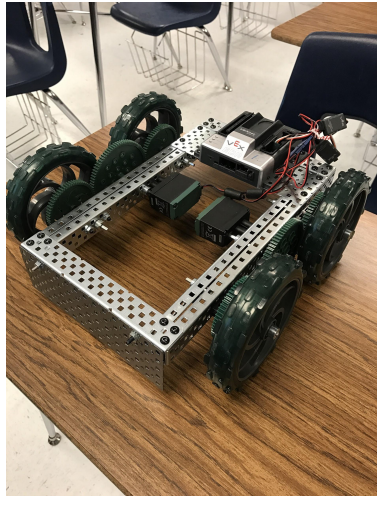
PLTW Design Challenge

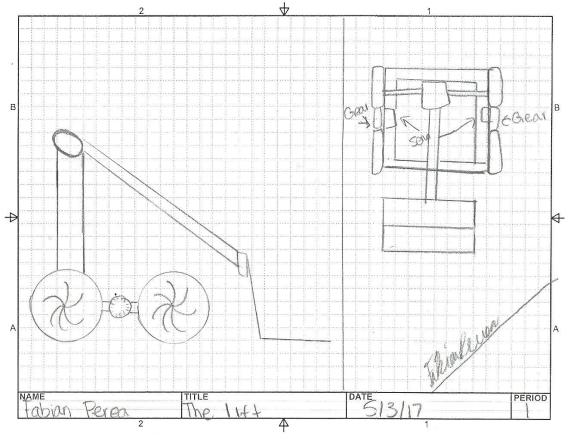
By: Bianca Diaz
1st Period
5/9/17

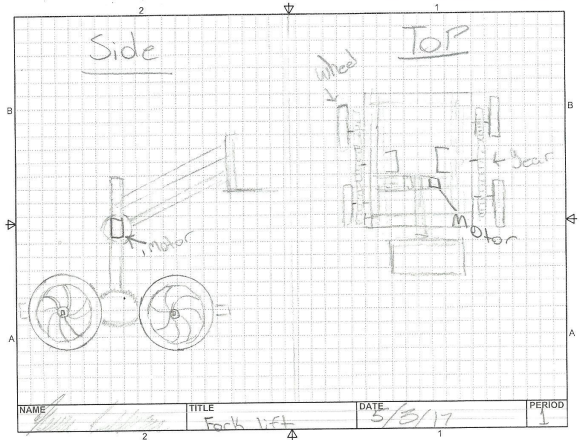


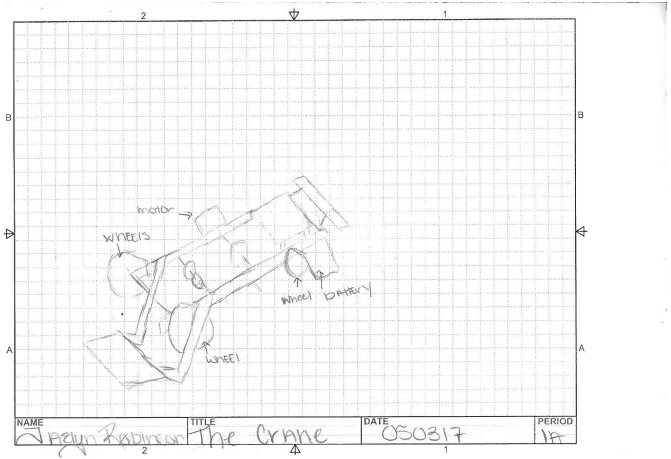
Design Brief

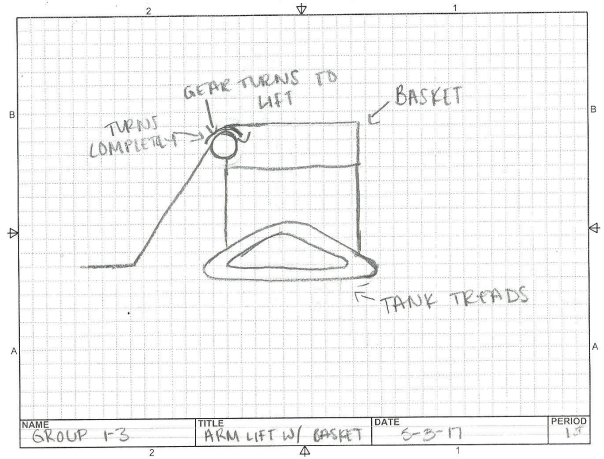
Client Company:	SP ROBOTICS, INC.
Target Consumer:	Governments, Non-Profit Organizations
Designer(s):	Bianca Diaz, Fabian Perea, Kevin Calderon, Jaelyn Robinson
Problem Statement:	There is no efficient way of cleaning up debris left by disasters, natural and manmade occur around the world, such as earthquakes, flooding, forest fires, hurricanes, tornadoes and terrorist attacks. The initial consequences are terrible and receive a lot of media attention, but the clean up often takes a very long time and is very expensive. The areas are often covered in thousands of pounds of trash and debris that must be moved, often over rough and hazardous terrain.
