

Check Under the Hood

Optimize Performance with this Maintenance Check List

Lesson Overview

Weight management is one of the top concerns of adolescents. This lesson helps teens understand what it means to achieve and maintain a healthy weight. This lesson helps students focus less on the number on the scale and more on optimizing their personal health, allowing their body to achieve a healthy weight as a result. Students learn how energy balance is measured, how to determine a healthy weight, what affects body composition and energy balance (genetics, gender, age, activity, diet, etc.) and how they can make informed decisions about what eating and activity behaviors will help them achieve optimum health and a healthy weight.



Destination: Respecting Your Body

- Students will understand the concept of energy balance in order to determine those factors that contribute to positive and negative changes in energy balance they themselves experience.
- Students will be able to describe what constitutes a “healthy weight” and will be able to state what is a sensible, healthy weight for them.
- Students will be able to list common environmental and behavioral factors that contribute to excess weight gain, and will understand the impact they have over time.



Itinerary

To take the “Shortcut” in 30 minutes, follow this route in class:

- Ignition (5 minutes)
- Driver’s Ed (10 minutes, only cover highlights)
- Test Drive (only do 10 minute version of “What difference?” activity)
- Take the Keys (5 minutes)

To take the “Standard Trip” in 40-50 minutes, follow this route:

- Ignition (5 minutes)
- Driver’s Ed (15-20 minutes)
- Test Drive (15 minutes, explain BMI briefly, then do activity)
- Take the Keys (5 minutes)

To take the “Extended Trip” in 90 minutes or two class periods, follow this route:

- Learner’s Permit (allow up to 10 minutes)
- Ignition (5 minutes)
- Driver’s Ed (20 - 30 minutes)
- Test Drive (30 minutes)
- Alternate Route (if used, substitute for part of time above)
- Take the Keys (5 minutes)
- Take the Wheel (10 or more minutes, just begin assignment)



Packing for the Journey:

- Explain pre-class assignment and assign in advance of class.
- Select “route” to take and activities and examples to use. The lesson includes a great deal of information. Key points are bolded with detailed information in regular print. Based on your time available and student interest, decide how much to cover.
- Create overhead transparencies.
- Obtain visual aids, if desired. Ideas include a basket of fruits and vegetables and a clear container with water and 2-3 ounce pieces of lean meat and meat fat.
- Obtain video(s) to view as alternate/additional activity.
- Copy student handouts to match your selected activities.
- Student Assessment
- Select follow-up activit(ies) for students to complete.



Your Teaching Road Map . . .

Give Students a Learner’s Permit

Provide students with the pre-class handout “Check Under the Hood” (pages 93-94). The purpose of this assignment is to assess a variety of health parameters/behaviors that impact weight as well as overall health. Read over the instructions together. Make sure they know they are to read the entire description before they determine how well they are doing in that area. In class you will discuss these factors in order for students to identify areas in which they can improve their health and better achieve or maintain a healthy body weight. Even if you don’t cover all of these areas in class, the descriptions of “optimal performance” are instructive on their own. These concepts will be repeated in lessons 7 and 8 when students design personal nutrition and physical activity plans. Make sure students keep their check list to use later in these lessons.

Put the Key in the Ignition: What am I made of?



Have you heard the expression, “You are what you eat”?

Well, that’s not *literally* true, you aren’t a cheeseburger or an apple . . . but, what your body uses to build your tissues and cells *does* come from the foods and beverages you eat and drink. And, what you eat and drink is what your body uses to do *everything* – to simply stay alive, to think, move, etc.

What are we?

The human body is made up of **water, protein, fat, minerals,** and **glycogen** (how we store carbohydrates).

Which one do you think we have the *most* of?

Water – the human body is 50-75% water.

(The reason for this variability is that lean tissue is 75% water and fat tissue is only 10% water.)

Water, protein, fat, minerals and glycogen are the building blocks for our bodies. We tend to think of body composition in terms of our proportion of fat tissue to fat-free (or lean) tissue.

(Invite students to guess the body compositions of the “reference man” and the “reference female.” Record answers on overhead or chalkboard. Compare to correct answers: Reference male is 15% fat, 45% muscle, 15% bone, and 25% other. Reference female is 27% fat, 36% muscle, 12% bone, and 25% other. From the research of Dr. Albert Behnke as referenced in McArdle and Katch, see resources.)

A healthy percentage of body fat in young adult males is 15% and a healthy body fat percentage in young adult females is about 25%. Why should women have more fat? Women need more body fat to support reproduction, pregnancy and lactation. Almost half of a woman’s fat is considered “essential” fat, whereas only 20% of a man’s fat is “essential” fat.

Today in class we’re going to learn about our weight and how to achieve a healthy weight.

Is body weight a big concern in our society?

Yes. Why do you suppose it is such a big concern? In our last lesson we talked about our obsession with body weight due to our concern with appearance.

Put the Key in the Ignition



Are there other, more important reasons for concern?

Two main reasons - **more people are overweight than ever before, including children and teens. That increase is a concern because there are health risks associated with excess weight.** (Optional: Discuss overhead of health risks.)

So, **what is a healthy weight?** Is there one perfect weight for each height? How can you know if you're at a healthy weight? Can you just refer to a height/weight chart for the answer?

No. **Your body weight can be a pretty meaningless number if you don't take into consideration what your weight is made up of (lean versus fat), where your fat is located on your body, and, how fit and healthy you are as measured in other ways.**

In a few minutes we'll take out your homework assignment "Check Under the Hood." This is a 15 point maintenance check list for the vehicle you live in - your body. Your answers to this assessment will give you a good idea of how healthy you are and whether your lifestyle behaviors make it easy or hard for you to achieve and maintain a healthy weight for you. You might be surprised how each of these factors relates to your weight and overall health.

In the lesson, "What's Your Make and Model" we learned that **our basic body shape and size is genetically determined.** You will naturally be tall, short, or somewhere in between. Your genetic blueprint determines your height, your shoe size, and the length of your fingers. Can you change these numbers? No.

Your genetic blueprint also determines your natural body shape. You will have a tendency to be one of three basic body shapes: ectomorph (slim), endomorph (round), or mesomorph (muscular). How easily you gain or lose fat and muscle, and where it goes on your body, is determined largely by your genes. **Your job is to respect the body you were born with by accepting your genetic blueprint and adopting healthy behaviors that take the best care of it.**



To really understand how our bodies gain and lose weight, we need to understand the concept of energy balance. (Use overheads. Fill in the blanks with underlined words.)

When the amount of energy we take in is equal to the energy we put out, our weight is stable.

When the amount of energy we take in is greater than the energy we put out, we gain weight. We store the excess energy as fat.

When the amount of energy we take in is less than the energy we put out, we lose weight because we use our stored energy, we burn body fat.

Let's see if we can list the basic things that *provide* energy and *use* energy.
(Question students to see if they know the answers.)

What provides energy??
Food.

What in food provides energy?
(If students answer "calories," ask: what in foods give us calories?)
Carbohydrates, fat, and protein (and alcohol)

Food provides chemical energy when the bonds in carbohydrate, fat and protein molecules are broken down by the body.

How do we measure the amount of energy in food?
We measure the amount of energy as calories.

How many calories does each provide?
Carbohydrates provide 4 calories per gram, fat provides 9 calories per gram, and protein provides 4 calories per gram, (alcohol provides 7 calories per gram).

How does our body use energy?
(Energy OUT = basal metabolism, physical activity, and the thermic effect of food)

First, we use energy to stay alive. This is called basal metabolism. This is the energy we need just to stay alive and keep all of our involuntary body processes going. It is about 60% of our total energy needs.



