# House as a System

# Quality Control Inspector

Learning Objectives

By attending this session, participants will be able to:

* Discuss the potential for interaction among building components and mechanical systems.
* Give examples of how air sealing a home can negatively affect indoor air quality.
* Recognize typical air leakage sites and know how to deal with them.

Key Terminology

Aldehydes

Backdraft

Bypass

Carbon monoxide (CO)

Chimney chase

Dropped soffit

Indoor air quality (IAQ)

Spauling

Stack effect

Vapor retarder

Supplemental Materials

Handouts & Resources

House as a System Quiz.

House as a System Quiz Answer Key.

Lstiburek, Joseph, and John Carmody. “Fundamentals of Moisture in Houses.” *Home Energy* Nov./Dec. 1995. <www.homeenergy.org>.

McWilliams, Jennifer A., and Iain S. Walker. “Retrofitting Residential HVAC Systems.” *Home Energy* Jan/Feb. 2005. <www.homeenergy.org>.

Partnership for Advancing Technology in Housing (PATH). *Your House is a System: Tips for the Handy Homeowner* Jan. 2006. <www.pathnet.org>.

Prowler, Don. “Mold and Moisture Dynamics.” Rev. Heinz Trechsel. WBDG.org. National Institute of Building Sciences. <www.wbdg.org>.

Van der Meer, Bill. “Avoiding Moisture Problems.” *The Weatherization Training Center Technical Update* *1* (Feb. 2003)

**Online Platform Lessons**

Use these online interactive training modules as prerequisites before students attend the course or as in-class computer lab sessions. Users must first create an account at [www.nterlearning.org](http://www.nterlearning.org) to access the lesson.

c- 5.1 Understanding Effective R-Value <https://www.nterlearning.org/web/guest/course-details?cid=247>

i- 3.1 Basics & Modes of Heat Transfer <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 3.2 Moisture <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 3.3 Driving Forces, Airflow & Stack Effect <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 3.4 Building Envelope, Thermal Envelope, Pressure Boundary & Conditioned Space  
<https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 3.5 House as a System - Part 1 <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 3.6 House as a System - Part 2 <https://www.nterlearning.org/web/guest/course-details?cid=249>

Classroom Props & Activities

**House of Pressure**: Illustrate the interrelationships of home mechanical systems, air-tightness, and connectivity to the basement or garage as they relate to energy efficiency and IAQ issues.

**Class Overview**

* Use the presentation and class discussion to teach students that each house is a system of interrelated components.
* Have students discuss the problems that can arise if:
  + A home with no exhaust fans or with kerosene space heaters is air sealed (moisture issues).
  + An older furnace is replaced with a 90+ direct vent appliance, orphaning the water heater (backdrafting).
* Introduce the concept of mounting savings.
  + Air sealing and insulating reduce load on heating and cooling appliances, making it possible to downsize equipment. Smaller equipment costs less to purchase and operate.
  + By sealing the ducts, we get conditioned air where it belongs, reducing the need for extra space heaters in rooms far from the heating source.
  + Air sealing and insulating the attic prevents warm, moist air from escaping, reducing residents’ heating bills and preventing ice dams and the costly repairs associated with them.