

# The Precision Nutrition Lean Eating Program Measurement Guide

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## Introduction

At Precision Nutrition, we know through experience that you need to measure things to see if your exercise, nutrition and supplement plan is working for you. Without measurement, we can't see improvement. And what's the point of all this effort if not to improve something?

Thus regular assessment is important. We record a number of our clients' measurements every week and others every few months.

For example, we make sure that clients report body weight and girth measures weekly. Every month, clients take progress photographs. And every three months, Lean Eaters report on their skinfold bodyfat measurements.

In this guide you'll learn about what measures we use and how often we use them. In the beginning, you may have to take more time and make more measurements. You'll eventually determine which tests are best for your goals (these will change over time and perhaps so will the tests). Like anything else in life, you'll become very efficient at doing them.

If you consistently follow the nutrition and training advice in the Lean Eating program, you should see and feel real results. You can expect to make a few tweaks to perfect and individualize your plan. Yet the only way to know when and what tweaks are necessary is to take regular measurements and let the results guide your program decisions.

## Part 1: Body weight measurement

Measuring body weight is the most common way people assess changes in their body, especially when they're hoping to see changes resulting from proper eating and exercise. Unfortunately, however, body weight measurements can be misleading.

Compare two people:

One person loses 20 lbs of fat and gains 20 lbs of lean mass from a new training and nutrition program. Their body weight doesn't change, but their body composition shifts dramatically, and they look significantly different (in other words, better).

A second person loses 20 lbs, but all of that weight loss is lean mass. They lost weight, but they probably look worse.

As you can see, "scale weight" doesn't tell you much about your body composition. Don't use body weight alone to help you with decisions about exercise and nutrition.

But scale weight isn't useless. You simply have to interpret it correctly, in combination with body composition. So let's start with body weight; we'll discuss body composition later.

Follow these steps to measure your body weight accurately and reliably:

### Step 1: Find a scale.

Start with a good scale, preferably a pre-calibrated digital scale or a beam scale (like the kind you find in doctor's offices).

### Step 2: Test & calibrate.

Once you have a good scale, determine its accuracy and reliability. To do so, select an object of known weight (in the lab we use a pre-calibrated reference weight) and weigh it 5 times successively. If these 5 readings are within one pound or so of both the known weight of the object and the other readings, your scale is as good as you're going to find. If the variation is greater than 2 lbs, you'll need to re-set your scale (if it's digital). If it still doesn't produce reliable or accurate readings, you need a better scale.

### Step 3: Test again.

Each time you weigh yourself, make sure to test your known object a few times (3 times or so) beforehand to see if the scale is accurate and reliable on that day. The same rules above apply.

### Step 4: Weigh yourself.

Next, step on the scale yourself. Record your first reading. Weigh yourself 2 additional times and record these readings. If your measurements are within 1 lb of each other, take the average of the three. If not, weigh a fourth time and average the closest three measurements.

**Step 5: Record.**

Record the mean (average) body weight measurement in the online Weekly Progress Update form. If you would like to keep a written record (not a bad idea!) then you can use the Results Tracker worksheet in the Appendix.

**Step 6: Repeat measurement under similar conditions.**

Weigh yourself at the same time of day (i.e. morning, afternoon, or evening) and at the same time relative to your meals. After all, your weight could fluctuate by 5 lbs or more after a particularly large meal. If you regularly weigh yourself in the morning before eating, continue to do so. Or if you regularly weigh yourself after breakfast, continue to do so.

**Note:** The process above is a deliberate one and is designed for maximal accuracy and reliability. However, once you've determined the accuracy/reliability of your scale you may not need to go through all the repeated measures. After all, I know my personal scale is good. When I want to take a measurement I step right on it and take the measurement. That's it. So don't get intimidated by the process. Be deliberate in the beginning to ensure you're using the right measurement tool. Once you've done this, you can relax and make the process as simple as possible.

**Summary**

Doing the steps above ensures that your readings are as reliable and as accurate as possible. However, despite your best attempts at fixing the variables you can control, random errors can present themselves. Try not to put too much stock in a single measurement. Rather, notice trends over time. If the trends are moving in the direction you desire, keep doing what you're doing. If not, don't fret. The great news is that you're in control, and your coach is here to help.

## Part 2: Body fat measurement

Many different techniques can be used to measure body fat.

