# Safety

Improving Efficiency, Comfort, and Health in Existing Homes

# Asbestos

**Asbestos can be located in:**

- Siding, walls, ceilings, etc.
- Vermiculite insulation
- On pipes, furnaces, and other small covered surfaces

This scanning electron micrograph of asbestos shows the tiny, glass-like fibers that make asbestos so dangerous. These miniscule fibers become lodged in the lungs and can cause mesothelioma or other cancers.

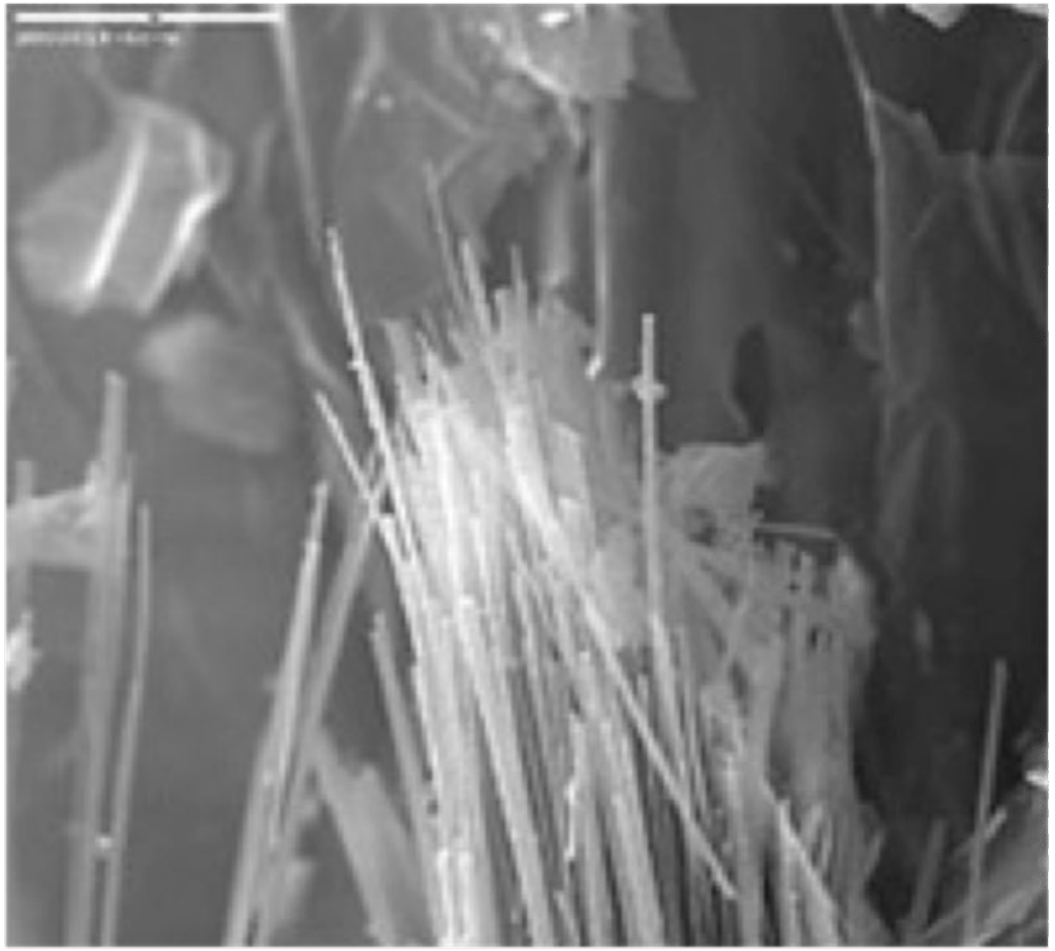


*Photo courtesy of U.S. EPA*

Ameren MISSOURI

# Asbestos


Photo source: U.S. Dept. of Energy


Photo source: U.S. Environmental Protection Agency


Photo courtesy of Hub Testing Laboratory, Inc.

Ameren MISSOURI

# Lead-Based Paint

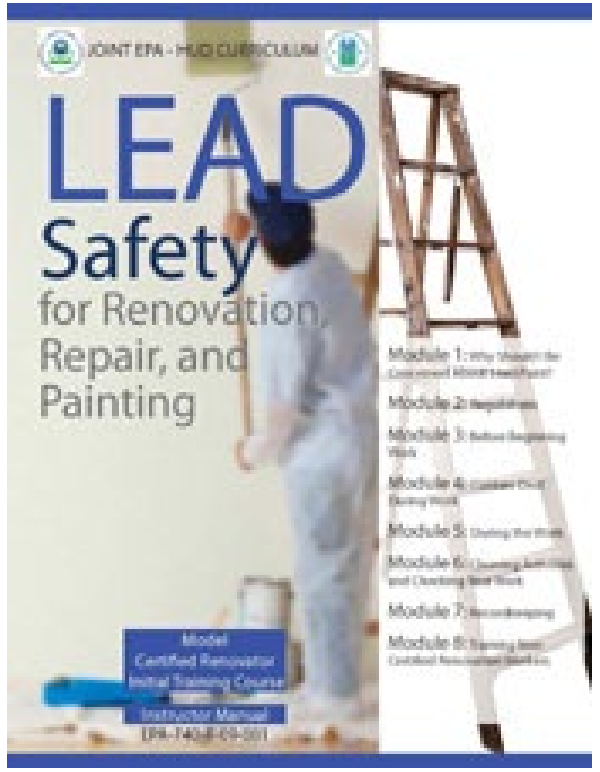
- Assume presence of lead in pre-1978 housing stock
- Lead-based paint is the primary source of lead-contaminated dust in housing
- Lead dust can harm everyone
  The most vulnerable are:
  - Babies/Children
  - Pregnant women
  - You!


