe fitting
   knowledge of pipe materials
   knowledge of processes for automatic feeders
   knowledge of manufacturer’s specifications

10. Sizing pipes
    knowledge of hydraulics
    knowledge of ANSI 7 requirements
    knowledge of pump specifications
    knowledge of pump flow rates

Content Area D 5%
Electrical Work

1. Determining power line requirements
   knowledge of wire size based on amperage
   knowledge of size of conduits
   knowledge of types of conduits
   knowledge of wire type
   knowledge of overhead power
   knowledge of “call before you dig”
   knowledge for determining line sizes

2. Installing electric control panels
   knowledge of safety requirements
   knowledge of location and clearance requirements
   knowledge of electrical grounding requirements
   knowledge of sizing breakers

3. Perform bonding procedures
   knowledge of safety requirements
   knowledge of bonding requirements
   knowledge of NEC requirements

4. Perform grounding procedures
   knowledge of safety requirements
   knowledge of electrical grounding requirements
   knowledge of NEC requirements
5. Installing light niches
   knowledge of proper installation requirements
   (conduit)
   knowledge of safety requirements
   knowledge of types of niches
   knowledge of location and amount of illumination
   knowledge of bonding requirements
   knowledge of manufacturer’s specifications
   knowledge of elevation and placement of niche
   knowledge of voltage limitations

   knowledge of specific handling requirements
   knowledge of supports and anchorage
   knowledge of backfilling requirements
   knowledge of surveying and leveling equipment
   knowledge of surveying and leveling techniques
   knowledge of soil properties and angle of repose
   knowledge of excavation techniques
   knowledge of manufacturer’s specifications

6. Installing, replacing and repairing electrical components
   knowledge of local and state codes
   knowledge of automatic timers
   knowledge of lights
   knowledge of electrical connections to chlorinating generators
   knowledge of manufacturer’s specifications
   knowledge of scope of work

   content of local and state codes
   knowledge of automatic timers
   knowledge of lights
   knowledge of electrical connections to chlorinating generators
   knowledge of manufacturer’s specifications
   knowledge of scope of work

Content Area E 10%
Shell Placement

1. Installing steel reinforcing bars
   knowledge of reinforcing practices and procedures
   knowledge of scale dimensions
   knowledge of measurement requirements
   knowledge of bonding requirements
   knowledge of concrete coverage and rebar clearances

2. Installing fiberglass walls
   knowledge of material properties
   knowledge of specific handling requirements
   knowledge of supports and anchorage
   knowledge of backfilling requirements
   knowledge of surveying and leveling equipment
   knowledge of surveying and leveling techniques
   knowledge of soil properties and angle of repose
   knowledge of excavation techniques
   knowledge of manufacturer’s specifications

3. Installing metal walls
   knowledge of material properties

   knowledge of specific handling requirements
   knowledge of supports and anchorage
   knowledge of backfilling requirements
   knowledge of surveying and leveling equipment
   knowledge of surveying and leveling techniques
   knowledge of soil properties and angle of repose
   knowledge of excavation techniques
   knowledge of manufacturer’s specifications

4. Installing plastic walls
   knowledge of material properties
   knowledge of specific handling requirements
   knowledge of supports and anchorage
   knowledge of backfilling requirements
   knowledge of surveying and leveling equipment
   knowledge of surveying and leveling techniques
   knowledge of soil properties and angle of repose
   knowledge of excavation techniques
   knowledge of manufacturer’s specifications

5. Installing structural polymer walls
   knowledge of material properties
   knowledge of specific handling requirements
   knowledge of supports and anchorage
   knowledge of backfilling requirements
   knowledge of surveying and leveling equipment
   knowledge of surveying and leveling techniques
   knowledge of soil properties and angle of repose
   knowledge of excavation techniques
   knowledge of manufacturer’s specifications

6. Testing for leakage in pool and spa shells
   knowledge of measuring elevation differentials
   knowledge of evaporation
   knowledge of testing procedures
   knowledge of rate of loss procedures

7. Mixing pneumatically applied concrete
   knowledge of concrete reinforcement requirements
   knowledge of concrete properties
   knowledge of concrete testing
   knowledge of placement techniques
   knowledge of finishing techniques
   knowledge of pressurized concrete equipment
8. **Installing precast support pilings**
   - knowledge of soils
   - knowledge of precast piles
   - knowledge of pile driving methods and procedures
   - knowledge of engineer’s specifications

