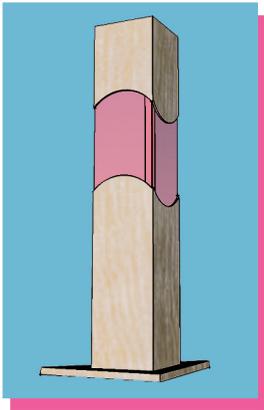


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2011





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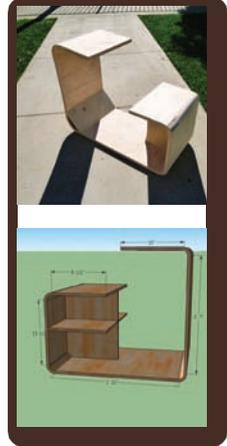
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Introduction

For our first semester senior project, we designed and built a chair and a lamp out of bent wood, analyzed design of everyday things as part of life, and wrote this book about the entire ordeal.

Building a chair is not easy. Well, that is to say, building a comfortable chair is not easy. There's a lot that people don't think about when sitting on everyday items like chairs and lamps (chairs are by far more comfortable than lamps, and if you're sitting on a lamp, you're probably not thinking a whole lot about anything). To design a really good chair takes creativity, finesse, skill, and good looks—okay, maybe not that last part; basically, designing a good chair is very difficult. You can't just create a good chair out of wood on the fly without a careful process of inspiration, design, planning, and material management. This book attempts to document the process that we went through when designing The New School Desk.

Design is important. Look at the chair you are sitting on (it may be ours!) and imagine creating, designing, proportioning, and finally building it. Imagine how you would recreate that chair if you were given power tools, wood, and some time. Would you be able to just figure it out? Would you know how to proportion your chair to fit the human body, or to hold up under one? We didn't. The biggest part of building a chair isn't actually the building process. It's the design



From



To



process. Unless you are reading from a set of blueprints, it's going to have to come up with a structure that works, dimensions that fit, and a design that is aesthetically pleasing. Each of those is relatively easy, on its own. Great design must, however, have all three to really shine. If you have a chair that looks great and is comfortable to sit on, but breaks after a few sittings, that isn't much of a chair, is it? Or if you have a chair that is well proportioned and extremely stable, but looks terrible, while you may have a chair, it won't sell.

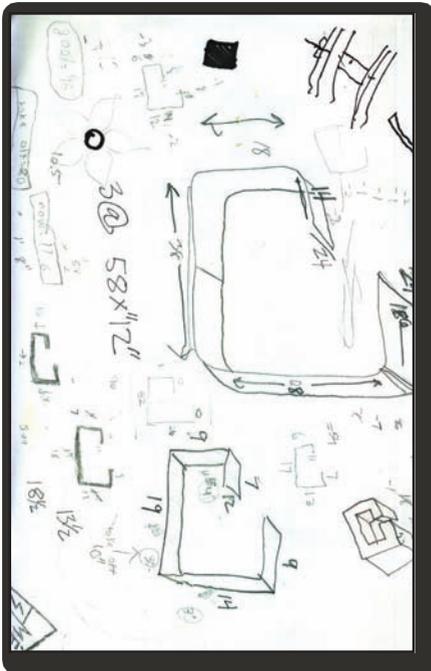
Take a look at any IKEA product—chances are, you have one in your house somewhere. That product has had hundreds of hours, revisions, models, and failed prototypes before it. Such is the process of design. We only had one model, one iteration of failures and corrections, but our chair probably isn't as well designed as it could be. It takes an incredible amount of effort to meet the high standard of good design. We attempted to meet that standard, and probably failed. But most of what we did is documented in this book, in order to shed light on the process of design and the craft necessary to create a chair like The New School Desk.

