

MA 150 Notes §8.1

1 Body Weight Models

Our goal is to develop models for projecting body weight over time. All of our models will be based on the _____. For our purposes this means that:

- If we consume more calories than we burn, then we will _____.
- If we burn more calories than we consume, then we will _____.

1.1 The Constant Calorie Expenditure Model

Simplifying assumptions:

- We assume that there are 3,500 calories in a pound of body weight.
- We consume the same number of calories each day.
- We burn the same number of calories each day.

Notation:

- $t =$ _____.
- $W(t) =$ _____.
- $W(0) =$ _____.

- $I_0 =$ _____.

- $E_0 =$ _____.

Flow Diagram:

DDS:

Equilibrium Value:

Example 1: John weighs 215 pounds, and he eats 2000 calories per day. If he burns 2200 calories per day, project his weight over the next 2 weeks.

Example 2: Reveal a shortcoming of the constant calorie expenditure model by projecting John's long-term weight.

Note: As our weight changes, so do our calorie needs. In other words, as our weight changes so does our *calorie expenditure*. We need a model that reflects this – next time!