STRENGTH TRAINING

Overview
Students will be able to demonstrate:
1. A better self-image.
2. A greater appreciation for strength training and the understanding that it is a necessary component in the pursuit of lifelong fitness.
3. Exercises and techniques that will undoubtedly aid them in their pursuit of lifelong fitness.
4. An understanding of the basic principles of strength training.
5. The ability to set up a strength training program designed to meet his/her needs that includes at least two exercises for each primary muscle group of the body.
6. The ability to thoroughly stretch every primary muscle group.
7. Proper breathing and lifting technique for all exercises.
8. The ability to classify body types using the traits that characterize each of the three basic body types: endomorphic, mesomorphic, and ectomorphic.
9. Knowledge of the three basic techniques of strength training: dynamic, static, and isokinetic.
10. An understanding of exercises that work specific muscles of the body.

Safety
1. There is absolutely no horseplay allowed in the Weight Room.
2. There is absolutely no gum chewing allowed in the Weight Room.
3. Students are not allowed to lift any weights or use any machines in the Weight Room until the instructor is present.
4. Students are required to warm up and stretch before strength training.
5. Students should not attempt to lift any weights beyond his/her capacity.
6. Students are prohibited from exercising without wearing appropriate clothing and footwear.
7. Students are required to use a spotter when bench pressing, incline bench pressing, barbell squatting, and power cleaning.
8. Students are required to wear a weight training belt when doing barbell squats and power cleans.
9. When using machines, individuals are responsible for making sure that all pins are in place and that they keep their hands free from danger.
10. Students should not attempt to use any machines or pieces of equipment without having the knowledge to do so. Always ask the teacher if you are not sure.

Use and Care of Equipment and Machines
1. Students will be taught how to properly use all of the equipment and machines in the Weight Room.
2. Dropping weights on the floor and slamming weights together while using machines is prohibited.
3. All jump ropes, weight training belts, dumbbells, collars, plates, and fitness mats need to be returned to their respective places before classes are dismissed.
4. Students are prohibited from using equipment and machines for any exercises other than those originally intended for its use.
5. Students are expected to immediately report all problems with equipment and machines to their teacher.
Terminology, Methods, and Techniques

Physical Image
There are many reasons why people should have a true physical image. Some of the main ones are:
1. Knowing what you are physically can help you adjust your physical appearance (i.e., an overweight person may realize that they should lose weight and a person that may be physically weak may realize that they should improve their overall strength).
2. To better understand your limits in selecting activities. The value of physical activities depends on your ability to adjust to them.
3. Certain physical characteristics increase one’s odds of contracting various degenerative diseases later in life. It’s important to realize what can be done to prevent the early onset of such diseases.

Principles of Training

The five basic principles of training are:
1. The rate of improvement is directly related to the intensity of the training, not the duration.
2. The body’s response to training is specific to the training stress or overload placed on it.
3. During training, individuals tend to retrogress before improving. Individuals tend to get worse before getting better.
4. The psychological limit of performance is much lower than the physiological limit. Individuals tend to give up before giving out.
5. It is much easier to maintain fitness than to attain fitness. It is easier to stay in shape than it is to get in shape.

Outcomes of Training

- muscular strength
- strength
- endurance
- relaxation
- poise & coordination
- organ efficiency
- skill
- satisfaction
- enjoyment
- feelings of achievement & confidence
- increased self-esteem
- higher resistance to multiple diseases

Physical Maintenance

The three broad objectives of physical maintenance are:
1. To enable individuals to get more out of life through greater physical and mental activity.
2. To prevent or at least delay the onset of degenerative disorders.
3. To maintain a desirable state of mental health.

The approaches to physical maintenance are:
1. To obtain an adequate self-image that indicates correctable deficiencies.
2. To train to remove such deficiencies.
3. To hold a desired level of fitness.
Body Typing or Somatotyping

Somatotyping is a method of classifying the human body into types by estimating the relative prominence of inherited characteristics such as bone, muscle and fat distribution. It is a subjective estimate and uses a value scale from 1-7 with which to evaluate or numerically describe each of the body type components.