Many things affect our basal metabolism. How do you think each of these things affect how much energy we burn? (*overhead - fill in the blanks with up or down arrows*)

Growth?	Higher basal metabolism
Higher body weight?	Higher basal metabolism
Larger surface area?	Higher basal metabolism
Male gender?	Higher basal metabolism
Female gender?	Lower basal metabolism
More lean body mass?	Higher basal metabolism
Older age?	Lower basal metabolism
Pregnancy?	Higher basal metabolism
Fever?	Higher basal metabolism
Dieting (limiting intake)?	Lower basal metabolism
Hot or cold outside temp?	Higher basal metabolism
Caffeine?	Higher basal metabolism
Smoking?	Higher basal metabolism

The next largest energy user is for physical activity. A very active person might use up to 40% of their energy needs in this way, but for most people it is around 30%. This is the part of the energy balance equation that you have the most control over.

You might be surprised to learn that about 10% of your energy output is used in processing the foods you eat. This is called the thermic effect of food. That's why people say that you burn more calories eating a piece of celery than the celery gives you.

You will get the opportunity to estimate *your* energy needs later.



Let's look "Under the Hood" with our 15 point maintenance check list:

(The objective of this portion of the lesson is for students to realize how many different things impact their weight and body composition. However, to go through all 15 points in detail is too time consuming. Unless you have an extended time for class, pick only a select number of points to discuss in more depth and cover the remainder briefly (only covering what is in bold print. For example, cover only points 2, 3, 5, 9, and 13, with other points discussed briefly. Options: **You** could make the selections, allow **students** to "vote" on which items to discuss, or, draw numbers at random. If you want to cover all 15 in a short 10 minute session, only cover the information in bold print for all points. Another option is to photocopy the information about each factor, and mount individually to heavy-weight paper or poster board and have students select or draw a factor to present to the rest of the class. These mini handouts could also be made available to students later for more in-depth study as part of their "Take the Wheel" assignment.)

#1 is sleep.

Are you getting enough sleep? Many teens do not.

How do you think the amount of sleep you get affects your body weight?

You might think that if you get less sleep you would weigh less because your body would be active more hours of the day, wouldn't you? That seems like a logical conclusion. However, research indicates otherwise.

Sleep is critical for our overall health in so many ways. For our bodies to function optimally, we need *enough* sleep and good *quality* sleep.

One negative consequence of not getting enough sleep is a decrease in a hormone your body makes called leptin. Leptin tells your body when it's full and when you have lower leptin levels you will crave more food to fill up.

Optimum performance is getting plenty of good rest.

#2 is energy level.

Raise your hand if you regularly skip meals. Skipping meals is very common, especially breakfast and lunch.

How do you think skipping meals affects how easily you maintain your weight? You would think that skipping meals would help you lose weight, you'd be eating less calories, right? Wrong.

Studies show that people who skip meals have a harder time achieving and maintaining a healthy body weight than people who eat regularly throughout the day.

This is the result of two things: First, our bodies store more calories as fat when we eat less often. Second, when we skip meals early in the day we usually compensate for those missed calories by eating much more later in the day.

Look at the two statements about eating when you are hungry and stopping eating when you are full. **Your body is designed to eat the amount of calories it needs and if you respond to your body's signals of hunger and satiety you will eat enough to meet your needs without eating too much.** However, when you wait until you are so hungry you are "starved," you will be more likely to eat more calories than you need. Or, if you generally stuff yourself, and tend to eat until all the food is gone, rather than stopping when you are comfortably satisfied, you will be taking in more calories than your body needs and will gain weight.



To satisfy our hunger and appetite at meals we need to eat foods that we find pleasurable to eat as well as “fill us up.” To be filling, foods with a high water content and/or fiber (soups, fruits, vegetables, etc.) provide short-term satiation and are relatively low in calories. Foods high in protein keep us from getting hungry and provide long-term satiety between meals. To maintain a high energy level throughout the day, eat combinations of foods that include protein, complex, high-fiber carbohydrates, and moderate amounts of healthy fats.

Optimum performance is eating regularly spaced meals and snacks, and eating to satisfy your hunger without overeating.

#3 is focused eating.

Think about where and when you eat throughout the day. What else do you do at the same time? Do you eat while you're driving or riding in a car? Do you eat while studying or watching TV? Do you eat while talking on the phone? Do you eat while cooking or cleaning up the kitchen? **Why do you think eating while engaged in other activities might lead to overeating?**

This is considered “disengaged” eating. When we eat while engaged in another activity we aren't thinking about the eating and it is very easy to ignore our body's signals of hunger and satiety.

On the other hand, when we focus on eating by doing it by itself, we are much more tuned in to eating the foods we need to satisfy our hunger and appetite. It is easy to eat an entire bag of potato chips while watching TV, you are less likely to do that as part of a meal.

Optimum performance is making eating an event where the focus is on eating and not another activity. Sitting at a table, where food and conversation with others can be enjoyed in a relaxed setting, is the ideal. Teens who eat regular meals with other family members have a more balanced diet, do better in school, and have better family relationships, than teens who rarely eat with their families.

#4 is variety.

Ever since you were in kindergarten you've been learning about the importance of eating a variety of foods. **Eating a variety of foods is important to meet your nutritional needs; do you think it makes a difference in how easily you can achieve and maintain a healthy weight?** How? Diets lacking in variety are usually high in fat, sugar and calories.

The two most neglected food groups by American teens are the fruit and vegetable groups. When teens eat vegetables they are most likely to consume them as french fries. **Eating a variety of fruits and vegetables, at least five servings a day, fills you up with foods that are relatively low in calories.** In addition to helping you maintain a healthy weight, fruits and vegetables provide a wealth of nutrients that keep you healthy and looking and feeling great.

Optimum performance is eating a variety of foods from all five food groups, especially getting five fruits and vegetables a day.

#5 is nutrient density.

To meet your body's needs, you need a certain amount of calories every day. Think of that as your calorie budget. You can spend those calories any way you want, but when you “spend” them you're investing in your health by “buying” foods and beverages with more or less nutritional value for the number of calories you're getting.



Foods that are “nutrient dense” give you a lot of nutrition for the calories. Foods that are “calorie dense” give you a lot of calories but not a lot of nutrients.

What kinds of foods are calorie dense?

Foods high in fat and sugar. Let's calculate the nutrient density of some foods.

(Use overheads and have students do the math. Multiply grams of carbohydrate by 4 calories per gram, grams of protein by 4 calories per gram, and grams of fat by 9 calories per gram.) Being high in fat, or high in sugar, or both, decreases a food's nutrient density.

Fruits and vegetables are very nutrient dense. To eat 1,000 calories from fruits and vegetables you would need to eat one apple, one pear, one banana, one orange, one bunch of grapes, plus half a head of cauliflower, a bunch of broccoli, 25 baby carrots, one large potato and 4 tomatoes - all in one sitting!!

(If possible, show real foods in a large basket.)

That doesn't mean we should *never* drink soft drinks or eat french fries, but instead of “super-sizing” consume them in moderation. How many calories are in a super-size 40 ounce Coke? (With ice about 400, without ice it would be 500 calories - because every 8 ounces of Coke has 100 calories) How many calories are in a super-size order of fries? (Over 600 calories, and about 29 grams of fat.) A good motto is: “Moderate, don't eliminate.”

Optimum performance is investing most of your calorie budget every day in nutrient dense foods and eating calorie dense foods in moderation.

#6 is fiber.

Nutrient dense foods from plants are usually high in fiber. **Fiber is great for helping you achieve and maintain a healthy weight, because it is so filling. Eating plenty of high fiber foods makes it easy to eat less of calorie dense foods.**

Foods high in fiber are fruits, vegetables and grains that have not been over-processed. For example, whole grain bread is high in fiber, white bread is not. Legumes, which are another name for dried beans, are also high in fiber.

