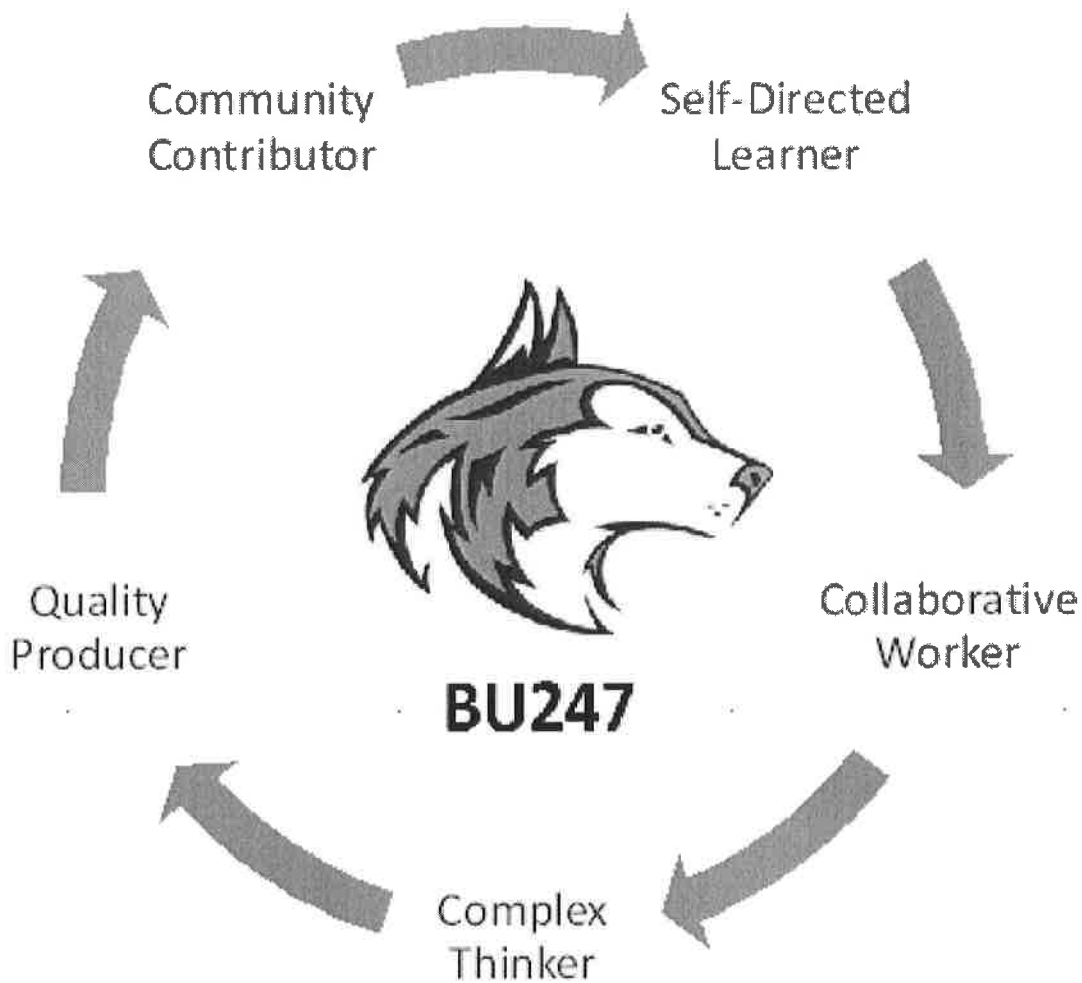


# ***Freshmen Fitness/Wellness Planning Guide***



*Naperville North Wellness Department*  
**2018**

## **The Mission Of District 203 Is To Produce Students Who Are:**

### **Self-Directed Learners:**

- ◆ Initiates, prioritizes, and evaluates achievable goals
- ◆ Seeks continuous learning opportunities
- ◆ Manages multiple tasks and life demands
- ◆ Takes responsibility for all choices
- ◆ Demonstrates positive choices for physical, social, spiritual, and emotional health
- ◆ Maintains a positive outlook

Skills: Independence, Accountability, Organization, Wellness

### **Collaborative Workers:**

- ◆ Works within diverse groups to achieve a common goal
- ◆ Monitors and manages own role and behavior as a group member
- ◆ Offers and accepts constructive criticism
- ◆ Demonstrates consideration and respect for self and others

Skills: Teamwork

### **Complex Thinkers:**

- ◆ Selects, applies, and reflects upon the processes to solve problems
- ◆ Accesses, evaluates, integrates, and cites information from primary and secondary resources
- ◆ Receives and expresses knowledge through spoken, written, visual, and tactile language
- ◆ Perceives, creates, and respects aesthetic meaning of behavioral, natural, and artistic expression

Skills: Research, Communication, Aesthetic Appreciation, Critical Thinking

### **Quality Producers:**

- ◆ Creates products to achieve an authentic purpose
- ◆ Constructs products appropriate for audience and context
- ◆ Designs and develops products/presentations that reflect integrity, confidence, objectivity, and craftsmanship
- ◆ Uses relevant computer technology wisely, ethically, and efficiently

Skills: Presentation, Technology

### **Community Contributors:**

- ◆ Explores individual and societal connections which impact communities of all sizes
- ◆ Develops respect for self and empathy for those of diverse abilities, cultures, and beliefs
- ◆ Plans and takes action for creating community in a variety of settings
- ◆ Exercises the rights and responsibilities of citizenship

Skills: Global Awareness, Acceptance of self and others

## **FRESHMEN FITNESS CONCEPTS – FITNESS/WELLNESS PLANNING**

***Students in District 203 will achieve and maintain a health-enhancing level of physical fitness based upon continual self-assessment. (State Standard 20).***

### **Essential Questions**

- What are the essential elements of total wellness?
  - Physical, Cognitive, Social, Emotional
- Why is it important to achieve & maintain a healthy, productive, and physically active lifestyle?
  - Improved Quality of Life
- How does one evaluate wellness levels?
  - Acquire knowledge, Collect data, Create goals/plan of action, Implement

### ***Students will understand...***

- The 5 health-related components of fitness and the benefits of exercise in each component
- The principles of exercise: frequency, intensity, time, type, progression, and overload
- How to evaluate fitness testing results and understanding of the principles of exercise
- How to assess personal fitness levels and how to write appropriate short term goals based on these results

### ***Students will be able to...***

- Identify the 5 health-related components of fitness
- Describe the benefits of exercise
- Apply the principles of exercise
- Identify and apply appropriate ways to improve fitness levels
- Evaluate personal fitness levels and write appropriate short term goals based on these results

### **Daily Expectations**

- **Demonstrate an interest in personal growth through a high level of ACTIVITY.**
- **Demonstrate an interest in the growth of others in the class through collaboration, encouragement, cooperation, and being considerate of safety issues.**

## NNHS Daily Engagement Standard

The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. The student demonstrates their competency of this standard through their abilities to be prepared, active, safe & cooperative on a consistent basis. The four Daily Engagement Targets are: 1) The student will be prepared for class in accordance to the expectations set by the instructor. 2) The student will demonstrate and promote safety at all times during class. 3) The student will participate in all activities with high levels of effort. 4) The student will cooperate with classmates and the instructor to create & maintain an efficient environment. The student is given a weekly grade based on the below rubric.

