This is a brief description of how to make a realistic scale model of your own home, or your own residential design. As a professional builder, I have constructed many of these models. It is fun, challenging, and can be very helpful for prospective homeowners. It is fairly inexpensive, but can be a bit time-consuming depending on your creativity, ability to solve geometric problems, and the time you have available for the project.

This is a model of my personal home, which I designed and built myself. With the purchase of a MakerBot Thing-O-Matic, I can now design any construction-related component in CAD and print it out in properly-scaled 3D for use in my 1:24 scale residential models... something I’ve never been able to do before.

WHAT YOU NEED:

Here is a list of the BASIC tools and materials required to build a 1:24 scale architectural model:
1) **Time:** If you don’t have a lot of time to spare, I wouldn’t recommend starting an in-depth project such as this.

2) **Space:** Building a model like this requires quite a bit of space. As you can see in the above image, I built mine on our Dining Room table (not widely accepted by many wives).

3) **Patience:** If you get frustrated easily, don’t even attempt to build a 1:24 scale model home.

Okay... let’s assume you have the above items in your possession. Shall we continue? We shall:

4) **Material:**
   a. I use 20” x 30” x 3/16” white foam board (available at Wal-Mart or just about any craft supply store) to build my walls, floors, ceilings, and roof sections. It is rigid, inexpensive, and easy to work with.
   b. I use 22” x 28” white poster board (also available at Wal-Mart or just about any craft supply store) to build other items within the model. Before my Thing-O-Matic days, I used it to build cabinets, appliances, fixtures, etc.

5) **Adhesive:** I generally use white glue to bond all of my connections. It’s inexpensive, readily available, and very easy to work with and to clean up.

6) **Cutting Tools:** I use Xacto knives of various profiles, depending on what I’m cutting.

7) **Architectural Rule:** This is not absolutely necessary, but helps in the layout of your floor plan. They are not very expensive, and usually have 1/2-inch = 1-foot graduations on one side (if you buy the correct type). This is the scale you will use for a 1:24 scale architectural model. If you do not have an architectural rule, you can use a standard ruler... you will just have to convert your real-life measurements mathematically.

8) **Small T-square:** Use this to help draw square (or perpendicular) lines while doing your lay-out work. You can also use a framing square, a speed square, or any other drawing device that is perfectly 90 degrees. (The speed square has the advantage that you can use it to create any angle you want. That’s actually what I use.)

9) **Cutting Board:** Unless your wife wants a brand new kitchen table, you will need a cutting board (or some sort of sacrificial material) under your foam board (etc.) while cutting.
10) **T-pins:** These are normally used in model aircraft construction (and I’m sure other crafts that I’m not currently aware of), and are available at most any hobby shop. I use them to hold my walls and floors together while the glue dries.

11) **Calculator:** This can be a very handy tool during the design phase. You’ll most certainly need a good one. I use a Construction Master IV (available at most Lowes or Home Depot stores, as well as CalculatedIndustries.com), which can calculate real-world feet/inch measurements; convert feet to inches, inches to mm, slope to pitch, calculate volume in cubic inches, cubic feet, and cubic yards; and do tons of other things that I won’t attempt to explain here. It’s a calculator for professionals in the construction industry. But if you’re good with math, just about any calculator will do.

12) **Tape measure:** Use it to measure your existing home. I won’t use anything but a 35-foot Stanley Fat Max, but use whatever cheap tape measure you want to.

13) **A Good Pencil:** I use a high-quality mechanical pencil to lightly (I do stress the word “LIGHTLY”) draw my layouts onto my foam board.

14) **A Good Eraser:** I use a high-quality retractable/extendable eraser to erase any errors or over-extended lines (and you you will have some of both). This is also why I stressed the word “lightly” in the above line item.

15) **3D Printer:** This is optional, of course. Not everyone wants to go to the elaborate steps of adding cabinets, appliances, and fixtures to their architectural models. I’m anal, and I do.

