# Concept

ATV robot: maintaining a constant speed while driving on sloped or uneven surfaces

# Possible Technology:

* Actuator
  + Wheels to move the robot (all-wheel drive?)
    - Rubber wheels (more grip/friction w surface)
    - Small gear→big gear (increased torque=more power=more stability)
  + Tires to prevent slips
* Controls (PID?)
  + DFR driver expansion board
  + Remote control (?)
  + Rotary encoders to measure distance travelled

# Construction

## Possible designs:

* VEX
* Arduino
* Microbit

Ultimately, I settled for VEX as it is readily available at school and I can focus more on programming than building.

# Research

* <https://www.youtube.com/watch?v=MCR_gMoFBPo&ab_channel=AmbrogioRobot>

“Whenever it hits area hasn’t visited for few days (using GPS) it spirals the grass down. Otherwise it does cut in straight lines. I do think navigation could be improved - tends to get stuck in some areas on a complicated lawn.” (Roger Murray)

* <https://www.youtube.com/watch?v=bP7p5Bd2d50&ab_channel=AdityaRMohan>
* <https://www.youtube.com/watch?v=4REqaFn2KqY&ab_channel=SDRRobots>
* <https://www.youtube.com/watch?v=3nvgoBgYpS4&ab_channel=OSZT%C3%A4uffelen>

# Analyzing Similar Products

20cm x 19.7cm

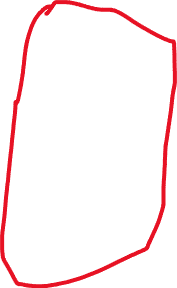
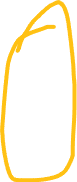
A picture containing electronics, engine

Description automatically generated

Gears: This robot uses a motor that is connected to a wheel through a large gear then a small gear. Because this robot is designed on smooth surfaces and to move at high speeds, this maximizes the rotations of the wheel

Omni-directional wheels:

Large plastic wheel with rubber \_\_. Could prevent the robot from tipping over and rolling, but could also potentially cause robot to slide around while moving.



Rotary encoder: measures wheel revolutions through “ticks.” These ticks will return a value that represents the distance turned. Using 2 will compare the two wheels’ revolutions and make adjustments accordingly

# Success Criteria:

* Climb various degrees of slope
* No slipping
* Be able to maintain a constant speed regardless of angle

# Minimum Viable Product

* Move forwards
* Climb slope
* Does not slip

# Materials:

* Vex parts
* Vex wheels (rubber?) 2 or 4
* 1 Caster wheel
* 2 rotary encoders