Somatotyping uses three principle body components designated as endomorph (soft and fat), mesomorph (husky and muscular), and ectomorph (linear). The components are named after the three embryonic layers: endoderm (the inner layer), mesoderm (the middle layer), and ectoderm (the outer layer). It is significant that everyone possesses each component and each of these components is rated on a seven-point scale. Doing so allows a numerical description of the body type. For example, an individual can possess a body type of 5-3-2. The 5 indicates the degree of endomorphy, the 3 mesomorphy, and the 2 the degree of ectomorphy.

The components and characteristics of the extremes of each body type are explained below.

**The extreme endomorph is characterized by:**
a large, soft bulging body
thick body segments
large round head
short, thick neck
fatty breasts
short arms
large abdomen
heavy buttocks
wide hips
hammy legs
small feet
body mass is concentrated in the center of the body

**The extreme mesomorph is characterized by:**
squareness and hardness
prominent and massive muscles
large, prominent bones
heavily muscled, massive legs
broad shoulders
narrow waist
large abdomen, heavily muscled
body mass concentrated in the center of the body

**The extreme ectomorph is characterized by:**
frail, delicate body structure
generally long slender neck
thin body segments
long thin bones
relatively large head with bulbous forehead
narrow shoulders
narrow waist
long legs and feet
little musculature

**Activity and You**

By forming good habits of exercise, diet, rest (sleep), and recreation it is possible to increase the number of years that you can enjoy quality physical activity.

The most obvious effect of regular exercise on the body is an increase in muscle development. Soft, flabby muscles become hard and firm. This improves physical appearance, increases strength and endurance, and enables your to better enjoy physical activities.

Medical evidence states that the lack of exercise makes you a more likely candidate for heart attacks, diabetes, cancer, backaches, nervous tension, obesity, psychosomatic disorders, and many other ailments.
Physical fitness is only one aspect of total fitness. Total fitness must involve emotional, social, and moral fitness as well as physical fitness.

Inactivity leads to deterioration. This is true whether it is physical or mental inactivity. The functional efficiency of an organism improves with use and regresses with disuse.

**Prevention of Stress and Emotional Tension**
Relaxation, rest, adequate recreation, and fitness all help to prevent and control stress and tension. There is little doubt that physical activity as part of a way of life can significantly delay the aging process.

**Mechanics of Daily Living**
Economy of effort is the result of skilled movements of the body and its ability to adapt to the rate and load of work being accomplished. It is very important to practice good body mechanics with every exercise. It is also extremely important to learn how to pick up, sit upright with, stand with, walk with, lift, put down, and carry weights properly.

**A Total Fitness Program**
The three basic goals of a total fitness program are:

- **Strength**—the amount of force a muscle can exert against a resistance. Strength can be developed through a strength training program.

- **Flexibility**—the stretching of muscles to increase the range of motion about a joint.

- **Cardiovascular Endurance**—the process of the body adapting to the work it is required to perform in proportion to the intensity of that work. This is developed by strenuously exercising the heart and lungs.

**Methods of Strength Training**

- **Isometric or Static Training**—the straining of muscles against an immovable force. In this type of training, there is a very slight shortening of the muscle and there is no movement of the joint, even though the muscle is still tense.

- **Isotonic or Dynamic Training**—this occurs when, throughout the shortening of muscles, the tension remains constant and there is movement of the joint involved.

- **Isokenetics**—muscle contraction with variable resistance throughout the entire range of motion.

**Setting Up A Strength Training Program**
1. You must first decide if you want to “tone-up” or “bulk-up” and ultimately whether or not you want to focus on developing strength or endurance. Toning-up tends to dramatically increase muscle endurance and bulking-up tends to dramatically increase muscle strength.
   a. “Toning-up” consists of doing a high number of repetitions (12 or more) using “light” weights for multiple sets (2-4); decrease the weight if you can’t lift the desired weight 12 times (it’s too heavy).
   b. “Bulking-up” consists of doing a low number of repetitions (10 or less) using “heavy” weights for multiple sets (3-5); increase the weight if you can lift the desired weight more than 10 times (it’s too light). It is essential to warm-up by using lighter weights before attempting to lift a heavy weight.
2. Isolate the muscle or muscle groups that you wish to develop and put that muscle or muscle group under stress that is challenging for you, regardless of the weight that you are using or the repetitions you are doing. The basic “overload” principle of weight training is that no muscle will truly become stronger if it is not put into a stressful situation; you must feel the burn. For that reason, you will dramatically increase your results if you go to failure during every set of repetitions; once again, you must feel the burn. For the record, it is a myth that girls will look like boys if they lift “heavy” weights.

