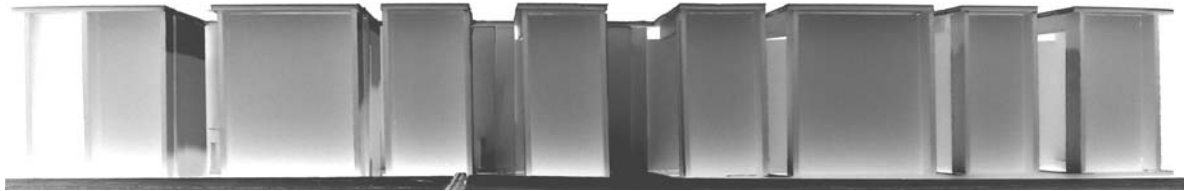


Exploring the Physical World Through Drawing and Visualization



ANDREW KRIVANEK

Architectural Foundations I

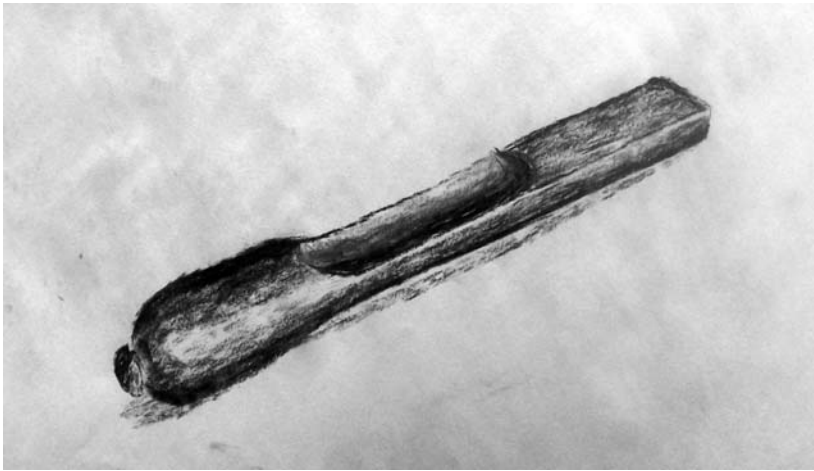
EARLY ANALYSIS

CHARCOAL DRAWINGS- SPENCER MUSEUM OF ART-

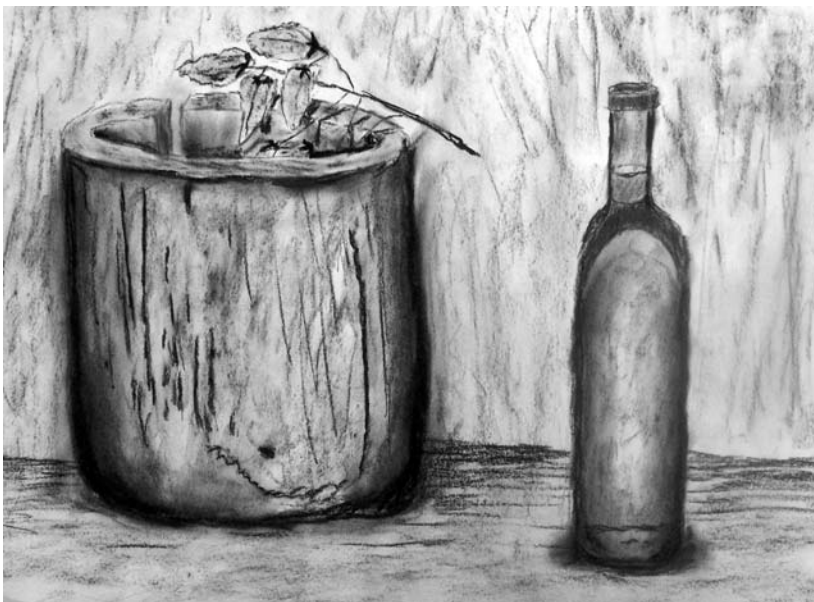


GRAPHITE PENCIL ON CHIPBOARD

CHARCOAL DRAWING



VINE CHARCOAL ON NEWSPRINT

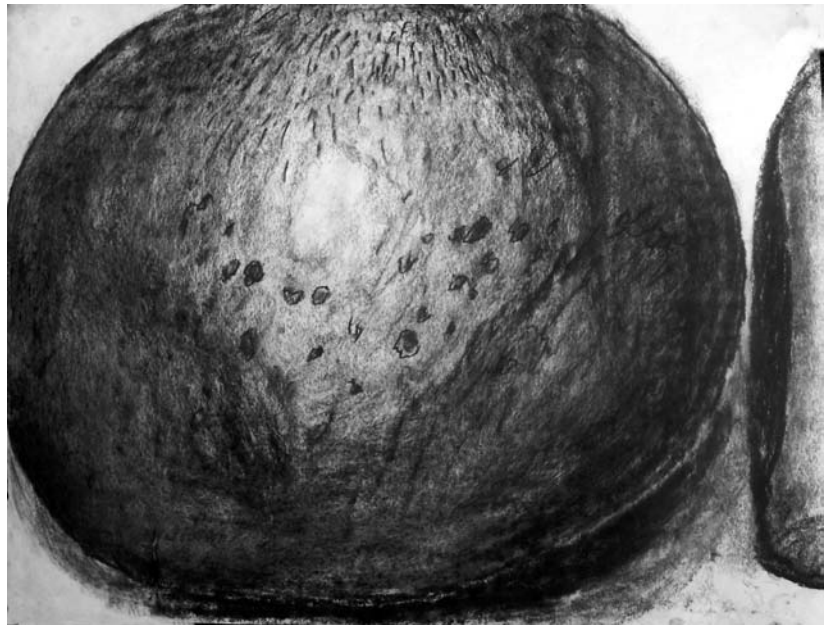


CHARCOAL ON NEWSPRINT

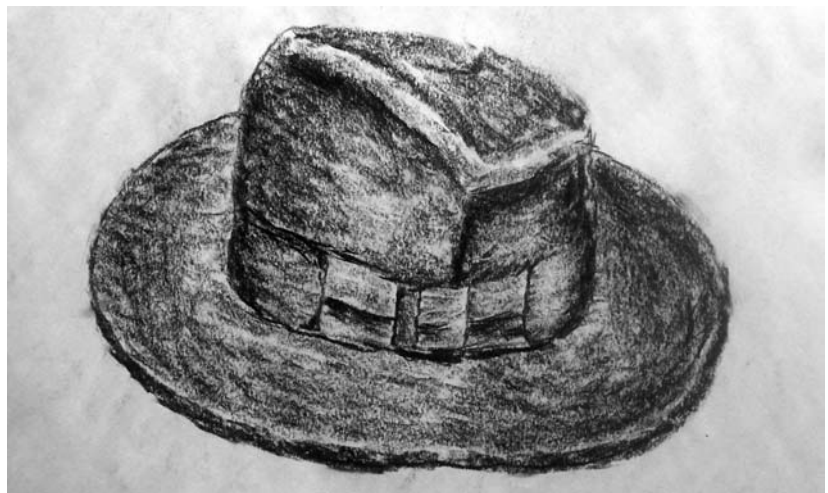
To begin the semester, I studied the importance of charcoal drawing. From the beginning, I found that charcoal allowed me to control my drawings better than other material. I tested my learning with a series of still life drawings. I focused on the importance of light in these drawings. I set up objects that would attract and reflect light, and try to relate that on my drawings. I began with a simple wooden object that I found very interesting. The shape of the object attracted light differently from every angle. It also changed its overall shape horizontally. By drawing, I noticed that shadows were created by the light and how that light hit the object. I also drew the object at an angle to express the heavier side of the object. To achieve that quality of depth, I mixed tonal values to show areas of light and dark. I then set up objects that were very different in size. I tried to create the same value of

CHARCOAL DRAWING

The importance of light and shadow led me to focus directly on the object I was drawing. I found it very important to be able to describe the object. I learned that all objects had texture. Being able to feel the object in my drawings was very significant to me. I noticed that different objects had different qualities of texture. The big round object was rough and uneven, so I varied by drawing style throughout the object. I found another object that had a different texture. This hat was smooth and soft, so I drew it with even strokes and with constant weight. I also focused on how the texture affected the light and how shadows are created by the light. The texture determined how much light was reflected or obtained by the object. The round object was harder and reflected light. The hat was soft and filtered most of the light that hit it.



