**Fundamentals of Weight Training:**

Benefits:

* Systems of the body change in positive ways
* Stronger, better toned, less susceptible to fatigue
* Neuromuscular system works in better harmony
* Brain learns to selectively recruit specific muscles
* Improves ability to control speed of movement and follow correct movement patterns

Muscles:

* Three types of tissue: smooth, skeletal, cardiac.
* Skeletal are striated and attached to the bone via tendons
  + Respond to Voluntary stimulation
  + More than 400 skeletal muscles
* Three types of muscle actions:
  + Isometric: static, tension but no shortening or lengthening
  + Concentric: positive work, when tension develops in a muscle and the muscle shortens
  + Eccentric: negative work, tension is present, but the muscles lengthen instead of shorten

Improvements in Muscular Strength:

* Muscular strength: ability to exert maximum effort in a single effort (1RM)
* Specifity concept: strength is specific to the muscle trained
* Neural-learning factor: nervous system fires first and is able to recruit more fiber
* Intensity: loads, repetitions, sets, rest periods
* Length: weeks, months, years
* Mechanical advantages and disadvantages: lengths of muscles and angles at which the tendons connect to the bones.
* Quantity of muscle tissue: 40% of BW in male, 23% of BW in female
* Muscle atrophy: inactivity leads to loss of about ½ lb per year in 20’s & 30’s; 1 lb in the 50’s
* Microtrauma: tearing down of muscle tissues
* Strength gains can be as much as 6% per week

Muscle Size Increases:

* Hypertrophy: increase in existing muscle fibers
* Hyperplasia: increase in muscle numbers (splitting of fibers)
* Genetics:
  + Fast-twitch: produce a great deal of force but fatigues quickly
  + Slow-twitch: not as forceful, but enduring and fatigues slowly

Improvements in Muscular Endurance:

* Muscular endurance: ability to perform repeatedly with moderate load for an extended period of time

Improvements in Cardiovascular Fitness:

* Oxygen uptake: ability to transport and utilize oxygen by the muscles
* Aerobic activities: with oxygen
  + 40-60% of 1RM, 15+ repetitions, 30-60sec rest period