Ameren MISSOURI

# Renovation, Repair and Painting (RRP)

- ALL paid contractors who work in pre-1978 housing where there's a risk that lead-based paint will be disturbed, or lead-based paint dust will be created, must comply with the EPA's Renovation, Repair and Painting (RRP) Rule or HUD's Lead Safe Housing Rule

- Consult your state environmental protection office or local jurisdiction for info on training requirements. Initial trainings are usually required with refreshers every 3-5 years



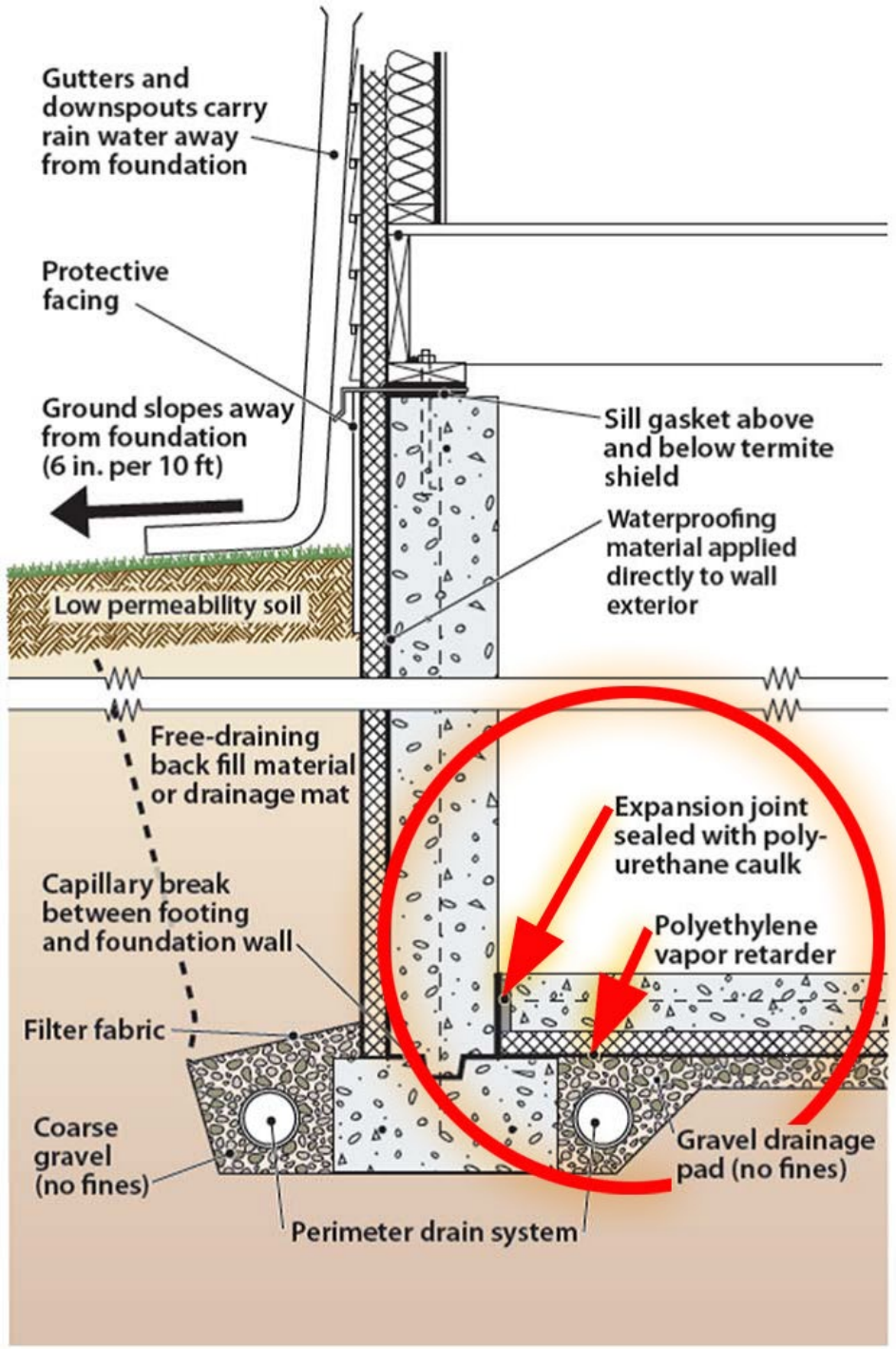
# Mold and Moisture

- Moisture problems generally occur in bathrooms, kitchens, crawlspaces, and basements.
- Always treat the source or the problem first!
- Installing a bath fan or range hood can mitigate moisture problems – consider push button pre-set timer controls

Ameren MISSOURI

# Mold and Moisture

Do not use a plastic moisture barrier in basement walls!