CHARCOAL ON NEWSPRINT



CHARCOAL ON NEWSPRINT



VINE CHARCOAL ON NEWSPRINT

“I focused on how art interacted with the space, and how I perceived that space.”

With the thought of light, shadow, and texture realized, I continued that learning by engaging art and architectural space in the Spencer Museum of Art. Finding a place that resonated with me and that I could relate to architecturally through space was my next challenge. Juhani Pallasmaa wrote about “dwelling” with space and with art. “I experience myself in the city, and the city exists through my embodied experience. The city and my body supplement and define each other. I dwell in the city and the city dwells in me.” Pallasmaa, p.40. I began by producing a series of drawings with charcoal that described a certain space within the museum. Charcoal is an important tool in my drawing because it can show tonal value and contrasting light very well. I focused on how art interacted with the space, and how I perceived that space. I drew a certain area, starting with the dark areas and then working on the light areas.

In my analysis, I began to look at solids within the space I was drawing, and focused on achieving depth in my drawings. I realized that solids create depth, and that earlier studies of light, shadow, and texture contribute to achieve depth. My goal was to describe the depth of the volume between me and the space. In my next set of drawings, I started with the spaces furthest away from me. Where the volume between me and the space was deep, I drew darker and slower. When the volume between me and the space narrowed, I drew lighter and faster. I achieved a highly distinctive sense of depth. I also described the light within the space of those drawings. Shadows and reflections were also taken into consideration, as they also contribute to depth. I portrayed the museum floor as shiny and reflective, and the walls dark and solid. I allowed light to reflect from the floor and shine on the walls to explain the texture of the space.