0	1	2	3	4	5
No Attempt	Does Not Meet	Does Not Meet - Emerging	Basic	Proficient	Exceeds
<p>The student does not meet any of the targets for the week for various reasons.</p> <p>*Students that are absent 5 days during the grading period fall into this category. These students have the opportunity to demonstrate their abilities through the PE make-up process.</p>	<p>The student does not meet 6 or more of the daily engagement target regarding:</p> <ul style="list-style-type: none"> <li>• Being prepared for class</li> <li>• Demonstrating safety</li> <li>• Being physically active</li> <li>• Cooperating with classmates &amp; instructor</li> </ul> <p>*Students that are absent 4 days during the grading period fall into this category. These students have the opportunity to demonstrate their abilities through the PE make-up process.</p>	<p>The student does not meet 5 of the daily engagement target regarding:</p> <ul style="list-style-type: none"> <li>• Being prepared for class</li> <li>• Demonstrating safety</li> <li>• Being physically active</li> <li>• Cooperating with classmates &amp; instructor</li> </ul> <p>*Students that are absent 3 days during the grading period fall into this category. These students have the opportunity to demonstrate their abilities through the PE make-up process.</p>	<p>The student does not meet 3-4 of the daily engagement target regarding:</p> <ul style="list-style-type: none"> <li>• Being prepared for class</li> <li>• Demonstrating safety</li> <li>• Being physically active</li> <li>• Cooperating with classmates &amp; instructor</li> </ul> <p>*Students that are absent 2 days during the grading period fall into this category. These students have the opportunity to demonstrate their abilities through the PE make-up process.</p>	<p>The student does not meet 1-2 of the daily engagement target regarding:</p> <ul style="list-style-type: none"> <li>• Being prepared for class</li> <li>• Demonstrating safety</li> <li>• Being physically active</li> <li>• Cooperating with classmates &amp; instructor</li> </ul> <p>*Students that are absent 1 day during the grading period fall into this category. These students have the opportunity to demonstrate their abilities through the PE make-up process.</p>	<p>The student meets or exceeds all daily engagement targets for the week:</p> <p>The student demonstrates a high level of motivation to be self-directed. The student is prepared daily. The student always demonstrates accountability with safety. The student demonstrates the ability to always cooperate with classmates and instructor. The student is highly active and participates in all activities with high effort.</p>

\*Students with excused absences, parent note, or doctor notes are eligible to make up a class.

# FRESHMAN FITNESS CONCEPTS

## PRE-WRITING ASSIGNMENT

Please answer the following questions in 2-4 sentences. The intent of this assignment is to determine what you know about fitness, what you expect to learn about fitness and what you want to learn about fitness.

1. WHAT IS FITNESS?
2. WHAT DO YOU WANT TO KNOW ABOUT FITNESS?
3. ASSESS YOUR CURRENT LEVEL OF FITNESS BASED UPON WHAT YOU PRESENTLY KNOW.
4. HOW DO YOU TAKE PERSONAL RESPONSIBILITY FOR YOUR HEALTH AND FITNESS? EXPLAIN YOUR ANSWER.

# **The Benefits of Keeping Active**

## **Improved Health**

The symptoms of heart disease and other health complications may not surface until middle age, the onset of disease can start taking place as early as the teens. Fact: consistent, regular exercise actually strengthens the heart, resulting in more blood and oxygen flow throughout the body. At the same time, aerobic exercise lowers blood pressure and cholesterol levels, both major health risks for many Americans.

## **Increased Function**

Fitness results in better coordination of muscles, and an increase in strength, flexibility and stamina. Improvements in function allow you to enjoy life more fully and help reduce the risk of injury: Stronger, limber muscles are less susceptible to strain and sprain.

## **Better Posture**

Poor posture is a major cause of injury, and often leads to big problems later in life. Exercising in proper form promotes better posture, as well as the strengthening and stretching of muscles that help you stand up straight.

## **Fat Loss**

Aerobic and strengthening exercises can result in weight loss when combined with a calorie-reducing diet. Without exercise, dieting can cause the loss of muscle as well as fat. An aerobic exercise regimen burns fat, while building muscle. This may mean less dramatic weight loss, but since muscle tissue burns more calories than fat tissue, the result is longer lasting.

## **Heightened Self Image**

A fitness regimen offers many psychological benefits, but the biggest payoff comes from an improved self image. Achieving fitness goals leads to self confidence, improved body image, self awareness and esteem. People often recount the first time they surpassed what they believed the limit of their skills, and how this affected their opinions of themselves. In addition, the discipline necessary to accomplish personal fitness goals will have a positive effect on your life.

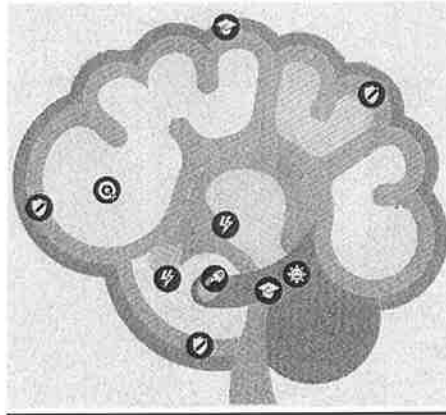
## **Intellectual Gains**

Several theories promote the theory that activity makes the brain work more efficiently. Newer research has identified that activity can promote neural growth in the brain! Fitness also helps the immune system, meaning better work performance, and fewer missed days of work or school. Exercise increases blood and oxygen flow throughout the body, including the brain. This may explain why studies have shown that those who exercise react more quickly to stimulus than their less fit counterparts, pointing to a link between motor and intellectual skills.

## **Enjoyment**

You may forget that the most important reason for fitness is because you enjoy it. People often mention weight control, feeling "better," and gaining strength as priorities for working out. But you won't lose weight, get strong, or feel "better" if you can't find motivation to exercise. One way to increase enjoyment is to try several different things, or find a new workout location.

## HOW YOUR BRAIN BENEFITS FROM EXERCISE



Current research reinforces that consistent exercise allows you to gain and maintain your full potential cognitively as well as emotionally. Your brain benefits from exercise in the following ways...



### **PITUITARY GLAND, HYPOTHALAMUS, AND FRONTOLIMBIC REGION:**

Running pumps out feel-good endorphins in the brain areas associated with emotions.



**DENTATE GYRUS:** Working out triggers neurogenesis-birth of new cells-in the dentate gyrus, a brain area responsible for memory and verbal learning.



**FRONTOL. PARIETAL, AND TEMPORAL CORTEXES:** Regular aerobic activity slows the loss of gray matter the begins around age 30.



**FRONTAL LOBE:** White matter, a conduit for messages between areas of gray matter, begins to decrease in size after age 30. Exercise minimizes this natural deterioration.



**CEREBRAL CORTEX AND HIPPOCAMPUS:** Exercise spikes levels of brain-derived neurotrophic factor (BDNF), a protein that protects neurons from injury.



