After going through this lesson, you will be able to:

- Identify sedentary behaviors;
- Recognize the benefits of physical activity;
- Define the four components of physical fitness and recognize the health-related benefits of each; and
- Differentiate between:
  - physical activity and exercise
  - light, moderate, and vigorous intensity activities
  - essential and non-essential fat
  - weight, body mass index, percent body fat, and waist-to-hip ratio as health indicators.

You’re likely aware of the fact that engaging in regular physical activity positively impacts health.

It can aid in weight management and helps prevent or manage diseases such as heart disease and stroke, type 2 diabetes, metabolic syndrome, depression, and some types of cancer, such as colon and breast cancer. It increases bone density and energy level and improves emotional wellbeing, sleep quality, and cognitive function.\textsuperscript{1,2,3,4,5,6} It’s even been shown to improve physical and emotional aspects of people’s sex lives.\textsuperscript{7,8} At the very least, physical activity enhances one’s ability to perform normal activities of daily living with ease and handle extraordinary stresses on the body, such as in emergency situations.

Engaging in regular physical activity not only improves health; it can also serve as valuable alone time to process thoughts and disengage from the day’s stressors or offer a good reason to connect with friends and family. It can even be a good opportunity to get outside and appreciate nature. In fact, research
has shown that the emotional benefits of physical activity seem to be enhanced when it’s done outside in nature.  

**Resources**
- Physical Activity objectives for Healthy People 2020
- Exercise: A Healthy Stress Reliever
- Exercise: A Healthy Stress Reliever Infograph
- 23 and 1/2 hours: What is the single best thing we can do for our health?
- Video

The terms physical activity and exercise, while often used interchangeably, actually mean slightly different things.

**Physical activity** is any bodily movement that requires or expends energy. **Exercise** is a specific type of physical activity; its goal is to improve and maintain physical fitness.

While any level of physical activity is beneficial to some degree, and some is certainly better than none, small amounts of light or low-intensity activity will probably do little to improve physical fitness. There are four components of health-related **physical fitness**.

- Cardiorespiratory endurance
- Muscular strength and endurance
- Flexibility
- Body composition

Improving these components of fitness reaps physical health benefits.

**Cardiorespiratory endurance involves the cardiovascular and respiratory systems, which include the heart, blood vessels, lungs, diaphragm, and air passages; these function to transport oxygen, nutrients, and other substances throughout the body.**

This component of fitness refers to the body’s ability to supply and use oxygen. The types of activities that impact cardiorespiratory endurance are those that involve rhythmic use of large muscle groups for an extended period of time, such as walking, jogging, swimming, and biking. These are generally referred to as cardio, aerobic, or endurance exercise.

At rest and during **light-intensity** physical activities such as casual walking, grocery shopping, or doing light household chores:
• heart rate is about 50 to 90 beats per minute;
• breathing rate is about 12-20 breaths per minute; and
• blood pressure is about 120/80.

During moderate- to vigorous-intensity endurance exercise, though, additional demands are placed on the cardiorespiratory system. Working muscles need more oxygen and nutrients, and they produce waste products that need to be eliminated. Thus, your heart rate increases and your breathing becomes heavier. As your level of aerobic training increases over time, your heart and lungs become more efficient, and you experience many health benefits, including:

• lower resting heart rate, blood pressure, triglycerides, and LDL—or bad—cholesterol;
• increased bone density, insulin sensitivity, and HDL—or good—cholesterol; and
• improved balance and immune function.

These changes reduce the effort required for everyday activities, prepare the body to respond to physical challenges, and help protect against obesity; cardiovascular disease; type 2 diabetes; colon, breast, and other types of cancer; and osteoporosis.

Muscular strength refers to the amount of force that a muscle can produce with a single maximum effort. Muscular endurance refers to the ability to hold a given level of muscle tension for a period of time or repeat such a muscle contraction multiple times before reaching fatigue.

Both are enhanced through resistance—or strength—training activities. Muscles make up about 40% of our body mass. Unfortunately, we begin to lose muscle mass after about age 30. Resistance training before then helps build up a larger reserve, and continuing after age 30 prevents muscle and nerve degeneration and maintains motor nerve connections that help us perform quick, powerful
movements. Resistance training also helps build and preserve bone mass.

Both muscular strength and endurance contribute to posture, prevent lower back pain and injury during emergency situations, and enhance physical performance in normal daily function as well as sports and other leisure activities.