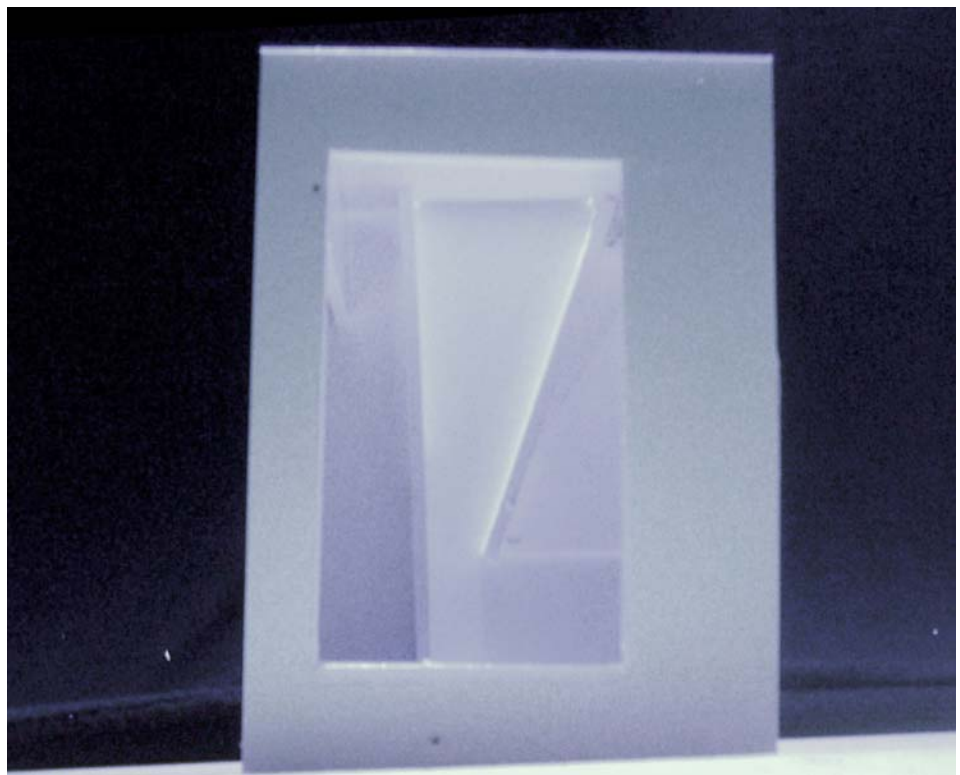
CHARCOAL ON NEWSPRINT



CHARCOAL ON NEWSPRINT

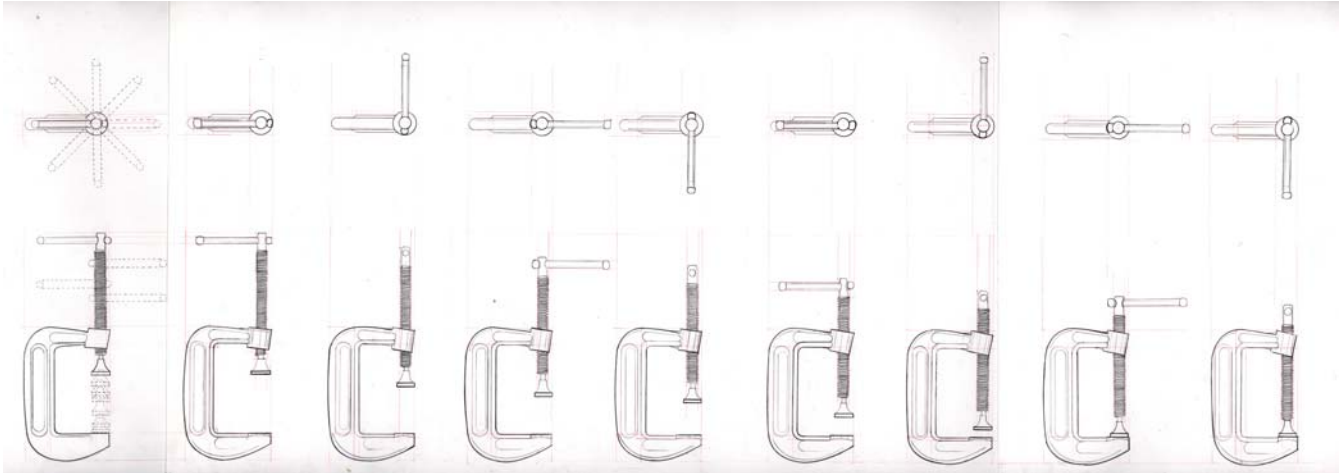
FINAL PROJECT

**TOOL DRAWING-
ANALYSIS-
MODELS-
ISOMETRIC DRAWINGS-
FINAL MODEL-**

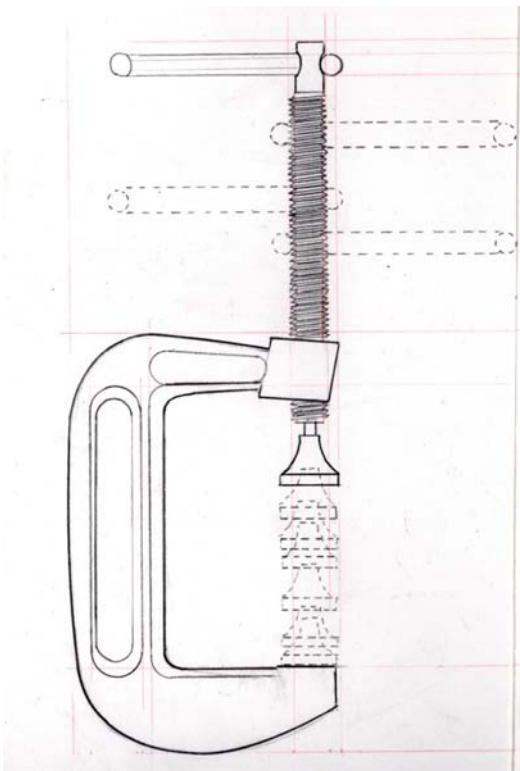


STUDY MODEL w/ FOAMCORE

FINAL PROJECT—TOOL DRAWING

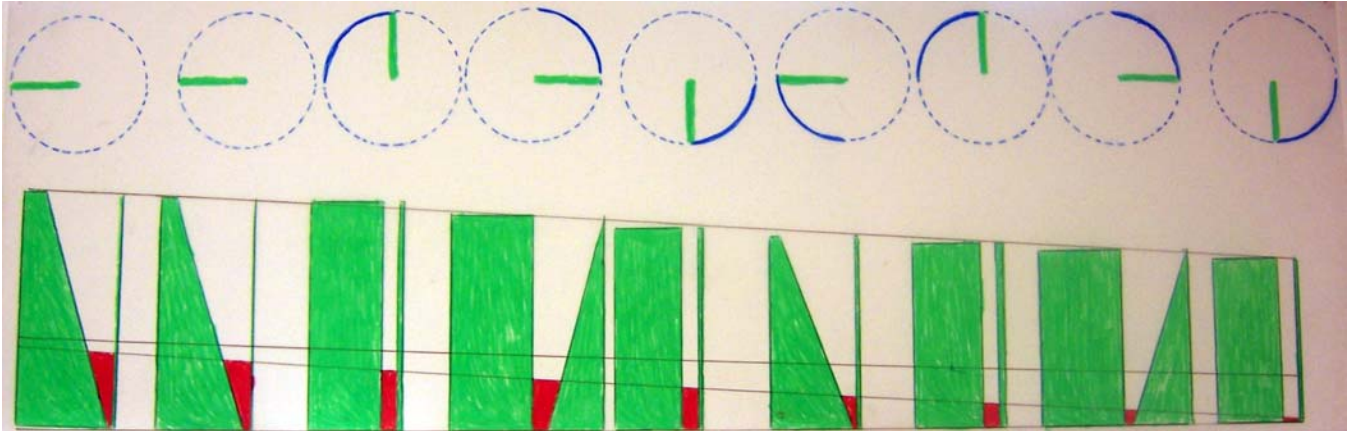


PENCIL ON BRISTOL PAPER



PENCIL ON BRISTOL PAPER

The final project of the semester was focused on one tool. The purpose of the project was to discover the movement of the tool and determine the forces that the tool produces. I chose a c-clamp as my tool because it provided both movement and force. I began by producing a full scale pencil drawing of the tool that showed eight important stages of the c-clamp's movement. I drew the front view and the top view of my tool. During the drawing process, I carefully took a few areas into consideration. I chose eight stages in my drawing because it accurately depicted the clamp closing. The use of construction lines in my drawing helped me determine my layout on the page. More space is left empty on the top of the drawing, because I wanted the focus to be on the bottom area of the page. The use of line hierarchy allowed me to show height in my drawing, with the heavier lines depicting areas that were raised.

