



# Calculating energy balance

## Are these people in energy balance?

For each example, calculate the person's energy expenditure by adding calories burned through BMR and daily activities. Compare this number to the amount of calories consumed (food energy intake).

Determine whether these people are likely to lose weight, gain weight or remain at a constant weight if they continue this lifestyle. Make recommendations for improving each situation.

**Henry** is 28 and works as a builder on a construction site. He weighs 89 kg and is 190 cm tall. Can you calculate his BMI?

Henry awakes at 5.30 every morning, gets ready for work and has a large breakfast. This usually takes 30 minutes, burning 70 calories. He then rides his bike to work for one hour, burning 300 calories. He works an 8-hour shift, burning 200 calories per hour and takes a short break mid-morning for a snack and something to drink. At work, he has one hour to rest and have a cooked lunch he brings from home; this burns 50 calories.

After work, he rides his bike home again for one hour, burning 300 calories. At home, he has a snack and spends an hour playing with his children, burning 150 calories and then helps them with their homework for an hour, burning 70 calories. The rest of the evening he relaxes with his family, reads the newspaper and has dinner; this burns 70 calories per hour. At 10.00 pm he goes to bed. He burns 53 calories per hour until he wakes up again.

We know that Henry:

- has a BMR of 2045 calories per day
- burns at least 3000 calories in daily activity
- consumes an average of 5000 calories a day

1. What is Henry's overall energy balance? (BMR + calories burned from daily activity compared with calorie intake (food and beverages consumed))
2. Is he likely to gain weight, lose weight or maintain the same body weight if his food intake (calories) and activity level remain the same?
3. What advice would you give to Henry, taking into consideration his BMI and current energy balance status?



★ 'BMR' is the amount of energy required for basic body functions.

The calculations used here are:

**Men:**  $(13.7 \times \text{wt in kg}) + (5 \times \text{ht in cm}) - (6.8 \times \text{age in years}) + 66$

**Women:**  $(9.6 \times \text{wt in kg}) + (1.8 \times \text{ht in cm}) - (4.7 \times \text{age in years}) + 655$

**BMI Formula:**  $\text{weight (kg)} / [\text{height (m)}]^2$

## Calculating energy balance (cont.)

**Irene** is 19 and works as a radio DJ. She weighs 71 kg and is 161 cm tall.  
Can you calculate her BMI?

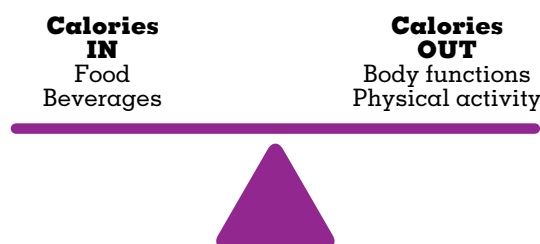
She gets up every morning at 6 am, eats breakfast and rushes out of her house so she can be on time for her morning radio programme which starts at 7 am. Her colleague who lives next door, gives her a lift to work every day; sitting in the car for 30 minutes burns about 30 calories. Irene's radio programme lasts 4 hours starting at 7 am and finishing at 11 am, burning 70 calories per hour. She snacks and drinks various beverages throughout her programme. When her programme is finished, she works for two hours on her computer, updating the radio's web-site and replying to emails. This burns 80 calories per hour. She takes a 1 hour break to eat a big lunch, relaxing and talking with her colleagues; this burns 70 calories. After lunch she spends another 2 hours in the office, preparing her next programme, listening to music and looking for interesting stories about the latest music stars. This burns 80 calories per hour.

After work, Irene usually meets some friends for 2-3 hours to get something to eat for dinner; sometimes they go to a local pub or the cinema, burning 70 calories an hour. She goes to bed at around 11 o'clock. She burns 50 calories an hour until she wakes up again.

We know that Irene:

- has a B.M.R. of 1537 calories per day
- burns at least 1260 calories in daily activity
- consumes an average of 3200 calories a day

1. What is Irene's overall energy balance? (BMR + calories burned from daily activity compared with calorie intake (food and beverages consumed))
2. Is she likely to gain weight, lose weight or maintain the same body weight if her food intake (calories) and activity level remain the same?
3. What advice would you give Irene, taking into consideration her BMI and current energy balance status?



## Calculating energy balance (cont.)

**Marie** is 35 and she is a farmer. She weighs 50 kg and is 168 cm tall.  
Can you calculate her BMI?

In the morning she awakes at 6 am, takes one hour to prepare breakfast for her family, do a few household chores and eats her own breakfast; this burns 120 calories. She then walks to her fields for half an hour, burning 130 calories. She ploughs, plants, weeds and digs for 6 hours each day. This burns 200 calories per hour. At noon she has a 2 hour break to have a little food and rest; this burns 70 calories per hour. When she has finished her work for the day, she walks home again (130 calories).

At home, she spends one and a half hours taking care of her chickens and preparing the evening meal for her family, burning 110 calories an hour. After dinner she spends some time with her husband and children, finishes her household chores (burning 120 calories) and goes to bed around 10.30 pm. She burns 50 calories an hour while she is sleeping.

We know that Marie:

- has a B.M.R. of 1273 calories per day
- burns at least 2380 calories in daily activity
- consumes an average of 1800 calories a day

1. What is Marie's overall energy balance? (BMR + calories burned from daily activity compared with calorie intake (food and beverages consumed))
2. Is she likely to gain weight, lose weight or maintain the same body weight if her food intake (calories) and activity level remain the same?
3. What advice would you give Marie, taking into consideration her BMI and current energy balance status?



You can check your answers on  
Answer Work sheet **Calculating energy balance**