**Content Area F**

**Deck Work**

1. **Laying out and forming decks**
   - knowledge of surveying and leveling equipment
   - knowledge of surveying and leveling techniques
   - knowledge of excavation and backfill
   - knowledge of drainage requirements
   - knowledge of form work
   - knowledge of safety requirements
   - knowledge of compaction requirements

2. **Installing wood decks**
   - knowledge of pressure treated wood
   - knowledge of other wood protection
   - knowledge of carpentry
   - knowledge of carpentry tools
   - knowledge of foundations
   - knowledge of piers
   - knowledge of connectors
   - knowledge of safety requirements

3. **Installing concrete decks**
   - knowledge of concrete properties
   - knowledge of concrete reinforcement
   - knowledge of concrete placement
   - knowledge of concrete finishing
   - knowledge of form work
   - knowledge of expansion and contraction protection
   - knowledge of drainage and slope
   - knowledge of deck drains and plumbing
   - knowledge of deck finishes
   - knowledge of compaction requirements
   - knowledge of soil treatments

4. **Installing masonry type decks**
   - (tile, stone, and brick)
   - knowledge of sub-base materials
   - knowledge of work requirements
   - knowledge of material placement
   - knowledge of drainage and slope
   - knowledge of deck drains

   knowledge of stabilization
   knowledge of compaction

**Content Area G**

**Tile, Coping and Trim Work**

1. **Installing tiles**
   - knowledge of material properties
   - knowledge of specific handling requirements
   - knowledge of measurements
   - knowledge of measuring equipment
   - knowledge of types of grouts and requirements
   - knowledge of adhesive requirements
   - knowledge of mortar requirements
   - knowledge of cleaning
   - knowledge of leveling techniques and requirements
   - knowledge of architectural effects
   - knowledge of manufacturer’s specifications
   - knowledge of control joints
   - knowledge of code requirements
   - knowledge of plans and specifications

2. **Installing masonry trims**
   - (brick, stone, and precast coping)
   - knowledge of material properties
   - knowledge of specific handling requirements
   - knowledge of measurements
   - knowledge of measuring equipment
   - knowledge of types of grouts and requirements
   - knowledge of adhesive requirements
   - knowledge of mortar requirements
   - knowledge of cleaning
   - knowledge of leveling techniques and requirements
   - knowledge of architectural effects
   - knowledge of mitering
   - knowledge of manufacturer’s specifications
   - knowledge of control joints
   - knowledge of code requirements
   - knowledge of plans and specifications

3. **Checking for level placement of materials**
   - knowledge of leveling equipment
   - knowledge of leveling techniques and requirements
   - knowledge of code requirements
   - knowledge of plans and specifications
## Content Area H
### Accessory Work

| 1. Installing fencing | knowledge of state and local codes  
|                       | knowledge of location requirements  
|                       | knowledge of picket spacing  
|                       | knowledge of safety requirements  
|                       | knowledge of barrier code and insurance requirements |
| 2. Installing diving boards and diving platforms | knowledge of materials for diving boards  
|                                                   | knowledge of installation requirements  
|                                                   | knowledge of safety requirements  
|                                                   | knowledge of proper placement  
|                                                   | knowledge of manufacturer’s specifications  
|                                                   | knowledge of bonding requirements |
| 3. Installing slides | knowledge of materials for slides  
|                       | knowledge of installation requirements  
|                       | knowledge of proper placement  
|                       | knowledge of safety requirements  
|                       | knowledge of manufacturer’s specifications  
|                       | knowledge of bonding requirements |
| 4. Installing auxiliary lighting | knowledge of fiber optic lighting  
|                                   | knowledge of low voltage accent lighting  
|                                   | knowledge of manufacturer’s specifications  
|                                   | knowledge of proximity location  
|                                   | knowledge of NEC requirements |
| 5. Installing alternate sanitation devices | knowledge of different types of devices  
|                                          | knowledge of manufacturer’s specifications  
|                                          | knowledge of installation  
|                                          | knowledge of different device applications  
|                                          | knowledge of scope of work |