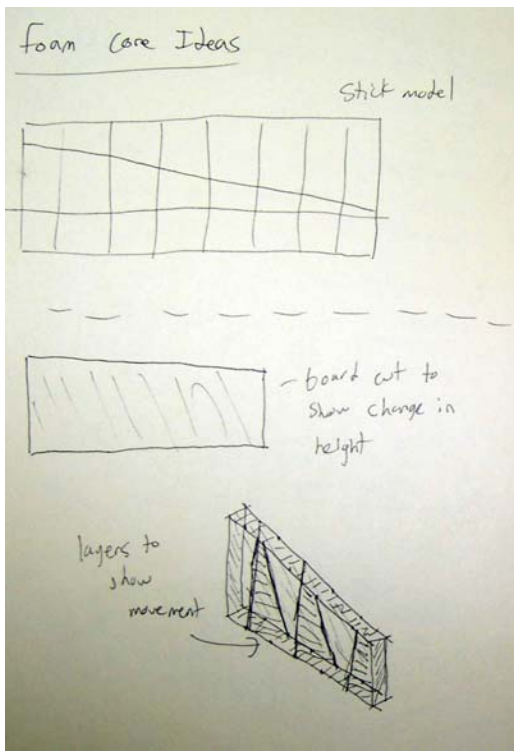


PEN & PRISMACOLOR PENCIL on MYLAR

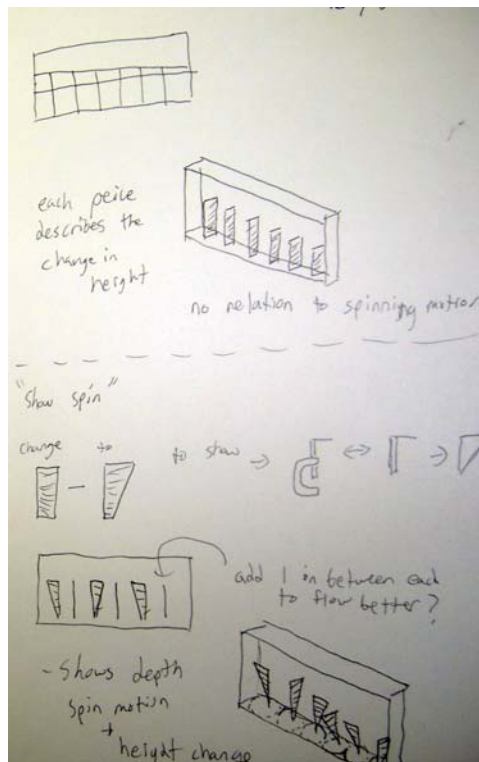
“Discover the movement of the tool and determine the forces that the tool produces.”

I produced a series of Mylar overlay drawings that focused on the meaningful relationship between the pencil drawing of the tool and the action of the tool. When placed over the pencil drawing, the Mylar drawing connects to the pencil drawing. On the elevation view of the overlay, “green” represents the area that the tool takes up during the closing process. The “red” areas correspond to the area of the clamp that is being closed. The empty space within the “green” areas show the movement of the tool inside that area. I also represented the top view of my drawing in the Mylar. I decided to describe the circular motion with dashed blue lines, and created a solid line where the object was moving during that portion of the drawing.

FINAL PROJECT—ANALYSIS

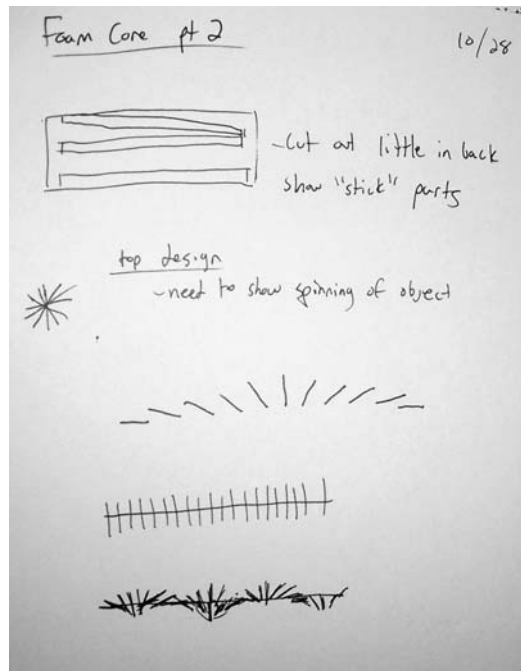


PEN IN SKETCHBOOK

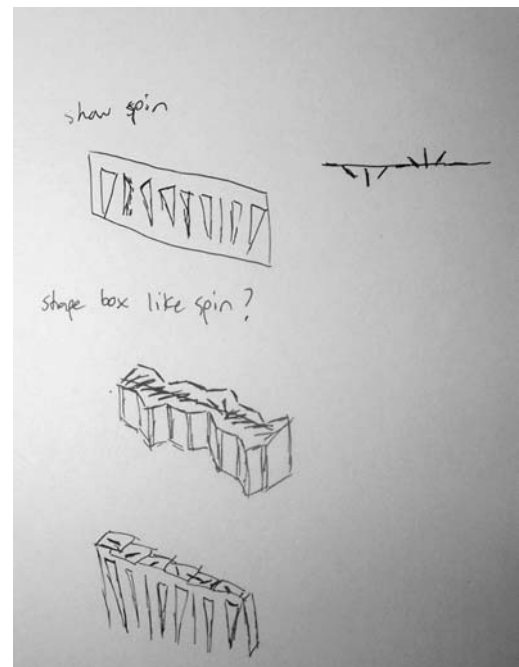


PEN IN SKETCHBOOK

When the construction process began, I had to determine how all six sides would affect the purpose of my tool. Each side had to relate to the movement of the clamp, and how it moves within space. I laid out a “bamboo stick diagram” to express the movement of the tool. The vertical sticks were spaced to show the space each section required. The horizontal sticks represent the change in height that the overall movement acquires. I began thinking about ideas for my project. In early sketches, I thought about creating layers positioned at the angle at which my tool spins. I then turned those layers into actual pieces, and began considering showing the spinning motion of my tool with actual solid material. That material was going to be rectangular, but I decided that triangular would solve more problems because it related directly to



PEN IN SKETCHBOOK



PEN IN SKETCHBOOK

During my thought processes and after some discussions, I wrote down a few new ideas for my project. My thoughts consisted of having little strips describing the spin of the tool. I experimented with the layout of these pieces and decided that there was more than one way to show the spin of my tool. I also thought about cutting out triangles within my board that represent the pieces from earlier drawings. I even considered shaping the box like the spinning of my tool, but it did not work with the six side requirement. It was determined that those early model ideas only expressed one side

