

A microscopic view of mold spores, showing several tall, thin stalks with spherical heads of spores, set against a dark background with a grid pattern.

Managing Mold: People First, Moisture Second, Mold Third

Donald Abramowitz, MS, CIH

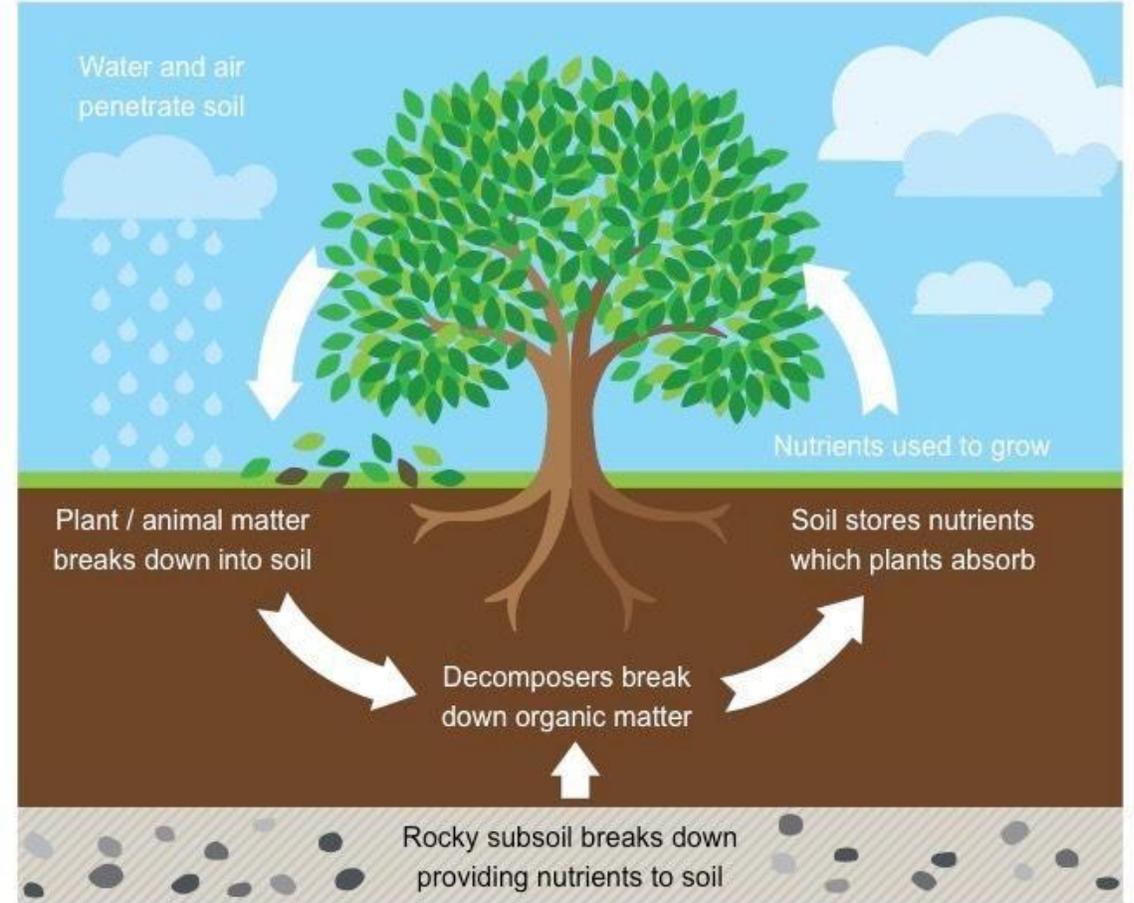
WasteStrategies LLC, Annapolis MD

What is mold, exactly?

- Molds are kinds of fungi. There are thousands of species.
- Fungi are a kingdom of organisms, separate from plants and animals.
- They include yeasts and molds, as well as the more familiar mushrooms.
- They feed by absorbing dissolved molecules from organic matter. They do not photosynthesize.



Molds are *saprophytes*: organisms that feed on dead or decaying organic matter. Also known as *decomposers*, they are essential to life on Earth. They break down organic matter into essential nutrients for re-use by plants and animals.



Breaking down organic matter into essential nutrients is great in a forest, less so in your house.



Mold is One of the Categories of Fungi

Molds form a network of thin, tubular, branching strands called a mycelium. This is largely invisible and exists in the material that is being digested.

The strands, called hyphae, are generally transparent, so the mycelium appears like very fine, fluffy white threads over the surface it grows on as it advances.