Design Statement:	Create an automated robot to help with initial clean up in areas affected by disasters, natural and manmade occur around the world, such as earthquakes, flooding, forest fires, hurricanes, tornadoes and terrorist attacks.
Design Constraints:	• Remote operated • Capable of moving different types of debris • Can push, lift, or transport debris • Navigate over and around rough terrain • Compact to fit into tight spaces • Quick • Accurate in movement and operation

Initial Sketches









Decision Matrix

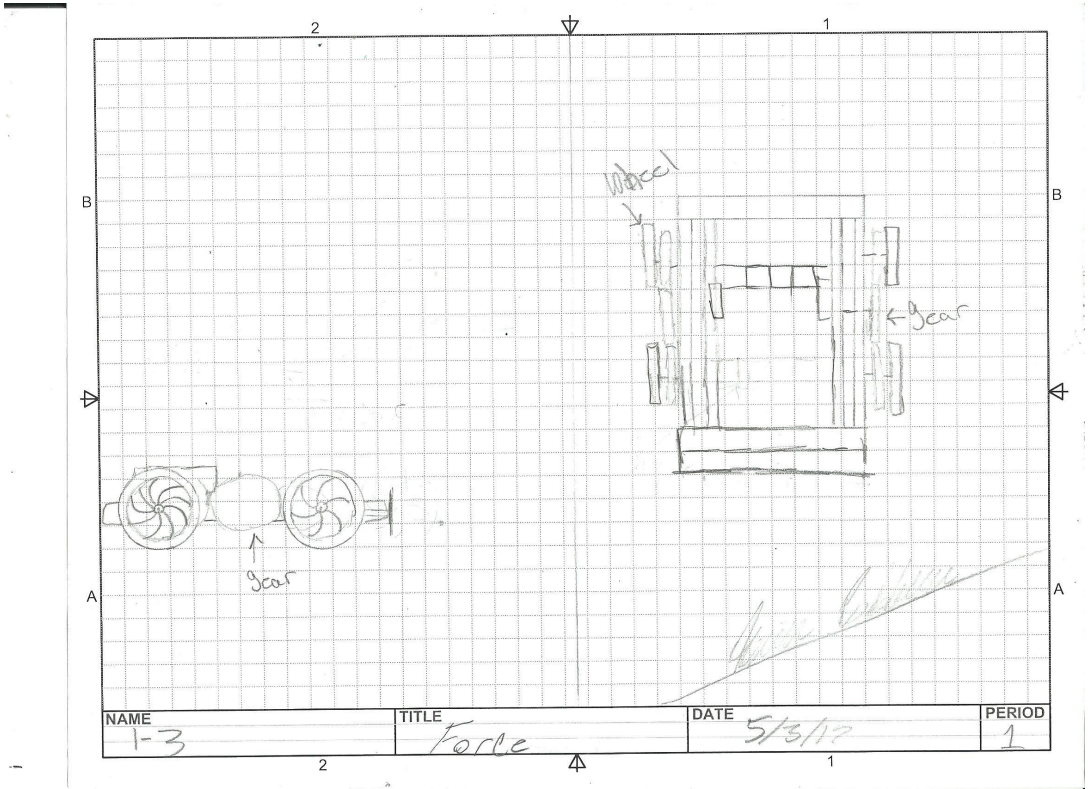
PLTW | Engineering

Decision Matrix Template

Ideas	Criteria: Simple To Build	Difficulty of Coding	Efficiency	Speed			Totals
Bianca	4	3	2	4			13
Fabian	3	4	2	2			11
Kevin	4	3	4	3			14
Jaelyn	2	2	2	3			9

