

BUILDING A HEALTHY AND RESILIENT HOME

Textbook

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BUILDING A HEALTHY
AND RESILIENT HOME

MODULE 1

Context and Basics of Building

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Hi, I'm Jen Jobart

I'm your instructor. I am a Build Science Educator and Consultant. I started my company, [Practical Healthy Homes, LLC](#) to help people build healthy, resilient homes they can thrive in.

I have the following qualifications:

- Certified Passive House Tradesperson ([International Passive House Association](#))
- Triple-Certified Building Biologist: New Build Consultant (BBNC),

Electromagnetic Radiation Specialist (EMRS), and Environmental Consultant (BBEC) ([Building Biology Institute](#))

- Certified Permaculture Designer ([Permaculture Institute of North America](#))

The book I wrote, [Destination Blue Sky](#), talks about how my husband and I healed our own family from PANS, Mold and environmental illness, Lyme and co-infections, and cancer, by building a healthy home. I run the Facebook group [Beyond Build Defects: Building a New Healthy Home](#). I serve on the [Board of Directors](#) for the Building Biology Institute of North America. I live in the California Sierra Foothills and work with clients worldwide.

I'm glad you're here! Without further ado, let's get started.

How we got here

Before we start, I want to give you a little background about what happened with our housing stock. Perhaps you, like me, have realized that most homes are moldy. There are a lot of mold-sick people today. It wasn't always like this. What happened?

Around the turn of the century in the United States, we built homes that “breathed.” What this meant was that there was very little to separate the inside of the home from the outside. Homes were built with solid old-growth wood, lathe and plaster walls, and heated with fireplaces, coal, or massive furnaces. They usually didn't have insulation. Houses got wet, but nothing was preventing them from drying out.

In the 1970s, we started to realize that fossil fuels aren't going to last forever, and building codes started to require more efficient, tighter homes. Around the same time, air conditioning became fairly common, and that changed the dynamics of how our homes work.

When we started to tighten up homes and add more insulation, it made it harder for our homes to dry out. At the same time, we only kind of tightened up homes, so water and air were still getting in. And also at the same time, air conditioning was

making the inside of our homes much cooler than the outside, which was creating condensation.

If it's your impression that most homes are moldy, you're correct. They are. And that is because homes are getting wetter, and they're not as able to dry out.

We're not going back to the old days. There is very little old-growth wood left, and fossil fuels are indeed running out. Building codes no longer allow us to build the way we did around the turn of the century.

The way we have built since the 1970s doesn't work.

The good news is that we do know how to build better. We understand the physics of how our buildings work, and we understand how to build in a way that works with the laws of physics, instead of against them.

Unfortunately, not many homes are being built to better standards - yet. Today's building codes are more concerned with preventing homes from falling down or catching fire than they are with indoor air quality. If you want to build a healthier home, you'll have to find a contractor who is willing to exceed code requirements and build a high-performance home.

I'll teach you how to design and advocate for your own healthier build in this class, starting with an overview in this module. I'll also give you some general design tips to think about as you're developing your floor plan.

How stick-built homes are usually built

Regulations called the "Residential Building Code" define how homes are built. The "International Residential Code" or "IRC" for short is the canonical code for the United States and some other countries. States vary in how much of the IRC they adopt. In some places, like California, building codes can be onerous. In other places, like certain counties in Texas, there are no building codes. The best way for you to find out is either to get online and do some research, or go down to your local

Building Department and ask.

Building code prevents hazards, like electrical fires and the house collapsing. It improves energy efficiency. It makes sure your house will reasonably protect you from the elements and will (hopefully) not fall down.

However, building a house “to code” in no way guarantees a healthy house, from an indoor environmental quality perspective.

Building codes evolve constantly, but getting a change made to a code takes time. As a result, even the latest version of the building code doesn’t reflect all the best practices we know about how to build.

Another issue is the way that we value real estate. Real estate appraisals are based on how big a home is, and how fancy and up-to-date the finishes are, compared to similar homes in the same geographic region. That is often what homebuyers are looking at, as well. The way we value homes has to do with the granite countertops and the number of bedrooms. It has nothing to do with how the walls are built.

However, to build a healthy home, it is paramount to build the walls in the right way. Finishes can be changed out later. It’s easier to maintain and clean a smaller home, and it’s less expensive to build. So we have to flip that model on its head and put our budget into right-sizing our home, and then building it correctly.