For every 1,000 calories you eat, it is recommended that you get about 14 grams of fiber. Most Americans do not reach this goal. To give you an idea of how much fiber is in food, most servings of fruits and vegetables and whole grains have 2-4 grams of fiber. So, if you eat the recommended 5 servings of fruits and vegetables and 6 servings of whole grains, you'll probably meet the recommended amount.

Optimum performance is eating plenty of high fiber foods.

#7 is hydration.

Dehydration has many negative consequences. **Do you think not getting enough to drink can affect your weight?**

When you're thirsty (an indication that you are mildly dehydrated), **you can easily mistake that sensation for hunger. What your body needs is fluid, but what you do instead of drinking is eating.** So, if you maintain adequate hydration you will not be as likely to eat when you're not really hungry (as a result of responding to the symptoms of dehydration by eating instead of drinking).



To maintain weight, you are better off *eating* your calories rather than *drinking* them. Studies have shown that older children and adults do *not* fill up on fluid calories in the same way they fill up on solid calories. Therefore, high calorie beverages *add* to your total caloric intake because your body will not respond by eating less food. (For example, if you *eat* a 100 calorie food right before supper you will probably eat less at supper. If you *drink* a 100 calorie beverage right before supper the amount you eat will probably not change.)

The best fluids to hydrate with are either calorie free (such as water), or nutrient dense (such as low fat milk).

Optimum performance is getting plenty to drink throughout the day.

#8 is bone health.

It is absolutely essential during your teen years to get enough calcium to achieve maximum bone density. You need 1300 grams of calcium a day, from foods and/or supplements. The best sources of calcium in the diet are found in the dairy group. **Did you know that eating foods from the dairy group not only gives you strong bones but also helps you achieve and maintain a healthy weight? Studies show that a diet including the recommended number of servings of milk and milk products leads to an increase in the breakdown of body fat and a decrease in the storage of fat.**

Optimum performance is getting 3-4 servings of foods from the dairy group. Bone health is also improved by regular participation in weight-bearing exercise.

#9 is lean versus fat.

Being "overweight" isn't necessarily unhealthy. A high weight that is mostly lean body tissue, like in many athletes, is a healthy weight. **It is having a high percentage of body fat that is associated with the health risks of overweight.**

How do you know whether your body fat percentage is too high? Accurate measurement of body fat requires sophisticated equipment and skilled technique using methods such as underwater weighing, a BodPod that displaces air, a DEXA scan (dual energy x-ray absorptiometry), bioelectrical impedance analysis, or skinfold thickness measurements. One "test" you can use to judge for yourself is how easily you sink or float when you're in a swimming pool. Lean muscle sinks and fat floats. **The more easily you float, the higher your percentage of body fat.**

(A good visual aid to demonstrate this is to obtain an equal weight of lean meat and meat fat from a butcher. Drop each in a clear container filled with water and watch the meat sink and the fat float.)

Where your body fat is located on your body is also a risk factor for various health problems:

Body fat on the lower body, the hips and thighs, (the "pear" shape), which is more common in women, is harder to lose but **is associated with less health risk.**

Body fat on the upper body, around the abdomen, (the "apple" shape), which is more common in men, **is associated with greater health risk.**

For this reason, **waist circumference is used to assess body fat distribution.** A waist circumference greater than 40 inches in men and greater than 35 inches in women increases health risk.

Optimum performance is a healthy level of body fat, without an excess of abdominal fat.



#10 is aerobic fitness.

What does it mean to be aerobically fit? Aerobic fitness is another way to describe cardiovascular fitness, or having a healthy heart and lungs. It is the ability to engage in moderately vigorous activities, such as walking up and down stairs, without getting winded. **Someone who is aerobically fit, in spite of being overweight, has a lower health risk than a person who is at an acceptable weight but is out-of-shape.**

Aerobic activities, performed over an extended period of time, use mostly body fat for fuel. The more regularly you participate in aerobic activities the more fat you will burn when you exercise. Being aerobically fit is a great way to achieve and maintain a healthy weight.

Optimum performance is the ability to participate in moderately vigorous levels of aerobic activities such as brisk walking, jogging, biking, or swimming.

#11 is strength.

Strength has several benefits. The most obvious is making many everyday activities easier, such as carrying groceries or lifting heavy objects. **Strength is the result of having well-trained lean muscle tissue. Lean muscle tissue is the most metabolically active tissue in the body. Having a higher proportion of lean tissue increases your basal metabolism such that you burn more calories 24 hours a day, 7 days a week.** How do you know if you are strong? How easily can you do exercises requiring muscular strength, such as sit-ups, push-ups, or chin-ups? These all require you to lift your own weight.

Optimum performance is having sufficient strength to easily do everyday activities requiring the ability to lift and carry heavy objects such as groceries or small children.

#12 is flexibility.

How does flexibility make it easier to achieve and maintain a healthy weight? Flexibility is essential to all forms of movement. Being flexible makes other activities easier and reduces the risk for injury. **Being flexible increases your likelihood to engage in regular physical activity.** When movement is uncomfortable or causes pain, you are more likely to remain inactive.

Optimum performance is having a wide range of motion and being able to bend and stretch without pain.

#13 is an active lifestyle.

Newton's law of physics states that an object in motion tends to stay in motion and an object at rest tends to stay at rest. Are you a mover or a sitter? **Being active, even in small ways, adds up to a lot more activity over the course of a day. Even little movements like fidgeting, tapping your feet, and swaying to music, increase your caloric usage over simply sitting still.**

In the not too distant past, humans were active most of the day out of necessity. **In the past century we have created many time and movement-saving devices that result in a much more sedentary existence.** Cars, escalators and elevators, remote controls, computers, convenience foods, washing machines, drive-up windows, and many other modern conveniences have resulted in a huge decrease in our overall activity level.



The physical environment in our communities often discourages activity by encouraging driving rather than walking or biking, or the use of elevators rather than stairs.

Optimum performance is making it a point to be active more than sedentary. It means walking rather than driving and getting up and moving more as a part of everyday activities.

#14 is mental health.

What does mental health have to do with body weight? An overall positive attitude leads to taking better care of yourself, including eating well and being physically active. Poor mental health, including anxiety and depression, can result in overeating, binge eating and other disordered eating behaviors. Achieving and maintaining a healthy body weight is easier when surrounded by the loving support of friends and family.

Optimum performance is the ability to cope with the ups and downs of life without turning to food for comfort, or engaging in destructive behaviors such as using tobacco, alcohol, or drugs.

#15 is your medical history.

Weight alone is not as strong a predictor of health risk as are other factors such as your blood pressure, blood sugar levels, cholesterol levels, iron level, etc. **If your blood profile is healthy, you have normal blood pressure, and you don't smoke, your disease risk will be low even if your weight is in the overweight range.**

What is a "Healthy Weight"?

A healthy weight can be defined in several ways. The most realistic, but not the simplest definition, is the weight that your body maintains when you practice all of the healthy behaviors on your maintenance check list.

If you are eating healthfully, being active, getting adequate rest, and have good mental and physical health, your body most likely has a healthy proportion and distribution of body fat, meaning you are at a "healthy weight," regardless of the number on the scale.

A simpler definition, and the standard used today for defining healthy weight, is Body Mass Index, or BMI. It is used because it is easily assessed with large numbers of people. Alone, it is not a reliable assessment of healthy weight for an individual. Health professionals using BMI for assessment of weight are instructed to assess other factors in their determination of weight status. For adults, additional factors to consider are waist circumference, other medical risk factors and overall fitness. For children, pattern of growth over time, eating and activity behaviors, and medical risk factors all need to be included in a thorough assessment of healthy weight. BMI alone is an inadequate assessment of health.



What is My Healthy Weight?