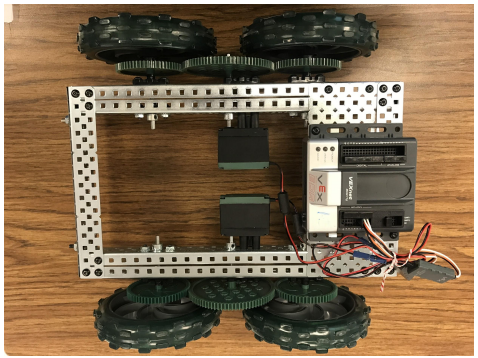
Key: 4 best -- 1 worst
Must include a minimum of 4 criteria.

Final Sketch

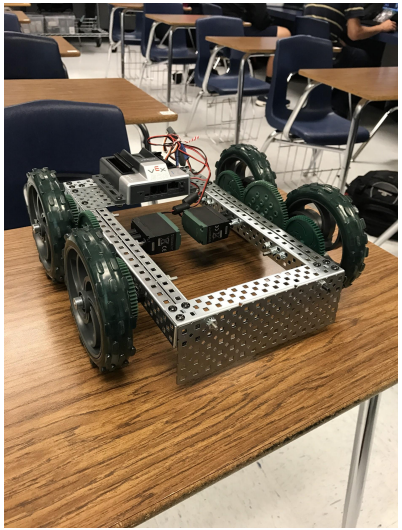


Final Design Pictures

Side View



Top View



Oblique View

Front View

Vex Parts List

Quantity	Description
	Metal Parts
4	Chasis - Rails
2	Chasis - Bumpers
2	Plate 5x5 Holes
2	3" Shafts
4	4" Shafts
	Motion Parts
4	60 - Tooth Gears
2	84 - Tooth Gears
4	5" Wheel
1	Joystick
	Input/Output/Motors
2	3 - Wire Servo

Robot C Code

```
task main()
{                                   //This open bracket is the beginning of code.

  while (1==1)                      //This will set the program to be true and sets it to be infinte.
  {                                 //This open bracket is for the beggining of the while loop.
    motor[rightMotor] = vexRT[Ch2]/2; //The right motor is set to a channel on the VEX controller and sets its speed to half speed.
    motor[leftMotor] = vexRT[Ch3]/2;  //The right motor is set to a channel on the VEX controller and sets its speed to half speed.
  }                                 //This is the ending of the while loop.

}                                   //This is the closing bracket a.k.a. the ending of the code.
```

Reflection Questions

1. Did you meet the constraints of your project?
    a. If you did NOT meet the constraints, what would you do if you had more time, or a chance to start over so you would be successful?
    b. If you DID meet the constraints, what would you add/change about the project to make it more challenging in the future?

1b. To make this project more challenging I would make a limit to how much debris the vex robot has to carry before transporting it. So that each trip the maximum amount of work is done. It ups the requirement for the amount of efficiency needed.

Advice To Future Students

1. What was the most challenging part of this project?
2. Explain one thing that helped you on this challenging part.
3. What other advice would you give a student next year who is doing the same project?

1. The most challenging part of this project was coming up with an effective way of moving the debris. While an idea would sound good and seem simple in theory actually constructing it came to be harder than expected. We had trouble figuring out coding that would work efficiently with our idea.
2. Something that helped with this challenging part is having ideas that varied a lot from each other. No two ideas were similar, so if we struggled with one when we moved on we had a complete new start.
3. Challenge yourself. This project can be easily accomplished by doing the bare minimum and by going with ideas that work, but you need to go a step beyond that. If there's a size constraint don't make it as big as possible. If an idea you use is alright and is somewhat efficient, challenge yourself and use an idea that works well 100% of the time.

Citations

https://www.youtube.com/watch?v=UXgrlFYfGgg

https://www.youtube.com/watch?v=5mPySMI_Y4c

https://www.youtube.com/watch?v=_JyNHP05FSQ

https://www.youtube.com/watch?v=w5eG4C5mRrg

https://www.youtube.com/watch?v=7j_846th1PQ