This class will teach you how to build beyond code and beyond finishes, so that you can end up with a truly healthy, resilient home.

What about tract and spec homes?

Most new homes built today are tract homes or spec homes.

Tract homes are planned communities. They are built as investments by large corporations.

A spec home is also built by a contractor as an investment. They are often built by contractors who are between projects and trying to keep themselves and their crews busy.

When you buy a brand new tract or spec home, you may get to choose some of the finishes, but you usually don't have any control over how the home is built. When a contractor's primary interest is in making money, he is going to build as cheaply as possible, while charging you as much as possible. There is a clear conflict of interest between the contractor's desire to cut corners and reduce costs, and your desire to build a healthy and resilient home.

People who are buying new tract and spec homes often get upset at the quality of lumber that is used in these homes. It's true that the lumber these contractors use can be pretty moldy, but honestly, that's usually the least of your concerns with a tract or spec home. The shortcuts that builders take on these homes go against most of the best practices I will teach you in this class.

To get a healthy home built, you will almost always need to build a custom home, where you have control over how it's designed and how it's built. A custom home will be more expensive upfront than buying a tract home. However, when you add up what mold testing and remediation can cost, out of pocket medical expenses for mold illness, lost income if one spouse needs to quit their job because of health issues or to take care of sick children, the picture can look different.

Think about building outside of town, where real estate is less expensive. Build a smaller home. Do some of the work yourself. Be realistic about what you're getting into, and get creative. To build a healthy home, you'll likely need to build a custom home.

And if you do manage to get a tract home builder to incorporate the best practices in this class? I want to hear about it, so I can recommend them to others.

How we do better

The general term for a home that is built to better standards is "High-Performance Home." What do we mean by that?

A high-performance home is one that takes into account how homes work and goes

beyond minimum code requirements in order to create a healthier, more energy-efficient home.

Sometimes, we use the term “Passive House” to talk about high-performance homes. Passive House is a certification. A home has to meet strict levels of performance in order to be certified as a passive house. Sometimes, this makes sense, but often it doesn't. You can still use the same principles to build a high-performance house that is much healthier and much more energy efficient than your standard code-built home.

The basic premise of high-performance, healthy building can be described in one short sentence:

Build tight, insulate and ventilate right.

Let's break that down.

Build tight

“Whoa, wait,” I can hear you thinking. “I don't want to build a tight house. I want a house that breathes.”

Unfortunately, that's a common misconception in the mold community, and it has harmed a lot of people. Let me address that right off the bat.

In leaky homes, which constitute the vast majority of homes, the air you breathe is coming from all the gaps and holes in the walls. Maybe it's coming from a hole in the foundation, where rats have also found a way in and have created a nest inside your walls. So your “fresh” air is picking up rat odors as it comes in. Maybe it's coming from a gap in the wall, that rainwater has also found, and that is moldy. Maybe it's coming from a gap in the floor and picking up damp, moldy air from your crawl space. Maybe it's coming from a gap around a lighting fixture from your vented attic, where squirrels have moved in and have been amassing a collection of acorns over the years.

This is not the air you want to be breathing. Even without an active mold problem,

breathing in rat poop and moldy acorn collections is not going to result in healthy indoor air quality.

We want to clearly define what is “inside” and what is “outside” so that we can keep the inside air clean and not have it be contaminated by the outside.

Most basements, crawl spaces, attics, and garages are kind of inside and kind of outside. Which means we’re sleeping in the same air that we park our cars in and store spare garage chemicals in. Our baby’s nursery shares the same air as all the rat babies who live in our basement. Our kitchen and the places where we prepare our food and eat share the same air as the squirrel stash in the attic. Our living room shares the same air as the crawl space that floods every year.

You see where I’m going with this. Really not good.

It’s important to define where you want your home to begin and end, and then keep the inside in and the outside out.

You want your garage to be outside. We don’t want to be breathing car exhaust. So that one is easy. You want a tight seal between your home and your garage.

If you have a basement or crawl space, you either want to build it to be “inside”, meaning it is waterproofed and insulated and conditioned just like the rest of the house, and critters can’t get in, or you want to build it “outside”, meaning there is a tight seal between the home and the space underneath your house. (Pro tip: basements and crawl spaces should be inside. I’ll get more into that later.)

