Rollercoaster https://phet.colorado.edu/en/simulation/legacy/energy-skate-park

Your rollercoaster/skate track/water slide should include a hill and a loop at the minimum, and the skater should make it through the whole track without flying off the hill or falling off the loop. Bonus if you make it safe: g-force not too big to black out, no danger of leaving track, full specs for acceptable height ranges, and interesting design/thrill.

a) Sketch your track with the labeled parts: heights of hills, radius of circle, etc. This should match with the screenshot turned in digitally.

b) For a particular setting of low friction, sketch the position-time, energy-position curves, and match it with the parts of your track. Describe what you observe in the pie graph?

Answer these questions, showing your calculations. Your answers should include concepts of v^2/r, kinetic, potential, thermal energy:
On the sketch, indicate

c) where the skater feels lighter than usual. Calculate the normal force

d) Where does the skater feel maximum heaviness (g force)? Will the person black out? Show the calculation.

e) Where does the skater accelerate? Decelerate?

f) To get over the hill but not fly off of it, what is the range of heights that are safe for the 1st incline? Does the mass of the skater matter?

g) To safely make it through the circle without falling off (critical velocity), what height considerations need to be considered?

h) When you increase the friction, how does this affect the simulation? How about the mass of the skater? How about gravity?