Using the handout, "Optimize Performance and Achieve a Healthy Weight" (pages 95-96) let's determine whether you are at a healthy weight and what your energy needs are to maintain a healthy weight. (This could be assigned as homework if time is short. If so, simply explain the instructions.)

Body Mass Index can be computed with a mathematical formula, or determined using a BMI chart. All you need to know to compute your BMI is your height in meters or inches, and your weight in kilograms or pounds.

Calculate your BMI using the formula:

(Do an example with the class using overhead as they compute their own BMI's. A later activity will use as an example a height of 5'6" and weight of 130 pounds at age 15.)

Height in inches: _____ ÷ **39.3** = **height in meters:** _____

Weight in pounds: _____ ÷ **2.2** = **weight in kilograms:** _____

BMI = Weight (kg)/height (m)² = _____ ÷ (_____)² = _____
(weight in kg) (height in m)

When you are an adult the BMI ranges that are considered underweight, healthy weight, and overweight are:

Underweight	BMI < 19
Healthy weight	BMI 19 - 24.9
Overweight	BMI 25 - 29.9
Obese	BMI > 30

Let's compare these BMI's to some of the people we looked at in the last lesson:

- Twiggy was 5'7" and weighed only 98 pounds. That means her BMI was only 15.3, which is acceptable at age 10 but not as an adult.
- The "average model" is about 5'10" tall and weighs usually less than 120 pounds, which is a BMI of only 17.2, also underweight for an adult.
- The average adult woman is 5'4" tall and weighs 152 pounds, which is a BMI of 27 and considered overweight by current standards. However, this number does not directly measure proportion of lean and fat weight, nor does it give us information about how the average woman lives her life.
- Vin Diesel is 5'11" and weighs 230 pounds, which is a BMI of 32.1 and considered obese, but he is highly muscled so his weight is from lean body tissue and is a healthy weight.
- The average adult man is 5'10" and weighs 170 pounds, which is a BMI of 24.4 and considered in the healthy range. As stated above, this number does not directly measure proportion of lean and fat weight, nor does it give us information about how the average man lives his life.

Focusing on numbers only does not give a true picture of a person's health. Healthy people come in a variety of sizes, shapes and weights. A BMI in the "healthy" range does not prove a person is at their healthy weight, and a BMI above or below that range isn't proof that a person is NOT at their healthy weight. Always use more information than BMI alone to answer the question "What is my healthy weight?"

Test Drive



Calculate your BMI at a web site:

The National Institutes of Health has a BMI calculator for adults at: www.nhlbisupport.com/bmi/. This site also has a BMI table but it doesn't list BMI's below 19. At this web site you are instructed to assess whether you are at a healthy weight using not only your BMI but also your waist circumference and your medical risk. Adults who are "overweight" (BMI 25-29) but have an acceptable waist circumference and no medical risk, are encouraged to avoid gaining weight. If an "overweight" adult is eating well and physically active, maintaining health and fitness, they are considered to be at a healthy weight.

The Children's Nutrition Research Center has a children's BMI calculator at their web site:

<http://www.bcm.tmc.edu/cnrc>. This calculator calculates not only BMI, but your BMI percentile and plots it on a growth chart. When you are under 18 years of age, the BMI that is considered a "healthy weight" is age and gender specific. To compare your BMI with your age and gender you need to plot it on the appropriate growth chart. Growth charts can be found at the Centers for Disease Control and Prevention (CDC) web site: <http://www.cdc.gov/growthcharts>. The CNRC web site also has a children's energy calculator for computing energy needs based on age, gender, and activity level. This site also links to the CDC growth charts and many other useful resources about children and weight. *(Teacher – you might print off some samples of the BMI growth charts for boys and girls ages 2-20 to show in class. You could copy a sample onto a blank transparency and plot the BMI of the example you computed earlier.)*

These charts were designed for use by health professionals. They are used for studying population groups and health trends and must be used carefully for assessing an individual child's growth and weight. Inaccurate measurements and plotting errors are common. Several measurements are necessary for a thorough assessment of your weight status, allowing you to see how your BMI tracks on the chart over time. Healthy weight gains track in the same percentile rather than jump up or down percentile channels. Rapid changes either up or down across growth channels deserve professional attention.

"Healthy" weights can be at any point on the chart for a particular individual, but the definitions for groups of children and adolescents are:

BMI's between the 5th and 85th %tile are considered to be in the "healthy" weight range.

The goal is weight maintenance or weight gain appropriate for growth, continuing in the same growth channel.

BMI's <5%tile are considered underweight.

The goal is to gradually gain weight. However, if you are eating well and are active, you may simply be smaller than average. If your BMI is tracking along in the same growth channel without dropping, you may be at your healthy weight.

BMI's ≥95%tile are considered overweight.

The goal varies with the reason for the higher weight and whether you are growing. If your weight is due to athletic training and you are highly muscled, or if you are eating well and are active and fit, you may simply be larger than average, especially if your BMI is tracking in the same growth channel without accelerating. This may be your healthy weight and your goal is weight maintenance. If not, your goal is gradual weight loss if you are finished growing. If you are still growing taller, an appropriate goal might be a slower rate of gain or weight maintenance as you increase in height. Weight loss can be very detrimental to growth and should be monitored by a physician.

BMI's ≥85%tile and <95%tile are considered "at risk for overweight."

If you have no weight-related medical complications (high blood pressure, type 2 diabetes, high cholesterol, sleep apnea, or orthopedic problems), your goal is weight maintenance or gradual weight gain if growing taller. As above, if you are eating well and are active, you may simply be larger than average. If your BMI is tracking along in the same growth channel you may be at your healthy weight.



How much energy do I need?

You can also assign the students to use the CNRC web site for computing their daily energy needs as described on their handout. Use the children's energy calculator for computing energy needs found at the Children's Nutrition Research Center web site: <http://www.bcm.tmc.edu/cnrc> to calculate your energy needs. All you need is your age, gender, height, weight, and activity level, which is defined as couch potato, low active, active, or very active.

Let's look at an example of an average 15 year old boy and girl and see how various factors affect energy needs:

We will use for our example a height of 5'6" and a weight of 130 pounds. This is a BMI of 21, which is between the 50th and 75th percentile for both boys and girls at age 15.

	Female	Male
"Couch Potato"	1853 calories	2273 calories
Low Active	2198	2674
Active	2521	3076
Very Active	3060	3570

On average, a boy of the same height, weight, and age needs about 500 more calories than a girl. The differences between boys and girls in energy needs are primarily based on the difference in the average percentage of body fat between the genders. If a girl and boy have the same body fat percentage the difference in calorie needs would be still be about 50 calories greater in a male of the same age. The reason for this difference is unknown.

The following information is optional, for more in-depth study, and can be assigned as homework by photocopying on the reverse side of the handout "Optimize Performance and achieve a Healthy Weight."

The amount of energy needed for basal metabolism can be computed with the following formula:

Female:

$$\text{_____ kg weight (wt in pounds } \div 2.2) \times 0.9 \text{ kcal/kg/hr} \times 24 \text{ hours} = \text{_____ kcal}$$

Male:

$$\text{_____ kg weight (wt in pounds } \div 2.2) \times 1.0 \text{ kcal/kg/hr} \times 24 \text{ hours} = \text{_____ kcal}$$

Test Drive



The amount of energy needed for physical activity varies with the intensity of the activity.

The equation for calculating energy use of physical activity is:

time spent in minutes x **weight** in kg x the **energy use factor** on the list below, such as 0.01 kcal/min/kg for sedentary activities = **calories expended**.

Students who want to do a more accurate assessment of energy use for physical activity can keep a 24 hour activity log and use the equation above and the energy use factors below to calculate how many calories they burn in physical activity.