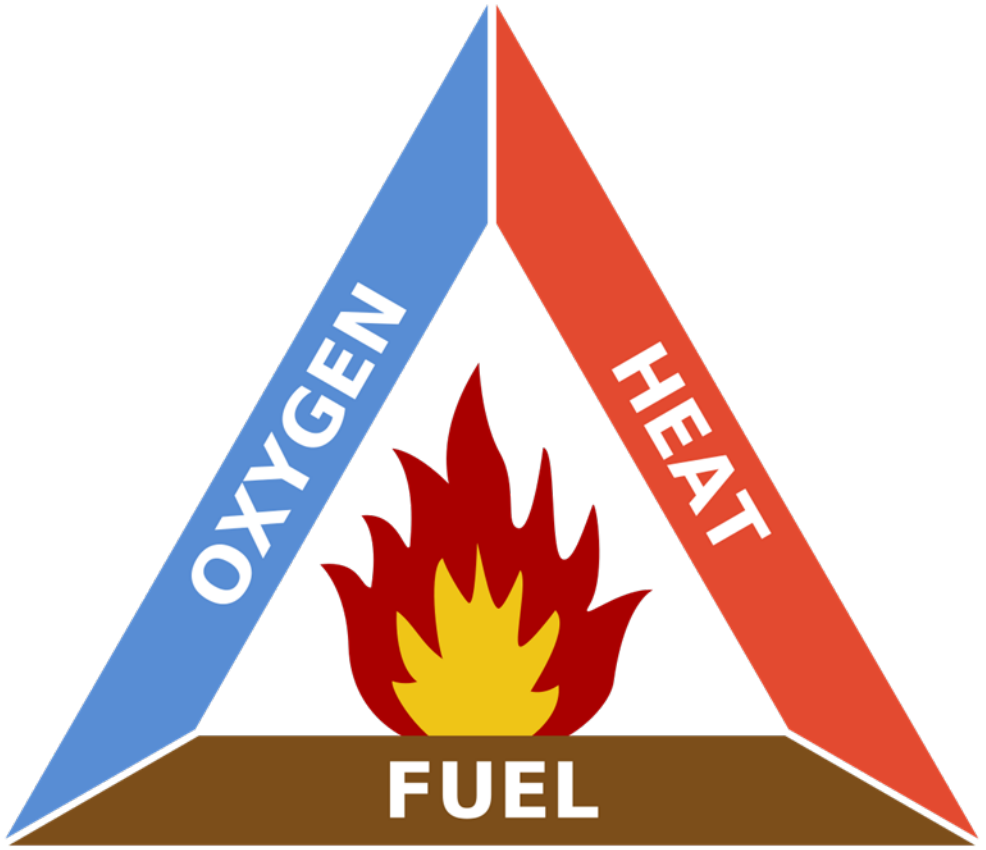

# Mold and Moisture

- Some details might be harder (more expensive) to correct in existing homes
- Some techniques to consider:
  - Regrade the site to direct water away from home
  - Install footing or French drains
  - Use dimpled plastic moisture barrier on exterior surfaces of below grade walls
  - Utilize pervious surfaces to allow water to drain properly

Ameren MISSOURI

# Combustion Safety

- Carbon Monoxide is a byproduct of incomplete combustion
- Improperly vented appliances and negative pressures in the home can magnify the problem
- Air sealing a house saves energy but means the oxygen available for appliances is reduced – Provide fresh air for the occupants and upgrade the appliances to have their own separate combustion air




Ameren MISSOURI

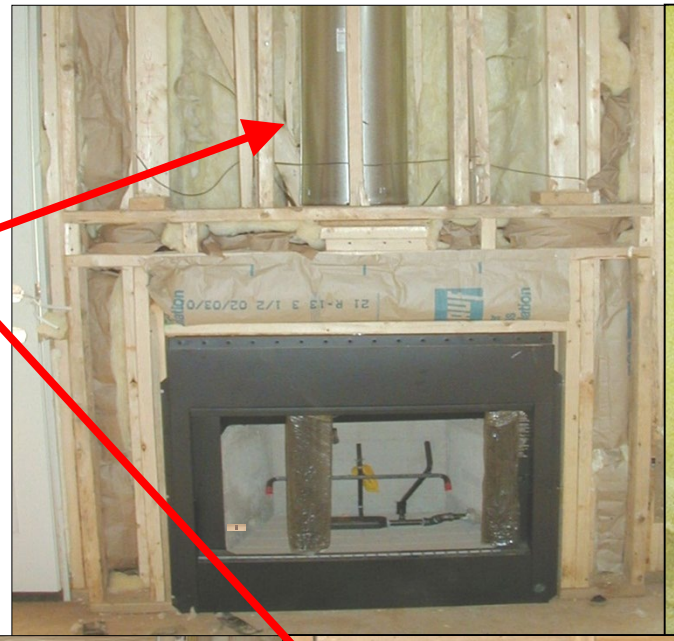
# Combustion Safety

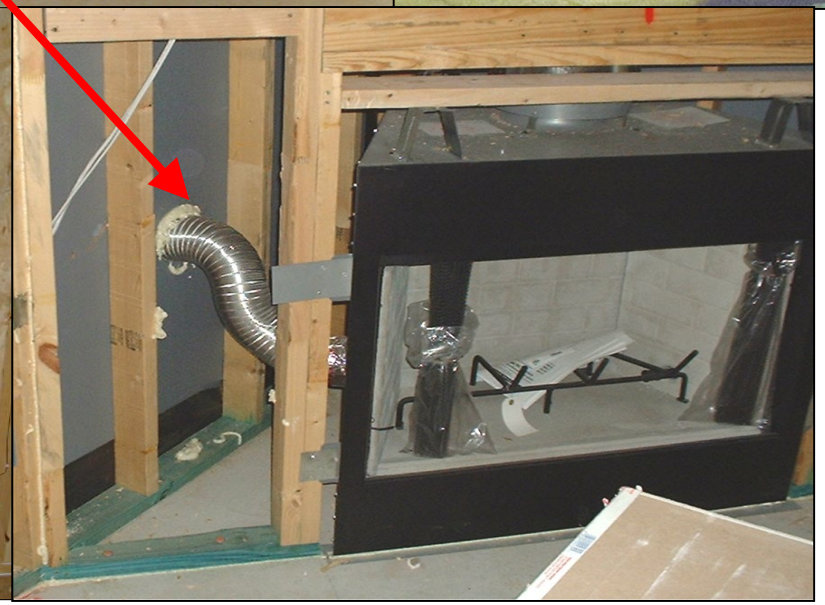
- **Proper air sealing with ventilation from a known source is key**
- **Making the house tighter without proper ventilation could:**
  1. Make existing problems worse
  2. Create new problems
- **These existing and new problems could be lethal**
  1. Carbon monoxide, Gas leaks, Back-drafting, Moisture (and mold)
- **Energy efficiency should not be a health hazard**

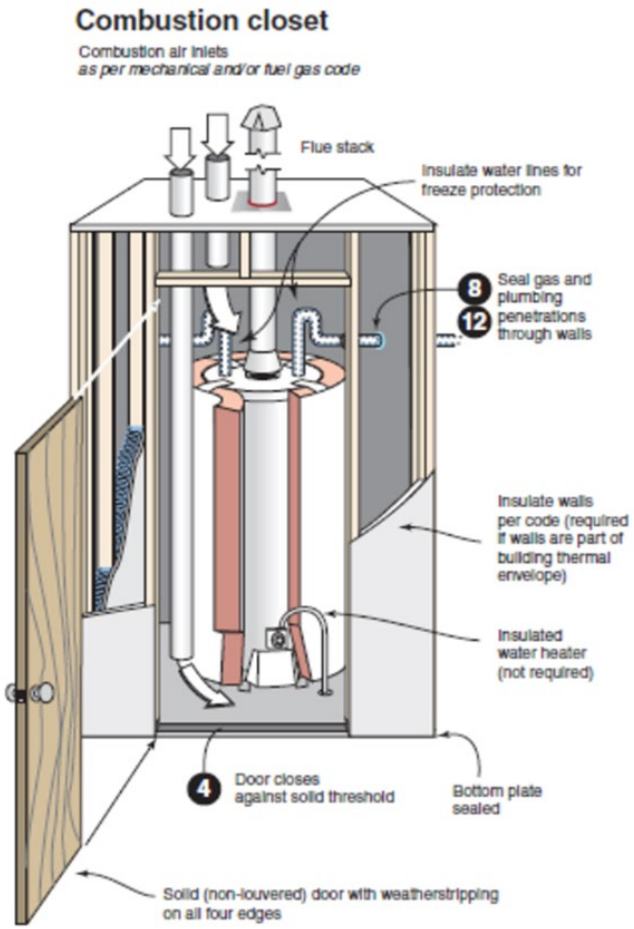
Ameren MISSOURI

# Two Essentials for Safe Combustion

1. ***Separate*** *source / supply of* ***Oxygen***
2. ***Flue pipe*** *that exhausts combustion products to outside*








Ameren MISSOURI

# Sealed Combustion Furnaces/Boilers

- Safer because combustion air comes from exterior (if vented properly)
- More efficient because a secondary heat exchanger extracts more heat before venting
- Produces condensation and must be drained

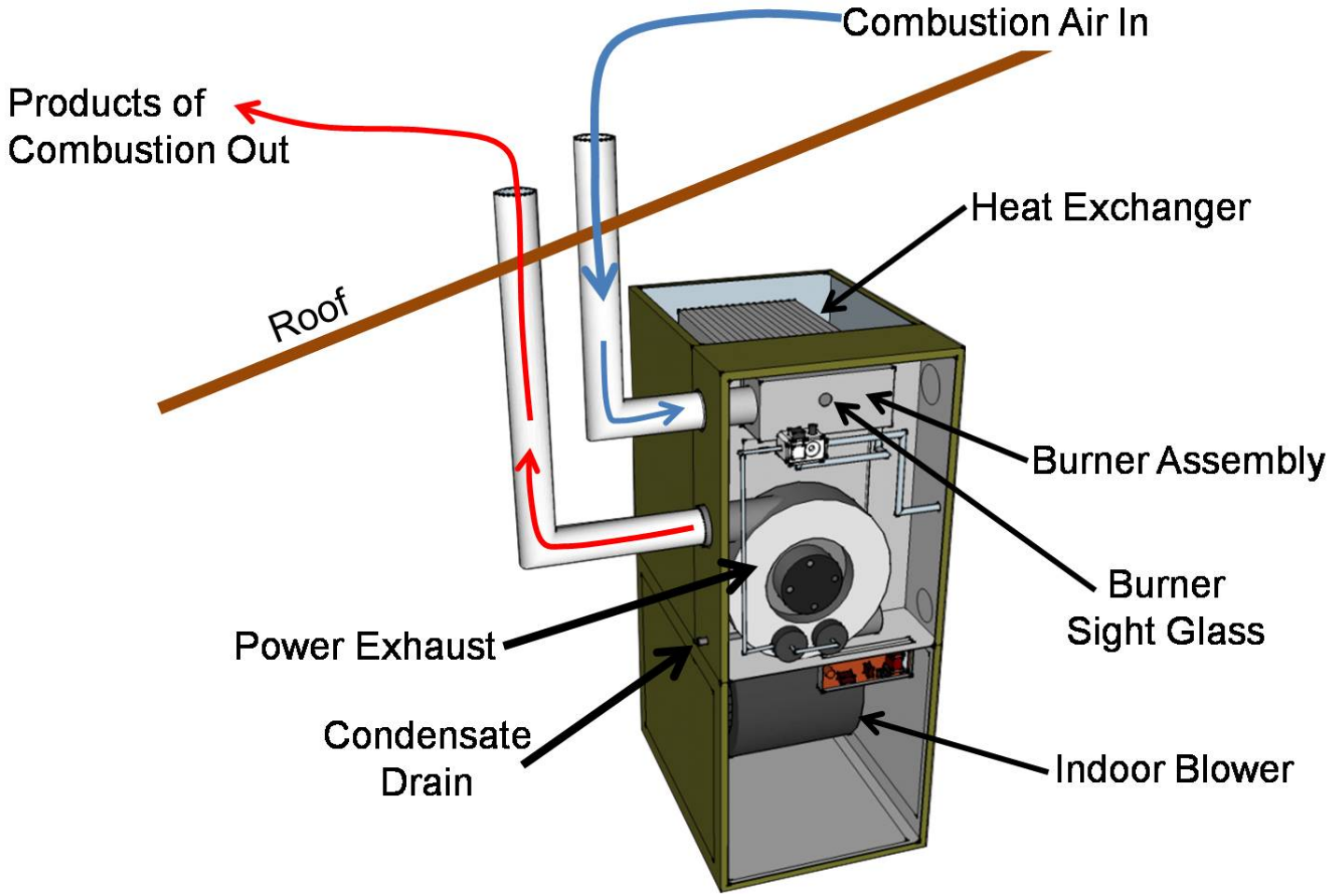



Diagram courtesy of Building America

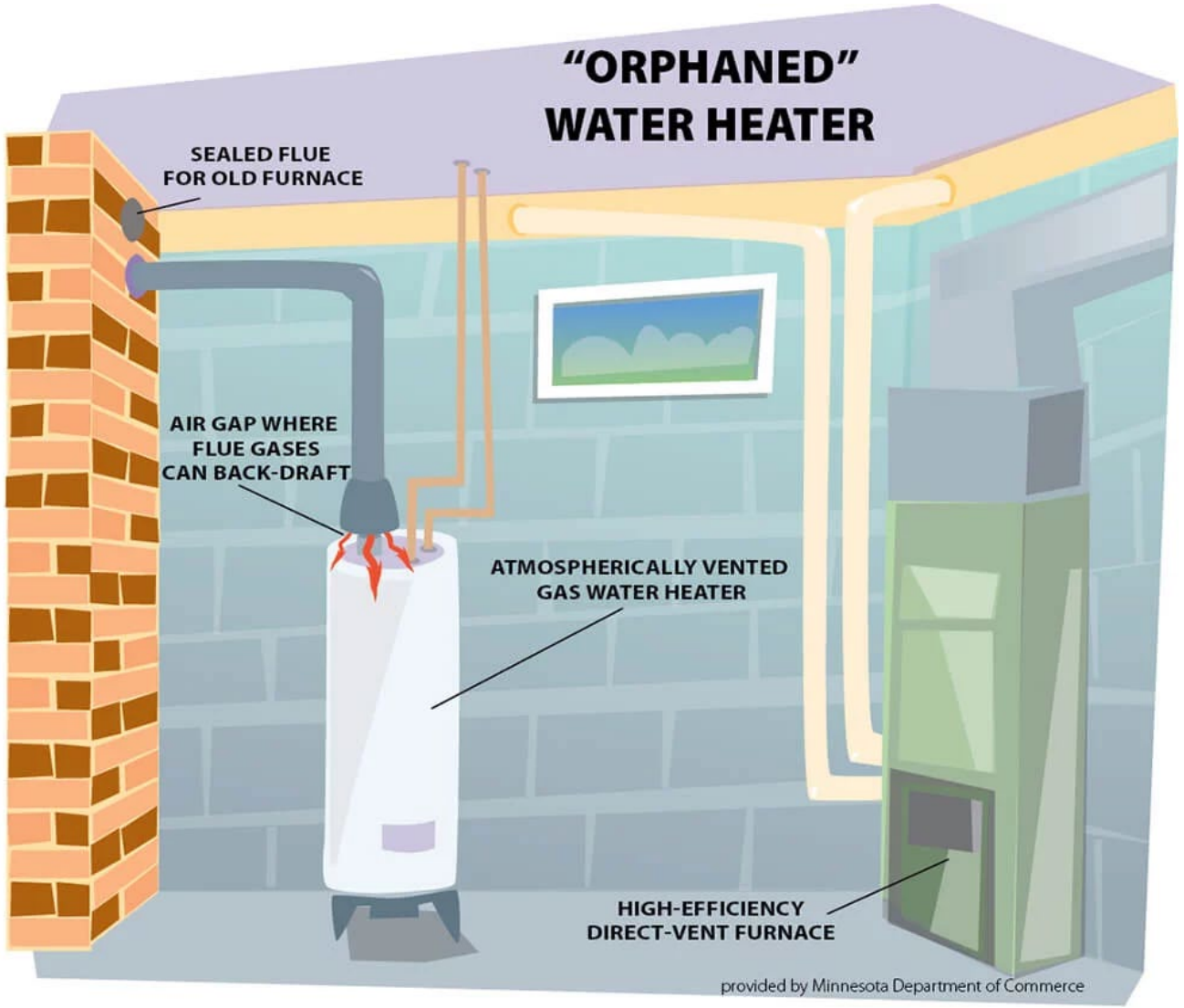



Photo courtesy of InterNACHI

After upgrading to a high efficiency furnace, there may be insufficient "draft" in the chimney to properly exhaust the flue gasses from an atmospherically vented gas water heater. Under certain conditions this can lead to **dangerous levels** of carbon monoxide and other pollutants. Solutions include adding a power vent to the existing water heater or replacing with a new direct vent water heater.

Ameren MISSOURI

# Direct Vent Water Heater

- For new construction & retrofit replacement of electric water heaters
- Requires no electric power
- Uses double wall vent pipe
- All air for combustion is taken from outside.  No chimney to install
- Can be side vented

Ameren MISSOURI

# Power Vented Water Heater

- Uses 3” PVC or CPVC or ABS vent piping
- Vents horizontally or vertically
- High efficiency- up to 11% more than a standard EF water heater
- Electronic ignition (eliminates pilot)
- Pressure switch reduces backdraft risk