- ❑ **DEXA** is currently the gold standard, as it measures both whole body and regional fat using X-ray technologies to estimate 3 tissue types: fat mass, lean body mass, and bone mass.
- ❑ **Hydrostatic (underwater) weighing** is another reasonably accurate and reliable technique for estimating body fat. It assumes that the body can be divided into two compartments with constant (and different) densities: adipose (fat) tissue and lean body mass, and these can be distinguished by weighing the body under water.
- ❑ **Bioelectrical impedance** is based on the electrical conductivity of body tissues. BI devices send an imperceptible electrical current through the body to estimate the amount of lean body mass and fat mass (as well as total water mass).
- ❑ **Skinfold caliper** measurements use the thickness of the skin at various locations on the body to estimate body fat percentage. This estimate is based on equations derived from hydrostatic weighing studies.

Although the DEXA, hydrostatic, and bioelectric impedance methods are fairly accurate and reliable under laboratory conditions, none are suitable for home use. The equipment required for DEXA and hydrostatic weighing is very costly and takes up a lot of space, and the tests themselves are time consuming. Laboratory bioelectric impedance devices are also expensive. Commercial bioelectric impedance scales (such as the so-called “body fat scales”) are inferior to laboratory devices and can be greatly affected by hydration and a number of other factors.

Considering the limitations of the methods above and the fact that a decent pair of skinfold calipers costs only \$10-15 USD, our preferred method of testing is the skinfold method. In order to use the Weekly Progress update, you will have to use the seven-site method described below.

### Find a trained professional

Because taking skinfold measurements requires experience and expertise, and because we only ask you to take them every three months, we strongly recommend that you find a nutritionist, personal trainer or health professional to take them for you. The measurements we require are listed in Part 3 of this guide. If for whatever reason you don't have access to a professional, you can use these instructions (and a friend) to do them yourself.

### Measurement steps

The process of skinfold measurement is relatively simple. However, there are a few steps you'll have to take:

**Step 1: Buy calipers.**

Pick up a pair of inexpensive yet well-made skinfold calipers. Our clients use Accu-Measure calipers at home ([www.accumeasurefitness.com](http://www.accumeasurefitness.com)).

**Step 2: Find a buddy.**

For the most accurate and reliable skinfold measurements, we use an equation that uses the skinfolds at 7 sites on the body to estimate your body fat percentage. You won't be able to take all 7 sites yourself, so you'll need a body composition buddy. If possible, find a personal trainer or nutritionist who is experienced in taking skinfold measurements.

**Step 3: Practice.**

Once you find a body composition buddy, stick with him or her. The largest margin of error with skinfold testing is operator error. Make sure that you and your buddy both read this guide and get enough practice to develop a consistent technique that will produce good readings.

**Step 4: Measure three times and average the values.**

Just as you did with body weight, you're going to measure each site 3 times. Record the results of these three readings in the online Weekly Progress Update form, and if you want to keep a written record then you can use the Skinfold Measurement Worksheet in the Appendix. If any measurement is not within 10% of the others, discard it and take another until all three measurements vary by no more than 10%. Average the closest three measurements.

**Step 5: Record your results.**

Record your skinfold measurements regularly and observe trends.

**Step 6: Standardize your measurements.**

Measure your skinfolds at a similar time of day (i.e. morning, afternoon, or evening) and at the same time relative to your meals. This isn't as important as it is with measuring body weight but it's something you want to consider and control, if possible.

**Note:** This is a deliberate process designed for maximal accuracy and reliability. Don't get intimidated. Be deliberate in the beginning to ensure you're using the right measurement technique. Once you've done this, you can relax and make the process as simple as possible.

**Summary**

Following the steps above will ensure that your readings are as reliable and accurate as possible. However, despite your best attempts to be consistent and careful, random errors can occur. Try not to put too much stock in a single measurement. Instead, look for trends over time. If the trends are moving in the direction you want, keep doing what you're doing. The great news is that you're in control, and your coach is here to help.