**HIPPOCAMPUS:** Exercise may reduce depression by increasing levels of BDNF, deficiencies of which have been linked to mood disorder.

# Why Fitness Testing is IMPORTANT!

and other notes...

The main purpose of fitness testing is to collect information about your physical condition and identify what fitness range you are in. When you collect the test results, compare it to the population norms, the average values of people of the same age and gender. This will allow you to make an accurate reflection.

- Fitness testing can motivate and inspire a person to start, maintain or increase physical exercise. The tests are most useful when following individual progress by comparing new results to previous test.
- Fitness tests are the cornerstone of personal training. When a person knows his/her test result, it is easier to choose the right exercise program.
- Remember, there are many factors that can influence your performance on fitness tests (e.g., maturation, heredity, predisposition/trainability and body composition.)
- Fitness testing is not a competition.
- To get reliable data you must give high levels of effort and perform the test correctly. Consistency in testing is what provides reliable data.
- Regardless of your fitness levels, low or high, you are always in position to improve.
- Getting to an acceptable level of total fitness and wellness is the first step. Maintaining fitness and wellness over the duration of your life is the goal.
- Ultimately, fitness testing is about you making a real world evaluation on your fitness levels at a time when a change in lifestyle can make a lasting impact on the rest of your life.



**\*TO PRODUCE VALID AND RELIABLE DATA YOU MUST FOLLOW INSTRUCTIONS AND GIVE YOUR PERSONAL BEST!\***

NAME \_\_\_\_\_ ID# \_\_\_\_\_ PERIOD \_\_\_\_\_ TEACHER \_\_\_\_\_

Age \_\_\_\_\_ Height \_\_\_\_\_ Weight \_\_\_\_\_ Sem \_\_\_\_\_

FITNESS COMPONENT	TEST ITEM	TEST RESULT	HEALTHY FITNESS STANDARD	MEETS DNM	GOAL TO REACH	EFFORT RATING 1-5
CARDIOVASCULAR	PACER					MX HR
CARDIOVASCULAR	MILE					AVG HR
FLEXIBILITY	SIT & REACH					
MUSCULAR ENDURANCE	CURL-UPS					
MUSCULAR ENDURANCE	PUSH-UPS					
MUSCULAR STRENGTH	PULL-UPS (regular or modified)					
*BODY COMPOSITION	BODY FAT %					X
*BODY COMPOSITION	BODY MASS INDEX					X

BLOOD PRESSURE: SYSTOLIC \_\_\_\_\_ DIASTOLIC \_\_\_\_\_ RESTING HEART RATE \_\_\_\_\_

**\*These are optional test.**

## Males

Age	*Mile	**Pacer	Push-up	Curl-up	Modified Pull-up	***Pull-up	Sit & Reach	BMI HFZ	Body Comp. HFZ
13	7:30-10:00	29	12	21	8	1-4	8	15.8-22.8	7.8-22.8
14	7:00-9:30	36	14	24	9	2-5	8	16.4-23.0	7.1-21.3
15	7:00-9:00	42	16	24	10	3-7	8	16.9-23.7	6.6-20.1
16	7:00-8:30	47	18	24	12	5-8	8	17.5-24.5	6.5-20.1
17	7:00-8:30	50	18	24	14	5-8	8	18.1-24.9	6.7-20.9
17+	7:00-8:30	54	18	24	14	5-8	8	18.6-24.9	7.0-22.2

## Females

Age	*Mile	**Pacer	Push-up	Curl-up	Modified Pull-up	***Pull-up	Sit & Reach	BMI HFZ	Body Comp. HFV
13	9:00-11:30	25	7	18	4	1-2	10	15.7-22.9	13.4-27.7
14	8:30-11:00	27	7	18	4	1-2	10	16.2-23.6	14.0-28.5
15	8:00-10:30	30	7	18	4	1-2	12	16.7-24.3	14.6-29.1
16	8:00-10:00	32	7	18	4	1-2	12	17.1-24.8	15.3-29.7
17	8:00-10:00	35	7	18	4	1-2	12	17.5-24.9	15.9-30.4
17+	8:00-10:00	38	7	18	4	1-2	12	17.8-24.9	16.5-31.3

\*Mile standards reflect the Fitnessgram Standards of 2010. In 2011 Fitnessgram began utilizing BMI to compute Aerobic Capacity (VO2max).

\*\* Minimum standard to meet Healthy Fitness Zone. Not a measure of VO2max.

\*\*\*Fitnessgram standard from 2005.

Youth Blood Pressure Standards				
	Males		Females	
	systolic	diastolic	systolic	diastolic
13	117	75	117	76
14	120	75	119	77
15	120	76	120	78
16	120	78	120	78
17	120	80	120	80

# CARDIOVASCULAR FITNESS

**What is it?** Your body's ability to efficiently feed oxygen to muscles when doing work. Muscles become fatigued when there is not an adequate supply of oxygen or energy. The greater your ability to supply oxygen and/or energy to muscles = greater amount of work with less strain.

## **What are the benefits of increasing Cardiovascular Fitness?**

Participating in a cardiovascular conditioning program can help the participant to:

- lower blood pressure
- increase HDL cholesterol
- decrease total cholesterol
- decrease body fat due to utilizing fat as energy
- increase heart function and its ability to pump more blood
- decrease stress reactions and anxiety
- reduce glucose-stimulated insulin
- increase oxygen output to body
- decrease resting heart rate
- increase cardiac output
- increase aerobic work capacity

\*There is also a proven link between greater cardiovascular conditioning and higher mental capacity. This greater mental capacity is due to the release of exercise induced endorphins, hormones, and enzymes that promote brain function. On the most basic level, you are increasing blood flow to the brain and providing it with the max amount of fuel, oxygen, and enzymes to work at an optimal level.

Regular aerobic conditioning may prevent or reduce the likelihood of cardiovascular disease.

## **Cardiovascular endurance is the most important component of physical fitness!**

**How do I increase my Cardiovascular Fitness?** This is accomplished by raising your heart rate to your **TRAINING HEART RATE ZONE** or **intensity level** (145 bpm & 185 bpm) for **25-30 minutes(time)**, for **at least 3 times a week (frequency)**. One way to find your **TARGET HEART RATE** is to complete the Karvonen formula.

- If you are just starting an exercise program it is recommended that you exercise between **50 - 60 percent** of your maximum heart rate.
- If you already exercise regularly and would like to continue increasing overall fitness, or improve your times, you should, exercise at **60 - 70 percent** of maximum heart rate.
- If your goal is to improve aerobic capacity or athletic performance, you will likely be exercising in the training zone, which is **75 - 85 percent** of maximum heart rate.

This may be accomplished through a variety of activities that may be **AEROBIC**. Aerobic activities are those that are performed at steady rate so the heart muscle can perform in the training heart rate zone, while also supplying the body with as much oxygen as the body needs. Examples are: jogging, bicycling, inline skating, jumping rope, power walking, roller skating, ice skating, and step machines, etc..

**ANAEROBIC** activities can also be added to your program to enhance your progress toward cardiovascular fitness. These activities are performed at a rate that will NOT allow the heart to provide enough oxygen to meet the needs of the body. Examples are: short sprints, sprinting when swimming, hard interval runs, etc..

