

LATHROP ENGINEERING

Name: _____

UNIT 2: SKETCHING

Introduction to Engineering & Design

Unit Due Date: **September 26, 2019**

Welcome to the second unit of *Introduction to Engineering & Design*! In this unit, you'll be focused on methods of sketching. Great engineers need to be able to share their ideas with others, and often that means using careful diagrams to get the point across. In this unit, you will get a chance to practice a variety of sketching techniques so that as you continue in the course you can have a variety of tools for documenting your work. As the unit ends, you'll also be given the chance to use the Engineering Design Process to solve a problem and then illustrate your solution. In the end, the expectation is that you learn the following:

- How to create concept sketches to share and plan out ideas
- How to sketch using oblique and isometric perspectives
- How to sketch with 1-point perspective and 2-point perspective to create depth
- How to create Multiview sketches of complex solids
- How to use the Engineering Design Process to brainstorm and solve a problem

As we move through this unit, you are responsible for making adequate progress through the assignments, and for being done by the Unit Due Date (**September 26, 2019**). You are also responsible for completing each part before moving on to the next. Our unit is broken up into three main parts:

Part 1: Sketching Methods 1 (30 pts) Approx. 3 days	
Engineers really need to be able to draw well. Certainly we can use computers to create diagrams, but in the engineering design process engineers use sketches to share simple ideas. In the first part of the unit, we'll look at three of the simplest sketching techniques: concept sketching, oblique sketching, and isometric sketching.	 Watch Tutorials & Take Notes
	 Complete 3 Concept Sketches
	 Complete 3 Oblique Sketches
	 Complete 3 Isometric Sketches
	 Check-off from Mr. Benshoof
Part 2: Sketching Methods 2 (40 pts) Approx. 3 days	
Eventually, engineers and architects need to be able to make more detailed sketches than simple concept and oblique sketches. This is where perspective comes in. For this part of the unit, you'll get to practice 1-point perspective, 2-points perspective, and Multiview sketching techniques.	 Watch Tutorials & Take Notes
	 Complete 3 1-Point Sketches
	 Complete 3 2-Point Sketches
	 Complete 3 Multiview Sketches
	 Take Sketching Quiz
	 Check-off from Mr. Benshoof
Part 3: Sketching Solutions (30 pts) Approx. 3 days	
Finally, you'll get to work either by yourself or with a partner to develop a solution to a small problem and describe that solution through sketching. First you'll identify a common problem, then you'll brainstorm solutions, and finally you'll sketch your solution in detail using 3 different sketching techniques.	 Define a Problem
	 Brainstorm Solutions
	 Sketch Your Solution in 3 Ways
	 Check-off from Mr. Benshoof
 Achievement: Finish your unit with a clear set of sketches for your Arctic Innovation Design submission	



(30 pts) Approx. 3 days

The first part of our project is an introduction to some simple kinds of sketching. Throughout the year as you design solutions to various problems you'll need to be able to sketch out what your ideas are. The sketching strategies and tools we'll learn in the first part of our unit will be great ways of documenting our work and planning out projects. This first part of the unit requires that you do the following in your engineering notebook:

1. Start by watching the sketching overview. This will briefly introduce our first three methods of sketching, and let you know what's coming up. Start a page of notes here, and then continue those notes as you watch the remaining tutorials for concept, oblique, and isometric sketching.
2. Watch each sketching tutorial and add to your notes. Once you feel comfortable with each type of sketching, find the suggested objects and make careful sketches in your engineering notebook using the proper sketching method.
3. Concept sketching comes first: watch the tutorial video then create a concept sketch of a *stapler*. Then find two other objects that would be good for concept sketching and make those sketches too.
4. Oblique sketching comes second: watch the tutorial video then create an oblique sketch of a *calculator*. Then find two other objects that would be good for oblique sketching and make those sketches too.
5. Isometric sketching comes last: watch the tutorial video then create an isometric sketch of a *puzzle cube piece*. Find two more objects that would be good for isometric sketches. Make sure you use isometric graph paper for your isometric sketches.
6. Have Mr. Benshoof *approve your 9 sketches!*

Part 1: Tasks	6-5 points	4-3 points	2-1-0 points
 Sketching Notes	+ You wrote at least a full page of notes on sketching and sketching techniques	- You missed one of the sketching styles in your notes	- Notes are missing multiple styles - Notes are missing
	8-5 points	4-3 points	2-1-0 points
 Concept Sketches	+ Your Concept Sketches use the correct sketching style + All 3 concept sketches are complete in your notebook	- Sketches are sloppy or on the wrong graph paper - Only 2 sketches complete	- Sketches are missing multiple parts - Only 1 or 0 sketches are complete
 Oblique Sketches	+ Your Concept Sketches use the correct sketching style + All 3 concept sketches are complete in your notebook	- Sketches are sloppy or on the wrong graph paper - Only 2 sketches complete	- Sketches are missing multiple parts - Only 1 or 0 sketches are complete
 Isometric Sketches	+ Your Concept Sketches use the correct sketching style + All 3 concept sketches are complete in your notebook	- Sketches are sloppy or on the wrong graph paper - Only 2 sketches complete	- Sketches are missing multiple parts - Only 1 or 0 sketches are complete



(40 pts) Approx. 3 days

The second part of our unit focuses on three more kinds of sketching techniques. In the first part, you looked at concept and oblique sketching which are great ways to describe new ideas to other engineers. You also looked at isometric sketches which are good for showing more accurate 3-dimensional drawings. Now we will turn our attention to 1-point perspective and 2-point perspective where we can make even better 3-dimensional drawings. We'll also look at multiview sketching that lets us make very detailed views of complex objects.