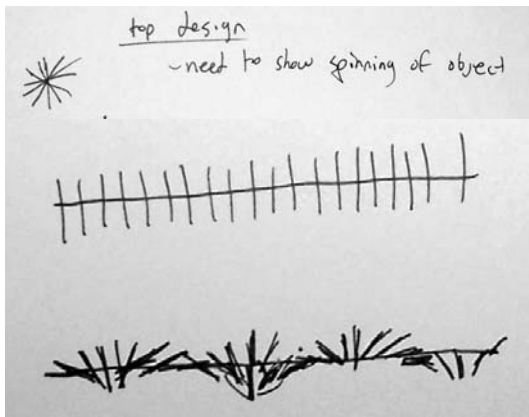


BAMBOO MODEL

FINAL PROJECT—MODELS



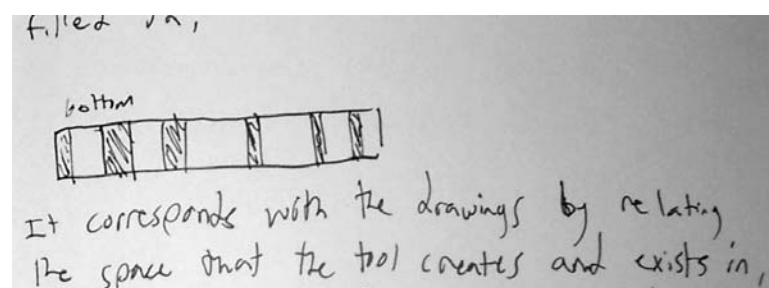
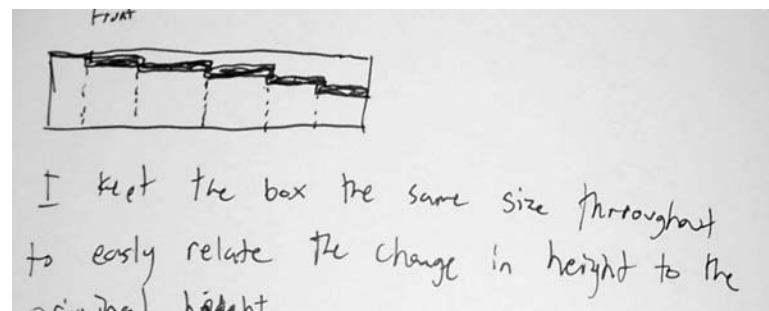
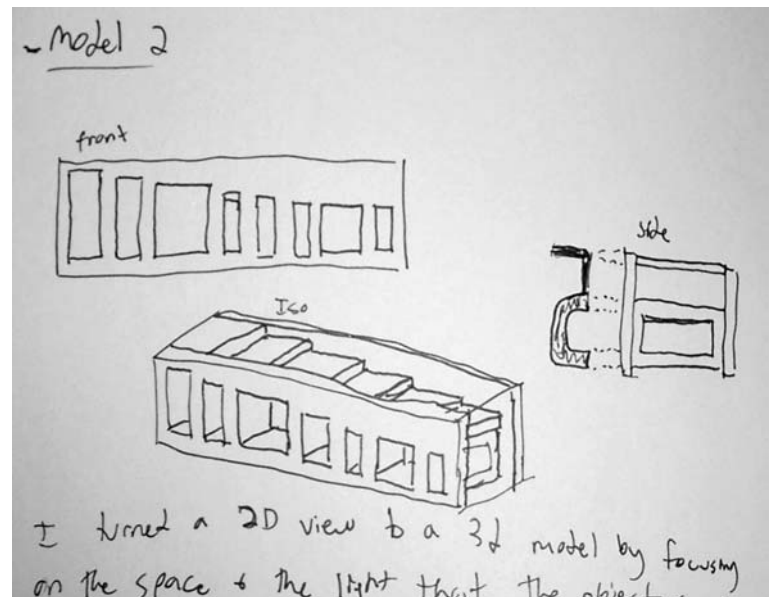
1ST MODEL w/ FOAMCORE



“(it) led me to respect simplicity. Big ideas, little

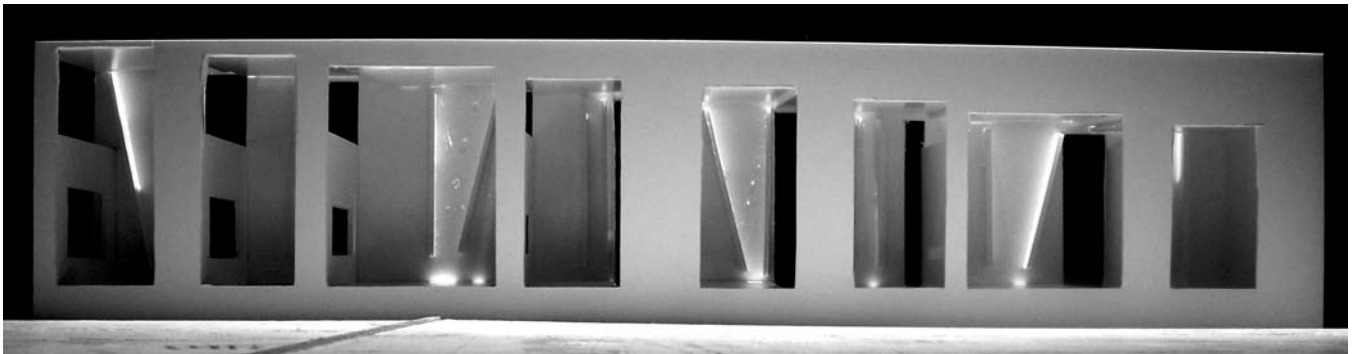
My first model expressed some early ideas and some proposed ideas. My model came directly out of my early drawings in the cut out triangles. It also consisted of many little strips that were laid out like the spin of my tool. I built my model out of 1/8th in. foam core. I experimented with triangular slits and wanted them to relate to my Mylar. I wanted to express the movement of my tool. The overall height of my model decreased, relating to my bamboo model. Discussions in class suggested that my project needed to simplify, and show more than movement indirectly.

Those discussions were very important to me. They led me to respect simplicity. Big ideas, little work. The goal was to articulate a point, and go with that point. Think of verbs and action, not nouns. I was also told to connect the sides through transitions. I decided to focus on space, time, and light for my next model. I began by reversing my thinking. Everything that was solid in my first model, I changed to open space. I left open rectangles in the front of my model, instead of shaping them like triangles. I allowed space to show the shape of my tool indirectly. From the side view, I thought about relating the height of my tool to the height of my project. I also thought about my tool drawings and decided to decrease the height of my project as it lengthened. I also simplified my project by getting rid of the little slits that were used to show the movement. I struggled to find a simpler alternative.

