Understanding cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition, known as the Five Components of Fitness is important for improving health, performance and appearance.

Cardiorespiratory endurance is the ability of the heart, blood, blood vessels and lungs to supply enough oxygen and necessary fuel to the muscles during long periods of physical activity. Participating in aerobic activities is the best way to improve cardiorespiratory endurance because they require the body to use large amounts of oxygen for sustained periods of time. With the increased need for oxygen, the heart must beat faster to pump more blood throughout the body. In turn, over time, the heart, which is a muscle, will become stronger and will be able with each beat therefore beating at a slower rate while more often and more vigorously for longer periods of time without getting tired.

Training to improve cardiorespiratory endurance also improve appearance by toning the body and reducing body fat, which helps to improve body composition. As personal appearance improves, a sense of well-being and a positive self-image is created.

Muscular strength is the ability of muscles to push or pull with total force. Increasing muscular strength allows a person to lift, push, or pull with more force. This is a benefit in any athletic situation, but it is also important for other life situations like when the car has a flat tire or when the door is stuck.

Muscular endurance is the ability of muscles to repeat a movement many times or to hold a position without stopping to rest. Improving muscular endurance allows a person to increase physical activity. A person with improved muscular endurance can accomplish more physical work by moving longer end taking fewer breaks.

Muscular strength comes before muscular endurance. Before the brick layer can stack hundreds of bricks a day, he/she must have the muscular strength to lift the first brick. Once he/she has the initial strength to lift the first brick, the brick layer can begin to build muscular endurance.

One of the best ways to build muscular strength and muscular endurance is through resistance training, or activities that place an additional force against the muscle or muscle group. Some examples of resistance training include weight training, push-ups and crunches.

Muscles react positively to strenuous activity and negativity. Therefore, the old adage, “Use them or lose them”, is true when the body is inactive a large percentages of strength is lost over time. Likewise, as the body ages bone density tends to decrease which can lead to weak bones (osteoporosis). While resistance training, along with engaging in an active lifestyle improves muscular strength and muscular endurance, it also can improve bone density. Therefore, building muscle provides health benefits that can last throughout life.

Physical performance will also be enhanced through the development of muscular strength and muscular endurance. As muscles become stronger and gain endurance, a person will be able to work, exercise or play more often, with more power and for longer periods of time.

Resistance training to develop muscular strength and muscular endurance also helps improve physical appearance by controlling body composition. As resistance training increases muscle mass, a part of fat-free mass, fat mass decreases. Because muscles use calories to work the more muscle mass a person has, the more calories that will be used. Using more calories reduces the number of calories stored as fat mass. Therefore, building muscular strength and muscular endurance is a lifelong habit needed to maintain or improve physical appearance.

Flexibility is the muscles ability to move a joint through a full range of motion, and staying flexible is important to health and performance. As the body ages, the muscles, tendons and ligaments stiffen, lose elasticity and become less flexible. As a result, a person's ability to perform movements may be hindered and he/she may be at an increased risk of injury. Improving flexibility decreases a person's risk of injury, prevents post-exercise pain and helps relieve emotional tension.

Daily activities such as combing hair, tying shoes and participating in athletics require flexibility. Golfers need flexibility in the hips and shoulders to allow them to rotate the golf club further and in turn hit the ball a greater distance. Softball and baseball players need flexibility in their shoulders and arms so that they can bring the ball back farther, which allows them to throw the ball harder.
Flexibility is required for everyday movements, from tying shoes to throwing a ball. If a person does not perform activities that improve flexibility, then one day he/she may not be able to perform these activities. Therefore, activities to improve flexibility should be performed daily.

Dynamic and static stretches are safe and effective methods to improve flexibility. Dynamic stretches involve moving parts of the body continuously while gradually increasing reach, speed of movement or both gently throughout a full range of motion. Static stretches involve stretching a muscle to a point of mild discomfort for an extended period of time. These stretches can be performed as part of the warm-up and/or cool down phases of a fitness program or as a separate flexibility program.

Body composition is the combination of fat mass and fat-free mass, including fat, bones, muscles, organs, and water. Healthy levels of fat mass are essential for insulation, the protection of organs, the absorption of vitamins, nerve conduction and as an energy source. Having too much or too little fat mass can become a health risk, lower performance and detract from appearance. Therefore, body composition is usually referred to as a percentage of body fat.

A healthy level of fat mass for men is between 10% and 20% of total body weight and a health level of fat mass for women is between 15% and 25% of total body weight. Improving and maintaining body composition at healthy levels will reduce the risk of heart disease, Type 2 diabetes, high blood pressure, strokes, certain types of cancer and obesity.

The percentage of fat a person has is affected by two factors; the number of calories consumed (energy in) and the amount of activity performed and calories used (energy out). Both of these factors are controllable. A combined effort of eating a healthy diet (energy in) and increasing physical activity (energy out) is the best approach to maintaining a healthy level of body fat and improving overall body composition.

