



GEOMETRIC INSECT HOTEL

— — — — — **PROCESS BOOK**

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Did you know that one out of every three bites of food we consume depends on animal pollinators? That's right, 35% of the entire world's food crops, including fruits and vegetables, depend on animal pollinators such as bees, beetles and butterflies to reproduce. That's scary when you take into account the rapidly declining insect population. That is why it is so important to create safe spaces for these insects help supplement increasing loss of natural habitat.

Insect hotels are simply man-made structures that are created from natural materials intended to provide shelter for insects. They typically take the form of hollow boxes with a back. These insect hotels act as indirect exterminators, reducing needs for pesticides in gardens and outdoor areas as well as a safe place for hibernation through the winter.

This insect hotel is made up of six different compartments, each housing a different environment for insects. It is a geometric, clean design housing the messy, chaotic life of insects. Here is a look inside the process it took to create this insect hotel.

INSECT RESEARCH

Although bees are well-known for their role as pollinators, they are not the only pollinators that can be attracted to an insect hotel. Other beneficial insects include lady birds, beetles, and butterflies.



Lady bird

Lady birds are considered one of the greatest allies of the farmer and the gardener because many lady bird species, and their larvae, feed on aphids *or* “pests”. They can actually be more effective than poisonous chemicals in the garden. Lady birds are always looking for a safe space to lay their eggs, as well as a place to hibernate over winter. They often are found using dead stems, old wood, or pine cones.



Beetle

Beetles pollinate 88 percent of all flowering plants, more than any other animal. They can be found in the dead wood, as it is essential for the larvae of wood-boring beetles. Dead Wood also supports many fungi, which help break down the woody material, while crevices under the bark hold centipedes and woodlice.



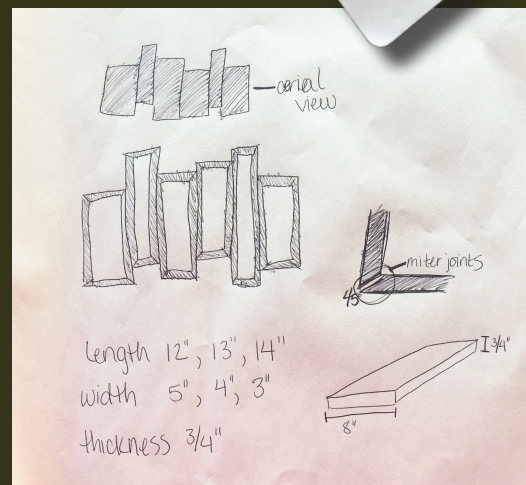
Green lacewing

Dry leaves serve as the home for a variety of invertebrates, as this mimics the litter on the forest floor. For example, spiders and green lacewings can be found nesting here, both of which feed on common pests and are considered a friend to the gardener.

INITIAL SKETCHES & PREP WORK

The most important factors to keep in mind when designing an insect hotel are that it must be made from untreated wood and it must be rain-resistant. This simply means you must use all natural wood and need to design a roof for the habitat compartments. The interior habitat must also be created from natural material. If the material used for the compartments is loose, such as using leaves, there should be a barrier to keep the material in while keeping unwanted predators out. Wire mesh works well for this. In this step,

I stumbled upon the idea of offsetting the compartments, but I fell between two design options. I refined my design and through the next two steps of building a cardboard model and playing with Google SketchUp, I finalized the design details.



Final Sketch

CARDBOARD MODEL

Originally, I had planned to add a circular wooden compartment, somewhere. With the provided wooden materials, I would have had to create them by cutting symmetrical slices, of half circles, layer them on top of and next to one another, and glue them together. I realized through creating a cardboard model that this would not be the most practical design technique seeing as the more divisions in the wood on top, the more probable water damage is.

I chose instead to play off of the idea of the rectangular box, expanding the number of boxes to six and playing around with different sizes. This idea really came to life in Google SketchUp.



Original Cardboard Model

RESEARCH PROPOSAL

My design is based on additive geometry and is made up of six rectangular boxes. These boxes will be three different sizes and there will be two of each size. Standing on the short side, the boxes will be staggered in height and depth, creating contrast with the sun throughout the day. Two boxes will be ground level and will act as the legs. This insect hotel can either be installed on two posts, keeping it above the ground and safe from flooding, or it can be set on the ground.