3. Divide (split) your body into parts and only workout specific muscle groups on specific days; doing so will allow you to exercise more efficiently and effectively during class. Make sure that you work out every primary muscle group at least once a week.

**Sample 3-Day Split**

**Day 1**
Pectorals (chest)
Triceps (back of arms)
Hamstrings (back of thighs)

**Day 2**
Quadiceps (front of thighs)
Latissimus Dorsi (upper back)
Biceps (front of arms)
Forearms (lower arms)

**Day 3**
Deltoids (outer shoulders)
Trapezius (inner shoulders)
Calves (upper ½ of the back of lower legs)

**Sample 2-Day Split**

**Day 1**
Pectorals (chest)
Triceps (back of arms)
Hamstrings (back of thighs)

**Day 2**
Quadiceps (front of thighs)
Latissimus Dorsi (upper back)
Biceps (front of arms)
Forearms (lower arms)

**Strength Training Definitions**

**Repetition (rep):** The act of repeating; doing an exercise over and over again. The number of times you lift and lower a weight in one set of an exercise. For example, if you lift and lower a weight 5 times before putting the weight down, you have completed 5 reps in one set.

**Set:** A group of repetitions (lifting and lowering a weight) of an exercise after which you take a brief rest. For example, if you complete 10 reps, then put the weight down to rest, complete 10 more reps, put the weight down to rest again, and then do 10 more reps, you have completed three sets of the exercise.

**Super-sets:** Combinations of exercises, usually two or more. When super-setting, individuals work different muscle groups immediately going from one exercise to the next. Super-setting maximizes one’s time as well as increases their odds of burning fat.

**Training Split:** The term used to categorize a group of muscles and the exercises used to train them on given days. For example, if a person exercises their chest, triceps, and hamstrings on Mondays (Day 1); their quadiceps, latissimus dorsi, biceps, and forearms on Wednesdays (Day 2); and their deltoids, trapezius, and calves on Fridays (Day 3), they’ve basically “split” their primary muscles into 3 groups. This example would be called a 3-Day Split.
**Tendons:** connective tissue that connect muscle to bone

**Ligaments:** connective tissue that connects bone to bone

**Fascia:** connective tissue that form sheaths over and around all muscles

**Cartilage:** connective tissue mainly used to protect bones from rubbing against each other

**Strength Training Tips**

- Warm up your primary muscles by doing warm up sets before attempting to lift heavy weights. Your desired starting weight determines the needed number of warm up sets; the heavier the desired starting weight, the more warm up sets are needed. Ideally, your first warm up set should be roughly 40-60% of your max.

- When spotting, protect yourself at all times by paying special attention to your partner. Do not over exert yourself by aiding your partner too much. If your partner can’t do the majority of work on their own, help them rack up the weights.

- Breathe through your mouth when strength training; exhale when pushing/lifting weights away from your body and inhale when pulling/lifting weights toward your body.

- *Never “lock-out” a joint (elbow/knee) when lifting weights; doing so can lead to serious injury.*

- Unless you are super-setting, rest for approximately 45-75 seconds between sets when using “light” weights and 2-3 minutes when using “heavy” weights; get a drink of water and/or stretch between sets.

- Learn the names of the primary muscles of your body as well as all of the exercises that you use to train them; knowing the names and locations of the muscles will help you concentrate more when strength training, thus allowing for quicker, better results.

- *Remember, strength training is more mental than physical.*

- Squeeze your muscles at the peak of each contraction.

- After strength training, give fatigued muscles a minimum of 48-72 hours to rest before strength training those particular muscles again.

