Open Ended Problem #1
Indiana Jones
Individual work only, Due 9/7/16 at beginning of class
(Don't be afraid to "Google" for reasonable assumptions; just provide references!)

Raiders of the Lost Ark

Clearly, Dr. Jones realized while standing in the temple in Peru that he mistakenly estimated the weight of the gold statue while in his office at Marshall College (in Bedford Connecticut). He filled the bag outside the temple based on his estimates in CT, though when he stood before the statue he realized his mistake. He tried to remedy this by removing a large handful of sand, but he didn't remove the correct amount. How many handfuls of sand should he have removed in order to have prevented his running a 400 meter dash in front of a giant boulder?

1) What is this problem actually asking for? What is the final value being asked to find?

2) Draw a sketch that indicates the actual problem.

3) a) What physical laws apply to this problem?
b) Indicate equations, correlations, and/or formulae that can model these laws.
c) What are the potential limitations of these equations?

4) What assumptions should be made to utilize the equations/correlations/formulae listed in part 3b?

a) List ALL the assumptions that you need to in order to solve the problem.
(hint - What simple shape could be used to approximate the statue volume?)
(hint - a handful is a unit of volume... feel free to estimate this unit)

b) Justify your assumptions (**references**, reasoning, judgment, common sense, etc.)

5) What are the physical properties used in this problem?

6) Calculate the handfuls of sand that should be removed.

7) Verify your answer... Does it look reasonable? Anything odd about the calculation?

a) Change your elevation assumption made in part 3 to be the minimum elevation.
b) Change your elevation assumption made in part 3 to be the maximum elevation.
c) Does the amount Dr. Jones removes appear to fall within this region?
d) Does Dr. Jones have enough sand to make the switch, based upon assumptions you made in part 4?
e) What other assumptions from part 4 could have a significant impact on the answer to part 6?