**Always keep in mind: Improvement in your cardiovascular fitness level depends on FREQUENCY, INTENSITY, and TIME (F.I.T.) of your cardiovascular activity.**

### **Criteria for Cardiovascular Exercise**

For criteria we will get acquainted with the word **FIT**.

Frequency  
Intensity  
Time

**Frequency** - This refers to the number of times per week you perform cardiovascular exercise. To improve cardiovascular fitness levels, a minimum of three days a week is recommended. The American Council of Exercise Guidelines recommends 3 -5 days per week. Remember that a person should not try to overdo it too soon but progress slowly and efficiently.

**Intensity** - Intensity level is a very important part of any exercise program. Exercising at correct levels can make a big difference in the effectiveness of a program. Intensity can be defined as speed or workload of an activity. Many people do not exercise at the correct intensity level for cardiovascular enhancement. On the other hand some people can actually exercise at too high an intensity level. Exercising at a high intensity level can increase a person's chance of injury. Knowing intensity level is very important in getting the desired results from a program. Intensity is important for a person who wants to build a base of fitness, a person who wants to burn fat, or a person who just want to increase performance levels for athletic competition.

The Guidelines for intensity levels or Target Heart Zone is 45-85 % of maximal heart rate.

**Time** - This refers to the duration of an exercise session or the length of time to complete an exercise. For many the duration of an exercise depends upon the intensity of an exercise. In general the cardiovascular exercise should last a minimum of 20 minutes with the best results coming after a longer period of time. A person can get good cardiovascular fitness and body fat burning utilization at 20 - 30 minutes of cardiovascular exercise. People who are just beginning a program should start slowly and progress over time. A person who rarely has ever exercised should start at 10 -12 minutes including a 5 minute warm-up and increase this by about 2 minutes per week until they are above 20 minutes. The key is to spend some time doing some cardiovascular activity every day if possible.

### **Monitoring Intensity (Heart Rate)**

Monitoring your heart rate is important for assessing fitness goals, regulating exercise intensity, and documenting progress to exercise. The three methods to measuring cardiovascular exercise are heart rate, perceived exertion, and laboratory testing and monitoring.

**Heart Rate** - Knowing heart rate and exercise intensity is essential to progress in a person's program. The two ways to measure heart rate during exercise are obtained from measuring the pulse rate and using a heart rate monitor. Measuring or feeling a pulse is the easiest and less costly method although it does have its drawbacks. During exercise such as swimming or running it is often difficult to stop and take a pulse. To take a pulse place an index finger or middle finger over the radial artery this is located on the edge of the wrist just below the thumb.

## **Heart Rate Monitor**

Heart Rate monitors are a very good way to measure heart rate during exercise. Heart rate monitors are accurate digital devices which use sensors strapped to the chest or wrist which can measure heart rate. The main advantage to heart rate monitors is the ability to accurately measure heart rate during exercise without stopping to take a pulse.

## **Intensity by Perceived Exertion – THE BORG SCALE**

Intensity by perceived exertion is also called measuring exertion using the Borg Scale developed by Dr. Gunner Borg. This scale uses a numbered scale from 6 -20 to measure feelings of exertion level. This is a good system in that it takes into account a persons fatigue level. Using this scale a reading of 12 on the scale would be approximately 50 -74% or maximum heart rate reserve (Karvonen formula). A reading of 16 would be 85% maximum heart rate reserve. Most people should try to stay between 12 and 16 on the borg scale.

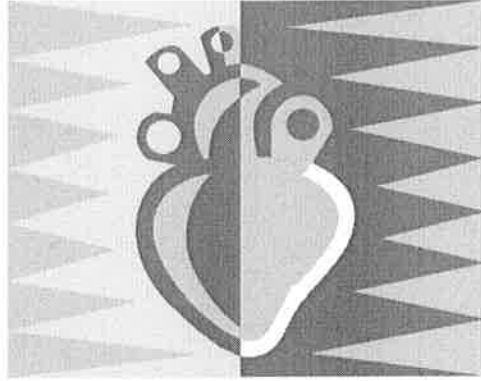
### **Borg Scale (ratings of perceived exertion)**

#### **RPE**

6	
7	Very, Very Light
8	
9	Very Light
10	
11	Fairly Light
12	
13	Somewhat Hard
14	
15	Hard
16	
17	Very Hard
18	
19	Very, Very Hard
20	

## **Talk Test Method**

This method is the simplest to use and understand. The talk test is exercising in an intensity level where a person is breathing comfortably and rhythmically. A person should be slightly winded but still be able to talk with someone somewhat easily when exercising. If a person is out of breath they should slow down. If they are not winded enough they should speed it up. Work up the intensity level over time. Using the talk test is great for beginners because it ensures a safe and comfortable level of exercise.



### Karvonen Formula

To get the maximum benefit from exercise, it is best to work at a pre-determined target heart rate. The Karvonen Formula is the standard used to determine Target Heart Rate.

#### **Taking your Pulse**

The pulse is most commonly taken either at the carotid artery on the neck or at the wrist. Use your index finger and middle finger to locate your pulse (never use your thumb). Use a very light touch and avoid pressing too hard. You may use a 6 or 10 second pulse check, then multiply by the appropriate number (10 or 6 respectively) to get a 60 second count.

#### **“220”**

A "standard" for Maximum Heart Rate. This is based on the assumption that 220 is the approximate maximum heart rate of a baby, and each year this rate decreases by one beat.

#### **Resting Heart Rate**

This is your heart rate at complete rest. To determine this, take your pulse for 60 seconds just before you get out of bed...or take it for 30 seconds and multiply by 2.

#### **Target Heart Rate Range**

Training intensity should range from 40% - 85% of adjusted maximal heart rate. Beginning exercisers should work between 50% - 65%. More advanced exercisers may be comfortable in the 70% - 80% range. Very fit exercisers may tolerate a level up to 85%.

Step 1:  $220 - \text{Age} = \text{Max Heart Rate (MHR)}$

Step 2:  $\text{Max Heart Rate (MHR)} - \text{Resting Heart Rate (RHR)} = \text{Heart Rate Reserve (HRR)}$

Step 3:  $\text{HRR} \times (60\%) + \text{RHR} = \text{Minimum Target Heart Rate (THR)}$

Step 4:  $\text{HRR} \times (80\%) + \text{RHR} = \text{Maximum Target Heart Rate (THR)}$

## **CARDIOVASCULAR**

What is cardiovascular fitness? Why is it important to overall fitness?

What are the fitness tests for Cardiovascular Fitness?

How do you apply the F.I.T. principle to cardiovascular fitness?

What are the benefits of being cardiovascular fit?

What is the difference between aerobic and anaerobic?

What is Resting Heartrate? How do you find it?

What is Target Heartrate?

What is Recovery Heartrate?

Is there a connection between improved cardiovascular fitness and improved cognitive ability?

# MUSCULAR STRENGTH

## WHAT IS MUSCULAR STRENGTH?

Muscular strength is your muscles ability to exert maximum force at a given time. A “strong” person is someone who can perform an exercise or daily task without pain or injury. The essence of being strong is being able to use the right muscle at the right time with the right amount of force.

