



CONSTRUCTION TECHNOLOGIES 46.0415.00

EMBEDDED MATH CREDIT CROSSWALK

The Construction Technologies program has been recognized by the Arizona State Board of Career and Technical Education (CTE) as eligible for consideration by local governing boards to grant 1 credit of 4th-year high school math. This is the result of a committee analysis completed in May 2026.

Note: AZ High School Math Standards are highlighted..

STANDARD 1.0 MAINTAIN A SAFE WORK ENVIRONMENT

- 1.1 Comply with OSHA's (Occupational Health and Safety Administration) safety and health standards [e.g., safe work attire and PPE (personal protective equipment); fall protection requirements; lifting procedures; stuck-by, caught-in, and caught between hazards; lockout tagout (LOTO) procedure; fire protection plan; emergency plan; and Safety Data Sheets (SDS)]
- 1.2 Explain safe work procedures around electrical hazards
- 1.3 Identify types of fires and the appropriate use of fire extinguishers
- 1.4 Describe methods to establish work zone safety per Standard, U.S. Code of Federal Regulations 1926 (i.e., danger signs, caution signs, information signs, safety instruction signs, barricades and barriers, etc.)
- 1.5 Practice safe use, maintenance, and storage of hand tools, power tools, and equipment according to manufacturer guidelines
- 1.6 Follow good housekeeping procedures for the worksite (e.g., keeping the work area clean, storing materials properly, eliminating hazards, performing safety checks, and reporting injuries, incidents, and near misses)

Geometry G.G-SRT.C.7 Explain and use the relationship between the sine and cosine of complementary angles.

Rationale: Understand the safe angle for ladder distance from the wall. Use Pythagorean theorem and ratios to calculate stacking materials. Use sine and cosine to determine angle height to base ratios with scaffolding as the preset figure.

STANDARD 2.0 APPLY CONSTRUCTION MATH SKILLS

- 2.1 Add, subtract, multiply, and divide whole numbers
- 2.2 Add, subtract, multiply, and divide fractions
- 2.3 Add, subtract, multiply, and divide decimals
- 2.4 Convert decimals, fractions, and percentages
- 2.5 Use English and metric rulers and measuring tapes
- 2.6 Identify common length, weight, volume, and temperature units in inch-pounds and metric systems and convert them into other comparable units

Geometry G.G.MG.A.3 Apply geometric methods to solve design problems utilizing real-world context

Quantitative Reasoning QR.NR.1 Represent quantities, using equivalent forms when appropriate, to investigate and describe quantitative and geometric relationships and solve problems in real-world contexts.

Rationale: Estimate volumes/shapes (concrete). Use volume formulas to calculate conversions (i.e., $\text{ft}^3 - \text{yd}^3$)
Lesson Example: Calculate the volume of a concrete slab.

- 2.7 Identify angle types
- 2.8 Identify common geometric shapes and summarize their qualities
- 2.9 Calculate the area of two-dimensional shapes

Geometry GG-GNQ.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world context.

Geometry G.G-SRT.C.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

Geometry GG-SRT.C.8 Use trigonometric ratios (including inverse trigonometric ratios) and the Pythagorean Theorem to find unknown measurements in right triangles utilizing real-world context.

Rationale: Calculate and convert area using the Pythagorean theorem. Use the 3-4-5 rule to make a corner in a square building. Use ratios for trusses, rafters and stairs. Design a rafter for a triangular roof.

- 2.10 Calculate the volume of three-dimensional shapes

Geometry GG-GNQ.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world context.

Geometry G.G-GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems utilizing real-world context.

Rationale: Understand 3D shape calculations for cylinders, prisms, pipe section values, footings, and sidewalks.

- 2.11 Calculate the quantities of materials needed for a job

Geometry G.N-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world Context

Quantitative Reasoning QR.NR.4: Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Perform calculations without a blueprint. Estimate cost, materials, and waste.

- 2.12 Calculate cost estimate based on the job specifications (i.e., timeline, materials, equipment, labor, etc.)

Quantitative Reasoning QR.CR.2 Compare, reason and communicate about proportional and non-proportional models utilizing real-world contexts.

