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## Activity 2.3.6 Residential Electrical Systems

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### Introduction

We often take for granted that a light will illuminate when we flip a switch or that there will be an electrical outlet in a convenient location when we want to use a hair dryer. The fact that you do not notice the design of the lighting and electrical system when you are in a building indicates that the designer has done a good job anticipating the needs of the occupants. The electrical system must be designed and constructed according to the applicable building codes and regulations, but it should also be designed with the end user in mind.

In this activity you will research lighting and electrical design topics and review residential electrical code requirements. Using the knowledge you gain, you will layout the electrical system for your Affordable Housing Project.

### Equipment

- Computer with Internet access
- Print of your Affordable Housing Project floor plan(s)
- Common Electrical Symbols handout
- Residential Electrical Code Requirements

### Procedure

1. Visit the following websites:
  - U. S. Department of Energy Efficiency & Renewable Energy website at [http://www.energysavers.gov/your\\_home/lighting\\_daylighting/index.cfm/mytopic=11970](http://www.energysavers.gov/your_home/lighting_daylighting/index.cfm/mytopic=11970).
  - Whole Building Design Guide at <http://www.wbdg.org/resources/daylighting.php>
2. Review the information on lighting and daylighting and complete the following questions.
  - Describe the three general classifications of lighting uses.
  
  - What is daylighting?

- What are some advantages to providing daylighting?
  - Describe the best orientation for windows in a building in order to take advantage of daylighting.
3. Review your affordable home floor plans. Consider how you can better incorporate daylighting into your design. Mark at least one change on the floor plan(s) that will improve the energy efficiency of the home by increasing the daylighting. Make the change on your 3D model.
  4. Locate an electric meter (typically mounted on an exterior wall) and sketch your proposed location for the main panel on the print of your affordable home floor plan. Choose an accessible interior location for the panel that is hidden from public view – perhaps a closet or separate space. Include the electric meter and main panel in your 3D model.
  5. Sketch a preliminary electrical plan on your affordable home floor plan(s).
    - Sketch the location of outlets, lighting, and switches so as to comply with the Residential Electrical Code Requirements. Think about how each room will be used, what appliances and equipment are needed, and where extra convenience outlets should be placed.
    - Connect each lighting fixture to at least one switch (or as required by the Residential Electrical Code Requirements) using a switch leg (dashed line). Consider the need for three way switches.
    - Locate exterior outlets and lights as required by code.
    - Comply with all New Construction Guidelines for Habitat for Humanity.
  6. Include an electrical service line on your electronic site plan.
  7. (Optional) Revise your Affordable Home Project drawings to include your electrical design. You must determine the best place to show your electrical plan. Sometimes it is easiest to place it directly on a floor plan; other times you will need to prepare a separate electrical plan.

## Conclusion

1. How did you incorporate daylighting into your project?

