In many studies related to physical fitness and health, researchers have focused on exercise, as well as on the more broadly defined concept of physical activity. Physical activity is defined by the World Health Organization as any bodily movement produced by skeletal muscles that requires energy expenditure, while exercise is a form of physical activity that is planned, structured, repetitive, and performed with the goal of improving health or fitness. So, although all exercise is physical activity, not all physical activity is exercise. Although physical activity and exercise are defined concepts, the ultimate focus of the health related components of physical fitness is to provide a framework for components that are necessary for good health. They are cardiorespiratory (CR) endurance (also called aerobic endurance), flexibility, muscular strength, muscular endurance, and body composition.

Cardiorespiratory Endurance

- **Aerobic endurance**: The ability of the heart, blood vessels, and lungs to work together to accomplish three goals:
  1. deliver oxygen to body tissues
  2. deliver nutrients
  3. remove waste products.
- CR endurance exercises involve large muscle groups in prolonged, dynamic movement (ex. running, swimming, etc)

Table \(\PageIndex{1}\)

Examples of Different Aerobic Physical Activities and Intensities

<table>
<thead>
<tr>
<th>Moderate Intensity</th>
<th>Vigorous Intensity</th>
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https://med.libretexts.org/Bookshelves/Health/Book%3A_Health_Education_(Rienk_and_Lundin)/11%3A_Physical_Fitness/11...
• Walking briskly (3 miles per hour or faster, but not race-walking)
• Water aerobics
• Bicycling slower than 10 miles per hour
• Tennis (doubles)
• Ballroom dancing
• General gardening

• Racewalking, jogging, or running
• Swimming laps
• Tennis (singles)
• Aerobic dancing
• Bicycling 10 miles per hour or faster
• Jumping rope
• Heavy gardening (continuous digging or hoeing, with heart rate increases)
• Hiking uphill or with a heavy backpack

**Frequency and Duration**

Aerobic physical activity should preferably be spread throughout the week. Research studies consistently show that activity performed on at least 3 days a week produces health benefits. Spreading physical activity across at least 3 days a week may help to reduce the risk of injury and avoid excessive fatigue.

Both moderate- and vigorous-intensity aerobic activity should be performed in episodes of at least 10 minutes. Episodes of this duration are known to improve cardiovascular fitness and some risk factors for heart disease and type 2 diabetes.

**Intensity**

The Guidelines for adults focus on two levels of intensity: moderate-intensity activity and vigorous–intensity activity. To meet the Guidelines, adults can do either moderate-intensity or vigorous-intensity aerobic activities, or a combination of both. It takes less time to get the same benefit from vigorous-intensity activities as from moderate-intensity activities. A general rule of thumb is that 2 minutes of moderate-intensity activity counts the same as 1 minute of vigorous-intensity activity. For example, 30 minutes of moderate-intensity activity a week is roughly the same as 15 minutes of vigorous-intensity activity. A person doing moderate-intensity aerobic activity can talk, but not sing, during the activity. A person doing vigorous intensity activity cannot say more than a few words without pausing for a breath.

**Muscular Strength and Endurance**

- **Muscular strength**: The ability of muscles to exert maximal effort.
- **Muscular endurance**: The ability of muscles to exert submaximal effort repetitively (contract over and over again or hold a contraction for a long time).

**Activities for Muscular Strength and Endurance**

These kind of activities, which includes resistance training and lifting weights, causes the body's muscles to work or hold against an applied force or weight. These activities often involve relatively heavy objects, such as weights, which
are lifted multiple times to train various muscle groups. Muscle-strengthening activity can also be done by using elastic bands or body weight for resistance (climbing a tree or doing push-ups, for example).

Activities for Muscular Strength and Endurance also has three components:

- **Intensity**, or how much weight or force is used relative to how much a person is able to lift;
- **Frequency**, or how often a person does muscle strengthening activity; and
- **Repetitions**, or how many times a person lifts a weight (analogous to duration for aerobic activity). Repetitions play a key role in determining if an activity is improving muscular strength or endurance. Low repetitions with more weight will focus more on muscular strength, while high repetitions with less weight will focus more on muscular endurance. The effects of muscle-strengthening activity are limited to the muscles doing the work. It's important to work all the major muscle groups of the body: the legs, hips, back, abdomen, chest, shoulders, and arms.

Muscle-strengthening activities provide additional benefits not found with aerobic activity. The benefits of muscle-strengthening activity include increased bone strength and muscular fitness. Muscle-strengthening activities can also help maintain muscle mass during a program of weight loss.

Muscle-strengthening activities make muscles do more work than they are accustomed to doing. That is, they overload the muscles. Resistance training, including weight training, is a familiar example of muscle-strengthening activity. Other examples include working with resistance bands, doing calisthenics that use body weight for resistance (such as push-ups, pull-ups, and sit-ups), carrying heavy loads, and heavy gardening (such as digging or hoeing).

Muscle-strengthening activities count if they involve a moderate to high level of intensity or effort and work the major muscle groups of the body: the legs, hips, back, chest, abdomen, shoulders, and arms. Muscle strengthening activities for all the major muscle groups should be done at least 2 days a week.

No specific amount of time is recommended for muscle strengthening, but muscle strengthening exercises should be performed to the point at which it would be difficult to do another repetition without help. When resistance training is used to enhance muscle strength, one set of 8 to 12 repetitions of each exercise is effective, although two or three sets may be more effective. Development of muscle strength and endurance is progressive over time. Increases in the amount of weight or the days a week of exercising will result in stronger muscles.

**Flexibility**

Flexibility is the ability of moving a joint through the range of motion. Flexibility is an important part of physical fitness. Some types of physical activity, such as dancing, require more flexibility than others. Stretching exercises are effective in increasing flexibility, and thereby can allow people to more easily do activities that require greater flexibility. For this reason, flexibility activities are an appropriate part of a physical activity program, even though they have no known health benefits and it is unclear whether they reduce risk of injury. Time spent doing flexibility activities by themselves does not count toward meeting the aerobic or muscle-strengthening Guidelines. Although there are not specific national guidelines for flexibility, adults should do flexibility exercises at least two or three days each week to improve range of motion. This can be done by holding a stretch for 10-30 seconds to the point of tightness or slight discomfort. Repeat each stretch two to four times, accumulating 60 seconds per stretch.
Body composition

The percentage of the body composed of lean tissue (muscle, bone, fluids, etc.) and fat tissue. Changes in body composition usually occur as a result of improvements in the other components of health related physical fitness, as well as changes in eating habits. This is discussed in more detail in the Weight Management and Healthy Eating Chapter.

There are also other components of fitness related to sports performance rather than just health. They are called skill-related components of fitness or motor fitness and include power, speed, agility, balance, and coordination. For the purpose of this class we will focus mainly on the health-related components of fitness.