



WEATHERIZATION

TOPIC OF STUDY

Auditing



90 MINUTES

KEY TERMS

manometer
calibrated fan
depressurization
infiltration
exfiltration
Pascal (Pa)
CFM
CFM₅₀
CMF_{natural}

LESSON

Blower Door

BIG IDEA(S)

A blower door system uses air depressurization to find air leakages in the home.

OBJECTIVES

Students will:

- Describe the three major components of a door blower system
- Describe the reasons why a blower door test is used
- Identify the metrics used for measuring air leakage
- Identify methods for detecting leaks during depressurization

TASK LIST SUBCATEGORY

- 804 Identify infiltration and exfiltration points
- 805 Perform the energy audit procedure including set up and use of a door blower test
- 806 Apply math concepts to weatherization
- 810 Use energy efficiency industry vocabulary

OVERVIEW

The blower door system is used to measure air tightness and air leakage sites. This system uses depressurization as a way to determine leaks large and very small. This class prepares students for the Blower Door Lab.

STANDARDS

PA/SDP

- 3.1.12.D.** Analyze scale as a way of relating concepts and ideas to one another by some measure; Analyze and apply appropriate measurement scales when collecting data.
- 3.2.12.D.** Analyze and use the technological design process to solve problems. Assess all aspects of the problem, prioritize the necessary information and formulate questions that must be answered.
- 3.4.12.E7.** Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

INSTRUCTIONAL

TEXT/REFERENCES

Energy Conservation Handbook. pp. 26-28, 65-67, 198

MATERIALS NEEDED

MATERIALS

- manometer
- equipment for blower door setup
- lab energy house

Technology: Video projection (optional)





IMPLEMENTATION (LESSON PLAN)

ENGAGE

1. Watch the YouTube video of the procedure:
<https://www.youtube.com/watch?v=icZG05XU9pM>
2. Ask students to list all of the unfamiliar words they hear during the video

EXPLORE

1. Review the use of a blower door and key concepts.
2. After presenting concepts, ask *Think about house construction. Using your experience and guesses, what are the most common leakage areas in a house.* Take answers and highlight those that are common and add leakage points that didn't come up.

EXPLAIN

- Review the Key Concepts inset on p. 27. Use equipment for blower door if available to demonstrate key features, weight, as well as manometer

EXTEND/EVALUATE

1. Provide pre-drafted examples of rate of air leakage metrics and what variables are used in determining whether a house is leaky or not.
2. List ways auditors use to find different kinds of air leaks and how they might or might not be addressed.



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RESOURCES/LINKS

Smoke emitters for determining leaks:

https://www.youtube.com/watch?v=UB9_62qJSHo

Energy Audit Equipment: Good overview of all equipment used in all categories, starting with the Blower door:

<https://www.energyauditingblog.com/energy-audit-equipment/>