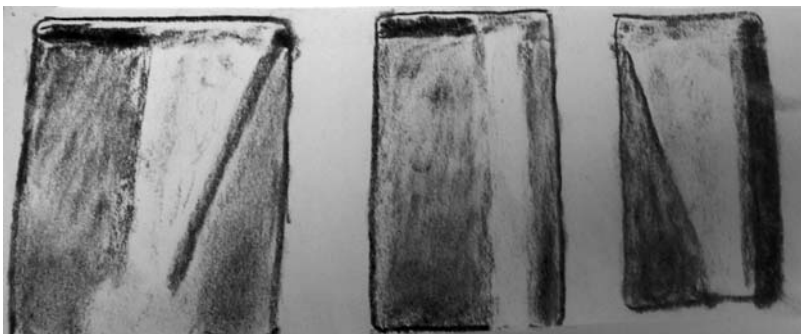


PEN IN SKETCHBOOK

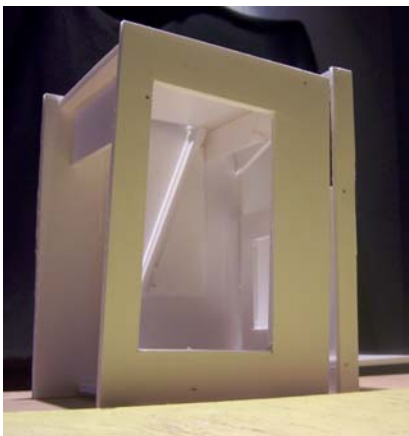
FINAL PROJECT—MODELS



2ND MODEL w/ FOAMCORE

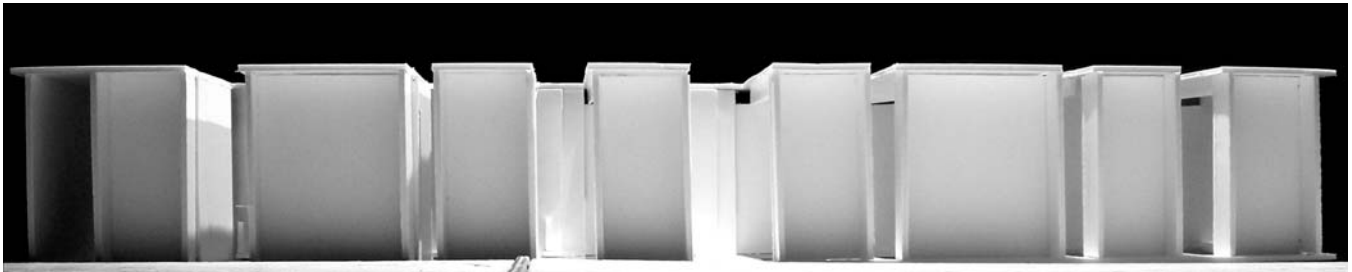


VINE CHARCOAL ON NEWSPRINT



STUDY MODEL w/ FOAM-

My second model accomplished more than my first model. I continued to use 1/8th in. foam core to construct my model, but became very confident in the properties of the foam core. I turned a 2D view into a 3D model by focusing on the space and the light that the tool creates. From the front view I used light to show the areas that spin. In my drawings, I showed triangles to express that movement. Those areas of movement are determined by direct light from above. The bottom view expressed the space in between the object. The top view expresses how the movement of the tool descends throughout the motion. I kept the box the same size throughout the model to easily relate the change in height to the original height of the tool. In the side view, I decided to allow open space to show each step of the tool. I used small rectangular pieces to describe each space. There were still a few problems with this model though. I still did not have a solution for the back view



3RD MODEL w/ FOAMCORE



2ND MODEL w/ FOAMCORE

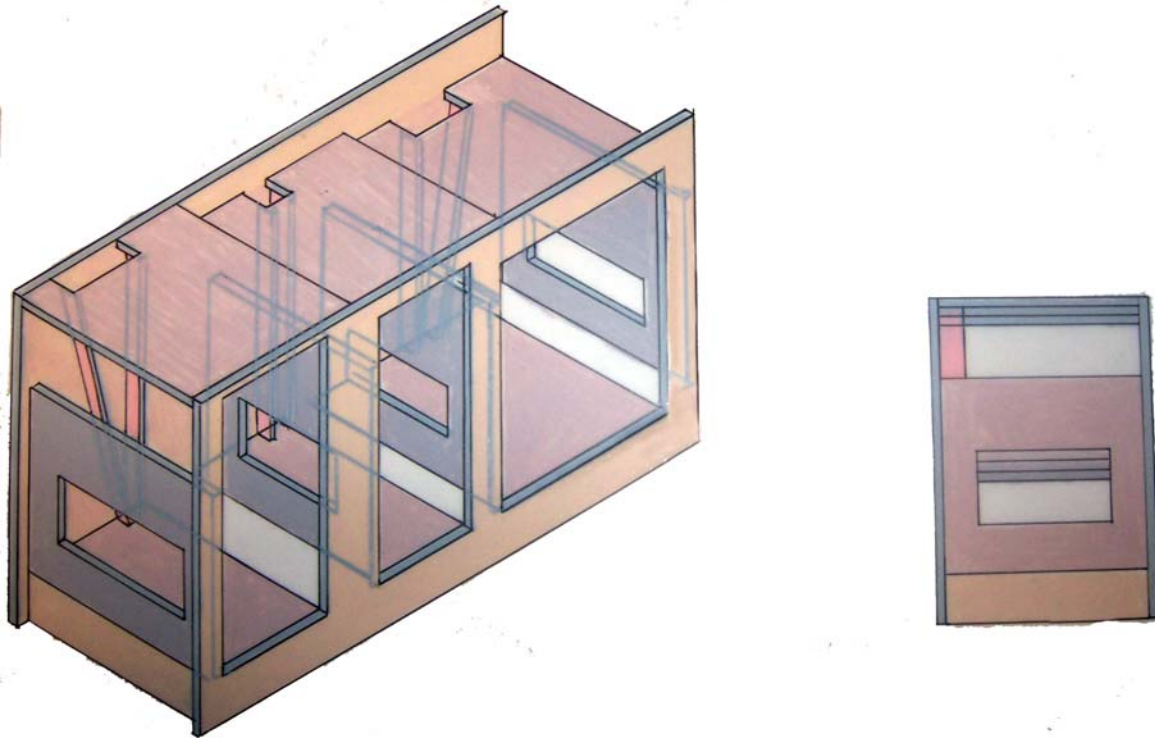
“I then decided to focus on the space between my object, and how that affects the object.”