When thinking of how your muscles work remember that while one group of muscles is performing the movement there is another group of muscles stabilizing. Increasing the strength of a muscle will also increase its ability to act as a stabilizer. Injury occurs when muscles are overloaded beyond their capacity.

## WHAT ARE THE BENEFITS OF INCREASING MY MUSCULAR STRENGTH?

The benefits to exercising muscles with resistance include:

**Increase Physical Capacity** - The ability to do more work with less effort. Research shows that untrained men and women can gain about 2 - 4 lbs of muscle and 20 - 40% of strength gain after two months of strength training.

**Physical Appearance** - Physical appearance can be greatly influenced by our muscle gain and loss of fat.

**Metabolic Function** - Muscle tissue is very active and is responsible for much of the calories that are burned. Even when sleeping our bodies burn up to a quarter of all total daily calories. Muscle or lean tissue means a higher metabolism. This equates to more fat burning which leads to better health. In a non-trained person there is about .5% reduction in metabolic rate per year due to loss of lean tissue of muscle. This is one of the reasons why we may gain body fat weight as we grow older.

**Increased Energy** - Because of higher metabolic rates due to increased lean muscle tissue we can increase energy levels as more calories are burned for fuel.

**Decreased Risk of Injury** - Muscles also serve the purpose to balance and act as shock absorbers. Our bodies are able to act more effectively during activity thereby reducing the risk of injury. When a person strength trains the muscles, ligaments, tendons, and bones are strengthened which decreases the risk of injury.

**FACTORS WHICH AFFECT STRENGTH**

**Gender** - Men and women are different only in the size and strength of muscle tissue. The reason for this is that muscle size and strength is influenced by the male hormone testosterone. However, if we measured men and women on a pound per pound basis, men and women show similar strength.

**Age** - Both men and women can benefit from a strength training program. The biggest benefits in size and strength come usually between the ages of 10 - 20 which are during the years of normal development and growth. Strength training in this age group should be measured in progressive and slow gains. Strength training gains come more slowly after maturity is reached.

**Limb Length** - The length of ones limbs (arms, legs) can make a difference in overall strength. Shorter limbs generally mean more leverage, which equates to higher strength output. Two people may have the same capacity for strength gains but a person with shorter limbs will show greater output.

**Muscle Length** - Muscles are attached to the bones by connective tissue called tendons. People have different muscle and tendon length. Some people may have shorter muscle with longer tendons. Some people may have longer muscles with shorter tendon attachments.



**Muscle Fiber Type** - There are two different types of muscle fiber. Fast twitch muscle fiber and slow twitch muscle fiber. A person with a majority slow twitch muscle fibers are best suited for endurance events such as marathons. A person with a majority fast twitch muscle fibers would be best suited for sprinting type events. Most men and women have about the same proportion of fast twitch and slow twitch fibers.

### HOW CAN I IMPROVE IN THE AREA OF MUSCULAR STRENGTH?

Muscular strength is improved through the training effect or improvement of cardiovascular and/or muscular endurance. Anytime your muscles meet resistance for a duration greater than 90 seconds there is a TRAINING EFFECT. The best way to improve strength is through really any type of resistance training. The most common are **ISOTONIC EXERCISES**. These are lifting exercises on the selectorized machines and with the free weights in the fitness center. Isotonic exercises can be performed with just moving your body weight when performing pull-ups, push-ups, dips, etc... An **ISOTONIC EXERCISE** is one where pressure is exerted against an immovable object such as a wall.

### When developing a Muscular Strength program:

\*You should develop a program that will work the muscle groups at 70% to 85% of your maximum.

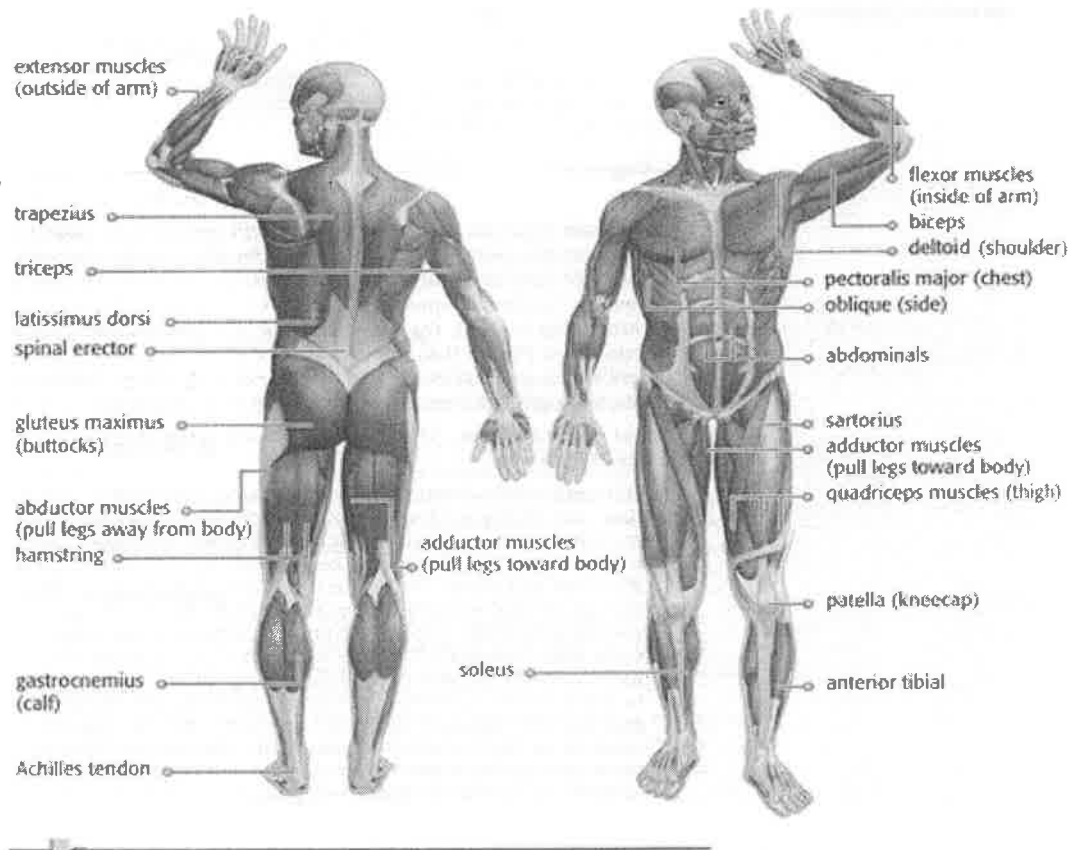
When putting a program together, the following are terms needed and ideas to be considered:

Include exercises that will work the major **ANTAGONISTIC MUSCLE GROUPS** (flexors/extenders).

If you work one group of muscles you need to work the opposites. Muscle imbalance increases chance of injury.