Sedentary: (0.01 kcal/min/kg) Sitting with little or no body movements (reading, writing, eating, watching TV, driving, sewing, etc.).

Light: (0.02 kcal/min/kg) Sitting or standing with some movement of arms and other parts of the body (preparing food, dishwashing, walking (2 mi/hr), bathing, etc.).

Moderate: (0.03 kcal/min/kg) Sitting with vigorous arm movements, or standing with considerable movement (making beds, mopping, walking (4 mi/hr), warm-up and cool-down exercises, bowling, golfing, etc.).

Vigorous: (0.06 kcal/min/kg) Moving body rapidly (tennis, jogging, weight-lifting, and team sports – basketball, baseball, football – but only while playing).

Strenuous: (0.10 kcal/min/kg) Moving body at maximum or near maximum capacity (swimming laps, running, rope jumping). This level is aerobic activity. Do not include warm-up and cool-down periods.

The amount of energy needed for processing food (the thermic effect of food) is 10% of total caloric intake.



What difference does it make?

Small changes in energy needs, energy intake, or energy output can make a big difference in weight over time. Refer to your handout titled "Optimize Performance by staying in Energy Balance" (pages 97-98). Let's learn how energy balance works with some real examples.

Have students fill in the following information on their handouts:

One pound of body fat is equivalent to approximately 3,500 calories.

In other words, we must eat about 3,500 extra calories above what we need to *store* a pound of fat, or, we must use about 3,500 extra calories more than what we eat to *burn* a pound of fat.

Carbohydrates provide 4 calories per gram.

Protein provides 4 calories per gram.

Fat provides 9 calories per gram.

Gender alone (whether you are a boy or a girl) accounts for a 50 calorie difference in energy needs if body composition is the same, with males using more calories than females. **If the body composition is typical at 15% body fat for a male and 25% body fat for a female, the difference in energy needs is approximately 500 calories greater in males, primarily due to the higher percentage of lean body tissue.**

Age decreases energy needs by about 30 calories per year for a girl and 60 calories per year for a boy. This decrease only occurs if you have *not* grown taller or heavier. Additional height and weight increase your energy needs. (For example, being one inch taller at the same weight and age increases your energy needs by about 27 calories.) Through adulthood, there is a 2% decrease in basal metabolism each decade.

Activity level makes the biggest difference in energy expenditure. To increase activity level from one level to the next results in an increased energy need of about 350-500 calories. Therefore, to go from being a "couch potato" to being active (two levels), increases energy needs by 700 calories per day for a girl and 800 calories per day for a boy.

Your body is amazing in how it is designed to respond to these changes in energy needs and usage and works to maintain a healthy weight. For this to happen we simply need to be sensitive to our internal cues of hunger and fullness (which we'll learn more about in the next lesson). If we ignore these signals small increases and decreases in energy intake and output make big differences in our weight. Let's see how some small changes could make a big difference.

Break the class into teams, such as by row or groups of desks. You will be called to the blackboard one at a time to represent your team. You will be given a story problem to compute and the first person answering correctly will earn a point for their team. If you are a boy, do the calculation for a male, if you are a girl, do the calculation for a female. Team members may cheer for their teammates but not assist them in calculating the right answer.



1) The impact of decreased activity:

You have been active on a sports team and participated in practice or events on a daily basis for several months. The season has ended and you are not in another sport for awhile. Instead of being active after school you come home and watch TV, play computer games, and do your homework. If you do not decrease the amount you eat each day how much weight will you gain in one month (30 days)?

Girl: $700 \text{ excess calories/day} \times 30 \text{ days} = 21,000 \text{ excess calories} \div 3,500 \text{ calories/pound} = 6 \text{ pounds gained.}$

Boy: $800 \text{ excess calories/day} \times 30 \text{ days} = 24,000 \text{ excess calories} \div 3,500 \text{ calories/pound} = \text{almost } 7 \text{ pounds gained.}$

2) The impact of increased activity:

You have been inactive and decided to increase your everyday activity by moving and walking more throughout the day. You begin to wear a pedometer to count your steps and you increase your number of steps by 2,000 a day, which is approximately 1 mile. At a moderate pace, this will burn approximately 100 extra calories per day. If you don't eat more, how long will it take to lose one pound?

$3,500 \text{ calories in a pound} \div 100 \text{ extra calories burned per day} = 35 \text{ days}$

3) The impact of gender:

You have a twin that is the opposite gender from you. You are the same height and the same weight, but your difference in body composition is what you would expect in males and females resulting in a difference in energy needs. You eat all meals and snacks together. Rather than eat the amount that satisfies your hunger, you decide to eat the same amount as your sibling because you are unaware of the difference in energy need and figure you need the same amount of food. How much will your weight change in two months and will you gain or lose weight?

Girl: $500 \text{ excess calories/day} \times 60 \text{ days} = 30,000 \text{ excess calories} \div 3,500 \text{ calories/pound} = 8.5 \text{ pounds gained.}$

Boy: $500 \text{ fewer calories/day} \times 60 \text{ days} = 30,000 \text{ fewer calories} \div 3,500 \text{ calories/pound} = 8.5 \text{ pounds lost.}$

4) The impact of getting older:

You just completed your adolescent growth spurt and have stayed at the same height and weight for the past 6 months. If for the next year you continue to eat exactly the same amount of calories you did this year, how much will your weight change in one year between one birthday and the next?

Girls: $30 \text{ cals/day} \times 365 \text{ days} = 10,950 \text{ calories} \div 3,500 \text{ cals/\#} = 3 \text{ \#s gained}$

Boys: $60 \text{ cals/day} \times 365 \text{ days} = 21,900 \text{ calories} \div 3,500 \text{ cals/\#} = 6 \text{ \#s gained}$

5) The impact of height:

You and your best friend are the exact same weight but your friend is one inch taller than you are. How many more calories can he or she eat in 6 weeks than you can and stay the same weight?

$27 \text{ more calories/day} \times 7 \text{ days/week} \times 6 \text{ weeks} = 1,134 \text{ more calories}$

Test Drive:



6) The impact of increasing portion size:

You enjoy going to a fast food restaurant after school 2 days a week with your friends and ordering fries and a soft drink. You used to order a medium size of each but when they started a “Super-Size” promotion for only 39 cents more, you started ordering that instead. A medium soft drink has about 60 grams of carbohydrate and a super-size soft drink has twice that amount. A medium order of french fries has 450 calories and a super-size order has 610 calories. How much weight will you gain after 6 months (26 weeks) of ordering the super-size portions as compared to continuing eating the medium-size portions?

60 grams x 4 calories/gram = 240 extra calories from the larger soft drink

610-450 = 160 extra calories from the larger order of fries

240 + 160 = 400 extra calories

400 extra calories x 2 days/week x 26 weeks = 20,800 extra calories in 6 months ÷ 3,500 calories/pound = almost 6 pounds gained in 6 months

7) The impact of less fat:

You have decided a good way to cut excess calories and fat from your diet is to switch from drinking 2% milk to fat-free milk. The amount of fat in a cup of 2% milk is 5 grams. If you drink 3 8-ounce servings of milk each day, how long will it take for this change to result in a one pound loss of weight?

5 grams x 9 calories/gram = 45 calories less/cup x 3 cups = 135 less calories

3,500 calories ÷ 135 calories less/day = 26 days

8) The impact of less sugar:

You have decided a good way to cut excess calories from your diet is to switch from drinking regular soft drinks to diet soft drinks or water. If you normally drink 2 12-ounce cans of soda every day, how much weight will you lose after 3 months of adopting this change?

1 12-ounce soft drink = 150 calories x 2 = 300 less calories per day x 90 days = 27,000 fewer calories ÷ 3,500 calories/pound = 7.7 pounds

Ideally, when your energy needs change due to changes in age, activity, etc., your body will respond to the changes by becoming more or less hungry, which will result in a corresponding change in your energy intake. Obviously, ignoring these signals can affect your weight.



