ENERGY BALANCE BASICS: A MATTER OF PHYSICS

What are your odds of winning a challenging game that you don't know the rules to? Not so great. Likewise, if you're trying to lose weight—but don't understand how your body works—your odds of success aren't good.

You need accurate information about how your body works:

- **How many calories do I need to eat?** (See Predicable Weekly Weight Losses, page 26 of your workbook.)
- **How many calories should I burn in activity each week?** (See Physical Activity, page 32.)
- **What changes can I expect during weight loss (in my calorie needs)?** (See How Does Energy Restriction Affect RMR in your workbook, page 27.)
- **How do I stabilize at my goal weight?** (Keep reading!)

Energy Balance Basics

Gaining weight: You gain weight when the amount of energy (calories) you consume as food and drink exceeds the energy your body uses (energy expenditure) in the following four ways:

1. **Basic metabolic processes**—the energy your organs and various body tissues use, generally referred to as "resting metabolic rate" or RMR.
2. **Energy** used in **activities of daily living**—taking the stairs, housework, parking further out in the lot, etc.
3. **TEF** (Thermic Effect of Food)—the energy costs associated with digesting and assimilated what we eat and drink.
4. **Voluntary exercise**—walks, what you do at the gym, gardening, exercise tapes, sports, etc.

Eating more than your energy expenditure means that at the end of the day, you are in **positive energy balance.** The excess energy is stored principally (but not entirely) as fat. Each pound of excess body weight represents approximately 3,500 calories.

Losing weight: You lose weight in the opposite scenario, when the total energy you expend (in items 1 through 4 above) *exceeds* what you consume in food and drink. In this case, at the end of the day you are in **negative energy balance**, which causes the body to draw upon its energy stores (use up body fat to compensate for the deficit).

What we are talking about is actually a *law of physics—The 1st Law of Thermodynamics: Energy cannot be created or destroyed, it only changes form.* You hear a lot of theories out there; this isn't a theory. Like gravity, this *law of physics* applies to every BODY.

Net-Maintenance-Calorie Multipliers*

Calories burned per pound of body weight

	BMI Range	Women	Men
Normal	(18.5-24.9	12	13
Overweight	(25-29.9)	11	12
Class I Obesity	(30-34.9)	10	11
Class II Obesity	(35-39.9)	9	10
Class III Obesity	(≥40)	8-9	9-10

The calories your body burns during a sedentary day are related to both your BMI, gender, and age. BMI (body mass index) approximates your body composition, or relative level of lean mass and fat mass. Higher levels of fat mass are associated with lower multipliers because fat mass is the least metabolically active tissue in the body.

The ideal situation is always to have your RMR measured, rather than estimated with any equation. Since that's not always feasible these multipliers provide a reasonable approximation for you. See the workbook page 13 for a more exact multiplier for your BMI.

*The Net-Maintenance-Calorie multipliers represent RMR calculated with the Mifflin-St Jeor equation and adjusted with a 1.25 multiplier for the minimal PAL (physical activity level) associated with sedentary daily living. The multipliers are also based on an age 30 to 50, 5'11" reference male, and 5'4" reference female. These multipliers apply only to adults.

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Know Your Goal Weight Net-Maintenance-Calorie TARGET

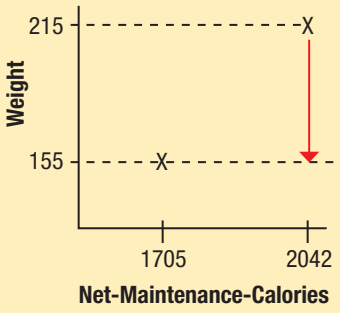
Part of the reason so many fail at *weight loss maintenance* is that they don't understand the difference between their *current-weight-energy-balance* and their *goal-weight-energy-balance.*

In this case "energy balance" means the **net calorie level that maintains a given body weight.** In other words the energy balance where your weight is stable and unchanging (other than water fluctuations) because your net energy intake matches the energy requirements necessary to support maintenance of your body mass.

Here's an example with numbers. A woman currently weighs 215-pounds, and her goal weight is 155-pounds. At 215-pounds her *net-maintenance-calories* are 2,042-calories per day. At her goal weight her *net-maintenance-calories* will be 1,705-calories per day; 337-calories lower than for her current weight.

How to Stabilize at Your Goal Weight

Know Your Net-Maintenance-Calorie Target!



Example based on 5'4" 40 year old female.

When starting at 215-lbs. a permanent reduction in NET Energy Balance of 337-calories is required to maintain at the goal weight of 155-lbs.

This can be done with any combination of diet and physical activity (PA):

The 337-calories per day difference is basically a quantification of the permanent lifestyle changes required for her to stay at her goal weight once she's there. In other words to maintain her goal weight she will have to *permanently* maintain a *net-maintenance-calorie balance* at 1,705-calories per day.

What Are Her Options to Do That? The two variables that she has control over: 1) what she eats and drinks, and 2) how much she chooses to move. Most successful maintainers achieve their success with a combination of these two variables: *reduced calories-in and increased calories-out.*

This illustration should make it very clear why *weight loss maintenance requires permanent lifestyle changes.* Also, the more weight you choose to lose the bigger the permanent lifestyle changes required to maintain that loss! Here's the recap:

- To lose weight you have to create an ongoing negative energy balance (through a lower energy intake and/or higher level of energy expenditure).
- To maintain weight loss, a permanently lower level of net-energy-balance must be maintained. This lower energy balance simply represents the energy balance appropriate to your new smaller body.

Putting it all Together

Understanding ENERGY BALANCE* is a necessary foundation for success with weight loss, but it is only the beginning. In the section "Three Approaches to Losing Weight" (page 46), we cover three options for losing weight. Each involves modifying both your eating and physical activity to hit your *net-maintenance-calorie* target. To be successful it's important that you review each topic in this weight management section before you start your weight loss—so that you are totally prepared and set up for success!

*For a detailed overview of RMR and energy balance see *Metabolism: Facts & Fiction* workbook page 27-29.