1. Biceps vs. Triceps
2. Pectorals (Chest) vs. Rhomboids and Trapezius (Back)
3. Abdominal vs. Spinal Extensors (Lower Back)
4. Quads vs. Hamstrings
5. Thigh Abductors vs. Thigh Adductors
6. Deltoids vs. Latissimus Dorsi

Front and back of your arms  
Front and back of upper torso  
Core  
Front and back of upper leg  
Inside and outside of upper leg  
Shoulders and back



\*A **REPITITION** is a single completion of a specified movement. A **SET** is a number of repetitions performed in succession. More **REPS** (the number of times you do an exercise) and lower weights enhance muscle endurance. Greater weight and fewer **REPS** with more **SETS** (groups of **REPS**) will enhance muscle size and strength.

Remember that to improve strength you need to **OVERLOAD**. Your program needs to be **PROGRESSIVE** in **INTENSITY**. Always be specific about what exercises you are going to perform.

**PROGRESSIVE OVERLOAD:** The gradual increase of demands on the body systems that cause the body to mobilize its resources and become adapted to the increased workload. Progressive overload can be achieved by increasing frequency, intensity, and time (F.I.T.). How much you improve in any area of your fitness program depends on **FREQUENCY, INTENSITY AND TIME (F.I.T.)**.

**SPEED** - Speed plays a major part of strength training. Performing each exercise movement in a controlled manner is important. A person should not jerk or go at a fast pace when exercising. Controlled movements equate to greater strength and size gains. The faster you move a weight the less it will resist your muscle. This is due to **momentum**. If your muscles are not moving the weight then you are not gaining any benefit.

**Range** - The term full range of motion means completing the full movement of an exercise. Exercising at a full range of motion enhances both muscle and joint strength and flexibility.

**Frequency** - Exercising the muscles causes micro-trauma to the muscle tissue which can cause a temporary reduction in strength output and cause muscle soreness. It is therefore very important to give the muscles plenty of recovery time between sessions to allow muscle tissue to rebuild. At least 48 hours of recovery time between sessions on the same muscle group is advisable. Recovery allows for the muscle to rebuild itself allowing for size and strength gains. Not allowing enough recovery can cause strength and size to increase much slower while increasing the risk of injury. Muscle tissue synthesizes protein and builds slightly higher gains during the recovery process. This process happens over time and recovery is important in this process.

## **STRENGTH PROGRAM CONSIDERATIONS**

### **Common Mistakes**

**Improper form and technique** - It is the tendency of most people to use too much resistance and cheat or use poor technique to lift the resistance. Improper technique not only decreases the effectiveness of training but can also cause injury. An example of poor technique would be bouncing the bar off the chest during a bench press or using the hip or back to start a barbell curl.

**Warm up** - Warm up is important to prepare the muscles for the work ahead. Warming up muscles will reduce the chance of muscle strains and pulls.

### **How do I find my "MAX"?**

Lifting the heaviest weight for one repetition (1RM) may be the most accurate but it can be dangerous. Lifting a weight for a manageable number (5-10 reps) and then utilizing a theoretical MAX chart will save you time and possibly from injury.

## ANTAGONISTIC MUSCLES AND THEIR FUNCTION IN THE BODY

Antagonistic muscles are muscles which work in opposition to each other. For example, a person uses certain sets of muscles to open his hand and splay his fingers wide. In order to close the hand and make a fist, however, an antagonistic set of muscles would have to be used. Antagonistic muscles are important for balance, extending limbs, holding objects aloft, and contracting limbs, among other things.

The antagonist muscle in a muscle set brings a limb or other anatomical part back to its initial position of rest. These muscle sets are referred to as antagonistic pairs, which are needed by the body because muscles can only inherently exert a force that pulls on ligaments and bones; it needs the opposite muscle in the pair to bring it back to its original position.

There are many groups of antagonistic muscles in the body. The most famous of these pairings is the biceps and the triceps on the arm. Additional antagonistic muscles include the chest and back of the torso, as well as the quadriceps and hamstrings of the leg.

Antagonistic muscles are necessary for the body to function properly. Skeletal muscles can only tighten, or contract; in a sense, they can be compared to a rope tied around a rock that can only be pulled tight in one direction or allowed to go slack. In order for a body part to move in the opposite direction, the antagonistic muscle group must be used. Returning to the rock metaphor, another rope must be tied to the opposite side of the rock and pulled taut if the rock is to be moved in the opposite direction.

**Examples:** In the case of the bicep muscle contracting to do a bicep curl, the triceps would be considered the antagonist muscle.

The hamstring becomes the antagonist when the quadriceps contracts to do a leg lift.

### Can you match the muscles listed below with their antagonistic pair?

1.	Biceps	A. Tibialis Anterior
2.	Quadriceps	B. Biceps
3.	Pectoralis Major	C. Pectoralis Major
4.	Gastrocnemius	D. Triceps
5.	Hamstrings	E. Latissimus Dorsi
6.	Triceps	F. Hamstrings
7.	Latissimus Dorsi	G. Quadriceps
8.	Tibialis Anterior	H. Gastrocnemius

## **MUSCULAR STRENGTH**

What is Muscular Strength? Why is it important to overall fitness?

What is the fitness test for Muscular Strength?

How do you apply the F.I.T. principle to training for Muscular Strength?

What are the benefits of improving Muscular Strength?

What are the factors that affect Muscular Strength?

List the major muscles of the upper body?

List the major muscles of the lower body?

What is the most effective way to improve Muscular Strength?

# **MUSCULAR ENDURANCE**

## **WHAT IS MUSCULAR ENDURANCE?**

It is the ability of a muscle to exert sub-maximal force repeatedly over time.

Strength, skill, performance, speed of movement, and power are closely associated with this component.

A good example of Muscular Endurance is CORE training. A CORE training focus strengthens the essential muscles to maintain posture and function without pain or injury. The term core refers to your mid section (front and back).

## **WHY INCREASE MY MUSCULAR ENDURANCE?**

Your muscle fatigue or fail when they do not receive enough oxygen. The other way a muscle will fail during a light load with many repetitions is by not having enough energy-producing fibers in the muscle to process the required amount of oxygen. Training for muscular endurance will increase your muscles ability to process oxygen and increase longevity of workload.

## **HOW DO I IMPROVE MY MUSCULAR ENDURANCE?**

**MUSCULAR ENDURANCE** may be improved in a variety of ways. The best way to improve muscular endurance is to perform exercises, such as, sit-ups, pushups, and/or weight training at 50% to 65% of your maximum.

Basically you need to increase the amount of repetitions or time you perform an exercise.

**You must increase**  
**FREQUENCY,**  
**INTENSITY**  
**AND TIME (F.I.T.)**  
**to improve muscular endurance.**

## **MUSCULAR ENDURANCE**

What is Muscular Endurance? Why is it important to overall fitness?

What are the fitness tests for Muscular Endurance?

What are the benefits of improving Muscular Endurance?

How do you apply the F.I.T. principle to Muscular Endurance?

What is your Core?

Why is it important to have a strong Core?

What is the most effective way to train for Muscular Endurance?

# **FLEXIBILITY**

## **What is Flexibility?**

Your body's ability to move through a full range of motion injury and pain free. The more elastic your muscles, tendons, and ligaments, the easier it is to achieve a full range of motion

## **How do I increase my Flexibility?**

Utilizing **Static Stretching** (holding a movement for a given time) is the safest. Static stretching is best when it mimic a functional movement you will use in activity or everyday life.