- Every now and then, follow the “opposite” guidelines for at least a week in order to “shock” your muscles. For example, if you are trying to “tone-up” by using lighter weights, use heavier weights for a week and vice versa.

- Do not work out the same muscle groups on consecutive days. Too much strength training without a significant amount of recovery time can tear the muscles down rather than build them up.
Steroids

What are steroids?
Anabolic steroids are powerful drugs that many people take in high doses to boost athletic performance. Anabolic means “building body tissue.” Anabolic steroids help build muscle tissue and increase body mass by acting like the body’s natural male hormone, testosterone.

Lower doses of anabolic steroids sometimes are used to treat a handful of very serious medical conditions. They should not be confused with corticosteroids, which are used to treat common medical conditions such as asthma and arthritis. Corticosteroids are strong medications, but do not have muscle-building effects. Anabolic steroids are the ones abused by athletes and others who want a shortcut to becoming bigger and stronger.

Who uses steroids?
In the past, steroid use was seen mostly in college, Olympic, and professional sports. Today, steroids are being used by athletes as well as non-athletes, in high schools and middle schools. Most major professional and amateur athletic organizations have banned steroids for use by their athletes. These organizations include the International Olympic Committee, National Collegiate Athletic Association (NCAA), the National Football League (NFL), and Major League Baseball (MLB).

Most commonly, steroid use can be found among the following groups:

- Athletes involved in sports that rely on strength and size, like football, wrestling, or baseball
- Endurance athletes, such as those involved in track-and-field and swimming
- Athletes involved in weight training or bodybuilding
- Anyone interested in building and defining muscles

How are steroids used?
Steroids can be taken in the following two ways:

- By mouth (pills)
- Injection with a needle

*Individuals who share needles to inject steroids also are at risk for serious infections including Hepatitis B and HIV, the AIDS virus.

Some athletes take even higher doses, called “mega-doses,” to produce faster results. Others gradually increase the amount they take over time, which is called “pyramiding.” Taking different kinds of anabolic steroids, possibly along with other drugs, is a particularly dangerous practice known as “stacking.”

Will steroids make you a better athlete?
No. Steroids cannot improve an athlete’s agility or skill. Many factors help determine athletic ability, including genetics, body size, age, sex, diet, and how hard the athlete trains. It is clear that the medical dangers of steroid use far outweigh the advantage of gains in strength or muscle mass.
What are the side effects of steroids?
Steroids can cause serious health problems. Many changes take place inside the body and may not be noticed until it is too late. Some of the effects will go away when steroid use stops, but some may not.

Side effects for both sexes
Possible side effects for males and females include the following:

- High blood pressure and heart disease
- Liver damage and cancers
- Stroke and blood clots
- Urinary and bowel problems, such as diarrhea
- Headaches, aching joints, and muscle cramps
- Nausea and vomiting
- Sleep problems
- Increased risk of ligament and tendon injuries
- Severe acne, especially on face and back
- Baldness

A special danger to adolescents
High school and middle school students and athletes need to be aware of the effect steroids have on growth. Anabolic steroids, even in small doses, have been shown to stop growth too soon. Adolescents also may be at risk for becoming dependent on steroids. Adolescents who use steroids are also more likely to use other addictive drugs and alcohol.

Side effects for males
One of the more disturbing effects of steroid use for males is that the body begins to produce less of its own testosterone. As a result, the testicles may begin to shrink. Following is a list of some of the other effects of steroid use for males:

- Reduced sperm count
- Impotence
- Increase in nipple and breast size (gynecomastia)
- Enlarged prostate (gland that mixes fluid with sperm to form semen)

Side effects for females
Since steroids act as a male hormone, females may experience the following side effects:

- Reduced breast size
- Increase in facial and body hair
- Deepened voice
- Menstrual problems

Emotional effects
Steroids also can have the following effects on the mind and behavior:

- “Roid rage” – severe, aggressive behavior that may result in violence
- Severe mood swings
- Hallucinations – seeing or hearing things that are not really there
- Paranoia – extreme feelings of mistrust and fear
• Anxiety and panic attacks
• Depression and thoughts of suicide
• An angry, hostile, or irritable mood

