



WEATHERIZATION

TOPIC OF STUDY

Health and Safety



80 MINUTES

KEY TERMS

indoor air quality (IAQ)
carbon monoxide
backdraft
evaporation
condensation
dewpoint

LESSON

Health and Safety in the Home: Indoor Air Quality

BIG IDEA(S)

Seen and unseen moisture issues within a house can pose health concerns. It's important for a house to have adequate ventilation so that moisture does not become a problem.

OBJECTIVES

Students will:

- Describe seen and unseen contributors to indoor air pollution
- Give examples of how moisture can affect the indoor air quality
- Explain how condensation occurs in a home
- Describe how a vapor barrier protects a house from condensation and the related problems of mold, rust and building rot
- Describe how to get rid of smaller mold problems, including what PPE is required

TASK LIST SUBCATEGORY

- 303 Describe the use of Personal Protective Equipment (PPE)
- 305 Recognize and mitigate hazards
- 803 Identify and evaluate mechanical, electrical, plumbing and roofing systems
- 810 Use energy efficiency industry vocabulary

OVERVIEW

As we learned in House as a System, moisture is a common problem that can cause unhealthful conditions. A house needs adequate ventilation so that moisture does not build up in living spaces. Unvented combustion appliances like a gas stove or a kerosene space heater creates moisture and also gives off toxic gases. A well weatherized home provides comfort and safety as well as energy efficiency. Providing a good balance is what a weatherization technician does.

STANDARDS

PA/SDP

- 3.4.10.B2.** Demonstrate how humans devise technologies to reduce the negative consequences of other technologies.
- 3.4.10.B4.** Recognize that technological development has been evolutionary, the result of a series of refinements to a basic invention.
- 3.4.10.D2.** Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.
- 4.3.10.A.** Describe environmental health issues: Describe how indoor pollution may affect human health; Explain how common household cleaning products are manufactured and how to dispose of their by-products after use.



DEFINITIONS OF KEY TERMS

Indoor Air Quality (IAQ): healthiness of air inside of a building related to indoor air pollution. **Combustion Appliance:** examples include gas stoves, kerosene space heaters, furnaces

Carbon monoxide: a by-product gas from burning fossil fuels that is toxic and has no smell

Backdraft: combustion gases that do not exhaust from a house's chimney or ventilator; when excessive can be an extreme health and safety hazard

Evaporation: when a liquid changes to a gas (opposite of condensation); a major source of water vapor

Condensation: when water in the air condenses and turns into liquid water

Dewpoint: the temperature air must reach for its water vapor to condense into a liquid



WEATHERIZATION

TOPIC OF STUDY

Health and Safety



80 MINUTES

INSTRUCTIONAL

TEXT/REFERENCES

Energy Conservation Handbook. pp. 101-105, 215, 184

MATERIALS NEEDED

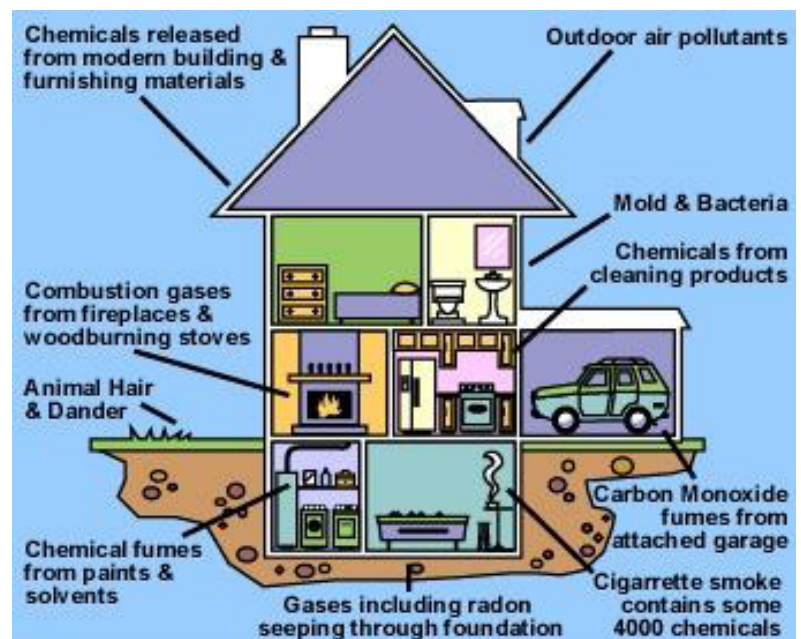
Teacher Presentation: Use of short videos.

MATERIALS

- Mold experiment materials:
 - zip bags
 - paper towels
 - sprayer with water

IMPLEMENTATION (LESSON PLAN)

1. Ask "What contributes to poor indoor air quality? Some of these sources are obvious, like cooking odors and gases, but some are not obvious or able to be seen." Use a T-chart to list seen and unseen contributions.
2. View the diagram on the right and compare to the T-chart. Ask "What did you know about? What surprised you?"
3. View one of the videos about indoor air quality (in Resources).
4. Moisture build up is a big problem because of mold growth. Condensation contributes to mold growth. This is a problem that can frequently be seen like mold on walls, bubbling paint. Mold presents a serious health risk for the inhabitants. How do we usually see mold in the bathroom? What are the best clean-up methods when you see mold? What PPE is recommended for cleaning up mold?



IMPLEMENTATION (LESSON PLAN) - CONTINUED

5. Mold is everywhere. Demonstrate mold growth: Dampen a paper towel and wipe a dusty surface with it. Spray a small amount of water in a zip bag. Place in the paper towel and close. Let it sit in a warm space and check daily for mold growth. (This can be done several days ahead of this class OR students can each do their own baggie and watch for growth).
6. Show examples of moisture problems:
 - a. Moisture problems that can be seen:



- b. Unseen moisture issues:



7. Review mold clean-up procedures for small jobs in the home (p.105). Use the EPA mold abatement site for ideas and methods: <https://www.epa.gov/mold/mold-cleanup-your-home>
8. Moisture build up can be prevented by good weatherization. This example shows use of a vapor barrier. <https://www.youtube.com/watch?v=fSdD9r5K4RU>



WEATHERIZATION

TOPIC OF STUDY

Health and Safety



80 MINUTES

HOMEWORK

Look for indoor air quality contributors in your own living spaces. Create a poster that shows where sources of pollution can be found and label the areas.





RESOURCES/LINKS

Indoor Air Quality 101/ Causes, Effects, Solutions (3 min.)

https://www.youtube.com/watch?v=tC_d3SeuFQ

How to Understand Indoor Air Quality: Ask This Old House. (HRV, 4:28 min.)

<https://www.youtube.com/watch?v=ZRqOUcVs52>



WEATHERIZATION

TOPIC OF STUDY

Health and Safety



80 MINUTES

