<u>List of Materials (priority first)</u>

1. ~~Arduino Uno~~ Raspberry Pi 3/4
    a. Shields (if we get Arduino)
        i. WIFI (built into Raspberry Pi already)
        ii. GPS (separate module for both RP and Arduino)
            1. Eg
                https://www.amazon.com/s?k=GPS+Module+NEO-6M&tag=754u-20&ref=nb_sb_noss_2
        iii. Motor driver/controller (both needed as well)
    b. LCD Monitor to display text?
2. Sensors
    a. Infrared sensor (senses if a heated object is in the way of the sensor)
        i. https://www.amazon.com/OSOYOO-Infrared-Obstacle-Avoidance-Arduino/dp/B01I57HIJ0/ref=sr_1_3?dchild=1&keywords=Infrared+Sensor&qid=1602874027&sr=8-3 (about 11$ for 10 sensors)
            1. How it operates on a basic level:
                a. An IR emitter shoots out a beam of light, facing an in-line receiver.
                b. If nothing is in the way, the receiver sees a signal.
                c. If the receiver fails to see an IR beam, it detects that an object is between the emitter and the receiver, and therefore present in the monitored area.
    b. Passive Infrared Sensor (PIR senses if a heated object is moving)
        i. https://www.amazon.com/HC-SR501-Sensor-Infrared-Arduino-Raspberry/dp/B07KBWVJMP/ref=sr_1_4?dchild=1&keywords=Raspberry+Pi+Motion+Sensor&qid=1602874334&sr=8-4 (about 10$ for 5 sensors)
    c. Ultrasonic Proximity Sensor (Typical Proximity Sensor used in cars)
        i. https://www.amazon.com/ELEGOO-HC-SR04-Ultrasonic-Distance-MEGA2560/dp/B01COSN7O6/ref=sr_1_15?dchild=1&keywords=proximity+sensor&qid=1602874836&sr=8-15

3. Camera
    a. Observation System
        i. https://www.amazon.com/Raspberry-Pi-Camera-Module-Megapixel/dp/B01ER2SKFS?th=1 (for raspberry pi)
        ii. If we decide to use arduino:
            https://nootropicdesign.com/video-experimenter/
4. Motors
    a. Brushless/Brushed DC Motor
        i. RPM and torque will depend on the mass of our entire rover, as well as what kind of speed we want to achieve
            1. 12V motor should be more than enough for our test case, could probably use less
        ii. 4 Motors (1 for each wheel) vs. 2 motors (1 for each axle, or 1 for each side for tank treads) vs. 1 motor (1 for entire rover)

1. Leaning towards 2 motor (1 for each side) because I think it will look cool to have tank treads, also 2 motors can be driven by arduino and pi controllers
   b. Motor Driver (Shield)
      i. https://store.arduino.cc/usa/arduino-motor-shield-rev3
         1. Allows Arduino to drive 2 DC motors, controlling speed and direction of each one independently
      ii. https://www.tutorialspoint.com/arduino/arduino_dc_motor.htm
      iii. DC Motor Driver (Raspberry Pi)
         1. https://www.amazon.com/DROK-Controller-Regulator-Industrial-Optocoupler/dp/B06XGD5SCB/ref=sr_1_3?dchild=1&keywords=raspberry+pi+motor+controller&qid=1602879235&sr=8-3
   c. Battery
      i. Also depends on the weight of our load, amount of motors, etc.
      ii. https://www.helidirect.com/blogs/news/how-to-choose-a-lipo-battery-for-your-rc-needs
         1. Need to consider mAh, voltage, dis/charge rating, and size of the battery
5. Chassis
   a. Last priority after sensors/ microcontroller work

What to work on for Fall
- UI for interfacing with hurt hikers (is it audio, a screen, buttons on device?)
  - Johnny
- Human detection (using camera, infrared, combination?)
  - James
- Controlling motors using microcontroller (arduino to motor shield?)
  - Jeffrey
- Sending data from microcontroller to base (arduino to phone/computer?)
  - Tobe
- Obstacle detection (using sensors or camera?)
  - Bk

Questions for QV
- Do you have an Arduino+Motor/Motor Shield that we could borrow? Would like to see how it all works
  - For those off campus, would we be able to be shipped any borrowed materials or should we begin looking into purchasing raspberry pi's etc.
- Insider Tips/Tricks for filling out UROP request? Deadline is 11/9