Alternate Route

- Watch and discuss one of the videos about weight management.
- See the options listed in the lesson plan, including students presenting the 15 points in Driver’s Ed, doing the BMI and Energy Need activities in class, etc.
- Do one or more of the “Take the Wheel” activities in class.

Take the Keys



- 🔑 **Taking care of your car means more than just filling it with gas and then driving it until the tank is empty. A well-running vehicle requires regular maintenance and proper care. In the same way, taking care of your personal vehicle (your body) involves practicing all of the healthy behaviors on your maintenance check list: eating healthfully, being active, getting adequate rest, and having good mental and physical health.**
- 🔑 **How did we define “healthy body weight”?** The weight that your body achieves and maintains when you take care of yourself. By “optimizing performance” in each of the areas on the maintenance check list your body can maintain a healthy proportion and distribution of body fat, meaning you will be at a “healthy weight,” regardless of the number on the scale.
- 🔑 **Avoid the temptation to weigh yourself frequently. This will lead to obsessing about the number of pounds you weigh rather than how you feel, how active you are, and how your clothes fit.** Weight fluctuates throughout the day and from day to day by several pounds without it meaning that you have gained or lost fat tissue. Much of this difference is due to what you have recently consumed and how recently you visited the bathroom.
- 🔑 **You should now know whether you are at a healthy weight for you.** At least you will if you have honestly assessed whether you are practicing those habits that will help you have a healthy body composition and stay in energy balance. If you need to make some adjustments in your habits to help you achieve a healthy weight, you can begin that process with today’s “Take the Wheel” assignment. In two future lessons we will look in more detail at how we can make positive changes in the maintenance check points we identified today as problem areas.
- 🔑 **If you have determined that your BMI puts you in the overweight, or at-risk-for-overweight categories, it is important that you do not try to lose weight at a rate that will compromise your health or your growth.** Weight loss is only appropriate when your BMI is above the 95%tile and you are fully grown, and it should never exceed 1/2 - 2 pounds per week. If you are still growing, a safe rate of weight loss is no more than 1 pound per month, under a doctor’s supervision. **Weight loss that occurs gradually is safer and more permanent than rapid weight loss. Weight loss should be achieved through making positive, permanent adjustments in your eating and activity behaviors.**
- 🔑 **Take the key of respect. Appreciate and care for the body you were born with, make the best of what you’re made of. Feed it well, move it often, give it rest, accept your flaws, and enjoy being YOU!**



Take the Wheel

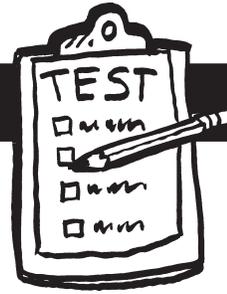
Provide students with the take-home assignment: “Check Under the Hood, Optimize Performance, then Take the Wheel” (page 99). Discuss the options and assign for homework. If time allows in class, begin the assignment.



Driver’s Test: Check Under the Hood

Answers to assessment:

1. d
2. a
3. a
4. d
5. d



Check Under the Hood

- 1. Which of the following is a true statement about body composition?**
 - a. a healthy percentage of body fat in a male is <10%
 - b. in order to become pregnant, women need less body fat than men
 - c. overweight people with more body fat will sink in a swimming pool
 - d. the body is 50-75% water
 - e. all of the above statements are true

- 2. Which of the following uses the most energy in the body?**
 - a. basal metabolism - energy for staying alive
 - b. physical activity - energy for movement
 - c. thermic effect of food - energy for processing food
 - d. all of the above use the same amount of energy

- 3. Which of the following practices will help you achieve and maintain a healthy weight?**
 - a. sleeping 8 hours a night
 - b. skipping breakfast if you're not hungry when you wake up
 - c. "grazing" throughout the day rather than sitting down to eat
 - d. avoiding "nutrient dense" foods since they are high in calories
 - e. none of the above helps you achieve and maintain a healthy weight

- 4. Which of the following indicates a "healthy weight" for an individual adult?**
 - a. BMI of 26
 - b. BMI of 24
 - c. BMI of 18
 - d. not enough information is provided to determine healthy weight

- 5. Which of the following changes could result in losing approximately one pound in one month if no other changes were made?**
 - a. Walk, mow the lawn, or do active housework for 25 minutes daily, which is the equivalent of walking a little over one mile more every day.
 - b. Eliminate one 12-ounce can of regular soda at least 5 days a week, or substitute one diet soda or 12-ounces of water.
 - c. Switch from putting regular ranch dressing on your salad, which has 14 grams of fat in 2 tablespoons to fat-free salad dressing with 0 grams of fat.
 - d. Any of the above changes could result in losing approximately one pound in one month.



Your Spare Tire: Teaching Resources

For further reading:

Children and Weight: What Communities Can Do is a tool kit published in 2002 by the Center for Weight and Health at the University of California at Berkeley. It is available at <http://www.cnr.berkeley.edu/cwh/>.

Guidelines for Childhood Obesity Prevention Programs: Promoting Healthy Weight in Children Position Paper developed by the Weight Realities Division of the Society for Nutrition Education, October 2002. These guidelines are available at www.healthyweight.net and www.sne.org.

Barlow, SE, Dietz, WH. **Obesity Evaluation and Treatment: Expert Committee Recommendations.** *Pediatrics* 1998, 102:3. Available at <http://www.pediatrics.org/cgi/content/full/102/3/e29>.

Shanley, E, Thompson, C. **Fueling the Teen Machine.** Palo Alto, California: Bull Publishing Co.; 2001.

Web Sites:

<http://www.cnr.berkeley.edu/cwh/resources/>
The Center for Weight and Health at the University of California at Berkeley has an extensive listing of web sites and resources with links to other sites.

<http://www.bcm.tcm.edu/cnrc>
The Children's Nutrition Research Center web site has the Children's BMI Calculator and Children's Energy Calculator.

The National Institutes of Health has a BMI calculator for adults at: www.nhlbisupport.com/bmi/.

Growth charts for boys and girls ages 2-20 can be downloaded from the Centers for Disease Control and Prevention web site: <http://www.cdc.gov/growthcharts>.

Food and Nutrition Information Center, Interactive Toolbox list
Links to web sites with interactive tools for assessing personal nutrition and fitness at <http://www.nal.usda/fnic/etext/000035.html>.

The Calorie Control Council has an exercise calculator at <http://www.caloriecontrol.org/exercalc.html>.

www.caloriesperhour.com is a web site hosted by a lay person but with very informative and accurate information about energy balance.

A Nutritional Analysis Tool and Energy Calculator is available at the University of Illinois web site: <http://www.ag.uiuc.edu/~food-lab/nat>.



Your Spare Tire: Teaching Resources

Videos/Resources:

Diet and Weight Loss: Clearing the Confusion, 1999. The Learning Seed. 22 minute video from www.learningseed.com.

Diet and Weight Management, Meridian Education Corporation. 30 minute video from www.meridianeducational.com.

Eating and Exercise Fact or Fiction, 45 minute video, CEV Multimedia, www.cev-inc.com.

Total Health: Becoming Physically Fit, Tape 1: Body Composition, 28 minute HRM Video, Human Relations Media, Inc., 1999. Comes with print resources.

Fueling for Success: A Guide for Teens, 2003, by Connie Evers, MS, RD, is available at <http://nutritionforkids.com>.

Jump Start Teens is a curriculum developed by California Project LEAN and is available as a PDF file at www.californiaprojectlean.org/consumer/lesson.html. To access, click on icon for "Jump Start Teens." A window will open describing the program. Click on the word "lessons" to link to a list of lessons. Each one can be downloaded separately. The first two lessons emphasize the role of nutrition and physical activity.

