

### Program weight by Bengt-Olof Drugge

The program below calculates the weight you get if you eat a stabil energy every day. Mass is how much you are weighing and energy is how many calories you eat everyday. And k is a constant who I assume states kcal/kg. Day are how many days you are going to change your weight.

Mass := 110      Your weight in (kg)

Energy := 3000    How much you eat everyday (kcal)

k := 30            A constant, how much calories you burn/ kg boddy mass (kcal/kg)

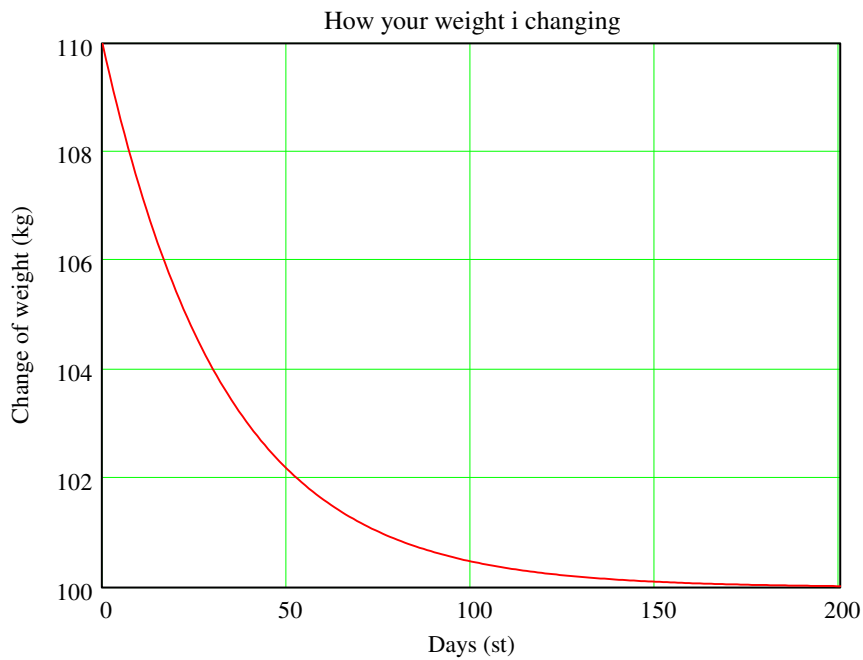
Day := 200        The number of days you are going to change your weight

$$\text{eat}(\text{Mass}, \text{Energy}, k, \text{Day}) := \left\{ \begin{array}{l} V_0 \leftarrow \text{Mass} \\ \text{for } i \in 0.. \text{Day} - 1 \\ \quad V_{i+1} \leftarrow V_i + \frac{\text{Energy} - V_i \cdot k}{1000} \\ V \end{array} \right.$$

i := 0..Day

V := eat(Mass, Energy, k, Day)

You can determine k if you measure your daily consumption of kilocalories and then divide with your mass in kg.



I have here written a sample program in Basic and Mathcad to show how you can do a computer program.

In the Basic program below you can determine the constant k (kcal/kg). If you are changing your weight about for example 10 days. You know your daily intake of calories, then you know your weight in the beginning at 0 day. And you know your weight at a couple of days later. Then you can calculate the constant k kilocalories/kg body mass.

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DEFDBL A-Z
CLS

m0 = 110
energy = 3000
deltaday = 10
mday = 107

v = m0
k = energy / m0
k1 = -20 * k
k2 = 20 * k

WHILE ABS(v - mday) > .000001
  v = m0
  FOR i = 0 TO deltagday - 1
    v = v + (energy - v * k) / 1000
  NEXT

  IF v > mday THEN
    k = (k1 + k2) / 2
    v = m0
    FOR i = 0 TO deltagday - 1
      v = v + (energy - v * k) / 1000
    NEXT
    IF v > mday THEN k1 = k
  END IF

  IF v < mday THEN
    k = (k1 + k2) / 2
    v = m0
    FOR i = 0 TO deltagday - 1
      v = v + (energy - v * k) / 1000
    NEXT
    IF v < mday THEN k2 = k
  END IF
WEND

PRINT "Constant (kcal/kg):"; k

```

On the left side a BASIC program to find the root of k. Here I have program a interval-half method to determine the root k.

m0=inital body mass (kg)  
 energy=how much kcalories you eat/day  
 deltagday= how many day you messure  
 mday= the body mass after deltagday

Defining the interval k1,k2 between the root k

The accuracy of the solution  
 err=1\*10<sup>-6</sup>

Determine the endweight of a sample days

Here I determine the leftinterval k1 of the root k

Here I determine the rightinterval k2 of the root k

The same program to determine the k value, written in Mathcad, here using increasing steploop to find the root.

M0 := 110    Energy := 3000    Deltaday := 10    Mday := 107.374

```
koff(M0, Energy, Deltaday, Mday) :=
  V ← M0
  c ← 1
  c ← -1 if (M0 - Mday) < 0
  k ←  $\frac{\text{Energy}}{M0}$ 
  while |V - Mday| > 0.001
    V ← M0
    for i ∈ 0..Deltaday - 1
      V ← V +  $\frac{\text{Energy} - V \cdot k}{1000}$ 
      k ← k + 0.001 · c
  k
```

koff(M0, Energy, Deltaday, Mday) = 30.001    (kcal/kg)