Geometry G.N-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world context.

Quantitative Reasoning QR.NR.4: Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Use proportional models to calculate labor and materials.

STANDARD 3.0 USE CONSTRUCTION DOCUMENTS AND TECHNOLOGY TOOLS

- 3.1 Describe guidelines and details provided by construction documents (i.e., blueprint, diagrams, drawings, specification sheets, site layout plans, cutting list, schedule, etc.)

Geometry G.N-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world context.

Rationale: Scale cut list for the size of project pieces.

- 3.2 Identify six types of construction drawings and explain their use (e.g., civil plans, architectural plans, structural plans, mechanical plans, plumbing/piping, and electrical plans)
- 3.3 Explain the basic components of a construction drawing (e.g., title block, border, drawing area, revision block, legend, and north arrow)
- 3.4 Explain drawing elements (i.e., lines, symbols, keynotes, etc.)
- 3.5 Explain how dimensions relate to drawing scales

Geometry G.G-SRT.A.1 Verify experimentally the properties of dilations given by a center and a scale factor: a. Dilation takes a line not passing through the center of the dilation to a parallel line and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

Rationale: Using scale factor and dilation to connect measurement.

- 3.6 Use scales to interpret drawing dimensions (e.g., engineer's scales, architect's scales, and metric scale)

Geometry G.N-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world context.

Rationale: Interpret plans (shape) to actual locations (transformations and origins).

- 3.7 Explain the importance of building codes (i.e., National Electric Code, IBC, Plumbing Code, state/county/city codes, Americans with Disabilities Act, etc.)
- 3.8 Identify software applications and technology tools used in construction [i.e., electronic software (email, operating system, spreadsheet, word processing, text messaging, instant messaging), radios, intercoms, smartphone, drones, robots, AI, etc.]

STANDARD 4.0 USE HAND, POWER, AND PNEUMATIC TOOLS

- 4.1 Identify and explain the use of common hand tools (i.e., hammers and demolition tools, chisels and punches, screwdrivers, socket wrenches, pliers, etc.)
- 4.2 Identify and explain the use of layout, marking, and measurement tools (i.e., metal rule, carpenter's square, engineer's square, marking gauge, sliding T-bevel, marking knife, etc.)

- 4.3 Identify and describe how to use common power/pneumatic tools [i.e., electric drill, jack hammer, saws (jigsaw, circular, reciprocating, cutoff, miter, table) grinders (portable, bench), sanders, wrenches, nail and staple guns, etc.]

STANDARDS 5.0 DEMONSTRATE MASONRY WORK

- 5.1 Describe the benefits of masonry construction (i.e., structural integrity, durability, fire resistance, aesthetic appeal, thermal efficiency, etc.)
- 5.2 Identify basic masonry materials (i.e., stone, bricks, concrete blocks, glass bricks, stucco, etc.)
- 5.3 Explain basic masonry techniques (e.g., bricklaying, dry-stone masonry, rubble masonry, bonding, pointing, and ashlar masonry)
- 5.4 Explain the primary functions of mortar and grout in masonry construction

Quantitative Reasoning QR.CR.2 Compare, reason and communicate about proportional and non-proportional models utilizing real-world contexts.

Rationale: Communicate proportional reasoning for the ratio of water, sand, and partial cement.

- 5.5 Mix mortar and grout for masonry installation

Quantitative Reasoning QR.CR.2 Compare, reason and communicate about proportional and non-proportional models utilizing real-world contexts.

Rationale: Use ratios and formulas to mix mortar and grout to specific tolerances.

- 5.6 Use masonry tools (i.e., wire brush, hammer, jointers, masonry square, masonry saw, plumb bob, chisel, mortar board, straight edge, etc.)
- 5.7 Calculate masonry work according to project specifications (i.e., volume of brick, brick size, number of bricks, quantity of mortar, etc.)

Geometry G.G-GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems utilizing real-world context.

Quantitative Reasoning QR.CR.2 Compare, reason and communicate about proportional and non-proportional models utilizing real-world contexts.