Ameren MISSOURI

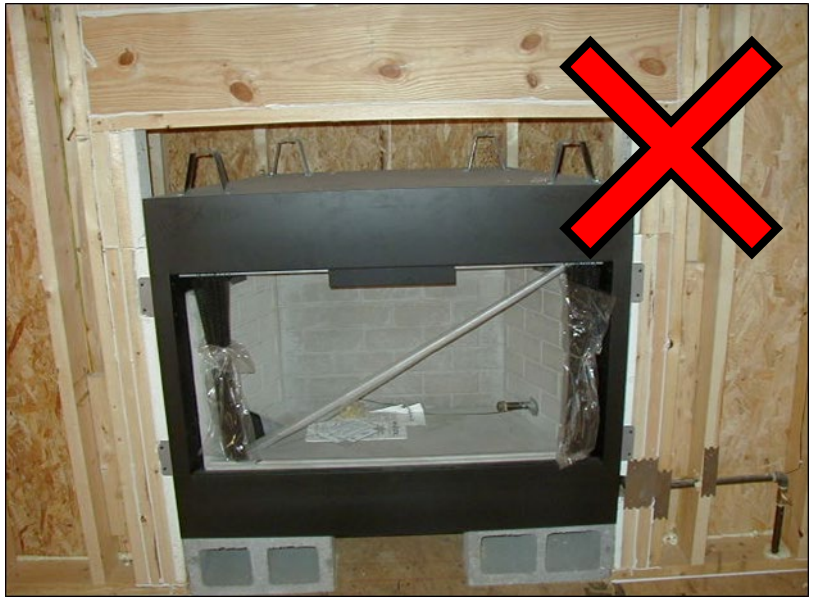
# Tankless Water Heaters

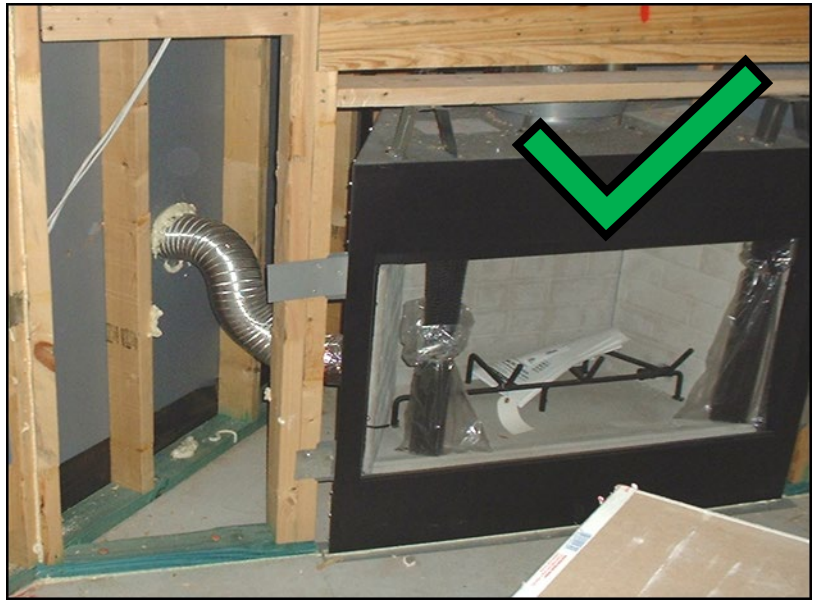
- Only heats water when it is being used
- Eliminates standby energy losses associated with storage water heaters
- Can use multiple units in parallel for larger heating loads or in combination with traditional units
- Retrofits have “hidden cost” of running larger gas lines

Ameren MISSOURI

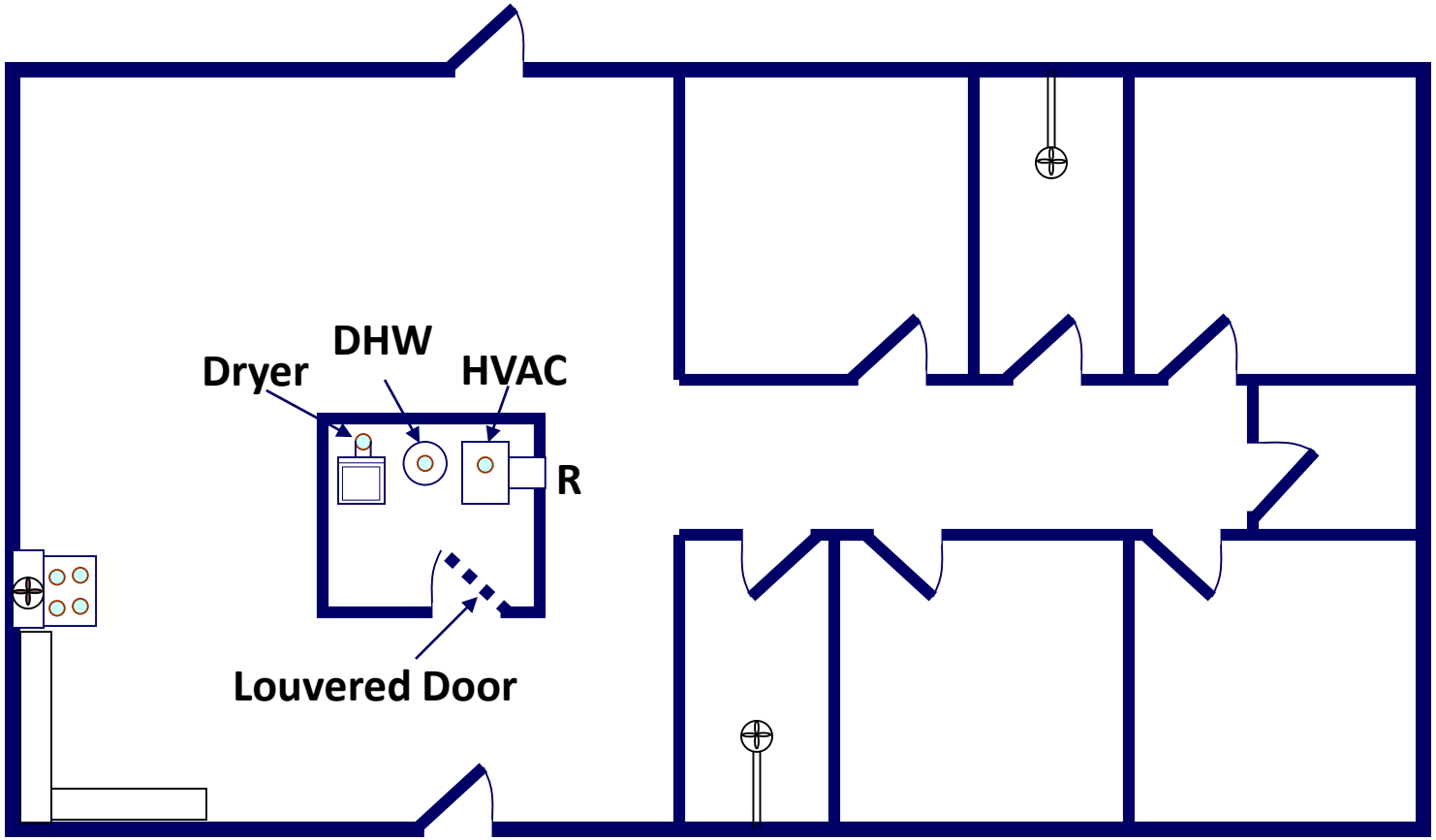
# Unvented Appliances

- *All* gas appliances can produce CO
- Fireplaces & other combustion equipment should be equipped with (a) flue pipe and (b) outside combustion air supply
- **Don’t use unvented gas appliances!**



