LESSON PLAN 17

**DYSART UNIFIED - CTE 2013-2014**

COURSE: **Architectural Design Drafting**

PROGRAM: **Signature Architecture Program**

TEACHER(S): **Scott Thomas, M.Ed., MCCTE, CD**

CURRICULUM UNIT/TITLE: Introduction to Architectural Design Drafting

LESSON TITLE: Electrical Plans

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| **STANDARDS AND OBJECTIVES** |
| CTE PROGRAM STANDARD - MEASUREMENT CRITERIA | 8.4 Draft an electrical plan locating receptacle, switch, and lighting outlets |
| COMMON CORE STANDARDS | 1. CCSS.Math.Practice.MP1

Make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.1. CCSS.Math.Practice.MP2

Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.1. CCSS.Math.Practice.MP3

Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.1. CCSS.Math.Practice.MP4

Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.1. CCSS.Math.Practice.MP5

Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.1. CCSS.Math.Practice.MP6

Attend to precision. Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions. |
| OBJECTIVES | Lesson 17 - Electrical PlansTime Estimate: to be determined by student needs.Lesson Objectives• Differentiate between three phases of electrical installation: temporary, rough in, and finish.• Discern when it is appropriate to place electrical symbols on a floor plan and when they should be placed on a separate sheet.• Define (in Writing) basic electrical terms. (CCSS.ELA RST.11-12.4)• Cite (in Writing) rudimentary rules of electrical circuit design. (Applied Math)• Specify methods of wiring a home with energy conservation techniques. (Applied Math)• Articulate (in Writing) the advantages of home automation and identify three systems where automation is available.• Delineate basic electrical symbols, including switches, duplex receptacle outlets, ceiling and wall-mounted lights, and circuit lines.• Identify (in Writing) basic service specification requirements, including service capacity, service entrance, meter base, and distribution panel locations.• Demonstrate the use of metrics in electrical installations. (Applied Math)• Cite (in Writing) steps in drafting electrical floor plans. (Applied Math)• Explain (in Writing) the process for using CAD for electrical plans. (Applied Math) |
| CHECKLIST OF ESSENTIAL CONTENT -IDEAS TO BE COVERED: (Lesson summary) | * Differentiate between three phases of electrical installation: temporary, rough in, and finish.

• Discern when it is appropriate to place electrical symbols on a floor plan and when they should be placed on a separate sheet.• Define (in Writing) basic electrical terms.• Cite (in Writing) rudimentary rules of electrical circuit design. (Applied Math)• Specify methods of wiring a home with energy conservation techniques. (Applied Math)• Articulate (in Writing) the advantages of home automation and identify three systems where automation is available.• Delineate basic electrical symbols, including switches, duplex receptacle outlets, ceiling and wall-mounted lights, and circuit lines.• Identify (in Writing) basic service specification requirements, including service capacity, service entrance, meter base, and distribution panel locations.• Demonstrate the use of metrics in electrical installations. (Applied Math)• Cite (in Writing) steps in drafting electrical floor plans. (Applied Math)• Explain (in Writing) the process for using CADD for electrical plans. (Applied Math) |

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| **LESSON CONTENT**  |
| BELL WORK | None… |
| KEY VOCABULARY | Electrical plan, outlets, switches, electrical wiring, main panel, electrical easement. |
| TEACHER ACTIONS/ACTIVITIES: (include instructions with all resources) | STUDENT ACTIONS/ACTIVITIES:(include instructions with all resources) |
| Lecture, Demonstration, Small Group Instruction, Individual Instruction**Architecture: Residential Drafting and Design** by Wm. Scott Thomas, M.Ed., MCCTE, CD, 11th Edition, Goodheart-Willcox Publisher, Inc. | Sketches, Working Drawings, Hands-On Projects related to subject matter**Architecture: Residential Drafting and Design** by Wm. Scott Thomas, M.Ed., MCCTE, CD, 11th Edition, Goodheart-Willcox Publisher, Inc. |

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| ALIGNED COMMON CORE ACTIVITY(include instructions with all resources) | All aligned common core activities will vary in scope and complexity depending upon the needs of individual students. Instructions and resources for all assignments can and will vary also because of the needs of individual students. |
| CHECK FOR UNDERSTANDING - ASSESSMENT | Sketches, working drawings, tests, and quizzes**“Assignment 1 / Project 1” to be used for Lesson Plans 2–30.… This is a long-term architectural assignment/assessment.** |
| CLOSURE ACTIVITY | Detailed Review of Lesson Materials and Subject Matter |

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| **LESSON RESOURCES** |
| BOOKS/TEXTSSUPPLEMENTALSRESOURCES | **Architecture: Residential Drafting and Design** by Wm. Scott Thomas, M.Ed., MCCTE, CD, 11th Edition, Goodheart-Willcox Publisher, Inc. |
| HANDOUTSACTIVITIESINSTRUCTIONSRUBRICS | * Architectural sketches per subject matter
* CAD design drawings
* Manual technical sketching
* AIA / IRC / UBC
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| SUPPLIES NEEDED | CAD stations, paper, fountain pen/pencil |
| NOTES | The aligned common core activities will vary in scope and complexity, based upon the individual needs of students. This includes the instructions per assignment and all resources needed to complete these assignments.Assignments will vary in scope and complexity depending upon the needs of individual students.The length of this lesson can and will vary depending upon student needs. |