Same with an attic; either it’s part of the house (this is called a “conditioned attic”) or it’s not (this is called a “vented attic”), and you define “inside” and “outside” accordingly.

Once you decide what’s inside and outside, you then have to make it so. That’s where “Build Tight” comes in. You want to build a tight air seal between the inside and the outside, whatever you define that to be, so that air isn’t accidentally leaking in from places you don’t want it to be.

Insulate right

We seldom think about insulation. It might live inside our walls and in our attic, and maybe in our basement. Some contractor put it there, or didn't. It may have gotten squished or damp over the years and lost its insulative value. It may not have been installed well to begin with (it usually isn't), and likely, the contractor installed the absolute minimum they could get away with and moved on.

One of the great ironies of homebuilding is that insulation is one of the most important parts of your home, and it's usually a complete afterthought and is installed by the lowest-paid subcontractors who will work on your house. I'm going to get into the science in Module 2, Understanding Build Science and the Control Layers of Your Home, but for now, I'll just tell you that insulation is really important, not just for keeping your home comfortable, but for keeping it free of mold. It's important to choose the right amounts of insulation, choose the right kind of insulation, and have it installed correctly in the right places.

Ventilate right

Houses are not people. They do not breathe. But for a moment, let's pretend that houses are like people, to make an analogy.

People breathe through our lungs, not our skin. Having someone punch holes in our skin would not help us breathe better.

Houses are the same. Assuming they do "breathe", they do it using their HVAC system, which stands for "Heating, Ventilation, Air Conditioning." The HVAC is designed to be the "lungs" of the house. A well-functioning HVAC system should heat and cool the air inside the home, exhaust stale air, and bring fresh air into the home.

Most HVAC installations heat, cool, and exhaust stale, damp air via bathroom vent fans and kitchen hood vent fans. That's pretty standard. But they're missing a very important step - they don't have a mechanism for bringing fresh air into the house.

High-performance homes have an additional piece of HVAC equipment that

constantly brings in fresh, filtered, conditioned air and exhausts stale air, ensuring that you are always breathing optimal fresh air. This equipment is called an ERV (Energy Recovery Ventilator) or HRV (Heat Recovery Ventilator).

There is a misconception that you can't open your windows in a high-performance, tight home. That's complete bunk. In fact, the Passive House International (PHI) passive house specification requires that there be at least one openable window in each room where people spend time. You can and should open your windows in a healthy home whenever the outside air quality, temperature, and humidity make it feasible to do so. But sometimes it's too polluted outside, and sometimes it's too hot or too cold or too humid outside. ERVs run all year long, regardless of what's happening outside, to bring fresh air into your home.

I'll talk more about ERVs and HRVs in Module 10, Designing and Installing a Healthy HVAC System.

Let it dry

Sometimes, when people say "their house should breathe", they think they want a house that can leak air through its walls. I've already established why that's a bad idea. Sometimes, though, when people say "a house should breathe", they mean - can water dry through the walls. This is confusing, but it's just the reality of the construction industry - "breathe" has two meanings.

You want a home that can dry out if it gets wet. You should assume that eventually water will find its way in, somehow, and give that water a path out. A resilient home should be vapor permeable, meaning that water in vapor form can evaporate through the walls.

Types of buildings

To greatly oversimplify, there are two different types of buildings.

Most of us live in homes with insulated walls. These walls work by blocking heat and liquid water from moving in or out of the building. These are called Stick Built or

Light Frame homes.

A Stick-Built Home uses wood sticks, or lumber, to build out the frame of the house.

Another type of home is Mass Wall construction. Buildings with “mass walls” work by absorbing heat and water, and letting it go when temperatures or humidity change. An example of a mass wall might be a cinder block home like you’d see in South America, or a straw bale home.

You need to know which type of building you are designing, because they work in opposite ways. In this class, I’ll focus more on insulated walls. If you’re interested in mass walls, the Building Biology Institute has some good classes and information about how to build them.

Does “high-performance” go far enough?

In short, no.

In general, the focus of “high-performance” construction is mostly on creating more energy-efficient homes that also happen to be healthier. If our focus is instead on creating healthier homes that also happen to be more energy efficient, we need to be thinking about other things, too.

When we are building a healthier home, we also need to think about:

- Preventing the growth of mold and other biologicals
- Minimizing the chemicals and Volatile Organic Compounds (VOCs) we use in our living space
- Minimizing our exposure to Electromagnetic Radiation (EMR)

This class will address all three of these goals.