Rationale: Understand mixing ratios and identification of materials Use 3-4-5 rule/Pythagorean theorem to establish a 90-degree corner, calc length of sides, verify if a corner is squared. Calculate truly square structures (e.g., angled walls) to determine out missing angles (i.e., calculate 45 degrees for a step wall with a corner)

- 5.8 Lay brick block to specification

Quantitative Reasoning QR.CR.2 Compare, reason and communicate about proportional and non-proportional models utilizing real-world contexts.

Rationale: Use proportional modelling.

- 5.9 Clean brick/block work surfaces and cavities and remove excess mortar
- 5.10 Use a level to evaluate masonry work

STANDARD 6.0 DEMONSTRATE FLOOR AND CEILING FRAMING

- 6.1 Identify the components of a floor system (e.g., floor covering, underlayment, subfloor, and floor joists)
- 6.2 Explain the function of the floor plan (e.g., to illustrate a property's design and structural details such as walls, windows, doors, and stairs of a property)
- 6.3 Describe what the floor framing plan shows (i.e., the layout of the supporting features such as bearing walls, columns, beams, girders, etc.)
- 6.4 Identify types of floor frames (i.e., floor joist, head joist, blocking, beam, sill plate, subfloor, etc.)
- 6.5 Identify fasteners used in floor systems (i.e., screws, nuts and bolts, washers, self-drilling screws, anchor bolts, rivets, etc.)
- 6.6 Identify ceiling components (i.e., joists, noggins or struts, lateral restraints, insulation and ceiling board, coving, etc.)
- 6.7 Identify ceiling accessories (i.e., trim, crown molding, adhesive, etc.)
- 6.8 Calculate the amount of material needed to frame a floor and the ceiling

Quantitative Reasoning QR.FR.2 Understand and apply strategies to monitor income and expenses, plan for spending, implement a diversified investment strategy, and save for future goals.

Quantitative Reasoning QR.NR.1 Represent quantities, using equivalent forms when appropriate, to investigate and describe quantitative and geometric relationships and solve problems in real-world contexts.

Quantitative Reasoning QR.NR.4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Apply strategies to monitor expenses and plan for spending. Calculate area and volume. Estimate waste.

6.9 Layout and construct a floor system

Geometry G.G-CO.C.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

Rationale: Square off a room and structure a finished floor. Estimate layouts for pop outs and gazebos. Use the same math applications for floors and walls including a wood frame floor.

6.10 Layout and construct ceiling framing

Geometry G.G-CO.C.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

Rationale: Use calculations to accommodate space for sky lights, chimney, fans, HVAC, emergency access hatch, etc.

STANDARD 7.0 DEMONSTRATE INTERIOR AND EXTERIOR WALL FRAMING

7.1 Define wall framing (e.g., the vertical and horizontal members of exterior walls and interior partitions)

Geometry G.G-GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects

Rationale: Review cuts are cross-sections of different 3-D shapes.

7.2 Identify wall framing specifications and building requirements (i.e., IRC custom and standard codes, stud size for interior load, wall weight, location of windows, doors, electrics, plumbing, HVAC, etc.)

Geometry G.G-GPE.B.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

Rationale: Use parallel and perpendicular lines to set posts. Find the center of a rough opening wall or opening and calculate the middle and sides.

7.3 Layout wall lines including plates, corner posts, door and window openings, pony/half wall, partition Ts, bracing, and firestops

Geometry G.G-GPE.B.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

Rationale: Use parallel and perpendicular lines to bisect the openings including rake wall calculations with pitch.

7.4 Calculate the materials, fasteners, and adhesives required to frame walls

Quantitative Reasoning QR.FR.2 Understand and apply strategies to monitor income and expenses, plan for spending, implement a diversified investment strategy, and save for future goals.

Quantitative Reasoning QR.NR.4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Estimate and plan spending.

7.5 Calculate lumber, panel, and concrete quantities

Quantitative Reasoning QR.NR.1 Represent quantities, using equivalent forms when appropriate, to investigate and describe quantitative and geometric relationships and solve problems in real-world contexts.

Quantitative Reasoning QR.NR.4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Quantitative Reasoning QR.FR.2 Understand and apply strategies to monitor income and expenses, plan for spending, implement a diversified investment strategy, and save for future goals.