## **Part 3: The skinfold sites**

### **Measurement technique**

When measuring body fat using the skinfold method, repeatability is key. To reduce measurement error, you need to perform the measurements the same way every time. Here are a few tips for improving your measurement technique:

- 1) Take all measurements on the same side of the body.
- 2) Place the calipers 1/2 inch below where you pinch with the thumb and finger. Measure perpendicular to the skinfold. You don't have to pinch hard – pull the full skinfold away from the body, but don't squeeze the skin as hard as you can.
- 3) Maintain the pinch while reading the caliper.
- 4) Wait 1-2 seconds after the pinch to take and read the measurement.
- 5) Measure each of the 7 sites once before returning for the second measurement. The same goes for the third measurement. The skin needs a chance to return to normal before it's pinched again.
- 6) Take a minimum of 3 measurements at each site. Record the measurements in the online Weekly Progress Update form, and use the Skinfold Measurement Worksheet in the Appendix.

Let's look at the 7 sites in more detail.

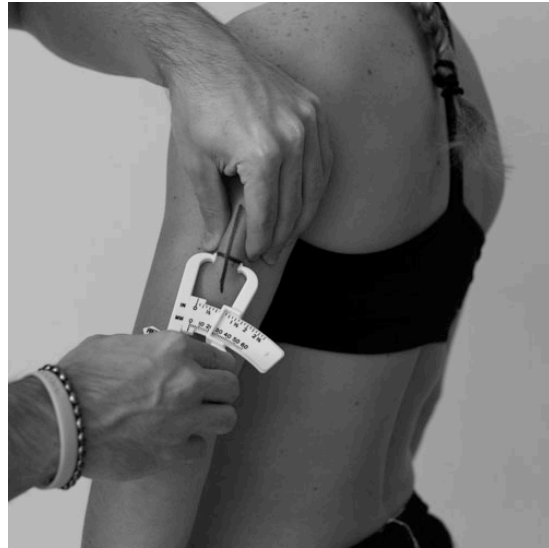
**Site 1: The abdominal site**

This site is located 1 inch directly to the left of, and in line with, the umbilicus (belly button). Pinch and measure a vertical fold of skin, as shown in the photographs below.



**Site 2: The triceps site**

This site is located at the back midline of the upper arm, halfway between the elbow and the bony point on the top of your shoulder. Measure this distance and mark the halfway point. Next, pinch a vertical fold of skin as shown in the photographs below.



If you have a hard time with this particular site, flex your triceps by extending your arm. This separates the muscle from the fat. It's easier to grab the skinfold and take the measurement as the arm relaxes.

**Site 3: The chest site**

In men, this site is located on the diagonal line between the armpit and the nipple. Find the halfway point between the armpit and the nipple, and measure a diagonal fold there.



In women, this site is located on the diagonal line between the armpit and the nipple, just as with men. However, women should measure 1/3 of the way between the two locations, closer to the armpit.

**Site 4: The midaxillary site**

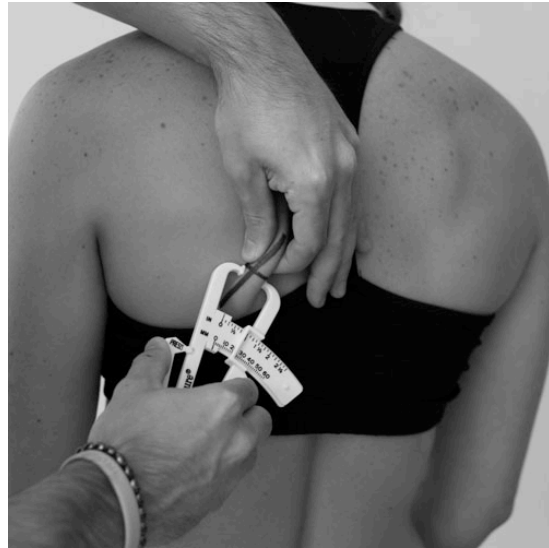
The midaxillary line is a vertical line between the armpit and the hip. Find this line and then find your skinfold site, which is on the same horizontal plane as your xyphoid process (the bony spot where your ribs meet at the center of your chest, also marked on the photos below). Select a vertical skinfold at this site.



It helps to place your arm on top of your head while taking this measurement.

**Site 5: The subscapular site**

This site is just below your scapula (shoulder blade). To find the skinfold, trace a line parallel to and an inch below the lower angle of your shoulder blade. Take a skinfold measurement perpendicular to this line, as shown in the photos below.



**Site 6: The suprailiac site**

The suprailiac region is the area just above the natural frontal angle of the iliac crest (hip). To measure this spot, trace the front angle of the hip and select a diagonal fold of skin 0.5 to 1 inch above the hip bone.