**Play safe, play fair**
Success in sports takes talent, skill, and most of all practice and hard work. Using steroids is a form of cheating and interferes with fair competition. More importantly, they are illegal and dangerous to your health. There are many healthy ways to increase your strength or improve your appearance. If you are serious about your sport and your health, keep the following tips in mind:

• Train safely, without using drugs.
• Eat a healthy diet.
• Get plenty of rest.
• Set realistic goals and be proud of yourself when you accomplish them.
• Seek out training supervision, coaching, and advice from a reliable professional.
• Avoid injuries by playing safely and using protective gear.
• Talk to your pediatrician about nutrition, your health, and ways to prevent injury.

If you, your friends, teammates, or family members are using steroids, get help. Share this information with friends and teammates. Take a stand against the use of steroids and other drugs. Truly successful athletes combine their natural abilities with hard work to win. There is no quick and easy way to become the best.

**For more information, contact the following organizations:**

National Institute on Drug Abuse (NIDA)

National Clearinghouse for Alcohol and Drug Information (NCADI)
[www.health.org](http://www.health.org)

**References**

American Academy of Pediatrics
[www.aap.org](http://www.aap.org)

[www.choosemyplate.gov](http://www.choosemyplate.gov)
**Unit 2 Strength Training Key Points**

- Barbell bench and incline bench, barbell squats, and Olympic lifts require spotters.

- Collars help to secure loose plates onto free weight bars.

- Dynamic stretching or dynamic resistance training relies on moving parts of your body and gradually increasing reach, speed of movement, or both.

- Static stretching consists of stretching a muscle or group of muscles to its farthest point and then maintaining or holding that position while remaining still.

- A weight training belt is used for squats, dead lifts, and Olympic lifts.

- The body’s response to strength training is specific to the intensity (weight) of the exercise.

- Weight training is directly linked to both the psychological and physiological response of the body.

- Somatotyping is a concept that relies on a scale to determine an individual’s body type.

  - Endomorph = thick body segments
  
  - Ectomorph = long and thin body segments

  - Mesomorph = broad and muscular

- An increase in muscle development is the most obvious result of weight training.

- It is possible to plateau or decrease in muscle strength if there is no variation in stress or overload within a strength program.
Unit 3 Strength Training Key Points

- Progression is to gradually improve the strength of the lifter by continually increasing the physical demands to overload the system.

- Overload – increasing the demand for your body through intensity (weight) and duration (time) of an exercise.

- Training to failure – allowing the body to go into complete fatigue.

- Specificity Variables – muscle action, speed of movement, range of motion, muscle group

- Training Split – Dividing your body into parts and only working specific muscle groups on specific days.

- Periodization – A strength training program that provides variation in volume and intensity over approximately 8-12 weeks to achieve a certain level of performance at the end of the program.

- Contraction:
  - Isometric – tension, but no movement
  - Eccentric – lengthens muscle (increase joint angle)
  - Concentric – shortens muscle (decrease joint angle)

- Bulking – Low number of repetitions and heavy weights for multiple sets. Rest time = 120-180 seconds

- Toning – High number of repetitions and light weights for multiple sets. Rest time = 45-75 seconds

- At the peak of every contraction the lifter should squeeze their muscles.

- Super Set – a combination of exercises used while immediately moving from one exercise to the next without a break.

- Muscle fiber that is resistant to fatigue – Slow Twitch (red muscle fiber)

- Muscle fiber that fatigues quickly = Fast Twitch (white muscle fiber)
**Unit 4 Strength Training Key Points**

- **Total Fitness Program = 1) Strength 2) Flexibility 3) Cardiovascular Fitness**

- **Training Split** – Dividing your body into parts and only working specific muscle groups on specific days.