## Content Area I
### Interior Surface Preparation and Finishing

| 1. Performing interior pool and spa clean-outs | knowledge of pool draining procedures  
|                                             | knowledge of possible uplift  
|                                             | knowledge of chemicals  
|                                             | knowledge of cleaning solutions  
|                                             | knowledge of cleaning procedures |
| 2. Performing interior pool and spa finishes of concrete pools | knowledge of concrete requirements  
|                                                            | knowledge of concrete testing  
|                                                            | knowledge of concrete properties  
|                                                            | knowledge of finishing and brazing  
|                                                            | knowledge of surface adhesion |
| 3. Installing lining in vinyl-lined pools | knowledge of materials  
|                                         | knowledge of methods  
|                                         | knowledge of soils and stabilization  
|                                         | knowledge of retaining walls  
|                                         | knowledge of coping  
|                                         | knowledge of leveling and installing  
|                                         | knowledge of anchoring  
|                                         | knowledge of manufacturer’s specifications |

## Content Area J
### Start Up

| 1. Pre-testing fill water | knowledge of water chemistry  
|                           | knowledge of testing procedures and requirements  
|                           | knowledge of reagents  
|                           | knowledge of saturation  
|                           | knowledge of pH  
|                           | knowledge of total alkalinity  
|                           | knowledge of hardness  
|                           | knowledge of prefiltering procedures  
|                           | knowledge of TDS levels |
| 2. Testing filters and filtration | knowledge of pressurizing procedures and requirements  
|                                    | knowledge of turnover rates  
|                                    | knowledge of pumps  
|                                    | knowledge testing procedures  
|                                    | knowledge of manufacturer’s specifications |
| 3. Balancing pool water | knowledge of water chemistry  
|                          | knowledge of testing procedures and requirements  
|                          | knowledge of solutions  
|                          | knowledge of reagents |
knowledge of saturation
knowledge of pH
knowledge of total alkalinity
knowledge of hardness
knowledge of disinfecting
knowledge of sanitizing
knowledge of safety requirements
knowledge of chemical dangers
knowledge of algae identification

2. Sanitizing pools and spas through chlorination
knowledge of water chemistry
knowledge of pH
knowledge of pool chemicals
knowledge of effects of pool chemicals
knowledge of practices of pool chemicals
knowledge of safety requirements
knowledge of dangers of chlorinating agents
knowledge of chlorinating procedures
knowledge of chemical balancing techniques and requirements
knowledge of testing techniques and requirements
knowledge of reagents
knowledge of adjusting techniques and requirements

3. Performing shock treatments or super-chlorinations
knowledge of water chemistry
knowledge of pH
knowledge of pool chemicals
knowledge of effects of pool chemicals
knowledge of safety requirements
knowledge of dangers of chlorinating agents
knowledge of chlorinating procedures and techniques
knowledge of chemical balancing
knowledge of testing techniques and requirements
knowledge of reagents
knowledge of adjusting techniques and requirements
knowledge of identifying chemical demand
knowledge of algae identification

4. Determining breakpoint chlorinations
knowledge of pH
knowledge of pool chemicals
knowledge of effects of pool chemicals
knowledge of practices of pool chemicals
knowledge of safety requirements
knowledge of dangers of chlorinating agents
knowledge of chlorinating requirements
knowledge of chlorinating procedures
knowledge of chemical balancing techniques and requirements
knowledge of testing techniques and requirements
knowledge of reagents

4. Starting pool and spa auxiliary equipment
knowledge of manufacturer’s specifications
knowledge of system design
knowledge of system calibration
knowledge of turnover rate

5. Testing heating equipment
knowledge of wiring
knowledge of fuels
knowledge of solar input
knowledge of testing procedures
knowledge of temperature measurement
knowledge of system design
knowledge of exhaust venting
knowledge of manufacturer’s specification
knowledge of types of heaters

6. Testing pump
knowledge of testing procedures
knowledge of pump requirements
knowledge of system design
knowledge of hydraulics

7. Performing final pool and spa clean-ups
knowledge of material procedures
knowledge of safety requirements

Content Area K
Service and Maintenance

1. Demonstrating pool operation to owners
knowledge of mechanical and hydraulic systems
knowledge of chemical systems
knowledge of general pool care requirements
knowledge of communicating safety requirements
knowledge of equipment
knowledge of communication skills
knowledge of daily reports
knowledge of maintenance procedures
5. **Sanitizing pools and spas through oxidation**
   - knowledge of effects of pool chemicals
   - knowledge of practices of pool chemicals
   - knowledge of safety requirements
   - knowledge of chemical balancing techniques and requirements
   - knowledge of testing techniques and requirements
   - knowledge of reagents
   - knowledge of adjusting techniques and requirements