**Flexibility refers to the ability to move joints through their full range of motion, which is important for maintaining normal body posture and function as we age.** Good flexibility is particularly useful in preventing lower back pain and injury, other types of injury, and joint problems like arthritis. Other benefits include relaxation and an improved ability to perform normal activities of daily living, such as carrying laundry and groceries or moving furniture, as well as reduced muscle soreness from other forms of exercise, such as resistance training.10

**Resources**
- Fitness training: Elements of a well-rounded routine
- Top Ten Reasons to Stretch

**The fourth component of health-related physical fitness is body composition: the relative proportion of fat vs. lean mass in the body.**

**Lean body mass** consists of water, organs, teeth, bone, connective tissue, and muscle. **Fat mass** within the body can be divided into essential and non-essential fats. **Essential fat** is necessary for normal body function. Yes; your body needs fat! The brain, nerves, heart, lungs, liver, and mammary glands all require some fat to function properly. The amount of essential fat is higher in females due to fat deposits in the breasts, uterus, and other sites specific to females and reproduction. **Non-essential fat** is excess fat that is stored just below the skin and around the organs. The amount of non-essential fat in an individual depends on genetics, metabolism, sex, age, diet, and activity level.

**Excess fat is a primary risk factor for chronic disease.** Different body shapes may reveal different things about this risk.

Some people store fat primarily in the abdomen; this is sometimes referred to as an **apple shape**. Abdominal fat surrounds the organs, is visceral—or deep—and is biologically active, meaning that storing fat in this area of the body triggers disease processes leading to cardiovascular disease, cancer, and type 2 diabetes.11,12
Other people store fat primarily around the hips and thighs and are said to have a **pear shape**. The fat in this area is subcutaneous—just under the skin. People who have a pear shape are generally considered less susceptible to chronic disease compared to people who have an apple shape, although this appears to be under debate according to some recent studies.\(^{13}\)

Because the apple shape may present higher disease risk than the pear shape, **waist-to-hip ratio**—or WHR—is generally considered an indicator of disease risk. It can be calculated by dividing your waist circumference by your hip circumference. To measure your waist circumference, place a measuring tape around your abdomen; it should be level with your belly button—not necessarily where you typically wear your jeans. To measure your hip circumference, place the tape around your hips at their widest point. Then, to calculate your waist-to-hip ratio, divide your waist measurement by your hip measurement. A waist-to-hip ratio of greater than .9 for men and .85 for women indicates increased disease risk.\(^{14}\)

Where we naturally tend to store fat is influenced by genetics, but we can do things to impact our genetic predisposition to disease. Eating a healthy diet and engaging in regular exercise to build cardiorespiratory endurance, muscular strength and endurance, and flexibility will decrease susceptibility to chronic disease regardless of body shape.

You might be familiar with the acronym BMI, which refers to **body mass index**. It is calculated by dividing weight in pounds by height in inches squared and multiplying that by 703. BMI is used to indicate a person’s weight category:

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BMI = \left( \frac{\text{Weight in Pounds}}{\text{Height in Inches}^2} \right) \times 703
\]
Lower than 18.5 is considered underweight.
18.5-24.9 is considered normal weight.
25-29.9 is considered overweight.
30 or higher is considered obese.

Underweight, overweight, and obesity have been associated with increased risk of premature illness, disease, and death.

While BMI is commonly used to track weight status and estimate disease risk on a population level because it’s relatively easy to measure, it does not take into account the proportion of the body’s total weight that is fat vs. muscle. Muscle weighs more than fat, so BMI may overestimate body fat in athletes and others who have a muscular build and underestimate body fat in older people or those who’ve lost muscle mass due to injury or other reasons.\(^{15}\)

Thus, measuring the percent of body fat is a better way to gauge fitness and disease risk. There are a number of methods for measuring percent body fat, such as skinfold tests, bioelectrical impedance, or underwater weighing. If you’re interested in having yours measured, this can be done at a health club in your community, a local clinic, or possibly your campus wellness center.

**Resource**
BMI calculator

**Community Resources**
Campus Recreation and Wellness Center
Campus Health Center

How much you weigh is not necessarily the key determinant of your overall health and wellness.

While achieving and maintaining a healthy weight is a good goal, try not to focus too much on the numbers on the scale or how your body looks. Instead, focus on how your body feels and what it can do. Focus on fitness. If you take care of your body by engaging in regular exercise to improve your cardiovascular endurance, muscular strength and endurance, and flexibility, you will reap the benefits of improved body composition and overall health. Research has shown that the benefits of exercise exist regardless of one’s weight.\(^{16}\),\(^{17}\)

*Unfortunately, most American adults lead sedentary, inactive lives.*\(^{18}\)
About a third—32.4%—of those 18 years old and older engaged in no leisure-time physical activity in 2010. Americans spend over half—54.9%, on average—of their waking hours sedentary. Sedentary behaviors include, but are not limited to: watching TV, engaging in other screen use, sitting while commuting or at work, or otherwise sitting or lounging while awake.