Take Charge of Your Health! A Teenager's Guide to Better Health is a booklet from the Weight-Control Information Network. 1999. Available at www.niddk.nih.gov/health/nutrit/pubs/winteen/index.htm.

Think Your Drink is a poster and reproducible handout from the National Dairy Council. It is available from your state dairy council or the National Dairy Council.

Your One & Only Body . . . feed it right! 1998. Booklet to assess daily food choices. Available from the Washington State Dairy Council, at www.eatsmart.org.

Check Under the Hood

Optimize Performance with this Maintenance Check List

Have You Ever Wondered . . .

What is a healthy weight? How can you know if you're at a healthy weight?
How is your weight related to your health and your health related to your weight?



Let's Take a Look

All of the things on the list below play an important part in your overall health. Below each title is a description of "optimum performance" in that area of your health. Read each description in its entirety and determine where you fall between the two extremes of "needs major work" (a problem for you) and "optimum performance." Circle the corresponding number. You might be surprised that all of these factors can make it easier or harder to maintain a healthy weight. Focus on getting these health habits "right" rather than focus on your weight. Take care of them and your weight will take care of itself.

	Needs major work				Optimum performance
	1	2	3	4	5
1. Sleep I wake up easily and feel refreshed. I don't fall asleep in school or crave caffeine to keep going through the day. I fall asleep easily at night.	1	2	3	4	5
2. Energy Level I fuel my body at regular intervals throughout the day and don't skip meals. I eat when I'm hungry but before I'm "starved." I stop eating when I'm full but not "stuffed."	1	2	3	4	5
3. Focused Eating I rarely do other activities while eating, except enjoying conversation with others. I do not eat while driving, studying, or watching TV.	1	2	3	4	5
4. Variety I eat a variety of foods from all five food groups on the Food Guide Pyramid, including at least 5 servings of fruits and vegetables.	1	2	3	4	5
5. Nutrient Density I eat foods with plenty of nutrients (vitamins, minerals, protein, etc.) for the number of calories they provide. When I eat foods high in fat or sugar, I eat them in moderation.	1	2	3	4	5
6. Fiber I eat plenty of whole grains and cereals, fresh fruits and vegetables, and legumes (dried beans). I am rarely constipated.	1	2	3	4	5

Optimize Performance with this Maintenance Check List

	Needs major work				Optimum performance
	1	2	3	4	5
<p>7. Hydration I get plenty to drink throughout the day. I don't experience dizziness, headaches, or fatigue. My urine is pale in color.</p>	1	2	3	4	5
<p>8. Bone Health I eat/drink 3-4 servings from the dairy group daily, or the equivalent in calcium from fortified foods or supplements. I engage in weight-bearing exercise.</p>	1	2	3	4	5
<p>9. Lean versus Fat I have a healthy proportion of lean tissue to body fat (I sink more easily than float). The fat I have is found more on my lower body (hips and thighs) than around my upper body or waist.</p>	1	2	3	4	5
<p>10. Aerobic Fitness I am not easily winded when doing activities such as running up and down stairs or participating in sports and leisure activities.</p>	1	2	3	4	5
<p>11. Strength I can lift and carry loads easily such as groceries, a backpack, or young children. I can do a satisfactory number of sit-ups, push-ups, or chin-ups.</p>	1	2	3	4	5
<p>12. Flexibility I can touch my toes. I have a wide range of motion and can stretch without pain.</p>	1	2	3	4	5
<p>13. Active Lifestyle I do not spend a great deal of my free time in sedentary activities. I walk places rather than drive when possible. I move around more than I sit still.</p>	1	2	3	4	5
<p>14. Mental Health I feel confident in my ability to cope with life's ups and downs without turning to food, tobacco, alcohol, or drugs. I have a strong support network of family and friends who I trust and can turn to.</p>	1	2	3	4	5
<p>15. Medical History/Disease Risk My blood pressure, blood glucose (sugar), blood cholesterol, iron level, etc. are in the healthy range. I do not smoke.</p>	1	2	3	4	5

Optimize Performance and Achieve a Healthy Weight

Calculate your BMI using the formula:

Height in inches: _____ ÷ 39.3 = height in meters: _____

Weight in pounds: _____ ÷ 2.2 = weight in kilograms: _____

BMI = Weight (kg)/height (m)² = _____ ÷ (_____)² = _____
(weight in kg) (height in m)

When you are an adult the BMI ranges that are considered underweight, healthy weight, and overweight are:

Underweight	BMI < 19
Healthy weight	BMI 19 - 24.9
Overweight	BMI 25 - 29.9
Obese	BMI ≥ 30

Calculate your BMI at a web site:

The National Institutes of Health has a BMI calculator for adults at: www.nhlbisupport.com/bmi/. At this web site you are instructed to assess whether you are at a healthy weight using not only your BMI but also your waist circumference and your medical risk. **When you are under 18 years of age, the BMI that is considered a “healthy weight” is age and gender specific.** To compare your BMI with your age and gender you need to plot it on the appropriate growth chart. Several measurements over time are needed to determine how you are growing and whether you are at a healthy weight. How your BMI tracks over time is more important than one point on the chart. The Children’s Nutrition Research Center has a children’s BMI calculator at their web site: <http://www.bcm.tmc.edu/cnr>. This calculator calculates not only BMI, but your BMI percentile and plots it on a growth chart.

My BMI: _____ BMI Percentile: _____

Does my BMI indicate a “healthy” weight?

“Healthy” weights can be at any point on the chart for a particular individual, but the definitions for groups of children and adolescents are:

If your BMI is between the 5th and 85th %tile you are considered to be in the “healthy” weight range.

Your goal is weight maintenance or weight gain appropriate for growth, continuing in the same growth channel.

If your BMI is <5%tile you are considered underweight.

Your goal is to gradually gain weight. However, if you are eating well and are active, you may simply be smaller than average. If your BMI is tracking in the same growth channel without dropping, you may be at your healthy weight.

If your BMI is >95%tile you are considered overweight.

Your goal varies with the reason for the higher weight and whether you are growing. If your weight is due to athletic training and you are highly muscled, or, if you are eating well and are active and fit, you may simply be larger than average, especially if your BMI is tracking in the same growth channel without accelerating. This may be your healthy weight and your goal is weight maintenance. If not, your goal is gradual weight loss if you are finished growing. If you are still growing taller, an appropriate goal might be a slower than normal weight gain or weight maintenance as you increase in height. Weight loss can be very detrimental to growth and should be monitored by a physician.

If your BMI is >85%tile and <95%tile you are considered at risk for overweight.

If you have no weight-related medical complications (high blood pressure, type 2 diabetes, high cholesterol, sleep apnea, or orthopedic problems), your goal is weight maintenance, or if you are still growing, a gradual rate of weight gain. As above, if you are eating well and are active, you may simply be larger than average. If your BMI is tracking in the same growth channel you may be at your healthy weight.

Healthy people come in a variety of sizes, shapes and weights. A BMI in the “healthy” range does not prove a person is at their healthy weight, and a BMI above or below that range isn’t proof that a person is NOT at their healthy weight. Always use more information than BMI alone to answer the question “What is my healthy weight?”

Optimize Performance and Achieve a Healthy Weight

Calculate your energy needs: _____ **calories/day**

Use the children's energy calculator for computing energy needs found at the Children's Nutrition Research Center web site: <http://www.bcm.tmc.edu/cnrc> to calculate your energy needs. All you need is your age, gender, height, weight, and activity level, which is defined as couch potato, low active, active, or very active.

