



SimBuilding Overview for Instructors

Introduction

As the design and operation of buildings becomes more scientifically based, technicians must now understand basic building science concepts. The Concord Consortium and Santa Fe Community College (SFCC) have developed innovative simulation games for teaching building science, integrating them into existing courses and evaluating their educational effectiveness.

What it Is

[SimBuilding](#) is a first-person virtual home inspection quiz game that introduces students to the blower door and infrared imager (IR) as building diagnostic tools and introduces a number of building science and home diagnostic concepts, including:

- Modes of heat transfer
- General rules of thumb for using and interpreting IR images
- Using blower door and IR in conjunction to evaluate insulation and air sealing
- R-values of different building materials and critical junctures requiring extra attention
- Recommended best practices and installation standards for wall and attic insulation

The 35 questions also provide practice evaluating the effectiveness of installed home retrofit work, asking students to determine if the work would pass or fail.

How it Works

Students walk around the home looking for “hot spots” with the IR. Each hot spot reveals a multiple-choice question for the student to answer. Whichever answer is selected, program feedback provides helpful learning tips.



Users follow the simple instructions in the game’s tutorial to navigate throughout the house. They have a virtual toolbox including an IR imager, a moisture meter, and a sensor ¹. Scanning the home with either the IR or the moisture meter reveals hot spots, indicated by dots on the walls, floors or ceilings. Users select the IR from the toolbox and point it at the spot to reveal the multiple-choice question.

¹ Moisture meter use limited. Sensor functionality pending.





How to Use It

The game is best suited to students with some experience with blower door and IR imagers, and some basic knowledge of the house as a system concept. If using the game as an introduction to these concepts, provide students with information covering the prerequisites listed below, either as assigned readings or as a classroom presentation. A suggested 3-hour course schedule:

- 1 hour – Presentation introducing blower door, IR imaging, and general terminology
- 1 hour – Students play the game
 - <http://energy.concord.org/simbuilding/game/index.html>
- 1 hour – Follow up discussion reviewing key concepts

Prerequisites

- General building science knowledge and the House as a System concept, including:
- Air leakage and its effects
- Methods of heat transfer
- R-value and different insulation types and properties
- Concept of blower door testing (they do not need to be able to use a blower door yet)
- Concept of IR imaging (they do not need to be able to use an IR imager yet)

Air Barrier

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BUILDING SCIENCE BASICS

The air barrier:

- Limits airflow between inside and outside.
- Is more difficult to identify.
- Is not always where you think it is.
- Is located by using a blower door.

Graphic developed for the US DOE WAP Standardized Curricula

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Suggested Support Materials

Standardized Curriculum Modules developed for DOE's Weatherization Assistance Program²:

- [Energy Movement](#)
- [House as A System](#)
- [Building Science Basics](#)
- [Interpreting Infrared](#)

² Available at <http://waptac.org/WAP-Standardized-Curricula/Energy-Auditor-002D-Single-Family-2002E0.aspx> each module includes presentation and lesson plan. Image taken from "Building Science Basics."