**Ballistic** (bouncing) Stretching can increase flexibility, but increases your chance for injury during stretching.

The best way to improve flexibility is through a **Dynamic Warm-up**. A Dynamic Warm-up is when you use movement to raise muscle temperature and increase blood flow to then achieve a full range of motion.

Performing static stretching after activity will impact flexibility and reduce muscle soreness.

Poor flexibility is most likely due to muscle imbalance, injury to the joint, or muscles not warmed up. When you train, do it safely and follow sound training guidelines. The more you use your body in a full range of motion when being active the more flexible it will become. Choose activities that promote total body movements such a pilates, yoga, swimming, etc...

Warm your body up before you stretch. A simple illustration is how plastic behaves when cold or warm. When cold, plastic can become brittle and break. When warm, plastic is much more pliable. Your muscles and tendons are similar. When you "warm-up" you are increasing blood flow to your muscles, getting them ready for movement, reducing chance for injury and maximizing the benefit of the exercise.

## **FLEXIBILITY**

What is flexibility?

Why is flexibility important to overall fitness?

How do you apply the F.I.T. principle to Flexibility?

List the different 3 types of stretching. (Briefly explain each)

Why is it important to warm-up before stretching?

What are the benefits of having good flexibility?



# **BODY COMPOSITION**

NNHS recognizes that measuring body composition can be a sensitive issue. Test completion can be completed at a time other than the students Physical Education class. NNHS respects the right of students to “opt” out of this testing for a variety of reasons. If you have any concerns about body composition testing, discuss these with your Physical Education teacher prior to any testing.

## **WHAT IS BODY COMPOSITION?**

Body Composition is the percentage of body fat you have in relation to your total body weight.

## **HOW DO I CHECK MY BODY COMPOSITION?**

There are many ways (skin fold, underwater, electro impedance). NNHS utilizes bioelectric impedance because it is accurate , quick, and noninvasive. To get the most accurate measurement, follow all the testing parameters. When looking at your data, be aware that as your body changes your body composition with fluctuate. Other factors that impact the accuracy is hydration and exercise or eating prior to the test.

## **WHAT IS BODY MASS INDEX (BMI)?**

It is a height to weight ratio. This ratio is then compared to a general chart to determine if you are overweight. It will not give you a percentage of body fat. BMI is an easy way to get more data on Body Comp. BMI does not take into account an individual that has a high percentage of muscle mass. Muscle weighs more than fat. This may lead to a high BMI.

## **WHY DO I NEED TO MONITOR MY BODY COMP. AND BMI?**

Individuals with a high Body Composition and/or BMI are more susceptible to variety of negative health conditions. It has been determined that individuals that are overweight and/or have a high percentage of body fat have a lower life expectancy.

## **WHEN DETERMINING YOUR FITNESS LEVEL:**

- Take in as much accurate data as you can.
- Look at all the data!
- Make educated decisions
- Use common sense!

## **BODY COMPOSITION WORKSHEET**

Why check Body Composition?

Why is weight alone deceiving?

Why is having fat beneficial for the body?

What is Body Mass Index (BMI)?

What is Basal Metabolic Rate?

# How to check your Body Composition

Body composition is a personal & optional data point for you to collect. Be respectful of yourself and others by allowing yourself and others to collect the data in a private manner. Data is private and individual. The tanita scale also offers you additional data on BMI, BMR and hydration.

You must be barefoot. You have the option to clean the pads before your use. Do not step on until step 5.

**Step 1: Enter 2.0 for the weight of your clothing**



**Step 3: Enter Age**



**Step 2: Enter Body Type, "STANDARD Male" or "STANDARD Female" "ATHLETIC Male" or "ATHLETIC Female"**

Tanita defines "athlete" as a person involved in intense physical activity of at least 10 hours per week and who has a resting heart rate of approximately 60 beats per minute or less.



**Step 4: Enter Height \* You need to enter feet, inches, to a decimal point**



**Step 5: Step On**

Print out will be created. Tape to Body Comp Worksheet. Complete Hydration formula

## Tanita Body Composition/Hydration

Name \_\_\_\_\_

This analysis includes a number of measurements that provide an in depth look at your body composition. Research shows that individuals with appropriate amounts of fat are less likely to develop obesity related health conditions.

### PLACE YOUR RESULTS HERE

**Fat %:** percentage of total body weight that is fat.

**Impedance:** Measured in Ohms. Muscle is the signals highway, and fat is like a traffic jam. Lower impedance = lower body fat. Healthy zone is 200-650.

**FFM:** Fat free mass is comprised of muscle, bone, tissue and water. Muscle is especially important because it burns fat.

**TBW:** Total body water reflects water retained in the body. Necessary to prevent dehydration.

TANITA BODY COMPOSITION ANALYZER TBF-300A	
BODY TYPE	STANDARD
GENDER	MALE
AGE	25
HEIGHT	166 cm
WEIGHT	61.3 kg
BMI	22.2
FAT%	13.9 %
BMR	6583 kJ
	1573 kcal
IMPEDANCE	517 Ω
FAT MASS	8.5 kg
FFM	52.8 kg
TBW	38.7 kg
DESIRABLE RANGE	
FAT%	8-20 %
FAT MASS	4.6 - 13.2 kg

**BMI:** Body Mass Index. A height to weight ratio. An increase in BMI is linked to increased health risks.

**BMR:** Basal metabolic rate reflects the amount of calories used by the body to maintain normal functions when at rest. Activity and exercise increase BMR by approximately 15%.

**Fat Mass:** Total weight of fat mass in the body.

Tape or staple your results on the sample above. Using **your** Tanita results answer the following questions:

1. Calculate your bodies hydration level below and compare your hydration level to the recommended ranges:

$$\frac{\text{TBW}}{\text{weight}} \text{ Divided by } \frac{\text{weight}}{\text{weight}} \times 100 = \text{estimated hydration level \%}$$

2. The healthy zone is 50-65% hydration for men and 45-60% hydration for women. Low hydration level will increase the Body fat percentage reading. Low hydration levels will adversely affect brain function.
3. What is your body fat percentage? \_\_\_\_\_ The healthy zone is 10-25% for men and 17-32% for women.

\* Remember fat is vital to daily body functions. It cushions joints, protects organs, regulates body temperature, and stores vitamins. However, serious health risks are associated with both too much and too little body fat.

## FITNESS CONCEPTS GLOSSARY

**AEROBIC EXERCISE:** exercise with oxygen, exercise that can continue for a long period of time, i.e., jogging, swimming, and biking.