- **Tendons** – connect muscle to bone  
  **Ligaments** – connect bone to bone  
  **Cartilage** – protective layer between bones to protect bones from rubbing  
  **Fascia** – protective sheathe over muscles

- **Contractions:**  
  **Isometric** – tension, but no movement  
  **Eccentric** – lengthens muscle (increase joint angle)  
  **Concentric** – shortens muscle (decrease joint angle)

- **Warm up set** – 40-60% of 1RM

- **Proper form requires full range of motion without locking out joints.**

- **Strength training is more mental (psychological) than physical (physiological).**

- **Proper breathing** – inhale when you pull or lift weights in towards your body, exhale when pushing/lifting the weights away from your body.

- **Steroids** – powerful drug to increase muscle size and boost athletic performance. Acts like the body’s natural hormone, testosterone.
  1. Groups of Steroid Users – body builders, high school athletes, Olympic athletes, non-athletes  
  2. Administered by mouth or injections  
  3. Side effects – hypertension, heart disease, organ failure, reproductive failure/inefficiency, infection (due to needle sharing)  
  4. Stacking – several different kinds of steroids or other drugs at the same time  
  5. Mega dose – One large dose of steroids that is administered at one time  
  6. Pyramiding – Increasing dosage after each use
EXERCISE LIST

PECTORALS (chest)
- Barbell Bench Press
- Incline Bench Press
- Dumbbell Bench Press
- Dumbbell Incline Bench Press
- Hammer Strength Iso-Chest
- Dumbbell Fly
- Incline Dumbbell Fly
- Close-Grip Bench Press

BICEPS (front of arms)
- Barbell Curl
- Dumbbell Hammer Curl
- Dumbbell Bicep Curl
- EZ Bar Curl
- Concentration Curl
- EZ Bar Preacher Curl

TRICEPS (back of arms)
- Tricep Kickbacks (3 variations)
- Overhead Tricep Extensions
- Lying Tricep Extensions
- Tricep Press Downs
- Icarian Machine Dips (NC)

DELTOIDS (outer shoulders)
- Dumbbell Shoulder Press
- Barbell Shoulder Press
- Hammer Strength I.L. Shoulder Press
- Lateral Dumbbell Raise
- Frontal Dumbbell Raise
- Barbell Incline Frontal Raise
- Dumbbell Incline Frontal Raise
- Bent-Over Lateral Dumbbell Raise

TRAPEZIUS (inner shoulders)
- Dumbbell Shoulder Shrug
- Barbell Should Shrug
- Hammer Strength Shrug
- Dumbbell Upright Row
- Barbell Upright Row

ERECTORS (lower back)
- Back Extension
- Good Morning

LATISSIMUS DORSI (back)
- Hammer Strength Iso-Back
- Lateral Pull Down
- Reverse Grip Lateral Pull Down
- EZ Bar Pullover
- Single-Arm Dumbbell Row
- Double-Arm Dumbbell Row
- Barbell Row
- Hammer Strength Iso-Lateral Row (NC)
- Icarian Machine Chin/Pull Up (NC)

QUADRICEPS (thighs)
- Barbell Squat
- Dumbbell Squat
- Hammer Strength Squat
- Hammer Strength Leg Press
- Hammer Strength leg Extension
- Leg Extension
- Hammer Strength Single Leg Lunge
- Barbell Lunge
- Dumbbell Lunge
- Icarian Super Squat/Hack Squat (NC)
- Leg Press (SC)

CALVES
- Hammer Strength Calf Raise
- Seated Dumbbell Calf Raise
- Seated Calf Raise (NC)
- Standing Calf Raise (NC)

HAMSTRINGS (back of thighs)
- Hammer Strength Seated Leg Curl
- Leg Curl (on belly)
- Hammer Strength Straight Leg Dead Lift
- Dumbbell Straight Leg Dead Lift
- Barbell Straight Leg Dead Lift

FOREARMS
- Dumbbell Wrist Curl (palms up)
- Barbell Wrist Curl (palms up)
- Dumbbell Reverse Wrist Curl (palms down)
- Barbell Reverse Wrist Curl (palms down)
- Dumbbell Hammer Wrist Curl (palms in)

ABDOMINALS & OBLIQUES
- Various Exercises

PLEASE NOTE THAT THERE ARE MULTIPLE VARIATIONS OF THESE EXERCISES