Be consistent here from week to week; small deviations can produce fairly large changes in the readings.

**Site 7: The thigh site**

To select the thigh site, select a vertical fold on the front midline of the thigh, halfway between the kneecap and inguinal crease (the line where leg inserts into trunk). Measure this distance and mark the mid-point.



If you're having a hard time with this one, it often helps to rest the foot of your measured leg on a box, chair, etc.

Now that you know the sites, where they're located, and how to measure them, record your measurements in the online Weekly Progress Update form.

## Part 4: The skinfold equations

The following equations are what we use to determine your body fat percentage based on your measured skinfolds.

### Female 7-site equation

Use the following equation to determine your body density. SUM 7 = the sum of all 7 skinfold readings above. AGE = your age in years.

$$\text{Body Density} = 1.097 - (0.00046971 * \text{SUM7}) + (0.00000056 * \text{SUM7}^2) - (0.00012828 * \text{AGE})$$

Once you've calculated body density ( $D_b$ ), plug this into the equation to determine your body fat percentage (%BF):

$$\%BF = [(4.57 / D_b) - 4.142] * 100$$

Once you have your body fat percentage, calculate your lean mass as follows:

$$\text{Fat mass (lbs or kg)} = [\text{Total body weight (lbs or kg)} * \text{body fat \%}] / 100$$

And once you have your fat mass, you can calculate your lean mass as follows:

$$\text{Lean mass (lbs or kg)} = \text{Total body weight (lbs or kg)} - \text{fat mass (lbs or kg)}$$

## Part 5: Girth measurements

Girth measurements show changes in the size of specific body parts. As with body weight measurement, girth testing tells us little about the composition of the measured changes. In other words, if a girth measure increases or decreases, we don't know which tissue is responsible for the gain or loss. But since some people want to do things like make their arms bigger or their waist smaller, girth measurements give us another way to measure progress.

Here's a step-by-step guide to accurate and reliable girth measurements.

### Step 1: Pick up a good measuring tape.

A simple cloth measuring tape will work, but we prefer to use the MyoTape device ([www.accumeasurefitness.com](http://www.accumeasurefitness.com)). It's inexpensive, it's handy, and since the tape encircles the body part with a consistent tightness, it allows for more accurate and consistent readings.



The MyoTape (left) and the Accu-Measure Skinfold calipers (right).

**Step 2: Choose the body parts to record.**

We recommend the following:

**Neck girth:** Measure just below the Adam's apple and at the level of the 7th cervical vertebra.



**Shoulder girth:** Measure at the widest point of the shoulders, around the entire shoulder area. Make sure you're standing upright and breathing normally. Record the measure after a normal (not a forced) exhalation.



**Chest girth:** The maximal horizontal girth of the chest at the nipple line. Stand upright and pass the tape measure over the shoulder blades and under the armpits. Record the measure after a normal (not a forced) exhalation.



**Upper arm girth:** Measure halfway between the elbow and the bony point on the top of your shoulder. Measure this distance if you have to and take the mid-point.



**Waist girth:** Measure at the navel. Stand upright and breathe normally with the abdomen relaxed. Record the measure after a normal (not a forced) exhalation.



**Hip girth:** Measure around the glutes at the level of maximal circumference (aka the widest point).



**Thigh girth:** Measure at the halfway point between the center of the kneecap and inguinal crease (the line where leg inserts into trunk). Measure the distance if you have to and take the mid-point.



**Calf girth:** Measure at the widest point of your calf muscle.



**Step 3: Wrap tape around body part.**

If you're using the MyoTape device (which we recommend), pull the end of the tape around the body part that you want to measure (pressing the button in the center will make it easier to pull) and place the rod at the end of the tape into the circular slot.

**Step 4: Tighten tape to a snug fit.**

Press the button in the center and let the tape retract to a snug fit. Make sure the tape is perpendicular to the body part and parallel with the ground. If you're using a regular cloth tape, try to achieve a consistent tightness with each measurement.

**Step 5: Read measurement.**

Read your measurement on the outer edge of the tape measure (the end opposite the locked in rod).

**Step 6: Record.**

Record your measurement in the online Weekly Progress Update form, and if you want to keep a written record then you can use the Girth Measurement Worksheet in the Appendix.

As with skinfold measurements, do all 8 sites and then go back and repeat them each two more times for a total of 3 measurements for each site. You'll use these to get the average girth measurement for each site/body part.