**ANAEROBIC EXERCISE:** exercise without oxygen, short, powerful bursts of exercise, i.e., sprinting

**ANTAGONISTIC MUSCLES:** muscles that work opposite of each other, flexors/extensors

**BALISTIC STRETCHING:** quick, repetitive, bouncy movements

**BLOOD PRESSURE:** the pressure that the blood exerts against the internal walls of arteries

**BODY COMPOSTION:** ratio of fat to muscle, bone and other body tissues

**CALORIES:** unit that measures the energy in food

**CARDIAC OUTPUT:** the volume of blood pumped by the heart in one minute

**CARDIOVASCULAR FITNESS:** the ability of the heart, lungs and blood vessels to deliver oxygenated blood to the muscles of the body to be used with fuel for sustained physical work

**CHOLESTEROL:** a fatty substance found in all animal fats that is important in certain body compounds and some tissue, elevated levels are associated with heart disease

**CIRCUIT TRAINING:** exercises performed in sequence from station to station, usually done at a rapid pace

**CONCENTRIC CONTRACTION:** an isotonic contraction where the muscle shortens and works against gravity also called a positive contraction

**CONTINUITY:** clear organization and flow of ideas or thoughts

**COOL-DOWN:** a 10-15 minute period of mild exercise following vigorous exercise that allows the body and heart rate to return to normal

**DURATION:** see time

**DYNAMIC STRETCHING:** stretching done in continuous, slow and controlled manner with movement

**ECCENTRIC CONTRACTION:** an isotonic contraction, in which the muscle lengthens during contraction, also called a negative contraction

**EXERCISE HEART RATE:** the heart rate during exercise, calculated to determine intensity of exercise and to ensure that one is in the desired training zone

**FAT:** used as an energy source, stored when excess calories are ingested

**F.I.T.:** the three ways to improve fitness in a physical fitness program – Frequency, Intensity, Time

**FLEXIBILITY:** the range of motion that is possible around a joint or joints

**FREQUENCY:** how often one should exercise to improve a component of physical fitness

**GOAL SETTING:** developing a plan to monitor improvement in short-term, incremental steps

**INTENSITY:** how hard one should exercise to improve fitness

**ISOKINETIC CONTRACTION:** a contraction in which tension is constant throughout the range of motion

**ISOMETRIC CONTRACTION:** a contraction in which no movement takes place and there is no change in the length of the muscle, also called a static contraction

**ISOTONIC CONTRACTION:** a contraction in which movement occurs at the joint, with a shortening and lengthening of muscles, also referred to as dynamic contraction

**KARVONEN FORMULA:** training heart rate = (max heart rate-resting heart rate) intensity% + resting heart rate

**LACTIC ACID:** the product of incomplete metabolism that can occur when insufficient oxygen is supplied to the muscle believed to be a contributing factor in fatigue

**MAXIMUM HEART RATE:** theoretical maximum times the heart could beat per minute at a specific age, estimated by subtracting your age from 220

**MAXIMUM REPETITION:** the amount of weight that can be lifted in one attempt

**MUSCULAR ENDURANCE:** the ability of a muscle to exert submaximal force repeatedly over time

**MUSCULAR STRENGTH:** maximum force that can be applied by a muscle during a single maximum contraction

**NUTRITION:** eating a proper balance of essential nutrients, which include protein, carbohydrate, fat, minerals, vitamins and water

**OVERLOAD PRINCIPLE:** training guideline in which muscular and cardiovascular systems are stressed progressively to bring about improvements in strength and endurance

**OXYGEN CONSUMPTION:** the amount of oxygen used by the body, usually in liters per kg body weight

**OXYGEN DEBT:** when the oxygen in the muscles and blood is exhausted and the heart and lungs cannot keep up with the demand

**PLATEAU:** a time when progress stops; indicates that some aspect of the program should be changed to stimulate the desired change.

**PROGRESSION:** the gradual improvement of levels of strength, endurance, and flexibility due to fitness program

**RANGE OF MOTION:** the degree of movement around a joint before the movement is restricted by the surrounding tissues

**RECOVERY HEART RATE:** the gradually declining heart rate following the cessation of exercise

**REPETITION:** the completion of a single, full-range movement of the body part being exercised

**REST:** a period of recovery from daily activities or exercise

**RESTING HEART RATE:** heart rate immediately after waking in the morning, before getting out of bed

**RISK FACTORS:** factors associated with disease, disability and premature death

**SET:** a group of repetitions performed one after the other, 1 set might consist of 10 reps

**SKINFOLD:** a pinch of skin and subcutaneous fat from which total fat may be estimated

**SPECIFICITY:** doing specific exercises to improve specific components of physical fitness in specific body parts

**SPOT REDUCING:** a myth that fat can be specifically reduced from one body area through exercise

**STATIC STRETCH:** movement of a joint that occurs slowly and gradually through the maximal range of motion

**STRESS MANAGEMENT:** learning to use positive coping techniques to deal with stress on day-to-day basis

**TARGET HEART ZONE:** the heart range within which an individual needs to work for cardiovascular training to occur, usually 60-85% of maximum heart rate

**THRESHOLD OF TRAINING:** the minimum amount of exercise to produce the benefit of exercise

**TIME:** how long one exercises to improve fitness

**TRAINING HEART RATE:** actual heart during exercise

**WARM-UP:** the first portion of a workout designed to prepare the body for the vigorous exercise to follow

**WELLNESS:** encompasses the principles of cardiovascular endurance, muscle strength and endurance, flexibility and body composition as well as nutrition, rest, risk behavior and stress management

# FITNESS CENTER CHART

		DATE								
EXERCISE	GROUP	MUSCLE	S/R	LBS.	S/R	LBS.	S/R	LBS.	S/R	LBS.
ABDOMINAL CRUNCH	Core	Abdominal								
ARM CURL	Arms	Biceps								
ARM EXTENSION	Arms	Triceps								
ASSISTED CHIN/DIP	Shoulders, Chest, Back, Arms	Deltoids, Lats, Pecs, Bicep, Tricep								
CHEST PRESS	Chest, Arms	Pectoralis, Triceps								
DIVERGING LAT PULLDOWN	Back, Arms	Latisimus Dorsi, Biceps								
DIVERGING SEATED ROW	Back, Arms	Deltoid, Lats, Tricep								
INCLINE PRESS	Chest, Arms	Pectoralis, Triceps								
LATERAL RAISE	Shoulders	Deltoids, Trapezius								
LEG EXTENSION	Legs	Quads								
LEG PRESS	Legs	Hamstrings Quads, Glutes								
LOW BACK EXTENSION	Back, Arms	Spinal Erector								
MULTI-HIP	Legs, Core	All								
PECTORAL FLY	Chest	Pectoralis Major								
ROTARY TORSO	Core	Abdominals Back								
SEATED LEG CURL	Legs	Bicep Femoris (hamstrings)								
SEATED PUSHDOWN	Arms, Shoulders Back	Triceps, Pectoralis, Lats								
SHOULDER PRESS	Shoulders	Deltoids, Triceps								

# FITNESS CENTER CHART

		DATE								
EXERCISE	GROUP	MUSCLE	S/R	LBS.	S/R	LBS.	S/R	LBS.	S/R	LBS.
ABDOMINAL CRUNCH	Core	Abdominal								
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LEG EXTENSION	Legs	Quads								
LEG PRESS	Legs	Hamstrings Quads, Glutes								
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MULTI-HIP	Legs, Core	All								
PECTORAL FLY	Chest	Pectoralis Major								
ROTARY TORSO	Core	Abdominals Back								
SEATED LEG CURL	Legs	Bicep Femoris (hamstrings)								
SEATED PUSHDOWN	Arms, Shoulders Back	Triceps, Pectoralis, Lats								
SHOULDER PRESS	Shoulders	Deltoids, Triceps								