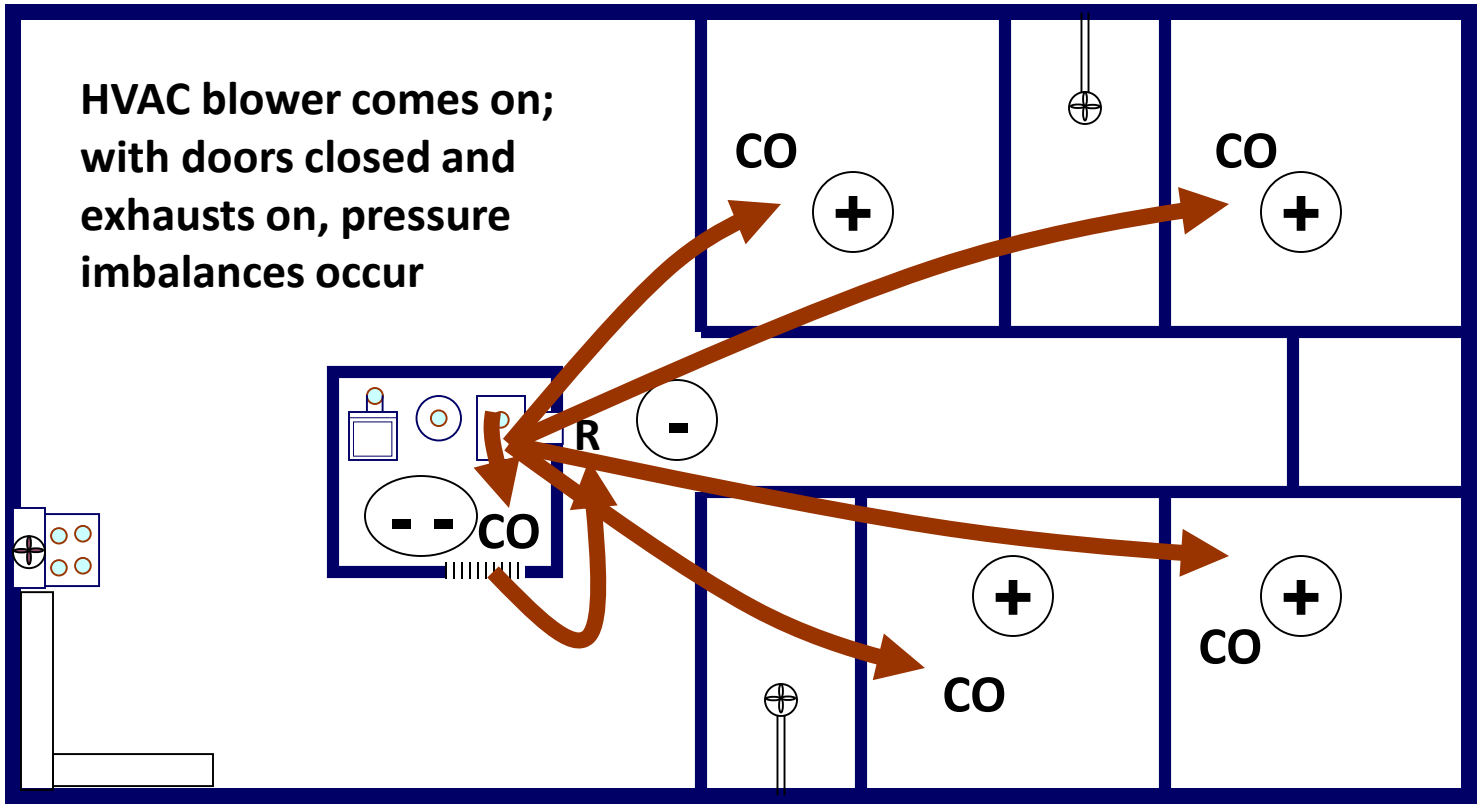


# House as a System Problem



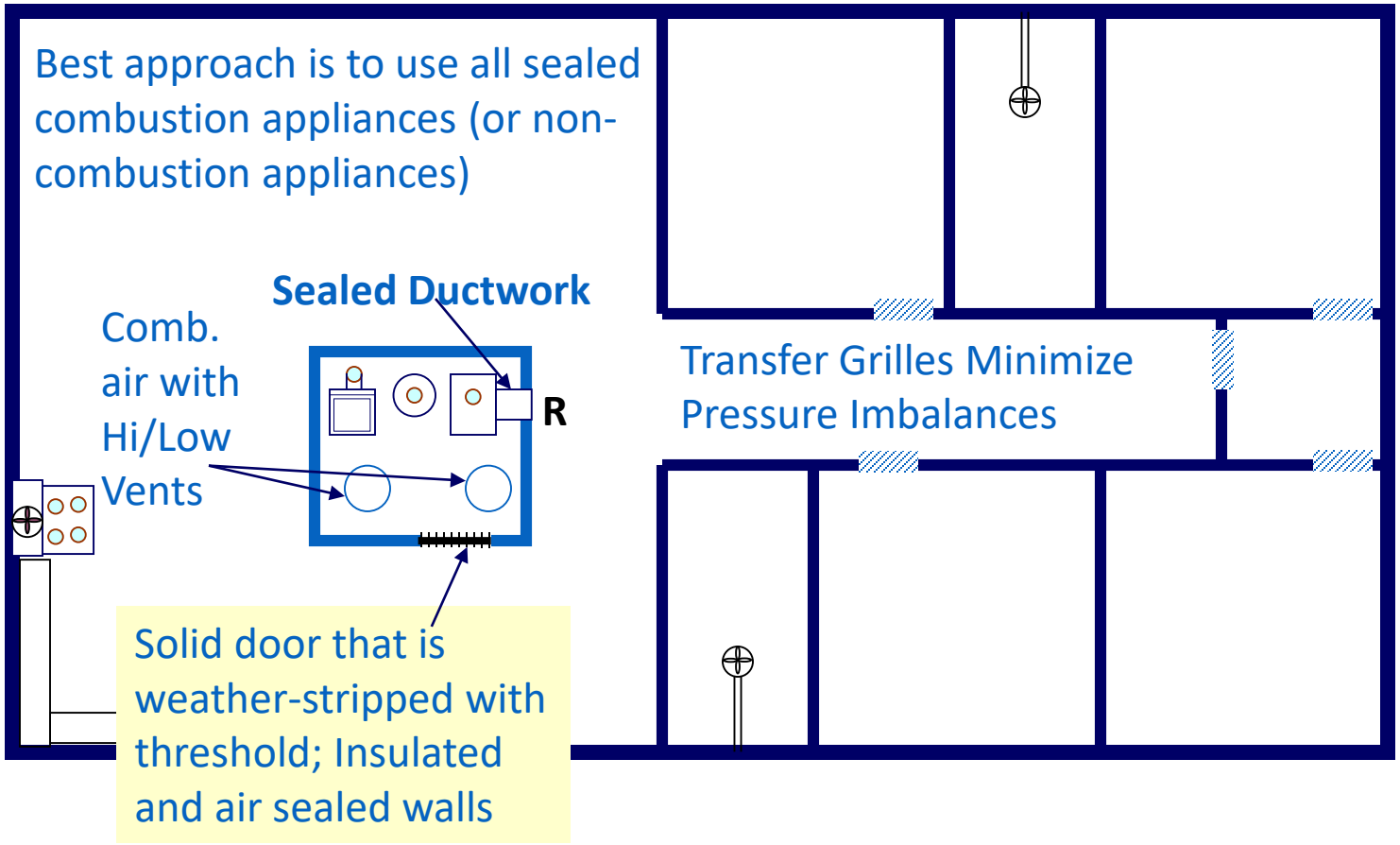

In this configuration, all equipment operated properly.

# Negative Pressures




In this configuration, negative pressures caused backdrafting, which produced CO!

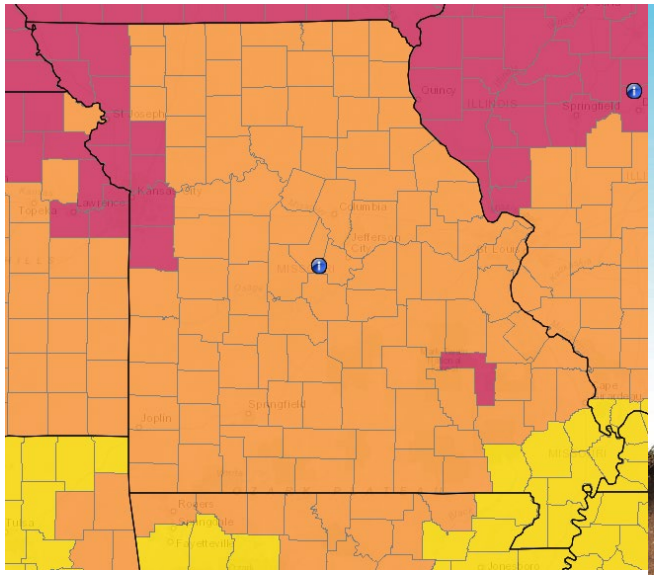
# “House As A System” Approach

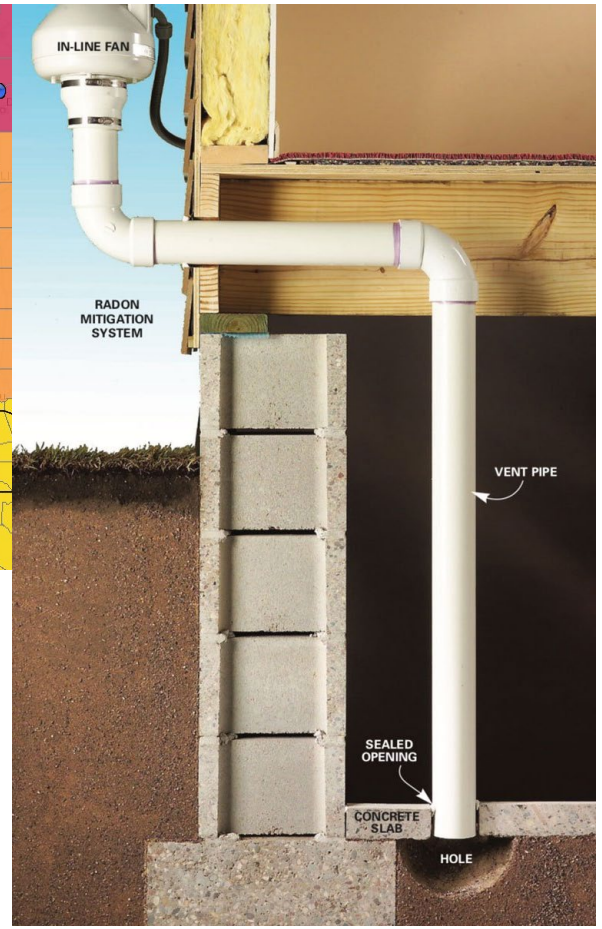



There are numerous ways to solve/prevent this problem!

# Radon

- Radon is the second leading cause of lung cancer and the number one cause of lung cancer among non-smokers, according to EPA estimates
- Must test to know if radon is a problem and requires remediation
- Test after upgrades






**Invisible killer: Spreading the word about radon cancer risk**

FEATURE December 16, 2019 Georgia Health News 0