The benefit of understanding cardiorespiratory endurance, muscular endurance, flexibility and body composition, known as the Five Components of Fitness, is immeasurable and is important for improving health, performance and appearance for a lifetime.

**FITT PRINCIPLE**

A formula in which each letter represents a factor important for determining the correct amount of physical activity.

<table>
<thead>
<tr>
<th>CF</th>
<th>CARDORESPIRATORY ENDURANCE</th>
<th>MUSCULAR ENDURANCE</th>
<th>MUSCULAR STRENGTH</th>
<th>FLEXIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREQUENCY</td>
<td>The number of exercise sessions per week</td>
<td>3-5x per week</td>
<td>2-4x per week</td>
<td>2-4x per week</td>
</tr>
<tr>
<td>INTENSITY</td>
<td>The training load expressed as resistance, speed or heart rate.</td>
<td>Target Heart Rate Zone 65-85% MHR Level 4</td>
<td>Level 3</td>
<td>Level 3</td>
</tr>
<tr>
<td>TIME</td>
<td>The amount of repetitions or time spent in activity.</td>
<td>20-60 min.</td>
<td>More than 12 reps</td>
<td>8 reps or less</td>
</tr>
<tr>
<td>TYPE</td>
<td>The type of activities selected for exercise.</td>
<td>Aerobic Activity</td>
<td>Resistance Training Yoga</td>
<td>Resistance Training</td>
</tr>
</tbody>
</table>
EXERCISE INTENSITY: Why It Matters, How It's Measured

Get the Most From Your Workouts by Knowing How to Gauge Your Exercise Intensity.

When you work out, are you working hard or hardly working? Exercising at the correct intensity can help you get the most out of your physical activity — making sure you're not overdoing or even underdoing it. Here's a look at what exercise intensity means and how to make it work for you.

Understanding Exercise Intensity

When you're doing aerobic activity, such as walking or biking, exercise intensity correlates with how hard the activity feels to you. Exercise intensity also is reflected in how hard your heart is working. There are two basic ways to measure exercise intensity:

- How you feel. Exercise intensity is a subjective measure of how hard physical activity feels to you while you're doing it — your perceived exertion. Your perceived level of exertion may be different from what someone else feels doing the same exercise. For example, what feels to you like a hard run can feel like an easy workout to someone who's more fit.
- Your heart rate. Your heart rate offers a more objective look at exercise intensity. In general, the higher your heart rate during physical activity, the higher the exercise intensity.

Studies show that your perceived exertion correlates well with your heart rate. So if you think you're working hard, your heart rate is likely elevated.

You can use either way of gauging exercise intensity. If you like technology and care about the numbers, a heart rate monitor might be a useful device for you. If you feel you're in tune with your body and your level of exertion, you likely will do fine without a monitor.

Choosing Your Exercise Intensity

How do you know how hard you should be exercising? For most healthy adults, the Department of Health and Human Services recommends these exercise guidelines:

- Aerobic activity. Get at least 150 minutes a week of moderate aerobic activity — such as brisk walking, swimming or mowing the lawn — or 75 minutes a week of vigorous aerobic activity — such as running or aerobic dancing. You can also do a combination of moderate and vigorous activity, preferably spread throughout the course of a week.
- Strength training. Do strength training exercises at least twice a week. Consider free weights, weight machines or activities that use your own body weight — such as rock climbing or heavy gardening. The amount of time for each session is up to you.

So think about your reasons for exercising. Do you want to improve your fitness, lose weight, train for a competition, or a combination of these? Your answer will help determine the appropriate level of exercise intensity.

To reap the most health benefits from exercise, your exercise intensity must generally be at a moderate or vigorous level. For weight loss, the more intense your exercise, or the longer you exercise, the more calories you burn. However, balance is important. Overdoing it can increase your risk of soreness, injury and burnout. If you're new to regular exercise and physical activity, you may need to start out at a light intensity and gradually build up to a moderate or vigorous intensity.

Beware of pushing yourself too hard too often. If you're short of breath, in pain or can't work out as long as you'd planned, your exercise intensity is probably higher than your fitness level allows. Back off a bit and build intensity gradually.

Gauging Intensity Using Your Heart Rate

Another way to gauge your exercise intensity is to see how hard your heart is beating during physical activity. To use this method, you first have to figure out your maximum heart rate — the upper limit of what your cardiovascular system can handle during physical activity.

The basic way to calculate your maximum heart rate is to take 220 minus your age. For example, if you're 45 years old, subtract 45 from 220, to get a maximum heart rate of 175. This is the maximum number of times your heart should beat per a minute while you're exercising.