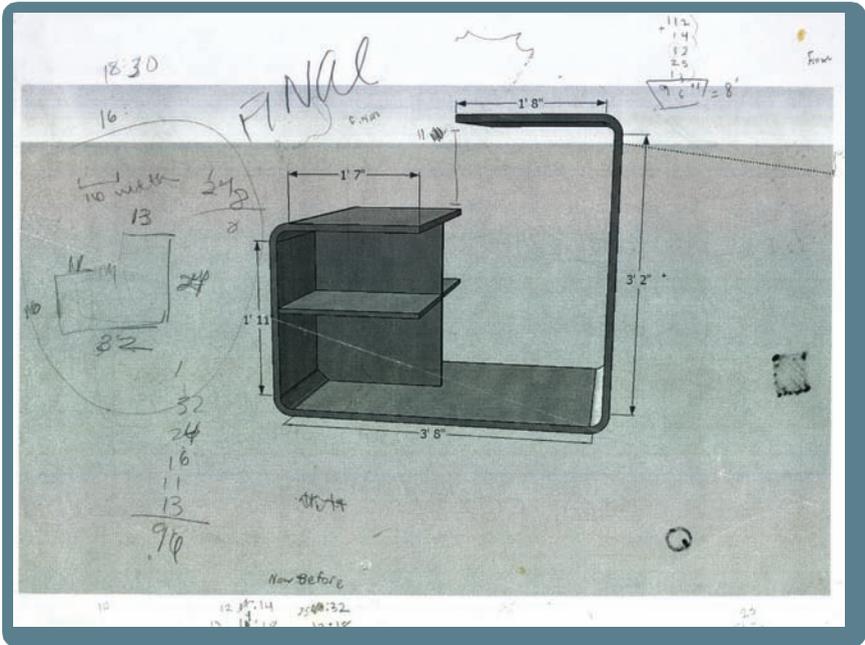
Planning

Planning our design was the longest process out of all.

When we first began, we had no idea what we wanted to make, or how to make it. Since we had an extra set of hands (six hands instead of four), we were able to make something a little bit more ambitious. We thought about couches, barstools, seats, and designing each. We looked at design blogs and magazines and went to furniture stores for inspiration. This process wasn't so much work as it was time consuming; starting with no direction or aim was an ambitious thing to do. There are a lot of chairs out there, and while we first were

concerned about making an unoriginal chair, we later realized that almost anything we made would be a copy of something else—otherwise, it probably wasn't very good. We finally settled on a few existing designs, and looked at them further in detail. We asked questions, drew a lot of pictures, thought about each chair and how it could be constructed using the materials that we had, and how its design would have to be modified for our purposes. Once we

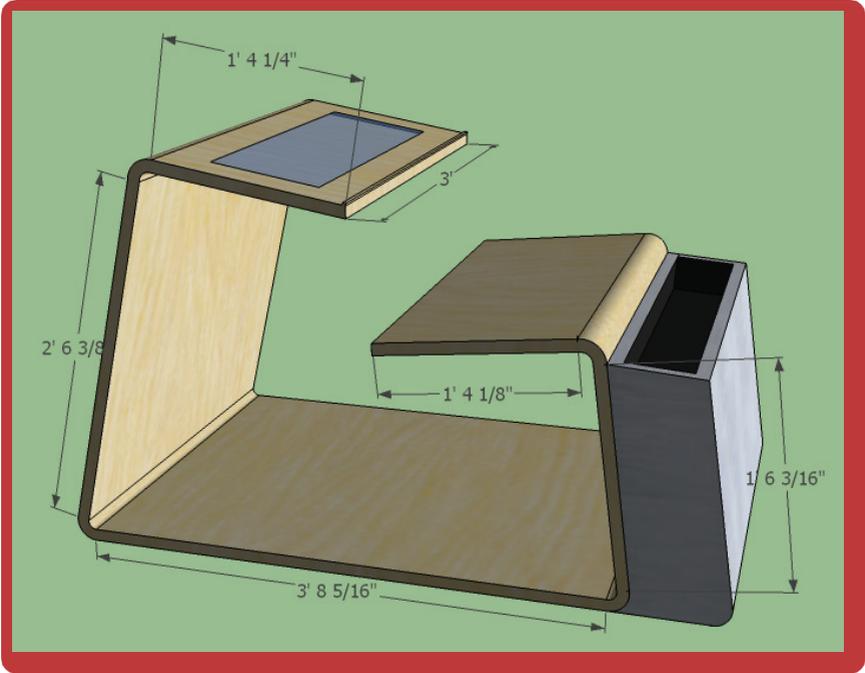




began to work on a chair, it would be difficult to change our course, so we wanted to make sure that what we were designing would really work. We threw around several ideas, but eventually settled on one: Solitaire by Alexander Lotersztain. It had every element we wanted: unibody, minimalist design, bent wood features, utility, and style. We decided to design our chair after the Solitaire.

After deciding on a design, we actually had to design. At first, we started with a design slightly different to the original; its components (seat and desk) bent into the chair, rather than out, and the desk was positioned at an angle. We used Google Sketchup and the old fashioned pen and paper to analyze different ideas of what we wanted the design to be.

Quickly, however, we realized that making the sides bend inward like they did would be very difficult. What we did not think about initially was the form that we had to use to construct the chair. The form is the

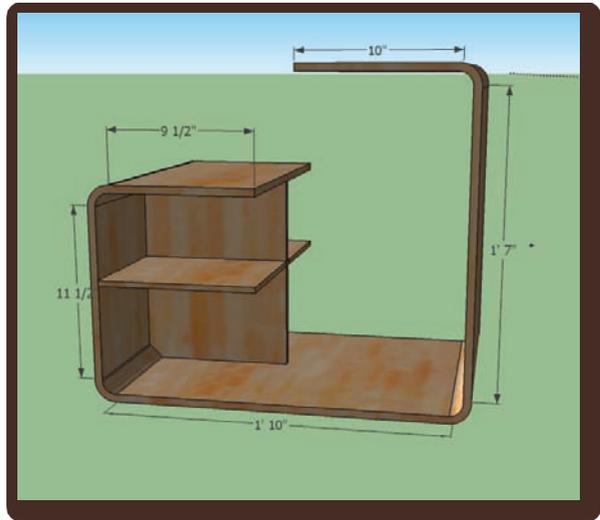


piece that the wood is bent around; it functions as a “mold,” and must be built in real size. Because our chair had large dimensions, it would take too much wood to be built, thus necessitating modification to our design. In hindsight, our original design wouldn’t have worked, even if we could afford to use the large amount of material necessary for the design; it was far too fragile to hold weight without extensive modification. We were also limited by our materials; the longest single sheet of wood that we had was 8’ long; our chair topped out at nearly 12’ long, from the front of the desk to the edge of the seat. And since it was designed to be unibody, making it out of two pieces

Right: Google Sketchup rendering of proof model

Right: the proof model in mold

Prev: scans of original designs



would have been an impossible compromise—

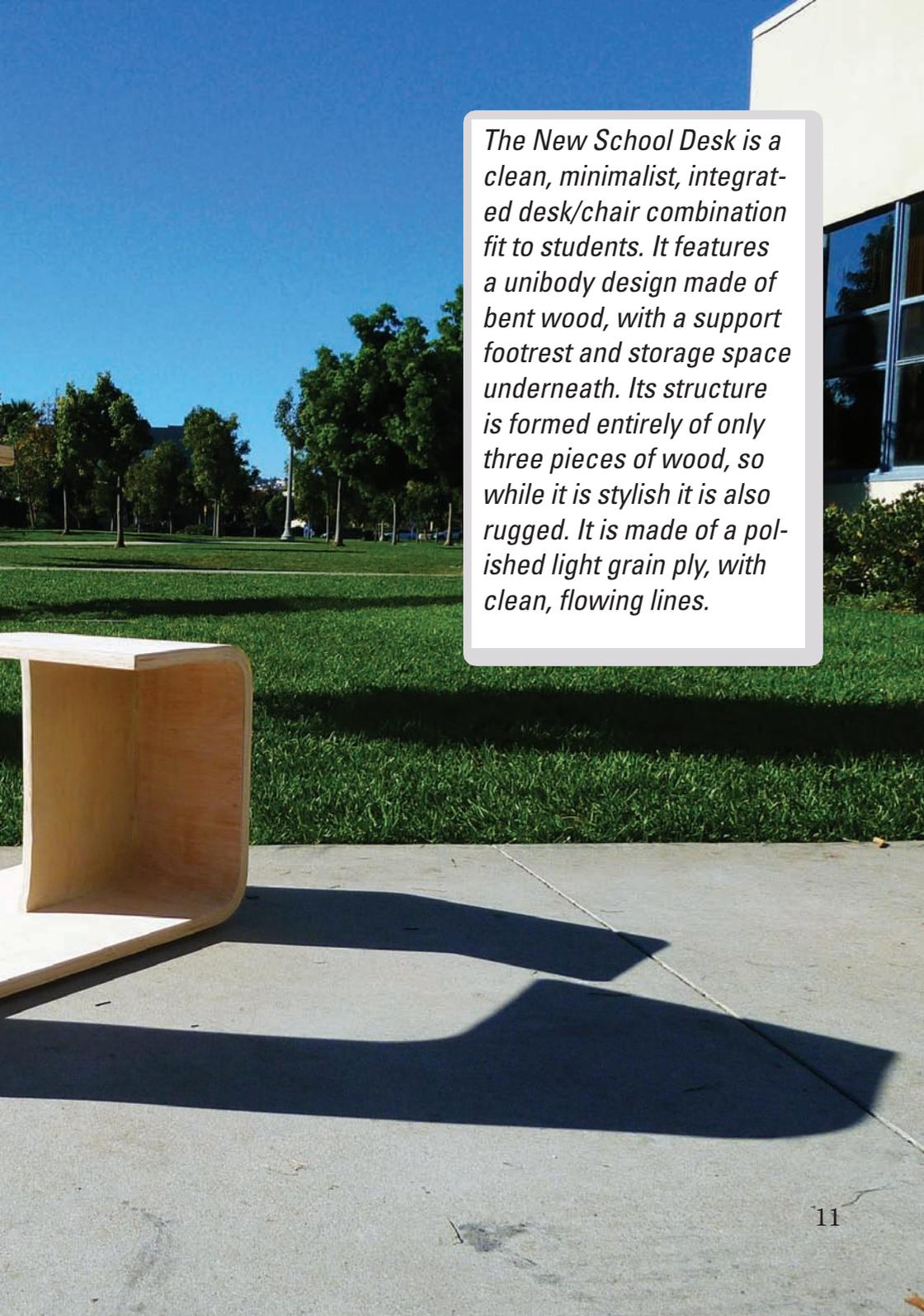
not to mention an expensive one.

We ended up changing all angles in our design to 90°. This simplified things in more than one way; for starters, we were able to more accurately assess the size of our chair, in order to make it fit with an actual person and be usable. Importantly, however, the 90° design enabled us to actually build the chair. Because of its perfect angularity, constructing the form for a chair with 90° angles is significantly easier than one with odd angles.

Even after the extensive modification to our design, we still had revision to do. We had to make sure that someone would actually fit comfortably in our chair, especially since it was unibody and non-adjustable. We measured heights of chairs and desks that fit us, and attempted to use the same dimensions. It was very challenging to get the dimensions correct, and even our proof model's dimensions were not accurate; we had to make changes to our design after building the proof model to make it fit.

THE NEW SCHOOL DESK



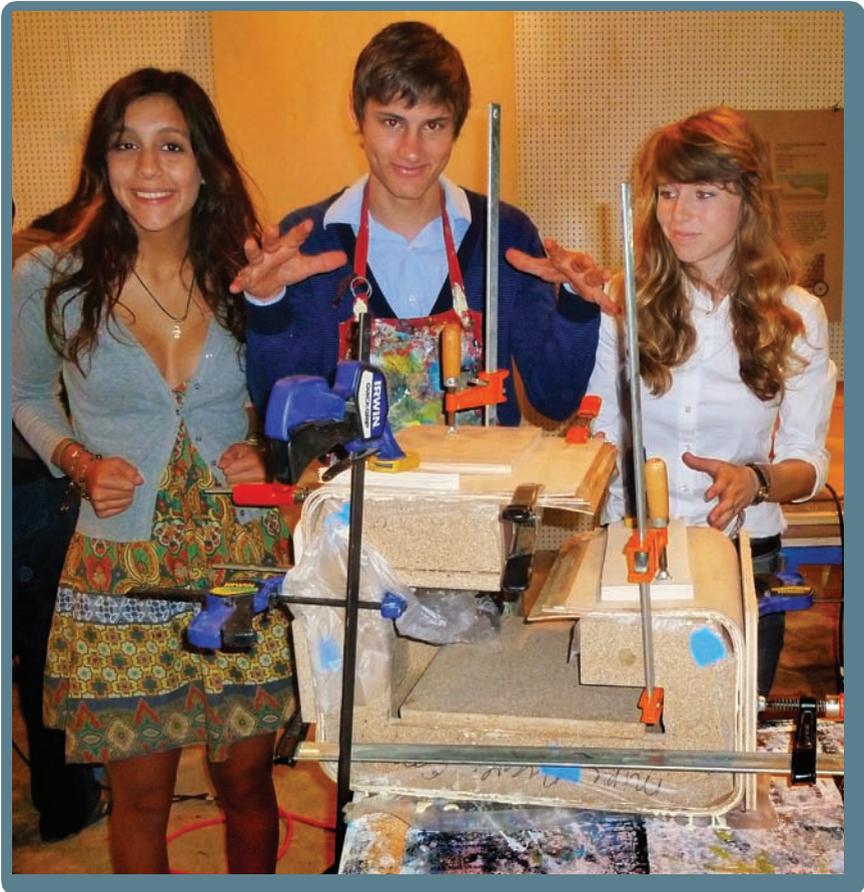


The New School Desk is a clean, minimalist, integrated desk/chair combination fit to students. It features a unibody design made of bent wood, with a support footrest and storage space underneath. Its structure is formed entirely of only three pieces of wood, so while it is stylish it is also rugged. It is made of a polished light grain ply, with clean, flowing lines.

Building

Building the chair was not as large a challenge as anticipated once we had the plans together. It's very easy to build something once you have plans for exactly what you want to do.

In order to proceed, we had to build a proof model first, to make



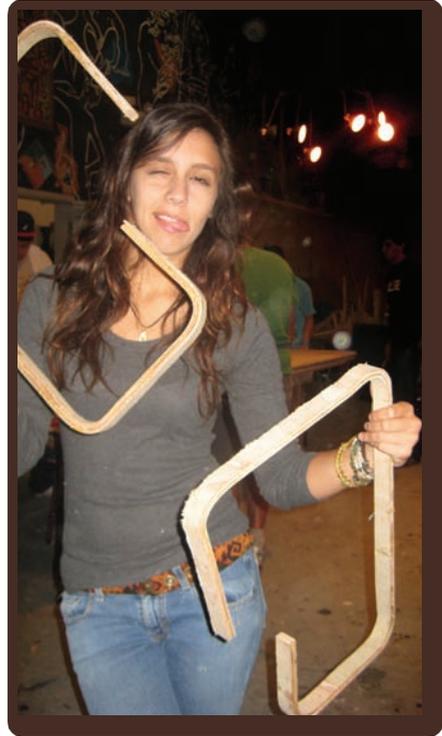


Above: completed proof model

Left: the proof model in mold

sure our plans would work. A proof model is essentially a miniature model of whatever you're building at half or smaller scale; it's a prototype of the design to make sure that your plans are correct and the building techniques work for the chair. Our proof model was a half scale model of our chair, and the construction was relatively easy, because we had planned everything out. We used a form made of particle board in the shape of the inside of the chair, then clamped glued-together

sheets of wood around the form. This made it so that the sheets (sandwiched on top of one another) curved around the form. We then removed the clamps and form after a day, and our proof model was essentially done; because we only used one piece of the design, we only had to clamp one piece around the mold. However, we quickly realized that we would need some kind of support for the chair part of our desk, as a simple curved wood structure would not support the weight of a sitting person. This was a problem that we had anticipated, so we

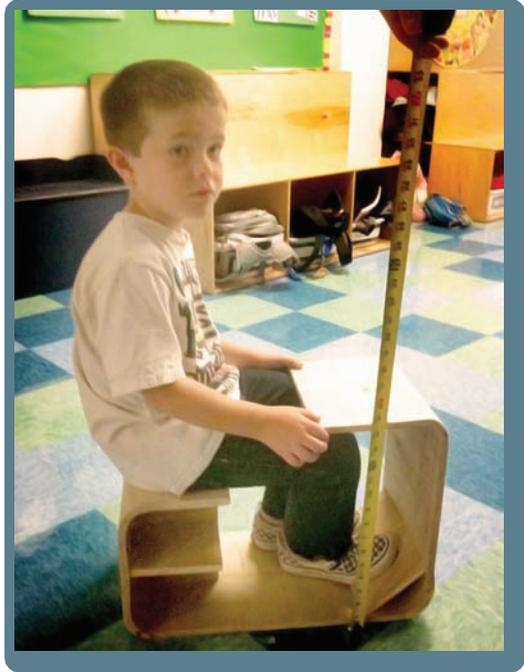


had several fixes in mind. We decided to add a vertical sheet of plywood underneath the seat, so that the seat was supported, but the design was not compromised. Once we had added a vertical sheet underneath the seat, we added another two horizontal sheets in the center of the vertical sheet to form a shelf underneath the seat part of the desk. In addition to those fixes, we had to make the desk sturdier. Instead of adding supports under the desk, we used a small piece of plywood to brace the desk in the bottom front corner. This piece had a dual function of being a footrest and a structural support.

Once we had the proof model, it was very simple to continue forward onto our main model. We realized, however, that the wood we had

Right: testing the proof model with Jeff's son

Left: Esme with leftover chair pieces



to use was only 8 feet long; our desk design was larger. This problem did not show itself in the proof model, because the proof model was smaller, and so the size of the wood was not an issue. We resolved the problem by making the desk smaller by a few inches on all sides. We had to make a compromise, and thus The New School Desk was born. Because our desk had to be a smaller design, we decided to design it for children rather than adults. This actually was not a bad compromise—it made our desk cheaper, but more importantly, single body desks are not often used by adults and are more suited to children. This compromise enabled us not to have to worry about the size of our materials, and made our design work. After some final adjustments, we were ready to create our real version of the chair.

The building of the chair was very eventful; because of its large size



Right: Esme with the proof model

Left: Michael measuring the proof model

and single panel construction, our mold had to be very large. After we had built the mold, we glued eight sheets of single panel plywood together. As soon as the glue was down, we had to work fast. If the glue dried too much before it was in the mold, it would warp or crack the wood when we decided to make the bends—in addition to simply making it more difficult to form the wood around the mold. At the same time, we wanted to be careful to make sure that the wood was glued properly together and clamped into the form. Clamping took quite the effort, from nearly all

of our class, who had to help us clamp the chair around the form. We used nearly all of the clamps available to us, and quite a bit of scrap wood. Everyone was yelling and gathering around the chair to try to clamp it in place—it was quite the scene.

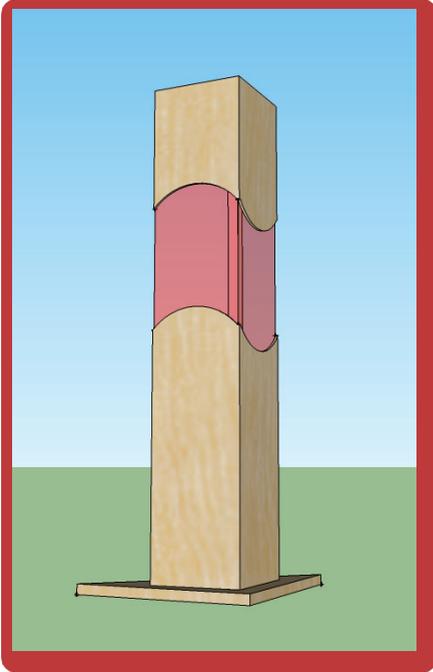
Once the chair was clamped, it had to sit for a while and we had to wait for the glue to dry. After the glue dried, we added the support piece under the seat and the brace at the bottom of the desk.

We then had to cut the

excess wood off of the seat and desk edges. The chair really started to take form after we were done with those two; the only thing left was sanding and grinding the excess wood off the lateral edges of the chair and sanding the surface down to a smooth finish. The sanding and grinding took probably the most time out of the entire construction process—about 2 days. All in all, the chair probably took a week to construct from start to finish. Once we had sanded the surfaces, we added supporting feet to the bottom of the chair, and it was complete.