3RD MODEL w/ FOAMCORE

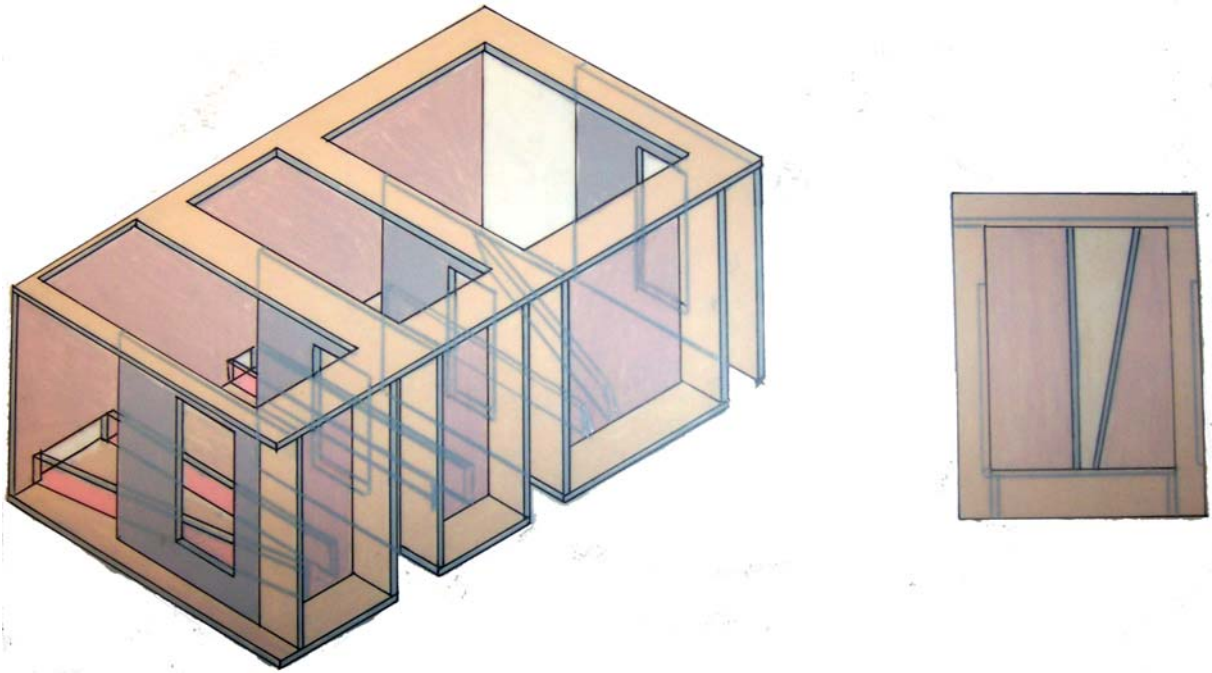
I looked back at my bamboo model to find solutions for my next problems. I thought about the importance of how the sticks were spaced out, and how they declined in height. I considered making the back of my project show the horizontal sticks in the bamboo model, to show overall height and change in height through space and time. I then decided that my side views could achieve that thought. With the rectangular sections of my side view, I decided to gradually close the opening of those pieces. This represented the closing of the clamp, and it happened exactly where my rectangular sections were located. This led me to the solution for my back view. I focused again on the space of the object. I determined that the front view described that space very well. I then decided to focus on the space between my object, and how that affects the object. I decided to open the space between the object, rather than the space of the object. This suggestion allows eyes to move around my project and see something different as they move around my model. The light also affects this solu-

FINAL PROJECT—ISOMETRIC DRAW-



PEN & PRISMACOLOR PENCILS on MYLAR

Another way to illustrate my project was to draw a series of isometric drawings to show the layers that my project consists of. Within these drawings, I was able to relate layers with color. I was able to show the interior pieces that control light for my project by describing it as a different color or layer. My drawings also illustrate the structure of my project, and how all of the pieces connect to each other. It is very simple to see through my project through these drawings and study my project as a whole. The picture shown above is an isometric view of my project standing up. The side view is also shown next to it. For each layer, there is a different color represented. The tan represents the outside of the model. The brown represents the horizontal interior pieces which relate in length. The vertical pieces are purple, to show each step of the motion. The bright red vertical pieces control light from above, and

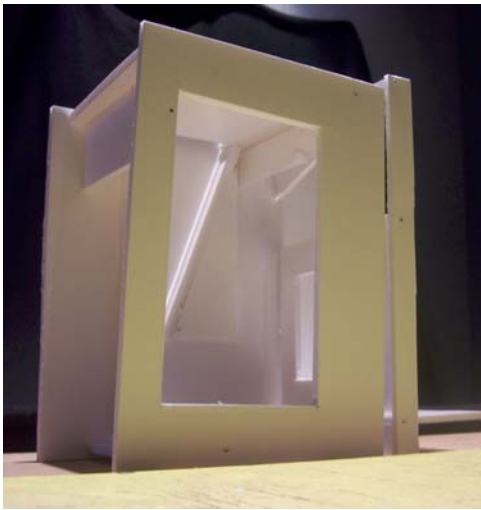


PEN & PRISMACOLOR PENCILS on MYLAR

“It is very simple to see through my project through these drawings and study my project as a whole.”

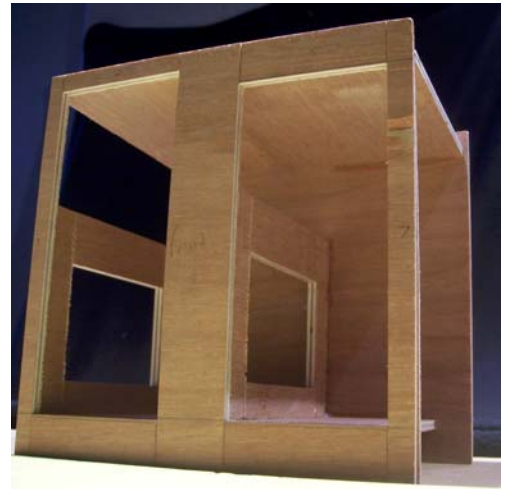
Above is the view of my project lying on its back. This is an important view because it shows different aspects of my project, and how they relate to the other parts of my project. It shows the pieces on the bottom that describe the space that my tool requires, and it shows the open space that is between each section. This view also consists of a front elevation view of my project, which illustrate the importance of the pieces that control light. These pieces only allow direct light to enter between the openings.