Rationale: Estimate and plan for spending.

7.6 Assemble wood and metal stud walls

Geometry G.G-GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Rationale: Understand cuts are cross-sections of different 3-D shapes.

7.7 Assemble, erect, and brace exterior walls for a framed building

Geometry G.G-GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects

Rationale: Review cuts are cross-sections of different 3-D shapes.

STANDARD 8.0 DEMONSTRATE ROOF FRAMING AND FINISHING

8.1 Describe the components of a roof plan [i.e., roof design (e.g., gable, gambrel, hip, mansard, flat), rafters vs trusses, roofing application, roofing sheathing, and roofing finish]

- 8.2 Identify the common layers of a roof (i.e., shingles, flashing, underlayment, ice and water protector, roof frame, roof's edge, etc.)
- 8.3 Describe the common roofing applications (e.g., self-adhered, heat-applied, liquid or cold applied, and mechanically attached)
- 8.4 Discuss the factors that determine what roofing application to use (i.e., cost, local building codes, energy efficiency, maintenance, lifespan, etc.)
- 8.5 Define roof sheathing and explain its importance
- 8.6 Explain the main framing structures of a roof (e.g., rafters and trusses) and the roof framing parts (e.g., rafters, trusses, and joists)
- 8.7 Estimate the materials used in framing and sheathing a roof

Geometry G.G-CO.D.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle; with a variety of tools and methods.

Quantitative Reasoning QR.NR.4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Measure angles of speed-squares and tri-squares Use and justify estimating skills

- 8.8 Calculate lumber and panel quantities

Quantitative Reasoning QR.NR.4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Use and justify estimating skills

- 8.9 Frame and finish a roof

Geometry G.N-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. Include problem-solving opportunities utilizing real-world context.

Quantitative Reasoning QR.NR.1 Represent quantities, using equivalent forms when appropriate, to investigate and describe quantitative and geometric relationships and solve problems in real-world contexts.

Quantitative Reasoning QR.NR.3 Understand and compare magnitudes of numbers utilizing real-world context. Understand the importance and impact of unit selection.

Rationale: Use 3-4-5 ratios to measure slope and rise over run and/or pitch ratio (before sheathing a roof). Use trigonometry ratios and calculate the length of a hypotenuse (same as a wall).

STANDARD 9.0 ANALYZE GREEN BUILDING SUSTAINABILITY

- 9.1 Explain a green or sustainable building (e.g., a physical barrier separates the interior of the building from the outside environment to protect the building from the weather, to separate conditioned space to the unconditioned space, and to save energy)
- 9.2 Identify the elements of building envelope (e.g., foundation, exterior walls, windows, doors, and roof)
- 9.3 Identify insulation materials for optimizing energy efficiency and maintaining comfortable indoor temperatures

Quantitative Reasoning QR.CR.2: Compare, reason, and communicate about proportional and non-proportional models utilizing real-world contexts

Algebra 1 A1.F-LE.A Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

Algebra 1 A1.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).

Rationale: Analyze and compare efficiencies of insulation types. Estimate material. Use a linear model and optimize insulation R-values, calculate total insulation costs, and determine energy savings, ensuring compliance with energy-efficient building standards. Solve linear equations and analyze functions. Lesson Example Thermodynamics/Conservation of Energy.

- 9.4 Describe tools and materials used to construct and seal a new home or building
- 9.5 Explain procedures to seal the building envelope (i.e., renewable energy sources, rainscreen systems, self-cleaning technology, materials with good thermal inertia, metal roofs, windows located to capture natural light, facades that reduce energy inputs, etc.)
- 9.6 Compare, select, and use products to seal leaks and maximize energy efficiency

STANDARD 10.O INSTALL EXTERIOR FINISHES

- 10.1 Differentiate among finishes, trim, and molding
- 10.2 Explain the functional and aesthetic purposes of exterior finishes applied around openings, windows, doors, attic vents, crawl space vents, shutters, etc.
- 10.3 Identify examples of exterior molding and trim [i.e., gable pediment, brackets, polyvinyl chloride (PVC), wood, etc.]
- 10.4 Explain common exterior trim terms (i.e., fascia, frieze, rake, barge, soffit, box end, gutters, etc.)
- 10.5 Describe types and applications of exterior finishing materials (e.g., stucco, wood siding, vinyl and metal siding, fiber cement siding, and brick veneer)
- 10.6 Apply exterior finishes according to the plan (i.e., stucco, siding, soffits, wainscot, etc.)

