Robotic Arm Design Plan/Steps to Follow

VMS Basic Engineering

1. **Research and design**: Look at the example model. How many different parts are there? How big are the parts? What are the materials used for the parts? What else do you notice? Use Google… what have other people done in the past?

2. **Sketches: Individually, brainstorm ideas** for a solution to the problem. What is the problem/challenge? 3 Thumbnail Sketches, 3 rough sketches (1 for each component i.e. shoulder arm pieces, elbow arm pieces, claw pieces).

3. **Get together with your partner. Come up with a plan**… what are the steps your group is going to follow? ***Think of the engineering/problem solving process…***

a. What jobs and/or parts need to be done/be designed? Who will record the 10 problems and solutions that will be included in the portfolio?

b. Who is going to complete each job/task? Choices are:

I. You
II. Your partner
III. Both of you

JOB/TASK	PERSON DOING TASK
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

*If there are more jobs/tasks to list, write on a separate piece of paper and attach.

CHECKPOINT… GET YOUR SKETCHES AND PLAN OKAYED BY INSTRUCTOR (*12 POINTS*)

4. **Staple all pages together** and include in your group's portfolio (all sketches and the "plan").

PROBLEMS/SOLUTIONS

As you design and build/fabricate your project, what were some of the issues, problems, snags, etc. that you ran into? How did you solve them?

PROBLEM	SOLUTION

Hydraulic Robotic Arm Grading Sheet

Research and design process:
~Thumbnail sketches (at least 3) and rough sketch (3) ____/6

~"Plan" with jobs/tasks and who is completing them ____/6
Checkpoint #1, drawings & plan = ____/12

Fabrication of the robotic arm model:
~Aesthetics (how does it look?) Is there excess glue, are the pieces cut evenly and tooled to a professional look? ____/10

~Pieces have been made with "slots and tabs" (i.e. braces/arms) Pieces fit "into" each other, not just glued to each other ____/10

~3D Printed pieces have been designed in mm for precision ____/5

~Followed guidelines (within measurements, has a working arm with elbow ____/5, shoulder ____/5, claw ____/5 ____/15

~Laser used once ____/5, 3D Printer used once ____/5 ____/10
Fabrication of the robotic arm model = ____/50

Testing:
How many mines did you successfully move in 3 minutes?
1 mine = 5pts 2 mines = 10pts 3 mines = 15pts 4 mines = 20pts
Every mine over 4 = 1pt extra credit. **Testing = ____/20pts**

Design Portfolio should include (one per group):
a. **What is the problem** you are trying to solve? ____/2 pts
b. **Give one example for how you used EACH step in the engineering/problem solving process (S.E.A.R.CH.)** Example: **S=** move 4 mines in 3 minutes using only 8 syringes and the available materials. **E=** We brainstormed coming up with a couple of really good ideas. One was….. the other was…. **A=** We chose…. **R=** We had to re-test or re-evaluate [this part] because… **CH=** [This part] didn't do exactly what we wanted so we ….
2 points for each step = ____/10pts
c. After testing and seeing other group's projects, **what would you do on a redesign?**
(at least 3 sentences) = ____/3pts
d. **List of at least 10 problems and solutions** you had during the project design/build.
____/10pts
Design Portfolio = ____/25pts
Project Total = ____/107pts