1. Start by watching the sketching overview. This will briefly introduce our next three methods of sketching, and let you know what's coming up. Start a page of notes here, and then continue those notes as you watch the remaining tutorials for concept, oblique, and isometric sketching.
2. Watch each sketching tutorial and add to your notes. Once you feel comfortable with each type of sketching, find the suggested objects and make careful sketches in your engineering notebook using the proper sketching method.
3. 1=point perspective sketching comes first: watch the tutorial video then create a 1-point perspective sketch of a *puzzle cube piece*. Then find two other objects that would be good for 1-point perspective sketching and make those sketches too.
4. 2-point perspective sketching comes second: watch the tutorial video then create a 2-point perspective sketch of a different *puzzle cube piece*. Then find two other objects that would be good for 2-point perspective sketching and make those sketches too.
5. Multiview sketching comes last: watch the tutorial video then create a multiview sketch of the *puzzle cube piece*. Find two more objects that would be good for multiview sketches.
6. Have Mr. Benshoof *approve your 9 sketches!*
7. Finally, take the Unit 2 Quiz on Sketching linked from our website. Take the quiz on or before **September 20!**

Part 2: Tasks	6-5 points	4-3 points	2-1-0 points
 Sketching Notes 2	+ You wrote at least a full page of notes on sketching and sketching techniques	- You missed one of the sketching styles in your notes	- Notes are missing multiple styles - Notes are missing
	8-5 points	4-3 points	2-1-0 points
 1-Point Perspective Sketches	+ Your 1-point perspective sketches use the correct style + All 3 perspective sketches are complete in your notebook	- Sketches are sloppy - Only 2 sketches complete	- Sketches are missing multiple parts - Only 1 or 0 sketches are complete
 2-Point Perspective Sketches	+ Your 2-point perspective sketches use the correct style + All 3 perspective sketches are complete in your notebook	- Sketches are sloppy - Only 2 sketches complete	- Sketches are missing multiple parts - Only 1 or 0 sketches are complete
 Multiview Sketches	+ Your Multiview Sketches use the correct sketching style + All 3 multiview sketches are complete in your notebook	- Sketches are sloppy - Only 2 sketches complete	- Sketches are missing multiple parts - Only 1 or 0 sketches are complete
	10-9 points	8-5 points	4-0 points
 Take Unit 2 Quiz	+ You took the Unit 2 Quiz on the website by the Quiz Due Date + Grade is based on number correct	N/A	(0 pts) You did not take the Unit 2 Quiz



(30 pts) Approx. 3 days

The last part of this unit asks you to work to develop a solution to a real-world problem. For this part, you can choose to either work by yourself or you can work with a partner. If you choose to work with a partner, it’s important to remember that you *both* need to record your ideas in your own notebooks and make your own sketches of your final solution.

For this part, we’ll walk through the first few steps of the engineering design process. To do this, you’ll start by identifying a small real-world problem that you see in your daily life. It can be something simple like:

Feeding the dog is tedious

Taking out the trash is messy

Cleaning dishes is messy

Shoelaces coming untied

Backpack straps jam lockers

Pencils break in backpacks

Whatever problem you choose, it should be relatively small in scope and should be able to be solved with a physical object. Once you’ve chosen your problem, you’ll write a clear description of the problem in your engineering notebook and then start brainstorming solutions! Once you’ve generated at least 10 possible solutions you need to pick one and start sketching. Start with a concept sketch of your idea, and then make two more diagrams using techniques of your choice to illustrate your solution further. When you’re done, you’ll have at least 3 good pictures of your new idea!

1. Watch the “Sketching Solutions Overview” video and think about different problem/solution ideas.
2. Work by yourself OR with a partner to come up with a problem you want to tackle. Write a clear 1-2 sentence description of the problem and why it’s a problem.
3. Work by yourself OR with a partner to brainstorm at least 10 possible solutions to the problem you selected. Make sure that you write down your ideas in your engineering notebook!
4. Decide which of your 10+ ideas you want to focus on. Your chosen solution could be a combination of multiple ideas.
5. Make a careful Concept Sketch of your final idea in your engineering notebook. Be sure to use shading and label important parts.
6. Make 2 more sketches of your idea using any two of the other techniques we discussed in this unit:

Oblique

Isometric

1-Point Perspective

2-Point Perspective

Multiview

Be sure to make your sketches in your engineering notebook!

Part 3: Tasks	10-7 points	6-4 points	3-2-1-0 points
 Define the Problem	+ You wrote a clear 1-2 sentence description of your chosen problem.	- Your description is vague or incomplete.	- Your problem description is missing.
 Brainstorm Solutions	+ You brainstormed and recorded at least 10 possible solutions.	- You only brainstormed 6-9 ideas	- You brainstormed and recorded fewer than 6 ideas.
 Solution Sketches	+ You made a good concept sketch of your idea. + You made 2 more sketches using different techniques.	- You only made 2 sketches of your idea.	- You made 1 or 0 sketches of your idea.
 Achievement	+ Choose a problem that relates to the Arctic or to Alaska and create a good solution to that problem for your work in Part 3		

