



HUMAN BODY

Bicycling and Calories

Problem Set

Problem 1: Sweating

If you go bicycling on a hot summer day, the surrounding air cannot cool you efficiently so you need to sweat to maintain your body temperature. A typical 70 kg person's body produces energy at a rate of approximately 500 W during bicycling, 80% of which is converted into heat (100 W basic metabolism + 75% of remaining 400W = 400W). What is the volume of water (sweat) the body has to generate to get rid of the excess heat during one hour of bicycling?

Problem 2: Running Speeds

After spending the holiday with your family, you have put on a bit of weight. You decide to go running and do a 6.0 km long run on flat terrain. You are wondering whether you should run the distance at a fast or a moderate pace to burn more calories. You go online and read that a 59 kg person burns 590 kcal running at 9.7 km/h for an hour and 797 kcal running at 12.9 km/h for an hour. Should you run the 6.0 km at a fast (12.9 km/h) or a moderate (9.7 km/h) pace to burn more calories? Explain your reasoning and show all your work.

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