6. **Checking accurate turbidity**
   - knowledge of testing techniques and requirements
   - knowledge of reagents
   - knowledge of adjusting techniques and requirements

7. **Testing and adjusting pH values**
   - knowledge of water chemistry
   - knowledge of pH
   - knowledge of pool chemicals
   - knowledge of effects of pool chemicals
   - knowledge of safety requirements
   - knowledge of dangers of chlorinating agents
   - knowledge of chlorinating requirements
   - knowledge of chlorinating procedures
   - knowledge of chemical balancing techniques and requirements
   - knowledge of testing techniques and requirements
   - knowledge of reagents
   - knowledge of adjusting techniques and requirements

8. **Testing and adjusting water hardness**
   - knowledge of water chemistry
   - knowledge of pH
   - knowledge of pool chemicals
   - knowledge of effects of pool chemicals
   - knowledge of practices of pool chemicals
   - knowledge of safety requirements
   - knowledge of dangers of chlorinating agents
   - knowledge of chlorinating requirements
   - knowledge of chlorinating procedures
   - knowledge of chemical balancing techniques and requirements

9. **Testing and adjusting total alkalinity**
   - knowledge of water chemistry
   - knowledge of pH
   - knowledge of pool chemicals
   - knowledge of effects of pool chemicals
   - knowledge of safety requirements
   - knowledge of dangers of chlorinating agents
   - knowledge of chlorinating requirements
   - knowledge of chlorinating procedures
   - knowledge of chemical balancing techniques and requirements
   - knowledge of testing techniques and requirements
   - knowledge of reagents
   - knowledge of adjusting techniques and requirements

10. **Testing and adjusting cyanuric acid**
    - knowledge of water chemistry
    - knowledge of pH
    - knowledge of pool chemicals
    - knowledge of effects of pool chemicals
    - knowledge of safety requirements
    - knowledge of dangers of chlorinating agents
    - knowledge of chlorinating requirements
    - knowledge of chlorinating procedures
    - knowledge of chemical balancing techniques and requirements
    - knowledge of testing techniques and requirements
    - knowledge of reagents
    - knowledge of adjusting techniques and requirements

11. **Testing and adjusting metals**
    - knowledge of water chemistry
    - knowledge of pool chemicals
    - knowledge of effects of pool chemicals
    - knowledge of safety requirements
    - knowledge of dangers of chlorinating agents
    - knowledge of chlorinating procedures
    - knowledge of chemical balancing techniques and requirements
knowledge of testing techniques and requirements
knowledge of reagents
knowledge of adjusting techniques and requirements
knowledge of sequestering agents

12. Cleaning D.E. filters by backwashing and jet spraying
knowledge of system design
knowledge of pump requirements
knowledge of flow rates
knowledge of safety requirements
knowledge of testing procedures
knowledge of water clarity
knowledge of gauges
knowledge of drainage
knowledge of valves
knowledge of filter media disposal

13. Backwashing sand filters
knowledge of system design
knowledge of pump requirements
knowledge of flow rates
knowledge of safety requirements
knowledge of testing procedures
knowledge of water clarity
knowledge of gauges
knowledge of drainage
knowledge of valves
knowledge of manufacturer’s specifications

14. Using sodium hypochlorite for disinfecting and deck cleaning
knowledge of safety requirements
knowledge of chemical properties
knowledge of mixing procedures
knowledge of chemical effects
knowledge of chemical balancing techniques and requirements
knowledge of storage procedures and requirements

15. Using calcium hypochlorite to sanitize decks and locker rooms
knowledge of safety requirements
knowledge of chemicals
knowledge of chemical properties
knowledge of mixing procedures
knowledge of chemical effects
knowledge of chemical balancing techniques and requirements

16. Using other pool sanitizers (e.g., bromine, iodine, ozone, ultraviolet, silver and electrolytic cells)
knowledge of safety requirements
knowledge of chemicals
knowledge of chemical properties
knowledge of mixing procedures
knowledge of chemical effects
knowledge of chemical balancing techniques and requirements
knowledge of chemical storage procedures and requirements
knowledge of chemical application procedures and requirements