The amount of energy needed for basal metabolism can be computed with the following formula:

Female:

_____ kg weight (wt in pounds ÷ 2.2) x 0.9 kcal/kg/hr x 24 hours = _____ kcal

Male:

_____ kg weight (wt in pounds ÷ 2.2) x 1.0 kcal/kg/hr x 24 hours = _____ kcal

The amount of energy needed for physical activity varies with the intensity of the activity.

The equation for calculating energy use of physical activity is:

time spent in minutes x **weight** in kg x the **energy use factor** on the list below, such as 0.01 kcal/min/kg for sedentary activities = **calories expended**.

If you want to do a more accurate assessment of energy use for physical activity, you can keep a 24 hour activity log and use the equation above and the energy use factors below to calculate how many calories you burn in physical activity.

Sedentary: (0.01 kcal/min/kg) Sitting with little or no body movements (reading, writing, eating, watching TV, driving, sewing, etc.).

Light: (0.02 kcal/min/kg) Sitting or standing with some movement of arms and other parts of the body (preparing food, dishwashing, walking (2 mi/hr), bathing, etc.).

Moderate: (0.03 kcal/min/kg) Sitting with vigorous arm movements, or standing with considerable movement (making beds, mopping, walking (4 mi/hr), warm-up and cool-down exercises, bowling, golfing, etc.).

Vigorous: (0.06 kcal/min/kg) Moving body rapidly (tennis, jogging, weight-lifting, and team sports - basketball, baseball, football - but only while playing).

Strenuous: (0.10 kcal/min/kg) Moving body at maximum or near maximum capacity (swimming laps, running, rope jumping). This level is aerobic activity. Do not include warm-up and cool-down periods.

The amount of energy needed for processing food (the thermic effect of food) is 10% of total caloric intake.

Optimize Performance by staying in Energy Balance

How much energy?

One pound of body fat is equivalent to _____ calories.

Carbohydrates provide _____ calories/gram.

Protein provides _____ calories/gram.

Fat provides _____ calories/gram.



Gender alone accounts for a _____ calorie difference in energy needs per day if body composition is the *same*, with males using more energy than females. If the body composition is the typical 15% fat for a young male and 25% fat for a young female the difference in energy needs is approximately _____ calories per day.

Age decreases energy needs by about _____ calories/day each year for girls and _____ calories/day each year for boys. This decrease only occurs if you have *not* grown taller or heavier because additional height and weight increases your energy needs. (For example, being one inch taller at the same weight increases your energy needs by about 27 calories.) FYI: Through adulthood, there is a 2% decrease in basal metabolism each decade.

Activity level makes the biggest difference in energy expenditure. To increase your activity level from one level to the next results in an increased energy need of about 350-500 calories. Therefore, to go from being a “couch potato” to being “active” (two levels), increases energy needs by _____ calories/day for girls and _____ calories/day for boys.

Check it out: What difference does it make?

1) The impact of decreased activity: You have been active on a sports team and participated in practice or events on a daily basis for several months. The season has ended and you are not in another sport for awhile. Instead of being active after school you come home and watch TV, play computer games, and do your homework. If you do not decrease the amount you eat each day how much weight will you gain in _____ (_____ days)?

2) The impact of increased activity: You have been inactive and decided to increase your everyday activity by moving and walking more throughout the day. You begin to wear a pedometer to count your steps and you increase your number of steps by _____ a day, which is approximately _____. At a moderate pace, this will burn approximately _____ extra calories per day. If you don't eat more, how long will it take to lose one pound?

3) The impact of gender: You have a twin that is the opposite gender from you. You are the same height and the same weight, but your difference in body composition is what you would expect in males and females resulting in a difference in energy needs. You eat all meals and snacks together. Rather than eat the amount that satisfies your hunger, you decide to eat the same amount as your sibling because you are unaware of the difference in energy need and figure you need the same amount of food. How much will your weight change in _____ months and will you gain or lose weight?

Optimize Performance by staying in Energy Balance

4) The impact of getting older: You just completed your adolescent growth spurt and have stayed at the same height and weight for the past 6 months. If for the next year you continue to eat exactly the same amount of calories you did this year, how much will your weight change in _____?

5) The impact of height: You and your best friend are the exact same weight but your friend is one inch taller than you are. How many more calories can he or she eat in _____ weeks than you can and stay the same weight?

6) The impact of increasing portion size: You enjoy going to a fast food restaurant after school _____ days a week with your friends and ordering fries and a soft drink. You used to order a medium size of each but when they started a "Super-Size" promotion for only 39 cents more, you started ordering that instead. A medium soft drink has about _____ grams of carbohydrate and a super-size soft drink has twice that amount. A medium order of french fries has _____ calories and a super-size order has _____ calories. How much weight will you gain after 6 months (26 weeks) of ordering the super-size portions compared to continuing eating the medium-size portions?

7) The impact of less fat: You have decided a good way to cut excess calories and fat from your diet is to switch from drinking 2% milk to fat-free milk. The amount of fat in a cup of 2% milk is _____ grams. If you drink _____ 8-ounce servings of milk each day, how long will it take for this change to result in a one pound loss of weight?

8) The impact of less sugar: You have decided a good way to cut excess calories from your diet is to switch from drinking regular soft drinks to diet soft drinks or water. If you normally drink _____ 12-ounce cans of soda every day (12-ounce soft drink = 150 calories), how much weight will you lose after _____ months of adopting this change?

Ideally, when your energy needs increase or decrease due to changes in age, activity, etc., your body will respond to these changes by becoming more or less hungry, which will result in a corresponding change in your energy intake. Obviously, ignoring your body's signals of hunger and satiety can affect your weight.

Check Under the Hood

Optimize Performance...then Take the Wheel

The Key of Respect

Taking care of your car means more than just filling it with gas and then driving it until the tank is empty. A well-running vehicle requires regular maintenance and proper care. In the same way, taking care of your personal vehicle (your body) involves practicing all of the healthy behaviors on your maintenance check list: eating healthfully, being active, getting adequate rest, and having good mental and physical health. A healthy body weight is the weight that your body achieves and maintains when you take care of yourself in all of these ways. By “optimizing performance” in each of these areas, your body can maintain a healthy proportion and distribution of body fat, meaning you will be at a “healthy weight,” regardless of the number on the scale. A healthy body can take you where you want to go.



A Closer Look Under the Hood

Keep diet and activity records for 3 days. Write down everything you eat and drink, including brand names and amounts eaten. Assess your diet using the Interactive Healthy Eating Index found at <http://www.usda.gov/cnpp/>. Keep activity records each day recording all 1,440 minutes in 24 hours. List your activities, how many minutes you did each activity, and the level of activity (see the list on the handout titled “Optimize Performance and Achieve a Healthy Weight.”) You can total the number of minutes spent in each level of activity and use the formula on that handout to determine how much energy you burn in physical activity.

Healthy Weight Promotions

Imagine you are a “salesman” for any one of the 15 healthy habits listed on the maintenance check list. Come up with a slogan to encourage other teens to practice the behavior. Create a poster or flyer promoting your idea. Give compelling reasons why to practice the behavior.

Take the Wheel

Select one of the 15 healthy habits on the maintenance check list that you would like to learn more about, and make changes in, to optimize your performance in this area. Find out more information about the benefits of practicing this behavior and write a brief report (1-2 pages). Set a goal for improving your performance and keep track of your progress in this area for 3 days. Write a paragraph at the end of your report describing what you accomplished.

Refueling Pit Stop

Select a new recipe to make for your friends or family that improves your diet in any one or more of the following ways: increased fruits and vegetables, fiber, more nutrient-dense foods and less calorie-dense foods, and/or increased dairy foods. Make it and evaluate how well it achieved your nutritional goal. To analyze the nutrient composition of the recipe go to <http://www.nal.usda.gov/fnic/foodcomp/>. Write a brief report including your goal, the recipe, and how well the recipe met your goal.