**STARTING OUT:**

1) **Draw your floor plan:** Depending on the size of your structure, this may take several sheets of foam board. It’s difficult to give an approximation of how many sheets you will need, since every structure is different. For instance, my home took about 1 ½ sheets to fit the width, and about 1 1/8 sheets to fit the depth. My home is approximately 2,450 square feet.

   a. Orient your first piece of foam board so that it will best match the alignment of your home. Measure 3/16” in from 2 edges of the foam board, so your lines meet at one corner.

   b. Where the lines meet on your foam board is where you need to start measuring your home. (Disregard these instructions if you are reproducing your model
from standard ¼-inch = 1-foot blueprints. In this case, simply double your manual measurements of the blueprint, or read the blueprint measurements and then use the ½-inch = 1-foot graduations on your architectural rule.)

c. Measure the interior dimensions of the first room, and transfer them to your foam board. While you’re there, measure the vertical locations of any doors, and lightly mark those locations on your floor plan. There is not much point in marking window locations on the floor, unless you simply want a reference point during wall construction.

d. Continue to the next room, and draw it. Also lay out any doors in that room.

e. Remember that walls are not a pencil line thick. They are the width of your foam board, which is 3/16” (or 0.1875”) thick. **NOTE: A standard 2x4 wall is 3 ½” thick (framing) plus ½” of sheetrock on both sides... which is 4 ½” thick. If you divide that by 24, you get 3/16”. So foam board is perfect for 1:24 scale architectural models.** (For 2x6 exterior walls and interior plumbing walls, you will just have to “fudge” a dimension or 2 somewhere, or add a layer of poster board on both sides of your foam board to meet the “true” scale dimension. I have never done that. As long as my interior dimensions are accurate, I don’t care that my exterior walls are 5/64” (0.078125”) thinner than they should be. I’m anal on my real houses, but this is a model. You aren’t going to live in it.

f. **Optional:** If you plan on building cabinets, vanities, or any other floor-standing object into your model, now is the best time to do that. Once you add walls, it becomes very difficult. In my model, you may notice that I drew the locations of my cabinets and vanities, and engraved concrete floor patterns onto my floors. I did this before any walls were stood. Had I done that afterwards, it would have been very awkward and time-consuming.
2) **Lay out and cut your walls:** This is always the fun part, and where things really start to look like a house.
   
a. Choose an exterior wall to start with. I usually start with the longest straight wall in the model, and work inward from there.

b. You can either measure your foam board floor plan and transfer it to your foam board wall material, or you can simply hold the foam board up to your floor plan and transfer your wall marks to the wall material. Either way works fine, but transferring measurements takes a long time. Transferring marks is much faster, as long as you have a sharp eye and make sure your layout is accurate (3/16” wall thicknesses, doors laid out right, etc.

   c. Make sure you’ve marked all intersecting wall locations and door locations properly. Now, you need to mark out your windows. This is best done by taking your foam board to each room and marking out your windows at the location. In some homes, you may find that windows are ½” to ¾” (or more) higher or lower than others. You could be measuring off of a different flooring material (i.e. carpet, tile, hardwood, etc.), or perhaps you have an older home or a very poorly built new home. Many times (especially in newer homes), windows are intentionally raised and lowered for aesthetic purposes. Anyone with a half-way keen eye should be able to tell the differences between measurement errors due to flooring material, building error, and aesthetic purpose. This will be up to your own judgment.

d. Cut your walls. Use a new Xacto knife blade to do this. I don’t use a straight-edge of any kind, but I have very steady hands. Do not use your architectural rule as a straight-edge... this is a no-no. Use any old ruler, if you must. Make sure your blade is perpendicular to the material, and at about a 45-degree angle. Don’t press too hard and try to cut the material with one stroke. Unless your blade is brand new and razor sharp, it’ll simply make an ugly cut. You want your cuts to be very clean and smooth. Practice makes perfect.