## Part 6: Photographs

There are several ways you can measure and monitor progress towards your health, body composition, and performance goals. And all of these markers have a place, depending on your current goals, priorities, level of commitment, etc. In this guide, we've discussed body composition markers (weight, skin fold measures, and girths), and we saved one of the most important ones for last – visual inspection.

When you begin the Lean Eating program, you will snap some “before” photographs. Then, every 4 weeks, we will repeat the same process. Save them on your hard drive, and post them in the online Weekly Progress Update form. By doing this, we can help by lending an objective eye. For now, here's what to do:

First, take photos of yourself from the front, from the side, and from the rear. We've provided instructions below for how to take progress photos. We won't be asking you to do this every week, but it will be often enough that you're going to want to have easy access to a digital camera.

We recommend that you purchase or borrow an inexpensive digital camera. There are plenty of affordable versions available that are not only easy to use but a great little investment.

Or, you can use the camera on your mobile phone or tablet. Your laptop or desktop may even have a camera built right in to the computer.

We'll talk you through the process for getting photos off your phone or camera, and onto your computer.

### How to take photos

We've gotten a lot of questions about how to take before and after pictures both for the Lean Eating Coaching Program as well as in general, to measure progress.

Here's what to do:

- 1. Clothing and location.** Dressed in a swimsuit, or small pair of shorts and fitted/revealing top like a sports bra, stand against a bare wall.
- 2. Camera setup.** Set up your camera about 5-7 feet away from you so that it can capture your whole body from head to toe. You can use a tripod or have a friend snap the photo.
- 3. Lighting.** Make sure the room is well-lit and that you use the flash when taking your photo. However, make sure there isn't a ton of overhead light; you don't want to cast shadows.

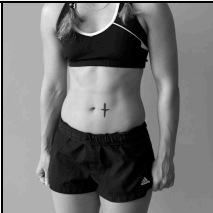


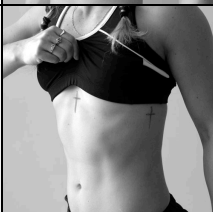
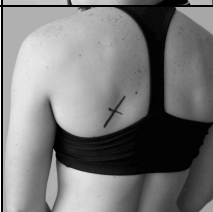
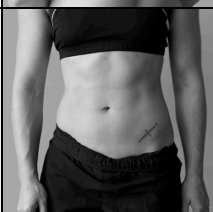

4. **Write it down.** Write down exactly how you took the before pictures (camera settings, lighting conditions, how far away the camera was, etc.). This will help you duplicate the same conditions in the future.
5. **Three photos.** Take 3 total photographs: one of your front side, one of your left side and one of your back side.
6. **Copy photos to your hard drive.** Connect your camera to your computer, typically with the USB cable that comes with the camera. You should be able to copy the photos to a folder on your computer.
7. **Upload the photos using the Weekly Progress Update form.** Using the photo upload form on the Weekly Progress Update page, browse to the photos you copied. Select each one in the appropriate box (the front photo for the "Front View" box, the side photo for the "Side View" box, etc) and upload them, one at a time.

Here is an example of what your progress photos should look like:


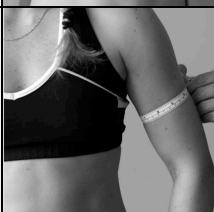




We know that the photographic process can be an intimidating one. After all, the lens sees all and the flash is bright. However, you're not here to hide anything! The Lean Eating process is all about honestly assessing where you are today and making the necessary changes to improve your outcome tomorrow.

## Appendix A: Skinfold Measurement Worksheet

Site		Measurement #1	Measurement #2	Measurement #3	Mean of 3 measurements
Abdominal skinfold (mm)					
Triceps skinfold (mm)					
Chest skinfold (mm)					
Midaxillary skinfold (mm)					
Subscapular skinfold (mm)					
Suprailiac skinfold (mm)					
Thigh skinfold (mm)					
Sum of mean skinfolds (mm) =					

## Appendix B: Girth Measurement Worksheet

Site		1	2	3	Mean of 3
Neck girth (cm)					
Shoulder girth (cm)					
Chest girth (cm)					
Upper Arm girth (cm)					
Waist girth (cm)					
Hip girth (cm)					
Thigh girth (cm)					
Calf girth (cm)					

## Appendix C: Results Tracker Worksheet

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