FINAL PROJECT—FINAL MODEL

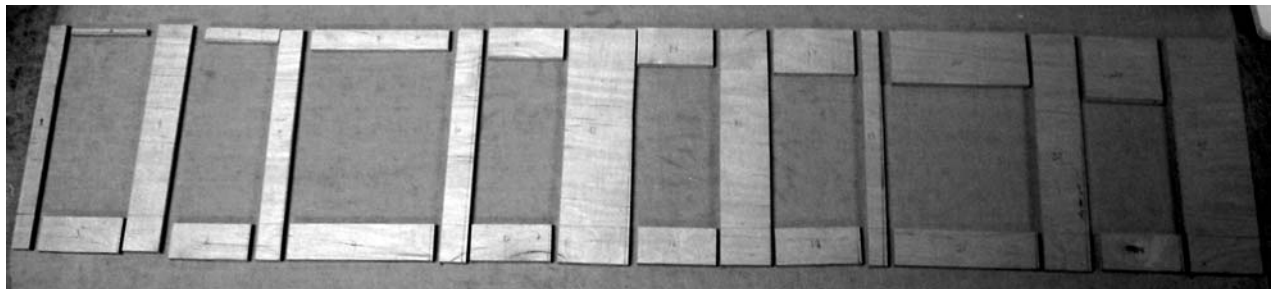


FOAM CORE STUDY MODEL

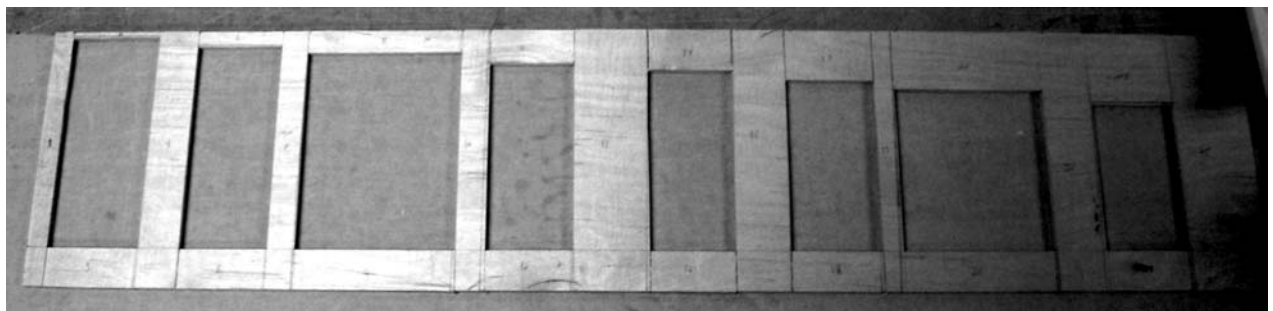
**“I found it
very easy
and logical”**



PLYWOOD STUDY MODEL

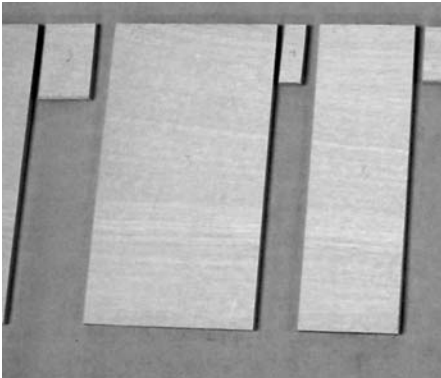


FRONT SECTION (BEFORE) w/ BALTIC BIRCH PLY-



FRONT SECTION (AFTER) w/ BALTIC BIRCH PLY-

FINAL PROJECT—FINAL MODEL

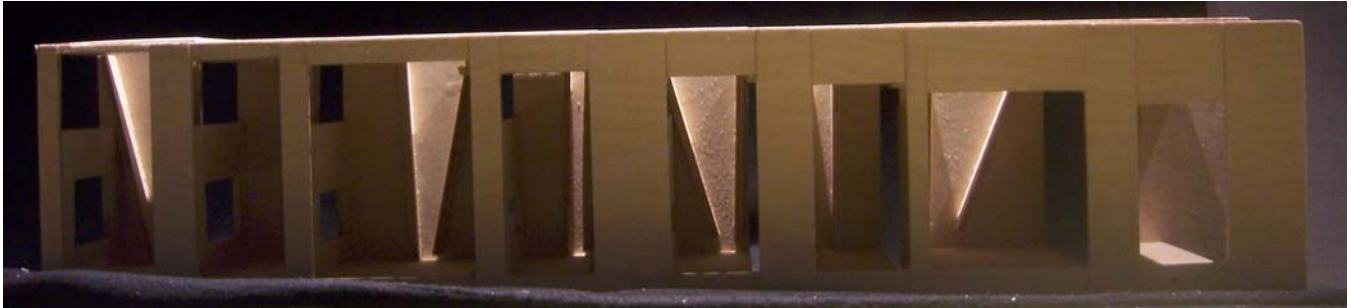


SECTIONS (BEFORE) w/ BALTIC BIRCH PLYWOOD

SECTIONS (AFTER) w/ BALTIC BIRCH PLYWOOD

After I figured out the problems of my previous models, I began to construct my wood model. I carefully studied my foam core models, and how well it was supported throughout its' structure. To experiment with the wood, I created a test model based on my foam test model I made prior to the wood. I found it very easy and logical to glue, and to remain structurally strong. I also discovered an easy way to cut my wood pieces. I decided to create the front and back of my model by creating a series of small pieces, then gluing them together. I found this easier than cutting out my project with one board. I cut twenty-five pieces for my front piece and fifteen for my back piece. I also decided to construct my side sections of my model the same way.

FINAL PROJECT—FINAL MODEL



FINAL MODEL w/ BALTIC BIRCH PLYWOOD

My finished wood model accomplished many goals I set out for. I am very confident that my project describes important aspects of my tool. I focused on the motion, space, time, and light that my object produces and assured the structural stability throughout my project.

In the beginning, I was only focused on motion. I used pieces to show the motion directly. I then began to study space, and using my knowledge of motion I began looking at how space is affected by motion. I chose to open up space of each section of my project. I also decided to let volume express the space of the spiral motion. My model also expresses itself through the model, and relates to my original design. I flipped my thought processes around for my later models and turned solid areas into empty spaces. This thought allowed me to express important aspects clearer, and with more confidence. With open space top priority, I decided that time is expressed through the space and motion of my tool. If the motion takes more space

“my model creates a sensation of curiosity and greed to learn about my project.”



VINE CHARCOAL ON NEWSPRINT



FINAL MODEL w/ BALTIC BIRCH PLYWOOD

My model uses light to combine my knowledge of time, space, and motion. I allowed light to describe the spinning motion of my object in the front view. On the back side of my model light only appears in between the space of the object, which allocates time. Light has different meanings in my project, depending on which side is being studied.

The model is also structurally stable with the use of material. I experimented with 1/8th in foamcore in early models, and connected the pieces with pins. I then added glue in between the pins to create strong connections. In my third model, I constructed my model again with foamcore, but decided to only use glue. It held together very well and I decided to use only glue in my wood model. In my final wood model, glue was used to connect the joints together.

Overall, my model creates a sensation of curiosity and greed to learn about my project. The eye travels around my project, and never runs out of details to study. Early analysis of light and shadow and experiments with different solutions for motion, space, time, and light ultimately taught me basic tools to use in every project in the future.