17. Using other pool chemicals (e.g., flocculents, algicides, sequestering agents, degreasers and defoamers)
knowledge of safety requirements
knowledge of chemicals
knowledge of chemical properties
knowledge of mixing procedures
knowledge of filtration requirements
knowledge of filtration media
knowledge of chemical effects
knowledge of chemical balancing techniques and requirements
knowledge of chemical storage procedures and requirements

18. Testing and adjusting water saturation and undersaturation
knowledge of water chemistry
knowledge of pH
knowledge of pool chemicals
knowledge of effects of pool chemicals
knowledge of safety requirements
knowledge of chlorinating techniques and procedures
knowledge of chemical balancing techniques and requirements
knowledge of testing procedures
knowledge of reagents
knowledge of adjusting procedures
knowledge of Langlier Index
19. **Identify the effect of chemical balances on staining**
- knowledge of safety requirements
- knowledge of chemicals
- knowledge of chemical properties
- knowledge of mixing procedures
- knowledge of chemical effects
- knowledge of storage procedures and requirements

20. **Replacing light bulbs and underwater lights**
- knowledge of different voltage lights
- knowledge of proper safety procedures and requirements
- knowledge of importance of ground fault interrupter
- knowledge of safe wiring and sealing water out
- knowledge of material specifications
- knowledge of bonding and grounding requirements
- knowledge of manufacturer’s specifications

21. **Utilizing pool blankets and covers**
- knowledge of materials and types
- knowledge of positives and negatives of pool blankets and covers
- knowledge of the properties of materials
- knowledge of safety requirements
- knowledge of installation
- knowledge of securing installation
- knowledge of chemical balance effects

22. **Maintaining and repairing plumbing equipment**
- knowledge of safety requirements
- knowledge of piping requirements
- knowledge of fittings
- knowledge of pipe fittings
- knowledge of piping protection
- knowledge of pressure requirements
- knowledge of gauges
- knowledge of pressure testing
- knowledge of flow rates
- knowledge of pumps
- knowledge of leak detection

23. **Maintaining and repairing decks**
- knowledge of bonding agents for adhesion of new material to old
- knowledge of cleaning in preparation for repair
- knowledge of safety requirements

24. **Maintaining and repairing accessory fixtures**
- knowledge of safety requirements
- knowledge of solar heating
- knowledge of conventional heating
- knowledge of materials
- knowledge of the properties of materials
- knowledge of procedures
- knowledge of material handling
- knowledge of manufacturer’s specifications

25. **Maintaining and repairing pool shells**
- knowledge of leak detection
- knowledge of leak testing
- knowledge of safety requirements
- knowledge of materials
- knowledge of the properties of materials
- knowledge of crack repair procedures
- knowledge of recoating procedures

26. **Cleaning cartridge filters**
- knowledge of system design
- knowledge of pump requirements
- knowledge of flow rates
- knowledge of safety requirements
- knowledge of testing procedures
- knowledge of water clarity
- knowledge of gauges
- knowledge of drainage
- knowledge of valves
- knowledge of manufacturer’s specifications

27. **Performing heater care and maintenance**
- knowledge of safety requirements
- knowledge of testing procedures and requirements
- knowledge of system design
- knowledge of system capacity
- knowledge of temperature measurements
- knowledge of effects of temperature
- knowledge of changes in temperature
- knowledge of effects of water chemistry on heater components
- knowledge of pool chemistry
1. **Using jackhammers**
   knowledge of safety requirements
   knowledge of OSHA requirements
   knowledge of equipment characteristics

2. **Using saw cutting machines**
   knowledge of safety requirements
   knowledge of OSHA requirements
   knowledge of equipment characteristics

3. **Using bobcats or backhoes**
   knowledge of safety requirements
   knowledge of OSHA requirements
   knowledge of equipment characteristics
   knowledge of traffic regulations

4. **Using compressors**
   knowledge of safety requirements
   knowledge of OSHA requirements
   knowledge of pressure regulators
   knowledge of pneumatic tools

5. **Using concrete pumps**
   knowledge of safety requirements
   knowledge of OSHA requirements
   knowledge of concrete properties
   knowledge of concrete procedures
   knowledge of concrete testing
   knowledge of concrete placement