**Lesson Information**

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| Lesson: (3 of 3) System Design Length: 90 minutes  Unit: (1 of 3) System Basics  Course: HVAC |

**Content Assumptions**

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| Prior to this class, students have taken construction drawing and math classes as well as lesson 3, “Services,” of unit 1, “Basic Theory and Practice,” of the Electrical course. |

**Essential Questions**

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| 1. How are heating and cooling systems designed to fit heating and cooling loads? 2. How are manufacturers’ product data used to select heating and cooling equipment? |

**Objectives Assessments**

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| After completing this lesson, students will be able to:   1. Complete heating and cooling load calculations for a sample residence. 2. Use product data from manufacturers to select heating and cooling equipment. | 1. Load calculator tool — Instructor observation 2. Equipment list and rationale— rubric |

**Activities/Instruction**

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| **Show and Tell** (30 minutes)  Instructor provides background information about HVAC system design processes, including heating and cooling loads, electrical loads, factors affecting heat gains and losses, how to read construction drawings to find HVAC information, and how to find manufacturers’ product data for heating and cooling equipment. Students ask questions and contribute responses.  **Load Calculations…** (30 minutes)  Using the construction drawings and online tool listed in the Materials section, Instructor walks students through finding information on the drawings and using the tool to determine heating and cooling loads for the sample residences.  **...and Product Specifications** (30 minutes)  Using the heating and cooling loads determined from the load calculator as well as product specification guides (such as, but not limited to, those listed in the Materials section), students choose heating and cooling equipment for their sample residences. For each piece of equipment, students write their reasons for choosing it, including any relevant calculations. |

**Materials**

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| For students:   * Sample construction drawings of a simple residence that include HVAC information * http://www.loadcalc.net/ (Online tool for calculating residential heating and cooling loads) * http://www.reedconstructiondata.com/smartbuildingindex/central-heating-equipment/manufacturers/ (Database for heating equipment specifications) * http://www.ajaxboiler.com/wp-content/uploads/downloads/2011/09/Ajax-Catalog-2011-FINAL.pdf (Sample product specification guide for heating equipment) * http://www.ahridirectory.org/ahridirectory/pages/home.aspx (Database for cooling equipment specifications) * http://www.ahridirectory.org/ahridirectory/pages/ac/defaultSearch.aspx (Sample search for specification guides for cooling equipment)   For Instructor:   * [EQUIPMENT RATIONALE RUBRIC] |