Additional Problem III for Physics 102

This problem is part of your written homework for chapter 19.

As you are walking to class one day, you see a penny lying on the ground, and wonder whether you should bother to pick it up. You think to yourself, “If I bend down to pick up the penny, I will do work. To do that work, I will have to burn some energy. A penny doesn’t buy much these days... it would probably cost more than a penny to buy the food I would need to give me that energy. So, picking up the penny would not be cost effective.” In this problem, you will carry out an estimate to see whether this argument is correct.

a) Estimate how much mechanical work you would do in the process of bending down, picking up the penny, and standing up again.

b) Estimate how much it would cost you to buy enough food to do the amount of work calculated in part (a). Remember that the “calories” used to measure the energy content of food are actually kilocalories; 1 kcal = 4186 J. Be sure to explain what type(s) of food you are considering, and how you determined its energy content and price. Is it worthwhile to pick up the penny?