In recent years, more and more research has been published indicating that being sedentary is highly correlated with disease risk, independent of exercise. This means that people who are inactive for most of the day on a regular basis are at an increased risk for a variety of diseases, such as type 2 diabetes, cardiovascular disease, cancer, and mental disorders—even if they exercise or are otherwise active for part of the day on most days. What this research is revealing is that someone who spends much of the day being active even at a light intensity is probably better off than someone who exercises at moderate- to vigorous-intensity for 30 minutes but is sedentary the rest of the day. The take-home message here is that it’s important to lead a generally active lifestyle—to get up and move around at various points throughout the day. In a nutshell, we want to move more and sit less while at home and work, during our leisure time, and in transit from place to place. Even if we have to sit for long periods while at work or studying, we can make a conscious effort to get up and move around on a somewhat regular basis—whether that’s taking a walk to the bathroom or water cooler or even around the block, or just standing to stretch a bit. Such interruptions in sedentary behavior can help mitigate risk.

Resources
Sitting Too Much: How Bad Is It?
Do You Have Sitting Disease?
Risks of Physical Inactivity
What are the Risks of Sitting Too Much?
America's Physical Activity Rankings

Everyone can benefit from physical activity, regardless of sex, age, race, ethnicity, size, or shape.
Even those limited by physical disabilities or chronic pain can engage in certain forms of activity and reap the benefits of leading an active lifestyle. Some ways to incorporate activity into one's regular daily routine include:

- taking the stairs instead of an elevator or escalator;
- walking to, from, and between classes;
- reading or studying while on a stationary bike or other cardio machine; and
- biking to run errands instead of driving or taking the bus.

**Active Community Video Transcript**

Mary: Sometimes I walk, but if I have to go across campus, then I bike. And I generally bike everywhere on campus. I like it because it’s about the same time it takes you to get anywhere on the bus, but it’s a lot more active, and something that you can do. And it wakes you up in the morning on your way to class, because you have to get your heart pumping.

Jesse: I ride my bike every single day. It’s quicker than walking. It doesn’t use fuel, and with little maintenance, it’s relatively inexpensive.

Hannah: Well, you definitely get there faster. A lot cheaper than paying for gas, or having a car. It’s a real hassle to park cars, too. So there’s tons of bike racks around campus.

Stewart: I also have a better view, more scenery. I’m able to maneuver around certain areas that cars cannot go through. I just feel better all around.

Jamie: For me, the advantages of biking is that I feel really great afterwards. I always need to spend time to get to where I’m going, but I don’t always have time to set aside to exercise. And so biking and walking end up being my two largest forms of exercise.

**It cannot be emphasized enough how important a helmet is while biking.** When in the midst of busy traffic, things can happen very quickly, and a helmet could be the difference between life and death. Using front and rear lights when it’s dark or near dark is a good idea, too; use a red light on the rear of your bike and white on the front to ensure that drivers see you. Wearing light colored clothing or a reflective jacket can also help.
Keep in mind that bicycles are considered vehicles; bicyclists are supposed to ride with traffic and are required to obey traffic laws. Riding in traffic might seem scary at first, but it’s really not a good idea to ride on the sidewalk, which is risky not only for pedestrians but also for cyclists. Keep in mind that pedestrians always have the right of way. If you bike, ride in designated biking lanes whenever possible, and ride in the same direction as traffic—not against it, which is much more dangerous. Be cautious of vehicles that are turning, as many vehicle-cyclist collisions occur at intersections, and watch out for opening doors of parked vehicles.

Cyclists use specific hand signals to signal their turns and other maneuvers. We recommend that you use these signals if you bike. It’s important for drivers to recognize them, too!

**Resources**
- Pedestrian and Bicyclist Crash Statistics

**Community Resources**
- Biking in Minneapolis
- Biking Safety on Campus

**How to Use Hand Signals on a Bicycle**
Return to page 16 of the online lessons or watch this short video directly on how to use hand signals on your bicycle.

**How can I be more active everyday? Google form**
Return to page 17 of the online lessons or visit this Google Doc directly to anonymously share with your classmates ways that you could incorporate more activity into your daily routine.

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