Quantitative Reasoning QR.NR.4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Geometry G.GMD A.3 Use volume formulas for cylinders, pyramids, cones and spheres to solve problems utilizing real-world context.

Rationale: Use volume formula to determine the amount of stucco used (3D estimation). Calculate the Area and volume to decide how much material is needed.

STANDARD 11.O INSTALL INTERIOR TRIM AND STAIRS

- 11.1 Identify types of millwork (i.e., floors, doors, panels, stair parts, cabinets, moldings, cornices and archways, etc.)
- 11.2 Define interior trim (e.g., the edge material used around doors, windows, between different floors, and on walls and ceilings)
- 11.3 Identify types of interior trim (i.e., wood, fiberboard, vinyl, fiber cement, wood-plastic, etc.)
- 11.4 Explain the Rule of 25 for safe comfortable stairs
- 11.5 Identify types of stair railings (i.e., steel, aluminum, and wrought iron for commercial and industrial settings; wood provides a more classic appearance, etc.)
- 11.6 Design and layout ideas for staircases

Algebra I A1.F-LE.B.5 Interpret the parameters in a linear or exponential function with integer exponents utilizing real world context.

Rationale: Calculate run and rise on slope. Apply the rule of 25 for horizontal and slope.

- 11.7 Calculate the cost to install a small stair unit

Quantitative Reasoning QR.NR.4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Calculate materials and overage.

STANDARD 12.O ASSEMBLE PIPING, WASTE, AND VENTING SYSTEMS

- 12.1 Identify basic piping systems (e.g., water supply, drainage, and venting)
- 12.2 Identify the major components of a water distribution system (i.e., pipes, valves, vents, traps, sewer lines, pumps, etc.)
- 12.3 Explain how a plumbing venting system works (e.g., ensures fresh air gets into the drainage pipes so that water can move from the toilet, sink, or shower)
- 12.4 Explain the function of plumbing fixtures and equipment (i.e., boilers, water heaters, etc.)
- 12.5 Measure, cut, and join plastic and copper piping

Algebra I A1.A-REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Quantitative Reasoning QR NR.1 Represent quantities, using equivalent forms when appropriate, to investigate and describe quantitative and geometric relationships and solve problems in real-world contexts.

Rationale: Use linear formula (slope = water per flush). Determine circumference, of pipe size and bends.

- 12.6 Explain how an efficient drainage and water distribution system affects the usage of water

Quantitative Reasoning QR CR 2 Compare, reason and communicate about proportional and non-proportional models utilizing real-world contexts.

Rationale: Determine flow velocity based on angles and slopes.

- 12.7 Assemble a soil waste and vent (plumbing) system

Algebra I A1.A-REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Quantitative Reasoning QR NR.1 Represent quantities, using equivalent forms when appropriate, to investigate and describe quantitative and geometric relationships and solve problems in real-world contexts.

Rationale: Use linear formula (slope = water per flush). Determine circumference, of pipe size and bends.

12.8 Assemble a water distribution system

Algebra 1 A1.N-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Rationale: Minimize waste and maximize labor and efficiency.

STANDARD 13.0 INSTALL ELECTRICAL COMPONENTS/SYSTEM

13.1 Refer to the NFPA 70E Standard for Electrical Safety in the Workplace (i.e., minimum approach distance, arc flash boundaries, lockout/tagout, appropriate PPE, etc.)

13.2 Explain Ohm's law of basic electrical theory (e.g., the relationship among voltage, resistance, and amperage in a circuit)

Algebra I A1.A-CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R .

Rationale: Rearrange Ohm's Law to solve unknown variables. Solve for Inverse operations. Substitute equations and unknown variables within the resistors (parallel or serial circuits).

