Problem solving activities: energy expenditure and health

Imagine you are working as an exercise physiologist at a football club. The football players who play there have to be very fit and would expect you to know about exercise and health. Have a read through the following questions and write down your answers. Each answer should be no more than 10 lines.

1. The football manager comes to ask your advice on what equipment to buy to measure fitness and physical activity levels in his players. What two pieces of equipment would you suggest he should purchase and why ?

2. You have a new signing to assess. He will cost the club £30 million and the manager want to know your view on his level of health and fitness.

   His resting heart-rate is 50 bpm

   His cholesterol level is 3.5 mmol/L

   His VO_2 max is 55 l/min/kgBW

   His body fat content is 12%

What pieces of equipment would you need to make these tests ?

Would you recommend that the club sign this player ? Why ?

3. One of the players has broken his foot. He is not going to be playing for the next 6 weeks. He is worried about gaining weight while being inactive. This is what he usually eats:

BREAKFAST:	Cornflakes with sugar, 3 slices of toast with peanut butter, coffee
LUNCH:	2 sandwiches with chicken salad and mayo; banana and a yoghurt
DINNER:	2 pitta bread with humous, chicken stir fry, apple pie and ice-cream

Suggest 3 changes he could make to his meals, to reduce his calorie intake but still maintain a healthy diet.

Suggest ways which he could use exercise as part of a weight-control programme (e.g. effect of type of exercise, duration, intensity or frequency on body weight and composition)

3. A 75 kg football player is undergoing a fitness regime. You need to calculate his daily energy expenditure.

   First, calculate his basal metabolic rate, using the equations from Scholfield *et al*. (1985)

   BMR = 0.063 * Weight + 2.896

   BMR = _____ MJ/d

You can now estimate his level of activity from his daily routine. Look at the Physical activity level descriptors and choose which category he would fit best. Then calculate what you think his total energy expenditure might be for a day.

PAL 1	PAL2	PAL3
1.7 * RMR	2.7 * RMR	3.0 * RMR
Office workers	Domestic workers	Agricultrual
Housewives	Students	Sports people
Sales representatives	Construction workers	Equipment operator

EE = _____ MJ/d

4. A journalist has phoned you to say she is writing an article on basal metabolic rate and energy expenditure. She asks you what the main influences on energy expenditure are.

   List below factors, which may reduce total daily energy expenditure: (e.g. illness/bedrest)

   List below factors, which may increase total daily energy expenditure: (e.g. swimming or gym session)

5. One of the player's wives had just been diagnosed with non-insulin dependant diabetes mellitus (NIDDM). She is now diabetic. He asks you a few questions:

   What is the role of insulin in controlling blood glucose:

   What is the role of glucagon in controlling blood glucose:

   Should she continue to exercise ?

   How will she control her blood glucose ?