3) **Glue your first wall:** After making sure you’ve cut out all of your door and windows, it’s time to glue your wall to your floor plan. If you’re anal (like me) you will also want to draw any electrical outlets, light switches, thermostats, wall fans, wall speakers, house vacuum ports, small access hatches, wall tiles, et cetera.

   a. Apply a liberal amount of white glue to the bottom edge of your wall. You could alternately apply glue to your floor plan, but you must be extra careful not to put glue in your door openings, et cetera.
b. Carefully place the wall on your floor plan, aligning the extreme ends first. Once in place, quickly push T-pins through the ends of the wall at a 45-degree angle into the floor.

c. Quickly place your speed square (or any other free-standing object that is perfectly 90 degrees) on the floor, and carefully slide it against your wall to prop the wall up perfectly plumb with the floor. You may have to prop it up from the exterior of the house, or the interior of the house, depending on which way your wall is leaning. I’ve used boxes, books, wooden cases, a box of tissues, et cetera. It just needs to be square with the floor until the glue dries.

d. Quickly check the straightness of your wall in conjunction to your exterior wall line. Push it in or out, and put T-pins as necessary to hold it in place. Use door openings to avoid puncturing the “shell” of the foam board, for better aesthetic appearances... but don’t worry if you must push one through your wall. It can always be covered up with a little dab of white glue and a little wipe-down to smooth it.

4) **Finish constructing walls:** Now that your first wall is installed, the rest go fairly easy with a little bit of forward planning.
   a. Try to work from one corner of the house to the other. This isn’t always possible, depending on the layout of the house. Long hallways, for instance, usually end up requiring some tedious wall installation in closets and smaller rooms.

   b. If you have any interior walls that have exposed corners, it looks best to miter your corners instead of having foam exposed at that corner. In this photo, you can see that I mitered the wall to the left of the tub/shower unit... 2 walls as one piece. This is tricky, and takes some practice. But it looks great, and saves a little bit of gluing/aligning/pinning. Mark your corner (on the inside
of the bend), then measure 3/16” on both sides of that mark. Cut both of those marks at a 45-degree angle, using light pressure and making sure not to cut through the bottom side of the foam board. Remove the waste, bend, and adjust if necessary. I always put white glue in this type of corner, just for extra reinforcement.

c. Every structure is different. With practice and patience, you’ll learn the best methods to make each wall. If you’ve never built a home before, or watched one being built, this might take a lot of practice.

5) **Optional 3D Objects:** If you have a 3D printer, this kind of project is the perfect way to make use of it! I meticulously measured every object that you see in these Thingiverse.com files, and reproduced them in as much detail as I could for the resolution of the Thing-O-Matic. Please note that my objects are not completely finished and neither is the 1:24 scale model of my home.

For instance, my kitchen appliances are all stainless steel with black trim. I printed these appliances in black ABS, cleaned them up a bit with an Xacto knife, and washed them down with a Q-tip and acetone. To simulate stainless steel, I am going to use aluminum HVAC duct tape, carefully cut around the handles, knobs, digital faceplates, and other features of my appliances.

I have more objects to complete, but wanted to get this file out there for anyone interested in making a 1:24 scale model of their home (or their dream home, or anything else). So far, my 3D architectural objects include:

--*Whirlpool* side-by-side refrigerator/freezer with ice/water and separate handles
--*Whirlpool* 30” electric range/oven
--*Whirlpool* above-range microwave
--*Panasonic* 42” flat-screen TV
--*Highlander* pellet stove
--60” left-hand tub/shower combo (2 printed for my home) based on *Koral* unit
--60” shower base with seats
--48” x 48” double-hung window with grids
--Basic toilet unit (3 printed for my home)

And more to come:

--Water heater
6) **The Roof:** Roofs are very complex things, depending on your experience with construction and/or geometry. The roof on my house is a simple gable, but has 3 dormers and a cupola over the garage. My house is also 2 stories with functional dormers, and I demand that all of my models have a removable roof and 2nd and/or 3rd level floors (if present in the design). I’ll tackle the roof portion of my design sometime after things calm down. Roofs (especially complex hip roofs with multiple pitches) can be a real “bastard” sometimes. Perhaps why they call hip roofs with multiple pitches “bastard” roofs. I promise... look it up.

Until then, here are a few more photos of my project so far: