

MYP Personal Project - Forging Knives

Criteria A: Planning

My Learning Goal:

For my personal project I decided that my learning goal would be learning and improving methods of metal forgery, specifically for cooking knives. When choosing my personal project, I knew I wanted to do something along the lines of building things, filmmaking, or cooking. I have been interested in cooking since I was really young so I thought that the personal project could be a good opportunity to improve my skills and knowledge about cooking. I am also interested in building things, for example during the summer of 8th grade, I had made a shelf for my room and really enjoyed the whole process of planning then making it. Thus I thought maybe I could do something similar for my personal project. One morning I was watching NHK news with my dad while talking about how I still couldn't think of something for my personal project, when a documentary about forging samurai swords started playing ("Yoshihara Yoshindo"). We watched it for a while, until my dad suggested the idea that I could do something with forging knives/swords. At first I was skeptical that I would be able to even do something like this. However, as I did more research about it, I realized it would be the perfect project because I had originally wanted to do something with cooking, and building things, and making a cooking knife would fit both these topics. This personal project topic would also give me an opportunity to further develop my knowledge and skills in working with metal and fire.



("Yoshihara Yoshindo")

My Product Goal:

Since I will be learning about cooking knives and the process of making them, my product goal is to forge at least one cooking knife out of scrap metal. The type/size of the knives will be depending on the size of the scrap metal that I find.

Product Success Criteria:

When making the success criteria for my product, I needed to think about professionally made knives, and what features they have to make them quality knives. To do this, I looked at 2 professionally made knives that I owned.



From this, I observed that my product success criteria should include function, aesthetics, and materials. These were important because they include important aspects of a successful knife.

I also decided to include safety, because I would be using fire and dangerous tools to make my product. This meant I would need things like safety goggles, gloves, a mask, etc (Pringle). Not only that but this was my first time forging, meaning that I had to be even more careful because I don't have much experience, therefore could get hurt more easily. Lastly, I chose to have "improvement" as one of my criteria because as a part of my learning goal, I wanted to not only learn how to forge metal, but also

improve my skills and techniques. Thus I felt that “improvement” was an important criteria for evaluating my success during the personal project.

	Function: What the end product should do and how it should do it.	Safety: Safety precautions taken during the making of the product.	Aesthetics: How nice and appropriate the product looks, specifically when compared to professionally made knives.	Materials: Materials that will be able to be washed without rusting or decomposing, that can be sharpened, safe to eat from , easy to clean, and recycled.	Improvement: Improvements/ progress made throughout making the different knives.
1-2	The knife is not able to cut effectively and barely demonstrates the skills and knowledge learned about knives.	Little to no safety precautions were taken	The individual components are poorly made and the knife as a whole does not look like a coherent product.	The materials used meet almost none of the requirements stated up above	1 knife was made.
3-4	The knife is able to cut, however it considerably affects the object that is being cut. The knife decently demonstrates the skills and knowledge learned about knives.	Some safety precautions were taken but safety in general was not a top priority.	Some of the individual components are well made however the knife as a whole does not look like a coherent product.	The materials used meet some of the requirements stated up above.	2 knives were made, however limited noteworthy improvements were made.
5-6	The knife is able to cut, however the blade has not been sharpened to the best extent. The knife	Most safety precautions were taken, however safety was still not the top priority.	Most of the individual components are well made and the knife as a whole looks like	The materials used meet most of the requirements stated above.	More than 2 knives were made and many noteworthy improvements were made.

	more than adequately demonstrates the understanding about knives.		a coherent product.		
7-8	The knife has all the features I chose for it. It successfully demonstrates the knowledge learned about knives and is able to cut most foods.	All safety precautions were taken and was the top priority to ensure maximum safety and so that no one got hurt.	All individual components are well made and the knife as a whole looks like a coherent product.	The materials used meet all of the requirements stated above.	At least 4 knives were made and many noteworthy improvements were made.
How will you know ?	I will carry out a test using a “global” knife I own and the knife I make, cutting different foods and objects. The performance level will then be compared to see how well the knife I made works. I will also take into account how well the knowledge and techniques learned during the research process were used to make the knife.	Reflect on how safe the whole experience was. Also take into account if any injuries happen and if there was something I could have done to prevent them.	I can compare my knives to professionally made knives.	Test each of the requirements that can be tested. Check according to research, which materials have the requirements stated up above.	A self evaluation/reflection will be done.

Plan for Achieving the Product:

I had two long term plans, one of which was a weekly plan and one gave specific due dates of when I wanted things to be completed.

The week by week plan made it so that I knew what had to be done by the end of each week, so that I could successfully achieve my checkpoints in time. For example, for the first week of June, I decided that by the end of the week I needed to make sure my process journal was updated, I had researched for 2 hours, and I had worked on my criteria. This plan was useful during the summer and first trimester of the personal project because during that time I was mostly just researching and needed guidance of how much I needed to research. However when I got to the stage of actually making my knives, I didn't use this at all because the process of making my knives was very unanticipated, thus I could not always make a clear plan for the future.

JUNE						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
31	01 Prepare for PP advisor meeting	02	03 Personal project advisor meeting	04 Work on criteria for 30 mins Make sure process journal is updated	05 Evaluate the research plan and all the steps I still need to take. See if I have enough time before summer Research for 2 hours	06 Make sure this month is planned (according to where i'm at) Make plan of what I need to write about for first part of the draft

For the other plan which specified each checkpoint/due date, there were two sections; the research stage and the actual making of the product. In this long term plan I had a column for the main task, and then the more specific steps to achieve that task in the “to do” column. I also added a column that specified what criteria each checkpoint was relevant to. This plan made it so that I knew what stage I was at and how I should be approaching and working on each task so that I can score highly on my criteria.

Date	Task	To do	Relevant Success Criteria	Process
May 10 - May 30	Research about different types of knives.	- Research about different types of knives and what different types of knives there are, and their purposes	Function	Done
May 24 - June 26	Research about the process of making knives. Choose which knife(s) to make.	- Make plan/diagram of the knife(s) I choose to make - Make step by step plan on how to make the knife(s) I choose - Make list of materials that are required for the process and look into prices	Function	Done
June until	Find place to forge	- Email about the space behind school	Safety	Done

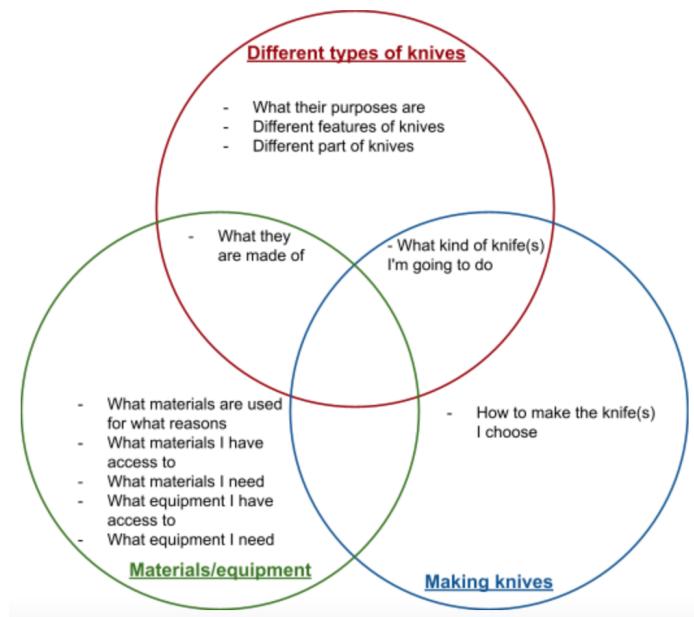
August 15				
June 27 - 30	Buy materials/equipment	- Buy all materials and equipment still needed, according to the material list made previously	Materials	Done
July 2 - 8	Preliminary testing of forging	- During this time, test/practice forging knives (only the forging metal part, not doing any sharpening or adding the handle) - Take notes on what all I learned and need to keep in mind when making the final product(s) - Revise process and what I need to do	Improvement	Done
July 9 - August 15	Full plan for knife(s)	- Finalize how many and which knives I am making for my final product - Make full plan about every aspect of the knives. This includes the handle and blade. - Revise next months of long term plan to make it more detailed and more fitting according to what I learned - Buy any extra materials/ equipment needed - Add any extra due dates/checkpoints to long term plan according to the detailed plan of making the knife(s)	Improvement	Done
September 1 - October 16	Start and finish forging and making the knife(s)	- Follow the plan made previously	Improvement	Done
October 17 - 24	Asses the knives according to criteria	- See what I can improve - Change plan accordingly - Choose what knives for the next step - Make plan/diagram of the new knife(s) I choose - Add any extra due dates/checkpoints to long term plan according to the detailed plan of making the knife(s)	Improvement	Done
October 24 -	Start and finish the new knife(s)	- Go through process of making new knife(s)	Improvement	Done

December 17				
December 17 - January 7	Evaluation of process/knife(s) according to criteria	- Grade product according to success criteria	All	Done
January 10 - 14	Show product to advisor	- Get feedback to put in personal project write up	Aesthetics	Done

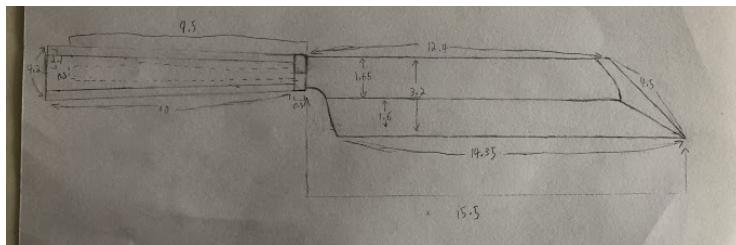
Criteria B: Applying skills

My learning goal is to learn and improve methods of metal forgery, specifically for making cooking knives. To achieve this learning goal, I had to use information literacy skills. More specifically, I needed to find information in different media and make connections between a variety of sources. When researching, I used different websites and a museum ("TAKENAKA CARPENTRY TOOLS MUSEUM"), to collect the information I needed to learn about forging metal. Then, I made connections between these sources, to create an effective plan of making my knives. Using a museum as a primary source allowed me to get a much different perspective than what I saw online, because the museum displayed how knives/tools were traditionally made in Japan and information that was specific to Japan. This different perspective allowed me to see different techniques used in the forging process.

I divided the information I needed for research into 3 different categories (as shown in the venn diagram): different types and parts of knives, materials and equipment needed to make a knife, and the actual process of forging a knife. As you can see from the diagram, some of these things overlapped, however these were the main categories of what I researched about.



For the different types and parts of knives I learned about the different anatomy of knives like the edge, bolster, handle, and pommel ("The Complete Guide to Buying Kitchen Knives"). I then learned about different types of knives which made it so that I could design my knife that I



would later forge. The types of knives I found included chef's knives, paring knives, cleavers, Yanagiba knives, usuba knives, santoku knives, and more ("The Complete Guide to Buying Kitchen Knives"). By learning about these different types of knives, I was able to plan different knife designs.

Next, for the materials and equipment needed to make a knife, I had to do research of what I needed online, and also research by searching in stores and resources I had at school, to find the actual materials and equipment I needed. Through observing people's setups from online, I found that to forge I was going to need a hammer, tongs, something to blow air into the fire, coals, an anvil, and a forge. For safety precautions I would need a bucket full of water, leather gloves, and safety goggles ("Backyard Forging – Part 1"). From this information from different sources, I was able to learn about forges and then create my forges.

For my research about the actual process of forging a knife, I had to look at a variety of different sources. I then had to take important parts from each of them, to create an effective, synthesized, and clear plan of how to forge. I learned how to make a fire hotter by using different materials to insulate, like refractory bricks ("Fire Brick"), dirt/sand ("Can You Use Sand as Insulation?"), and a material called diatomaceous earth (Morrisby). For the actual hammering of metal I took the information from "Christ Centered Ironworks" and "Knight" (refer to a picture of my research notes on the right), and combined useful information to create a plan of how I was going to forge my knife:

General Knives

Chef's Knife: A chef's knife is an all purpose knife that has a straight edge which curves at the point. Its blade size is from around 6 to 14 inches, however 8 inches is the typical size for a chef's knife.¹



Paring Knife: Paring knives are small knives used to cut smaller items with more detail like peeling vegetables or peeling shrimp. It's usually 3-4 inches.¹ The different types of paring knives include spear point, bird's beak, and sheep's point.¹²

Utility Knife: It looks like a chef's knife but is smaller and has more versatile functions. It's used for cutting meat, preparing vegetables, and just doing food prep in general.¹



Bread Knife: Bread knives have serrated edges and are around 10 inches long. This type of knife is mostly just used for cutting bread, but can also be used for things like tomatoes. The benefit of using a serrated blade for cutting bread is that it will saw through the crispy crust without crushing the loaf.¹



Meat Knives

Cleaver: A cleaver has a long rectangular blade mostly used for cutting hard things like soft bones in meat or hard vegetables.¹ They are lightweight and thin.¹²



Carving and slicing knife: Both used for cutting thin pieces of meat, poultry, and fish. Carving knives are less precise and larger cuts. Slicing knives on the other hand are able to make much thinner cuts.¹



Boning Knife: Boning knives have around 5.5 inch blades that are thin, flexible, and narrow and are used for removing bones from things.¹



Filet Knife: A filet knife is like a boning knife, but the blade is 6 to

- Half on, half off face blow: Pinching the metal between the anvil and the round part of the hammer to try and flatten out the metal



Starting off by making the shape of the knife. He starts off by making the tip. To do this he has the metal on its side and he has it angled downwards and has some of it hanging off the anvil

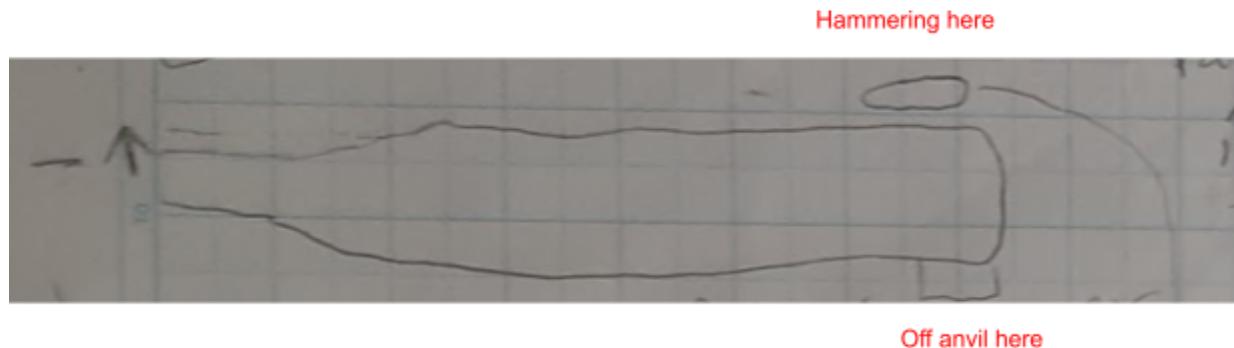


He hits it in this position 3-4 times then turns it flat and hits it 2 times.



He then places it like the first position, just the other side up.

- First, I would place it on its side and make it so that the top is flat and then to make the tip/point hammer it here until some of it is off the anvil (refer to the diagram down below).



- Turn on the flat part and flatten out any lumps.
- Flip on the opposite side as 3 (but this time with all of the edge on the anvil and hammer it out to keep making the point).
- Repeat these steps until you have a point and make sure to not make it any thinner after that.
- Start making the blade by hammering more in the middle, working your way to the other side of the knife. Keep flipping the knife.
- Now do the same things but on the edge (keep the knife in the shape you made it in step 2). Throughout this whole process you should be making sure to keep it flat, not to thin out the top of the knife too much because it is already a pretty thin piece of metal, make sure to keep the knife in shape as you are doing these steps, and make sure everything is even (in terms of thickness).

Although this plan/process might not make sense when someone else reads it, I understood what it meant. In the end though, I think that the process of actually making this step by step plan was more beneficial than using it because I didn't really refer to it that often when making the knife, instead, I was more so just focused and learning how to hammer the knife properly, myself. Making the plan on the other hand allowed me to visualize and think about what I needed to do when forging. Especially since I used many different sources, I was able to learn and create a plan/process about all about the different aspects of forging a knife

To achieve my product goal of forging a knife with scrap metal, I had to use critical thinking skills and more specifically, identify problems and develop aims, goals and objectives. Throughout the process of making my product, I ran into problems and had to identify certain things in my process in order to achieve a better product. The main problems were having a practical anvil and creating an effective forge. Due to the restrictions of price and limitations of availability of decently sized anvils, I had to improvise and use a block of steel nailed (through a pre cut hole) to a piece of wood. I originally put a piece of foam in between the metal and wood, to try to limit the noise and help absorb some of the shock from hammering. However,

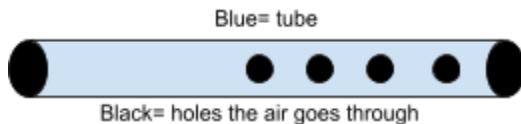


after the first time using this set up, I found that the piece of metal moved around too much when hammering. To develop a solution for this I used silicone to attach the metal to the piece of wood, so that it would keep it in place and absorb more of the hammering.

Another problem that was identified was that only the tip of the metal was getting heated up, meaning that I could only work on the tip of the knife. To solve this problem, I positioned the forge so that it was on its side, thus the coals could reach higher up on the metal.



However, oftentimes the metal was not getting hot enough in the forge, so that it was malleable enough for me to hammer it. To solve this problem, I drilled holes along the side of the white tube blowing air into the forge. This made it so that the air was blowing on the coals throughout the entire forge, rather than just at the back.



Thus as shown, I have used the ATL literacy skills more specifically, finding information in different media and making connections between a variety of sources. This allowed me to create a clear plan and learn about the different aspects of forging. I also used critical thinking more specifically, identifying problems and developing aims, goals and objectives when running into problems during the process of making my product goal.

Criteria C - Product Evaluation

Reflection:

An effect that the personal project had on me was that I have learned how to adapt and improvise better when things don't go as planned. Throughout the process of making my knives, many problems arose that ultimately changed the outcome of my product. For example, as I was making my product, I realized that it was taking longer than I thought it would, so I had to change my schedule and compromise on some aspects of the knife so that I could finish the product in time. Another example of this is when planning my knife, I had clear ideas with how I wanted it to look and how I would go about achieving that, however since forging a knife was a completely new experience to me, I wasn't able to accurately anticipate how things would actually go. This means that because I was learning how to make knives for the first time, while actually making them, with no additional guidance, I had to just make decisions and improvise based on the research and little experimenting I had done so far in the project. I believe that this skill is very important and can be applied to any subject in the future. For example when I join the DP, I will constantly be learning new topics and be doing assignments that I don't have experience with. This

means that being able to adapt to new situations is very important so that I can stay on track with my school work and not get as overwhelmed.

Another important thing I learned during the process of researching, planning, and making my knives was that I needed to balance research and my own experimentation. I found that the most important way for me to learn how to make my product, was to experiment myself rather than relying too much on my research of other people's experiences. Of course there were some things that were necessary to research, such as the materials needed, however I realized at one point, that I could look at how other people forged and what worked for them, but the reality of it was that I had to just experiment myself and see what would work for me. This was especially important because I had never done anything like this before, so things that people did online wouldn't always work for me because of my limited experience and in some cases limited materials and equipment. For example I found different forges that people used online like these:



(OUTDOORS55)



(FargoFX)



Throughout this process, I have also learned how I personally manage my time depending on the task. When making my product I actually didn't end up procrastinating, or at least not as much as I thought I would, and I realize now that it's because I would rather make something hands-on, rather than all my other school work where I just have to sit on my computer and do work. However, the part of my project where I did struggle with time management was for the researching stage, which further shows me how I am less likely to have the motivation for certain tasks so I need to be able to be more balanced when deciding on what to work on.

Connecting my learning experience to DP art, I think that this whole process really has helped me prepare for some aspects of DP art. When making my product I had to deal with working with a new medium, trying things that didn't always work, managing my time with making my product and doing other school work, and all the problems that I mentioned above. I think that all these things are similar to what I have to do in DP art, so this project has been helpful in giving me some type of prior experience to help me in the future.

Product:

In the end, my product consisted of 2 cooking knives. My first knife was created from a piece of scrap metal from some driftwood on a beach.



The second knife was created from a different piece of scrap metal:



Evaluation of product according to product success criteria:

Criteria	Grade	Evaluation
Function: The knife should cut effectively and demonstrate the skills and knowledge learned about knives.	3	<p>The knives were not fully functional as they left food unsafe to eat and still had some flaws like the durability, however I was still able to make the knives sharp which I am happy with. I also achieved my goal of forging scrap metal into a knife.</p> <p>I think that for both the knives I was able to show what I learned during my research, because in the end, I actually made knives. During the process, I made plans of the steps I needed to take to hammer out my metal to the right size. However once I actually started forging, I didn't follow this plan closely and more so just experimented myself. However I was able to show my learning of making knives, through my product.</p> <p>When comparing my 2 knives to a professionally made knife, I found that they both were able to perform well and cut everything I tested them on. This included tomatoes, onions, raw chicken, and garlic. However the knives left a gray residue from the metal, wherever they cut, thus making the food they cut, unsafe to eat.</p> <p>I also found that the knives were less sturdy compared to a professionally made knife. This was probably partly me trying to be more gentle since I</p>

		had made the knives and wanted not to break them, but either way, they did not hold up to the expectations of a proper knife.
Safety: When making the product, the proper safety precautions should be taken.	5	<p>When making my product, although I did take safety precautions like wearing gloves, goggles, having water and a fire extinguisher nearby, and having supervision, I still wasn't fully focussed on safety when making my product. For example, for the most part when it came to the stage of grinding the metal and handles, I did all of that in my room which didn't really have air ventilation, and in the beginning, I wasn't even using a mask or goggles. Basically by the end, I started to overlook and forget some of the safety measures because I was too focussed on the outcome of my product.</p> <p>I never actually ran into any danger due to not fully following the safety measures, but things could have gone differently so I think making a clear list of all the safety measures I need to take, other than the safety in terms of equipment, would have helped me.</p>
Aesthetics: How nice and appropriate the product looks, specifically when compared to professionally made knives. The individual components of the knife should look well made and the knife as a whole should look like a coherent product.	4	I think that the different components of the knife look coherent. I also think that they are well made, however the reason I think this is because I know the amount of effort and time put into it, so I still like how it turned out. However I do realize that the blades don't look like actual cooking knives, on the other hand, I think the black handle does look well made. Overall I give myself a 4 on this because although I think the knives look coherent, the blades of the knives don't look well made.
Materials: Materials that will be able to be washed over and over again (not rust and not have the wood,	4	After testing my 2 knives I found that the handles hold up to water and food well, however the blades don't. When the knife cuts food, it leaves behind a gray residue on the food. This means that the food it cuts, is not safe to eat. Also, once liquid is left on the knife for a little without being properly cleaned and/or dried, it causes the surface of the knife to look different. This is partly because of how I made my knife out of scrap materials so I don't know the exact type of metal it is made of. This means

<p>if using wood, decompose), that can be sharpened, safe to eat from (not toxic), easy to clean, environmentally friendly, recycled materials, and that will give the appropriate finish.</p>		<p>that some of the materials used do not allow these knives to be safely used with food, thus I gave myself a 4.</p>
<p>Improvement: Improvements/ progress made throughout making the different knives. Multiple knives should be made and there should be noticeable improvements made throughout the process.</p>	2	<p>In the end I was able to make 2 knives, but since I made them simultaneously, there weren't clear improvements between the 2 of them. However there was an improvement in the methods and steps along the way. For example, when making both knives, my technique and skill of hammering the metal improved. When I first started forging, I struggled to hit the metal hard enough, while still being precise enough. However as I kept forging, I was able to learn how to hit it hard, while still hitting it in the right place.</p> <p>In the end though, I did not achieve my goal of making knives that had noticeable improvements because since I made them simultaneously there is more so an improvement in the process of making the knives and my skills, rather than an improvement of the knives compared to each other. I also was too ambitious when thinking I could make more than 2 knives.</p>

Considering all my success criteria, overall I would give myself a 4 because in most of my criteria, I had major problems such as the materials used or the overall aesthetic being poor. However, in the end I am happy with how much I learned and improved my skills about knives, metal, forging, grinding, sanding, fire, sharpening, and more. I am also really happy and proud with all the work, effort, and time I spent. Thus I would say that I definitely achieved my learning goal and product goal even if I didn't do that well according to my criteria. I also would say I improved a lot, not just to do with making knives, but also to do with learning and being a more independent student.

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