What are your priorities?

It’s important to check in with yourself at the beginning of this process and list out

your priorities. At many points during your build, you'll have to make tradeoffs. Sometimes, building a mold-resilient home can be directly at odds with building a low-EMR home. For example, for a mold-resilient home, you may want to build at the top of a hill so that water drains away from the home, but for a low-EMR home, the top of the hill might have more radiation from nearby cell towers. Different people are going to make different decisions, depending on their sensitivities. Before you get too much further, check in with yourself on your priorities. Write down your thought process, so when you're in the thick of decision making, you'll remember what you decided and why.

Getting the most out of this class

This class is intended to teach you best practices of building, and help you design your own healthy, resilient home.

I wrote it for homeowners like you who have been through it with mold and need to build a healthy home. I assume you know nothing about how homes are put together, and I explain it all clearly. Its focus is on how to prevent mold and have optimal indoor environmental quality in a new home. While I respect people who are building high-performance homes to help the environment, that is not the focus of my class.

The advice in this class is based in solid build science, which I explain as I go. I dive into details about how every little bit of your home should be constructed. This isn't just general advice. So much of building a mold-safe home is in the details, and this class covers them. It also covers how to reduce VOCs and EMR in your new home.

Here's how I'd suggest you use the class to make the most of the material:

1. Download and print out the textbook.
2. Download and fill out the workbook.
3. Read, watch, or listen to the modules.
4. Optionally, take the certification test.

5. Share the class with your build team.
6. Consult with me to get any additional questions answered.
7. Join us for a live class in the future.

Print out the textbook

Before you go any further, download the complete textbook from the next module of this class. If you want to take notes, you can do that through Acrobat Reader, or you can print out the textbook and put it into a three ring binder (or have it bound if you're feeling ambitious).

The textbook PDF contains the complete text of every module. Using a PDF reader, you can click on a link in the Table of Contents to jump to that section. You can also search the PDF to find specific words. This is helpful if you remember learning about something but can't remember which module it was in.

The textbook contains:

- the complete text of every module
- links to relevant websites and products
- photographs illustrating build details
- a summary of the key takeaways of each module
- a glossary that contains definitions for the many new terms I introduce
- a list of the sources I drew from in creating this class

Download the workbook

You'll also want to download the workbook from the following module. You can fill out the corresponding section for each module as you go in order to translate the theoretical information in the lectures into a design for your personal build. For instance, when we talk about foundations, the workbook exercises will help you decide what kind of foundation might work best for your needs and your build site, and define the requirements for how your foundation should be designed and built.

If you complete the workbook, you'll end up with a personalized requirements document for your healthy home. You'll understand why you made the decisions that you made, and you'll be able to hand that document to your architect or designer or design builder and tell them what the home should look like and, more importantly, how it should be built. Knowing what you need going in is the only way to make sure that you end up with that at the end, and this class will help you do that.

The workbook is set up as a PDF form, so you can fill it out in Acrobat. If you prefer, you can print it out and handwrite your responses, but there will be some drop-down menus that won't print out correctly, so you'll need to refer back to the PDF when you get to those sections.

Watch or listen to the modules

By fall 2025, I will offer an accompanying video lecture for each module. Each video will have the same content as the accompanying PDF.

If you're a visual learner and it helps you to sit down and watch video, you're welcome to do that, but you don't have to. The videos will just be me talking. Everything you'll need to see is in the textbook. Feel free to listen to the lectures while you're commuting, or chopping carrots, or loading the dishwasher, or folding laundry, or going for a run.

If you're wanting to get a head start on the content before the videos are available, you can read the textbook. It contains the same content that will be in the video.

Optionally, take the certification test

At the end of the class there is an [optional test for a certification path](#). There is no requirement for you to do the test; you're perfectly welcome to just ignore it. If you'd like to get a certificate that demonstrates that you know the information taught in this class, you'll need to pass the test with a score of 80% or better. The test is open-book and you may take it as many times as you need.

Note that this class is intended for homeowners; it's not intended as a professional

certification. For that, I invite you to explore the programs offered by the [Building Biology Institute](#), [EMU Passive](#), and [PHIUS](#).

Share the class with your build team

It does you no good to take my class and learn all these concepts if you can't find an architect and contractor who will design and build this way. So every class you buy includes three seats - one for you and your spouse or project partner, one for your architect, and one for your contractor. If you can find a build team willing to learn, this class can help them do that.

When your architect and contractor are ready for their login, have them email hello@practicalhealthyhomes.com and provide your name, their name, their company name, their location, their website, and their license number. I will reply to the email with a coupon code that gives them their own login to the class for free.

Consult with me

In addition, your class purchase includes an optional one hour of consulting with me at [Practical Healthy Homes](#) at a discounted half price rate of \$75, to help you iron out any remaining questions you have and identify next steps. And of course I am available going forward to help you with your build at my normal hourly rate, if you need that help.

You can email me at hello@practicalhealthyhomes.com if you would like to schedule.

Join us live in the future

At some point, I will likely lead a supplemental live version of the class. [Join our mailing list](#) if you'd like to be notified when the live class is available.

Welcome to the class, and happy learning!

Key Takeaways



How we got here

- Older homes "breathed" due to minimal separation between indoors and outdoors and dried out easily.
- Post-1970s homes became tighter and more insulated due to energy concerns, but without proper ventilation, leading to more trapped moisture and mold risk.
- Air conditioning introduced cold surfaces that condense humidity inside walls, contributing to mold.
- Most homes today are not built to support drying, hence widespread mold issues.

Modern building code limitations

- The IRC (International Residential Code) governs basic safety and structural integrity—not health.
- Code-built homes meet minimum standards, not optimal ones.
- Real estate appraisals emphasize size and finishes, not indoor air quality or construction quality.
- Building a healthy home requires going beyond code and beyond finishes.

Tract and spec homes

- Most new homes are tract homes or spec homes that contractors build to make money.
- Conflict of interest between the contractor's desire to cut corners and reduce costs, and your desire to build a healthy and resilient home

- Need to build a custom home, where you have control over how it's designed and how it's built

What is a high-performance home?

- Goes beyond code to enhance health, comfort, energy efficiency, and durability.
- Passive House is a high certification standard, but you can apply its principles without being certified.
- Core principle: "Build tight, insulate and ventilate right."

Build tight

- Leaky homes draw air from dirty or moldy spaces like basements, crawl spaces, and attics.
- Define what is "inside" and "outside" and seal accordingly.
- Garages should be outside.
- Basements, crawl spaces, and attics should either be inside or outside.
- Prevent unwanted air infiltration and pest access with a continuous air barrier.

Insulate right

- Insulation is critical to comfort, energy efficiency, and mold prevention.
- Often undervalued and poorly installed.
- Proper insulation must be:
 - In the right places
 - The right amount
 - The right type
 - Correctly installed

Ventilate right

- Homes don't "breathe"; they need controlled ventilation.
- HVAC = Heating, Ventilation, Air Conditioning → should function as the "lungs" of the home.
- Most homes exhaust air but don't bring in fresh, filtered, conditioned air.
- Healthy high-performance homes use ERVs or HRVs for constant healthy ventilation.

Let it dry

- "Breathing" also refers to vapor permeability—the ability of walls to dry out if they get wet.
- Assume water will get in eventually, and design wall assemblies that allow drying.
- Use vapor-permeable materials to promote drying toward the exterior or interior, as appropriate.

Types of building construction

- Stick built / light frame homes use lumber frames and insulation to block heat and moisture.
- Mass wall construction absorbs and releases moisture and heat (e.g., adobe, straw bale).
- This course focuses on stick-built insulated homes, which are more common in the U.S.

Does "high-performance" go far enough?

- Not always. It often emphasizes energy efficiency over health.

- A truly healthy home must prioritize:
 - Mold prevention
 - Low-VOC materials
 - Low-EMR environment

Know your priorities

- You will face tradeoffs—e.g., elevation for mold prevention vs. EMR exposure from cell towers.
- Define your personal health priorities early, and refer to them during decision-making.
- Document your thinking so you stay grounded when navigating conflicting choices later in the build.

About this class

- Learn best practices for building a healthy, mold-resistant home.
- No prior knowledge needed; the course explains building basics clearly.
- Focuses on mold prevention, indoor air quality, VOC and EMF reduction.

Getting the most out of this class

- Print out the textbook
- Download the workbook
- Watch or listen to the modules
- Optionally, take the certification test
- Share the class with your build team
- Consult with me
- Join us live in the future