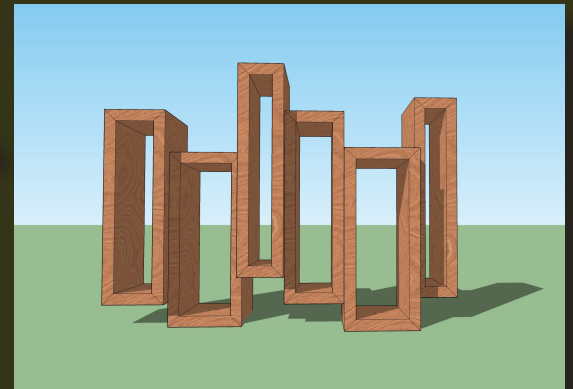
There will be three different types of natural filling for the boxes: pine cones, wood logs, and leaves. These fillings will make up all six boxes and wire netting will line the outside of each end of three filled boxes. This netting will make these three boxes accessible for bugs from each side while acting as a barrier from other predators. The insects this hotel is intended to provide shelter for are lady birds (bugs), bees, beetles, and invertebrates like centipedes.

I want to create something modern with the intent of drawing in people's attention and curiosity. The outside will be simple and clean which will contrast the interior filling which will be full and cluttered. By creating something stylish and modern, I hope that younger generations of visitors might walk away thinking bug conservation and protection is cool, sparking further thought. Caring about an issue begins with an agreement that it is worth caring about.

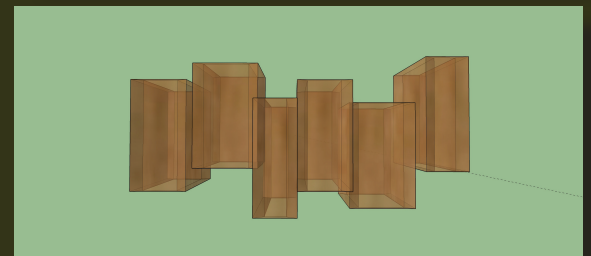
DIGITAL DESIGN: USING GOOGLE SKETCHUP

I was able to carefully measure out every piece and cut of my wood thanks to SketchUp. The digital application allows the user to visualize the end result using specific measurements, shapes, textures, and environments. The wood I'm working with is 3/4in thick and varies in size. So, 4 boxes will maintain a 8 in depth while 2 boxes will have a 6 in depth. I chose to create miter joints, which is the diagonal joint at each corner, because they look nicer. I am hoping the real cuts end up as nicely aligned as they look in SketchUp. The offset of the boxes are measured in increments of .5in. The five box sizes are 14x3x8, 14x3x6, 13x4x8, 13x4x6, and 12x5x8 and The sizes of each piece of wood is as follows:

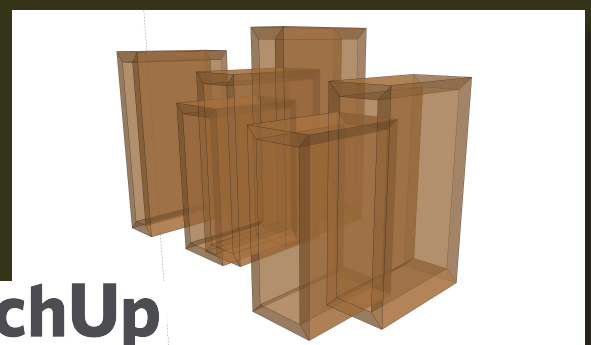
14x8	x2	3x8	x2
14x6	x2	3x6	x2
13x8	x2	4x8	x2
13x6	x2	4x6	x2
12x8	x4	5x8	x4



Front view of SketchUp model



Aerial/top view of SketchUp model



Side view of SketchUp model



FINAL DESIGN



Front view of final insect hotel



Aerial/top view of final insect hotel

Before completion, I sanded the boxes to soften and smooth the edges and sides. After gluing the boxes into the offset structure, I stapled the wire netting onto the faces of the boxes and placed the loose material inside. For the boxes that were not covered by the netting, I wedged the vertical and horizontal pieces of wood into the open boxes strategically and forcefully so that they would sit securely for a long time to come.

This was the first time I worked with wood, and it was surprisingly easier than I thought. The final overall form is heavily influenced by geometry and brings a clean, modern feel to the naturalistic outdoors. I was happy with the final structure and ended up learning so much about insects, their environments, and how significantly humans' and insects' lives affect one another.

There is something special about creating a piece of art for an environmental purpose. So, if you have time some time on your hands and a passion to make the world a better place, this is a fun project anyone can do!