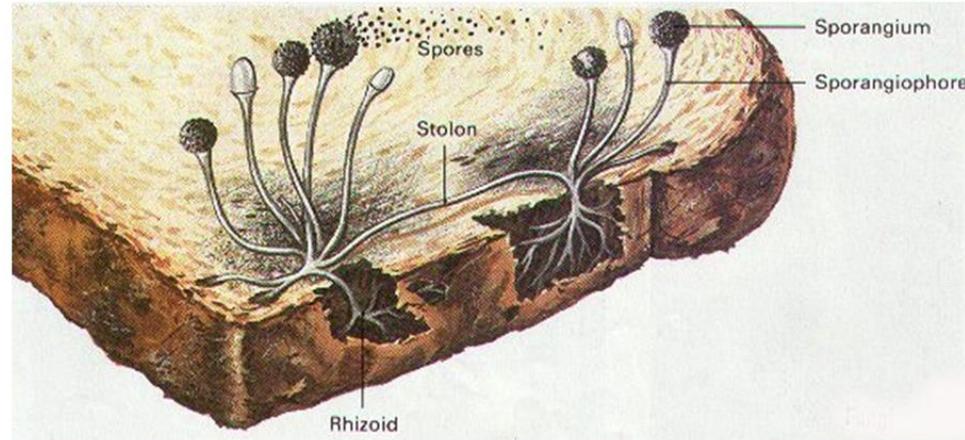
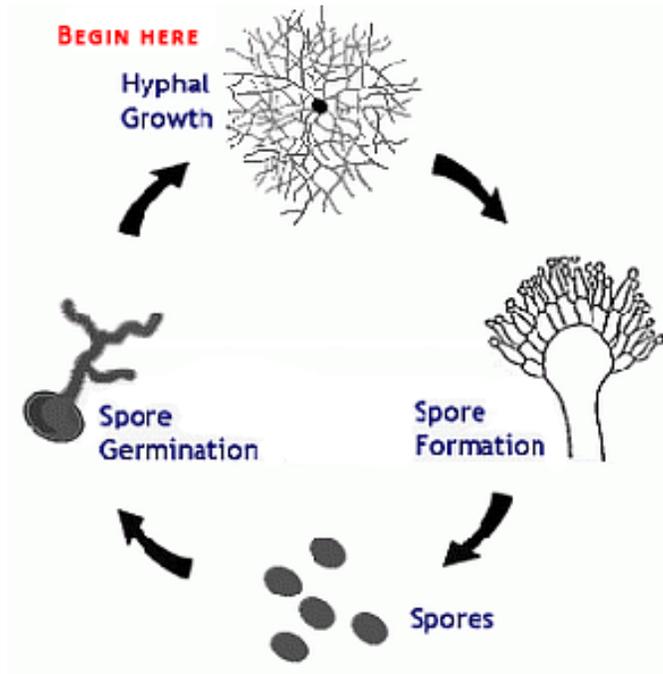
As it thrives, the mold develops tiny spore producing organs, analogous to a mushroom, which is the spore producing organ of a much larger organism.

The dust-like, colored appearance of molds is due to the formation of spores.

The tiny, pollen-sized spores are dispersed into the air in huge numbers so the fungi can reproduce. The spores present our primary health concerns with molds.

Many of these spores are colored, making the fungus much more obvious to the human eye at this stage in its life-cycle.

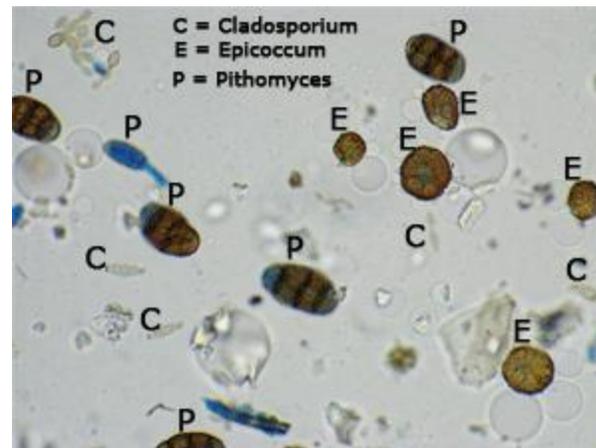
Mold Spore Formation



(Exaggerated rendition. Spores are too small to see without a microscope.)



Microscopic close-up.



Spore trap slide, microscopic view.

Mold spores are everywhere

- Indoors and out, there are always mold spores in the air.
- The outdoor spore concentration varies with the season of the year, weather, and climate.
- Locally, the number of spores outdoors drops to low levels from December through February, while the highest outdoor spore concentrations are observed from August through October.
- There are three main sources of spores found in indoor air.
 - Outdoor air carried in through doorways and windows;
 - Spores carried in on people, pets, or items brought inside;
 - Molds that grow and produce spores indoors.

Why Are We Concerned About Mold?

- When mold grows and forms colonies on indoor surfaces, they can damage materials, create unsightly conditions, cause odors, and create health problems for some people.
- Small amounts of mold growth are not a major concern but should be addressed promptly.
- Not everyone who encounters mold on building surfaces will experience symptoms, but **allergic reactions to mold occur when spores and bits of broken-off mycelium get suspended in the air.**
- Symptoms include runny nose, sneezing, eye irritation and wheezing.
- People **without** allergies may also experience such symptoms, and flu-like symptoms or aggravation of asthma may sometimes occur.

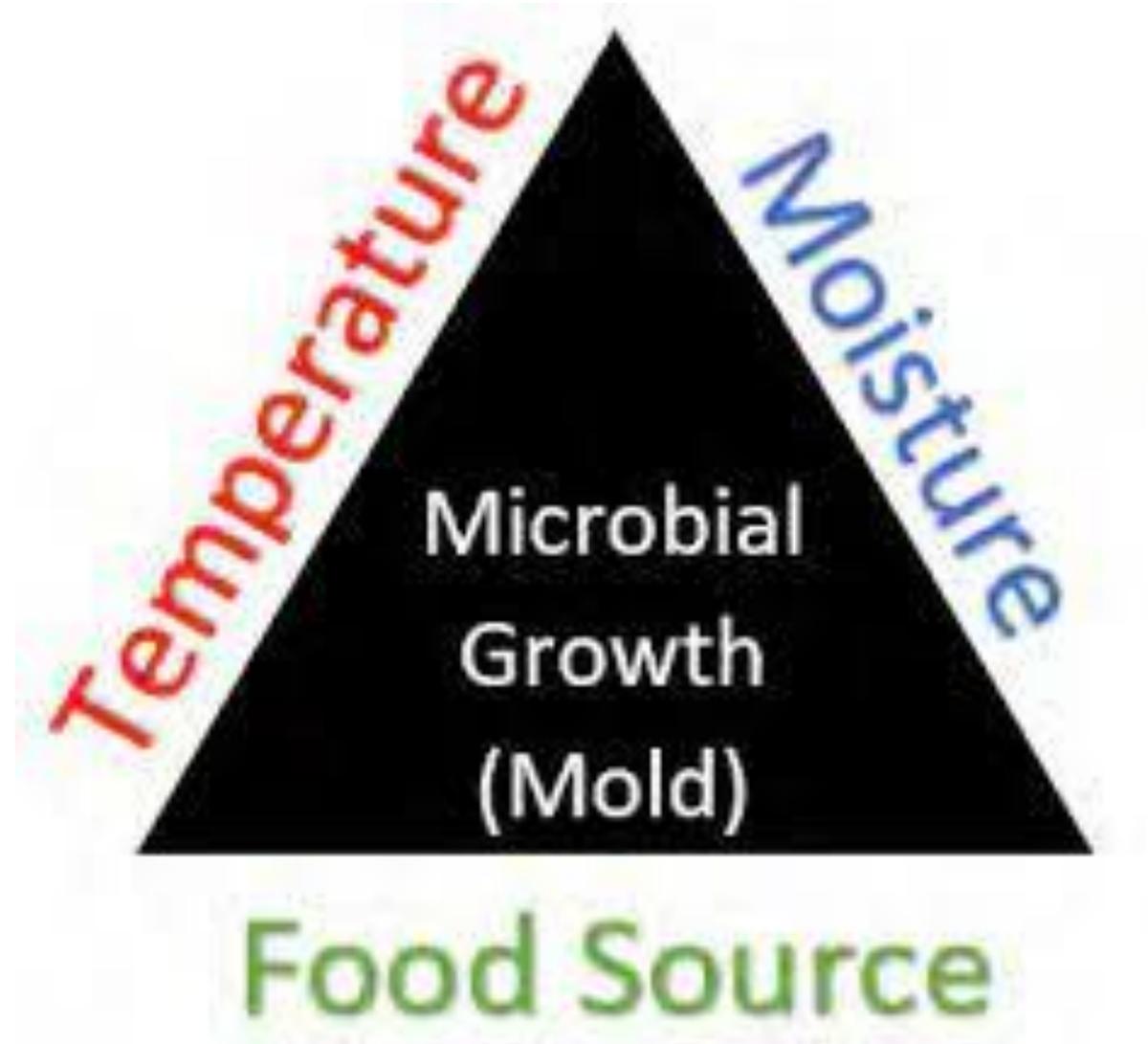
More on Health Effects...

- Most symptoms from mold exposure are temporary and are eliminated by removing the mold growth.
- Fungal infections from building-associated molds may occur in people with serious immune-compromised conditions, but this is rare.
- Health effects of common indoor molds **do not vary significantly by species or color**.
- The term “**toxic mold**” has largely fallen out of favor by experts, as reports of mysterious illnesses reported to be caused by mold exposure have largely been refuted.
- For example, *stachybotrys chartarum* should not be singled out for concern. Per the CDC: “*It is not necessary to determine what type of mold you may have growing in your home or other building. **All molds should be treated the same** with respect to potential health risks and removal.*”

What Does Mold Need to Grow?

Just like us, it needs:

- Food
- Water
- Oxygen
- Suitable temperature range.



Food:
Molds will
eat a lot of
things we
won't...

Regular people food (anything with calories).

Paper (drywall, in ceiling tiles)

Cardboard

Wood

Fabrics

Leather

Household dust

Some paints, plastics, caulks

Residue left on synthetic carpet, insulation, or inorganic surfaces.



Water: Molds Need Moisture to Grow.

Since we can't eliminate food, temperature, or oxygen,

MANAGING MOISTURE

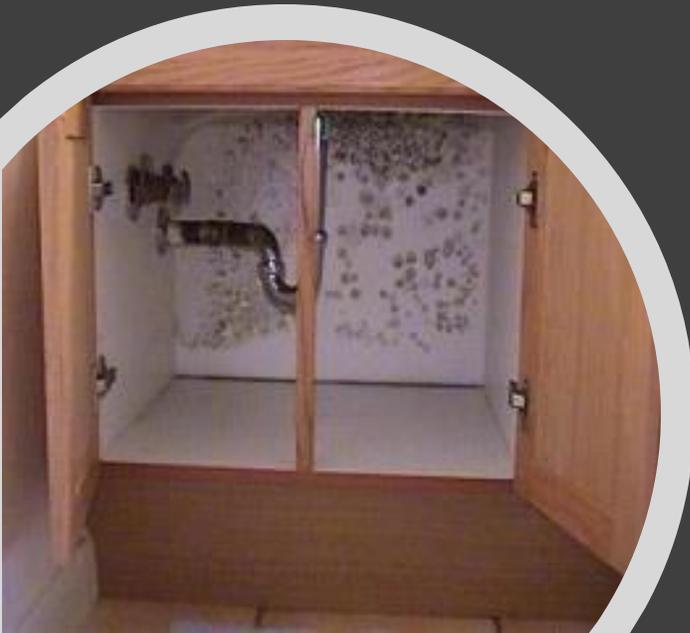
IS HOW WE MANAGE MOLD

on building materials.



Wet Building Materials = Mold Colonies

- Materials that stay wet for more than about 48 hours are candidates for mold growth.





Where does the water come from?

1) Water intrusion:

- Roof and building envelope rainwater leaks
- Plumbing pipe and fixture leaks
- Spills, overflows.
- Floods, sprinkler activations, groundwater infiltration.



2) Condensation:
humid air meets cold surface =
liquid water.

- Air-conditioned space with open window in summer.
- Cold air conditioner surface in humid room.
- Poorly insulated or uninsulated chilled water piping.
- Cold window frame in warm room.



3) Sustained high humidity:

>80% humidity, in poorly vented spaces, can lead to mold growth without liquid water being present.



Showers, closets (esp. on exterior walls), and basements are such places.

Quick Control of Water Stops or Prevents Mold

- Stop the leak and repair the source.
- Adjust ventilation systems to manage humidity.
- Remove standing water.
- Dry the space out
- Clean non-porous surfaces.
- Remove porous materials that can't be cleaned or dried.





Stop the leak and repair the source.



Remove standing water.



Dry the space with fans and dehumidifiers.



Clean non-porous surfaces.



Remove porous materials that can't be cleaned or dried.

Tools for Mold and Moisture Evaluation: Level 1



Tools for Mold and Moisture Evaluation: Level 2

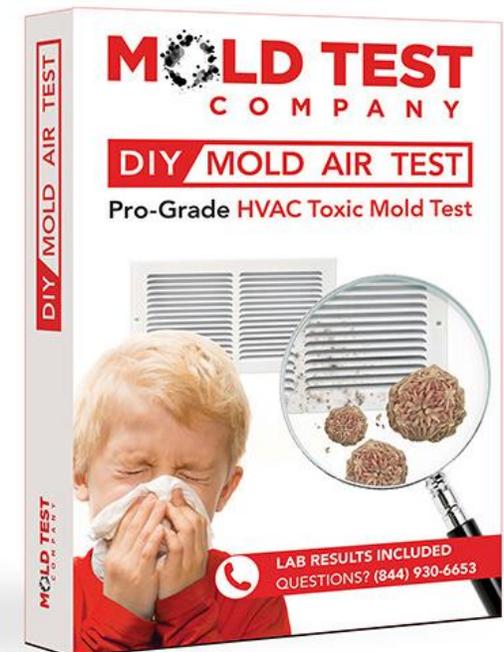


Tools for Mold and Moisture Evaluation: Level 3



What About Testing for Mold?

- Mold and moldy odors seldom require testing.
- When mold is suspected, the first step is to look for water sources and any visible mold growth.
- Air concentrations of mold spores vary rapidly with time. Even back-to-back samples will rarely match, making interpretation difficult.
- **There are no EPA, CDC, or other regulatory standards for “acceptable” or “unacceptable” levels of mold in buildings.**
- Health effects of mold are not very dependent on the species.
- The key is to remove mold once it’s found. **Air testing does not tell you where the mold is or what to do about it.**



People

- For most institutions, mold issues are brought to your attention by the discovery or reporting of water leaks, flooding, or individuals' concerns about mold in a particular space.
- Water leak and flood reports require immediate response to control the source, remove the water, and dry the space to prevent mold growth.
 - Equip your Facilities and Housekeeping departments – mops, squeegees, shop vacs, carpet extractors.
 - Have prearrangements with restoration contractors. Immediate needs: fans, dehumidifiers, removal of water damaged porous materials like drywall and carpet.
- When people reach out with a concern about mold in their dorm, office, or other space, a rapid, informed response is essential.

Responding to Mold Concerns

- Responsiveness is the key. Take reports and complaints seriously and sympathetically.
- Decide who is going to respond. This should be consistent.
- Listen carefully to the concern.
- Respond promptly with a site visit - putting eyes on the situation is essential.
- Evaluate the severity and decide if relocation is needed.
- If relocation is not indicated, be prepared to quickly mitigate, if needed, and explain the next steps. Propose further investigation if needed.
- Refer people with health concerns to reputable web sites, such as the EPA and CDC. A great deal of inaccurate and alarmist material remains readily available on-line.

3 Common Mold Concern Scenarios:

1. Visible mold is present. Hopefully, you can identify and resolve the water source.
2. No visible mold, but it smells musty, maybe it's humid, and building materials are dry.
3. No visible mold. Clean, dry conditions, but occupant is convinced there's a mold problem.

Quick mitigation for minor mold:

- Try to figure out where the moisture came from. (If the moisture source continues, so will the mold.)
- Wipe off small areas of mold with a disinfectant cleaner. Quaternary ammonium disinfectants are often listed as mildewcides. (No need for bleach, though it can remove stains.) Can be a “teachable moment.”

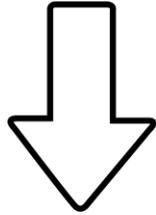
Accommodations:

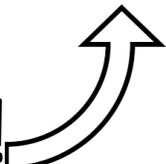
- Consider HEPA air purifiers for people with allergic reactions to reduce spore count.
- Consider dehumidifiers, if appropriate, though they are not without drawbacks.

Training/Awareness Sessions

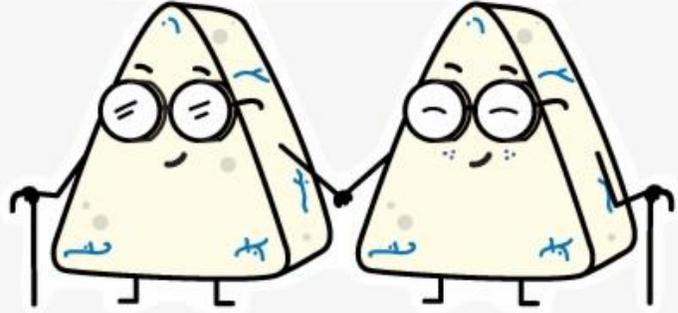
- Meet with relevant groups, such as hall advisors and employee groups (such as academic administrative assistants, department heads) to talk about how to recognize, report and prevent mold issues. Share current guidance on accepted health effects.
- Get basic info to new students. (Make sure they know not to open the windows when the air conditioning is running, for example, and who to contact when they have a concern.)
 - Printed handouts, inclusion in other orientation materials or presentations may be useful.

Encourage people to call
if they see this...



Not to wait for this! 

LET'S GROW
— *mold* —
TOGETHER



Thank you
for your
attention!



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