13.3 Define electrical system (e.g., box containing electrical components that transport electrical power for electrical outlets, lights, and switches)

13.4 Identify and explain types of electrical systems (i.e., three-phase, single-phase, medium voltage, line voltage, low voltage, etc.)

13.5 Identify major components of an electrical system (i.e., resistor, capacitor, inductor, etc.)

13.6 Identify electrical materials used in construction projects (i.e., electrical box, wiring system, circuit breaker, power strip, digital multimeter, etc.)

13.7 Identify electrical tools and testing equipment (e.g., battery testers, voltage testers, wire tracers, outlet testers, circuit testers, multimeters, oscilloscopes, and generators)

13.8 Rough in electrical enclosures (e.g., switch boxes, outlet boxes, conduit fabrication, wire pulling, raceway, and box capacity)

Precalculus RFR.ETT.2 Apply the laws of sines and cosines to solve problems.

Quantitative Reasoning QR NR 4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Use trigonometry functions to estimate length, bend angles, and wire length. Determine the distance of conduit and angles for materials and apply different multipliers to bend conduit (tables and charts). Estimate box capacity and conductor capacity (volume).

13.9 Demonstrate the termination of electrical devices, appliances, light fixtures, and ceiling fans

STANDARD 14.0 INSTALL INTERIOR WALL AND CEILING FINISH

14.1 Identify types of wall and ceiling finishes (i.e., drywall, hardwood, fiberboard, particleboard, wood paneling, etc.)

14.2 Identify finishing tools (i.e., trowels, silica, sanders, screw guns, plastering tools, utility knife, dust mask, tape measure, etc.)

14.3 Describe and demonstrate techniques for handling, staging, storing, and cutting drywall and drywall materials

Geometry G.G-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects utilizing real-world context.

Rationale: Calculate joint compound for drywall and storing ratios for safety compliance.

14.4 Use fasteners, anchors, and adhesives to fasten drywall

Quantitative Reasoning QR NR 4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Calculate adhesive coverage calculations from pattern measurements and estimations.

14.5 Demonstrate drywall finishing techniques (i.e., use Portland or gypsum plaster, use tape and apply joint compound, use tape/mesh, install corner bead, etc.)

Quantitative Reasoning QR CR2 Compare, reason and communicate about proportional and non-proportional models utilizing real-world contexts.

Quantitative Reasoning QR NR 4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Use ratios to mix water and gypsum for application. Estimate and apply materials.

14.6 Demonstrate appropriate order, material use, and paint application for walls, trims, and ceilings

Geometry G.G-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects utilizing real-world context.

Quantitative Reasoning QR NR 4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Find the total paint coverage.

STANDARD 15.0 PREPARE, PLACE, AND FINISH CONCRETE

15.1 Identify uses of concrete (i.e., driveways, sidewalks, patios, foundation, floors, walls, etc.)

15.2 Refer to job specifications for materials needed to form, scaffold, and place concrete

Geometry G.G-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects utilizing real-world context.

Geometry G.G-GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems utilizing real-world context.

Quantitative Reasoning QR NR 4 Use and justify estimation skills, and know why, how, and when to estimate results. Assess and justify the reasonableness of estimations using the context and comparisons to other known values.

Rationale: Construct the form in various geometric shapes.

15.3 Explain the ingredients of concrete (e.g., cement, water, and sand and gravel aggregates)

Quantitative Reasoning QR CR2 Compare, reason and communicate about proportional and non-proportional models utilizing real-world contexts.

Rationale: Use proportional ratios (water to cement/sand aggregate).

15.4 Identify the properties of concrete (e.g., workability, strength, curability, creep, shrinkage, unit weight, modular ratio, and Poisson's ratio)

15.5 Identify equipment and tools for moving and handling concrete (i.e., wheelbarrows, belt conveyors, forklifts, trolleys, manual lifting, etc.)

15.6 Mix, convey, and finish concrete

Quantitative Reasoning QR CR2 Compare, reason and communicate about proportional and non-proportional models utilizing real-world contexts.

Rationale: Use proportional ratios (water to cement/sand aggregate).

15.7 Explain the concrete leveling process [e.g., when/why leveling is required, needed equipment (automatic level, tripod, leveling rod, and benchmark)]