The Lamp



After completing our chair, the final project was to design and create a matching lamp. After several design ideas, we concluded on a book-like wooden structure with a wave of acrylic going through it. The idea of incorporating plastic with wood was something we were really committed to, but we were given only about a week for construction. Consequently, when a design that worked eventually came about, we ran with it. We initially thought about making the lamp small and able to rest

comfortably atop the desk portion of our chair and be kept for storage in the space beneath the seat. Because of the excessive amount of materials we had, however, we decided to make it bigger, and ended up changing the design. The idea is fairly simple, with sheets of wood and red acrylic meeting at a curve, to go along with the “bent wood” theme. The lamp is four feet tall and sixteen inches wide.

In order to construct our lamp, we decided to attach wood panels directly to the acrylic and then attach both panels to the center sup-

port. Instead of gluing the acrylic to the wood, we used screws and washers to give a more constructivist, minimal look. The wood, metal, and acrylic are all in perfect proportion to each other and they all serve the purpose of supporting the lamp through the structure.

After we constructed the lamp, we realized that the open design would not allow nearly enough light through to illuminate anything. We had to glue rice paper to the back to make sure that light would reflect through the structure.

The final lamp is a finished, modern, sleek design, consistent with the design philosophy that we used to build our chair. The lamp, while angular, has a prominent curved accent; the color and curvature helps draw the eye toward the curve and away from the sharp angles, and the translucency of the acrylic creates dynamism in the illumination provided by the lamp. Both the chair and the lamp are compatible with each other, and while their utility isn't directly related, they have value and style.



Michael Sutherland,
Nicole Spiegel, and
Esme Bitticks posing
with their work.







During the construction of our chair, we ran in to a few technical and motivational challenges. At the beginning, the idea for our design varied, but when we found the right one, it stuck. However, we had a lot of trouble constructing the idea in Google SketchUp, which is quite the uncooperative program. The original idea for this school desk was for the ends to be slightly slanted, but such a concept was unattainable considering our skills and resources. The model created in Google SketchUp ended up with 90-degree angles, making the mold easier to construct.

Once the design was concrete, our group started building a half-scale wooden mold. The design took longer than expected; we could not clearly envision the mold's design. Once we were able to conceptualize it, the actual assembly was fairly simple. The rest of the making of the proof model wasn't too difficult, but wrapping thin sheets of wood around the mold and clamping them down successfully did take the effort of at least ten people.

The real challenges started during the creation of our promotional

poster. The first draft was not at all what it was supposed to be – the overall design of our book is simple and iconic, so we made the poster with the same idea. Jeff was not pleased with this though, and humbled us by letting us know the design of our chair wasn't so iconic that it didn't deserve a humanistic poster. So, we completely started over with Nicole as our model and brilliant colors in the background. The idea was bright and cute, but during revision we realized the photo was somewhat pixilated and the Photoshop job was less than perfect. And of course, the image we used had been deleted. Because of time restraints, we couldn't take a new photo and instead played with contrast and lighting on Photoshop in attempt of altering the image. The final poster wasn't terrible, but definitely not as good as it could have been.

When it was time to construct the mold for our actual chair, our group was under the impression that spending \$200 for the materials for an adult size school desk was a good idea. Andrew talked us out of it, and instead suggested building a much cheaper child's desk. The challenge was to design each curve to fit within eight feet of wood. The old design size was somewhere around eleven feet, so we definitely spent a lot of time shaving off inches here and there while keeping the proportions correct. The final design was both affordable and doable, and after the entire class helped bend wood around the mold, the school desk ended up looking great.

Though the products of this project are more than satisfactory, a major problem our group ran into was the consistency of our work ethic. We too often found ourselves neglecting work on the chair, instead focusing on assignments from other classes or other things. When it came down to working on the chair, though, we were able to motivate ourselves enough to complete the work required, but our product would have been better if we were motivated the entire time.



As far as design goes, our chair/desk is quite good. Once we discovered a design we really liked, we executed it well. In the proof model, we added a shelf under the seat, to act as storage and support, as well a piece of wood positioned at 45 degrees underneath the desk, which worked for support and a footrest. When the final chair was finished, the size turned out to be perfect for a child, and the edges were smooth and appealing. When we worked efficiently, the school desk was completed in good time, leaving more opportunities to design a lamp and work on the book. The chair is sturdy, useful and attractive – exactly what we were going for.

Another great accomplishment was the math poster. At first, we took a light photo of the proof model and traced the mathematics over it. On Photoshop, we implemented pink, blue, and yellow, to match the promotional poster, but it was too messy so we instead used black and blue and typed out the text rather than using handwriting. The element of tracing was still present however, making it look softer

and more humanistic. The math is all correct, and there's just enough on the poster to be comprehensive and not overwhelming.

The plan for our book is also very well thought out. The idea is clean; there's plenty of room for images, text and white space. Not every page is made up the exact same way, but each different layout is cohesive and they work well together. The second assignment for this project was to compose a timeline of the evolution of a certain object in the layout of our book, and we chose bicycles. After plenty of revision, every image of a bicycle is in the same setting, so the look is very consistent.

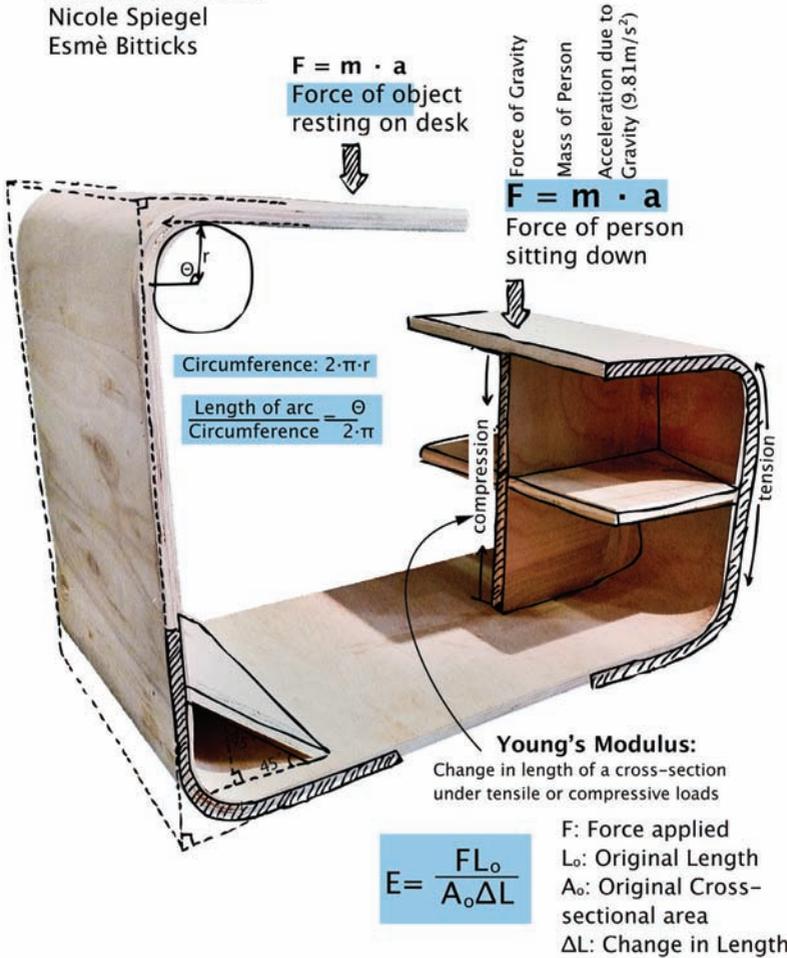
Despite the setbacks we encountered, our desk, book, and lamp really show a lot of attention to detail, consistency, and thought. We were able to have fun with the project and design something that we really liked, rather than aiming for an uninteresting and uninspired design. Our result is a consistent, clean, fun, and polished set of furniture and accents. Even though we were new to the process of building furniture, we were able to create a stable and well put together desk—something that sometimes isn't present even in commercial furniture stores. While only time will tell, we think that our desk will last a long time to come.

Bottom:
*Explantional
 Poster*

Right:
*Promotional
 Poster*

Mathematics

Michael Sutherland
 Nicole Spiegel
 Esmè Bitticks



the new school desk



SENIOR PROJECT FALL 2010
"GET BENT"

Esme Bitticks
Nicole Spiegel
Michael Sutherland