Once you know your maximum heart rate, you can calculate your desired target heart rate zone — the level at which your heart is being exercised and conditioned but not overworked. Working out within your target heart rate zone gives you the best results for burning fat and losing weight. If you work out below that zone, you reduce your exercise intensity, and you may not burn as many calories. If you work out above that zone, you may not be able to work out as long as you planned.
**HEART RATE & INTENSITY LEVEL CONNECTION**

- **LEVEL ONE: SEATEDARY (MEDIA/SEAT) - below 40% MHR**
  - Little to no movement.
- **LEVEL TWO: LIGHT EXERCISE (DAILY ACTIVITY) - 40-50% MHR**
  - Feels easy.
  - You have no noticeable changes in your breathing pattern.
  - You don’t break a sweat (unless it’s very hot or humid).
  - You can easily carry on a full conversation or even sing.
- **LEVEL THREE: MODERATE EXERCISE (BASE LEVEL) - 50-65% MHR**
  - Your breathing quickens, but you’re not out of breath.
  - You develop a light sweat after about 10 minutes of activity.
  - You can carry on a conversation, but you can’t sing.
- **LEVEL FOUR: TARGET HEART RATE (HEART HEALTHY LEVEL) - 65-85% MHR**
  - Your breathing is deep and rapid.
  - You develop a sweat after a few minutes of activity.
  - You can’t say more than a few words without pausing for breath.
- **LEVEL FIVE: VIGOROUS EXERCISE (MAX LEVEL) - above 85% MHR**
  - Feels extremely challenging.

If you’re not fit or you’re just beginning an exercise program, opt for light exercise intensity and gradually build up to a higher intensity. If you’re healthy and want a vigorous intensity, opt for the higher end of the zone.

To determine your desired target heart rate zone, use an online target heart rate calculator, which does the calculations for you. Or, here’s how to do the math yourself. If you’re aiming for a target heart rate of 65 to 85 percent, which is in the target heart rate / heart healthy range, you would calculate it like this:
- Subtract your age from 220 to get your maximum heart rate.
- Multiple that number by 0.65 (65 percent) to determine the lower end of your target heart rate zone.
- Multiply your maximum heart rate by 0.85 (85 percent) to determine the upper end of your target heart rate zone.

For example, say your age is 20 and you want to figure out your target heart rate zone for heart healthy exercise. Subtract 20 from 220 to get 200 — this is your maximum heart rate. To get the lower end of your target zone, multiply 200 by 0.65 to get 130. To get the higher end, multiply 200 by 0.85 to get 170. So your target heart rate zone for heart healthy exercise intensity is 130 to 170 beats per minute.

**HOW TO TELL IF YOU’RE IN THE ZONE**

So how do you know if you’re in your target heart rate zone? Use these steps to check your heart rate during exercise:

1. Stop momentarily.
2. Take your pulse for 6 seconds. To check your pulse over your carotid artery, place your index and third fingers on your neck to the side of your windpipe. To check your pulse at your wrist, place two fingers between the bone and the tendon over your radial artery — which is located on the thumb side of your wrist.
3. Multiply this number by 10 to calculate your beats per minute.

Here’s an example: You stop exercising and take your pulse for 6 seconds, getting 16 beats. Multiply 16 by 10, to get 160. If you’re 20 years old, this puts you in the middle of your target heart rate zone for heart healthy exercise, since that zone is 130 to 170 beats per minute. If you’re under or over your target heart rate zone, adjust your exercise intensity.

**TARGET HEART RATE TIPS**

It’s important to note that maximum heart rate is just a guide. You may have a higher or lower maximum heart rate, sometimes by as much as 15 to 20 beats per minute. If you want a more definitive range, consider discussing your target heart rate zone with an exercise physiologist or a personal trainer. Generally only elite athletes are concerned about this level of precision. They may also use slightly different calculations that take into account gender differences in target heart rate zones. These differences are so small that most casual athletes don’t need separate calculations for men and women.

Also note that several types of medications can lower your maximum heart rate and, therefore, lower your target heart rate zone. Ask your doctor if you need to use a lower target heart rate zone because of any medications you take or medical conditions you have.

**REAP THE REWARDS OF EXERCISE INTENSITY**

You’ll get the most from your workouts if you’re exercising at the proper exercise intensity for your health and fitness goals. If you’re not feeling any exertion or your heart rate is too low, pick up the pace. If you’re worried that you’re pushing yourself too hard or your heart rate is too high, back off a bit.
There are 3 fundamental principles of exercise (Training Principles) that need to be applied in order to achieve success with an exercise program. These three principles are as follow:

Specificity, Overload, and Progression

There are various ways to apply these principles depending on the activity you want to improve and your unique exercise goals.

**SPECIFICITY**

There are a few ways to break down and apply this principle. Specificity may apply to muscle groups, energy systems, specific movements, and activities. Basically this principle states that in order to get better at any type of activity you need to perform that activity. This means that if you want to get better at running you need to run, throwing darts you need to throw darts, swimming you need to swim.

This principle may however be subdivided further to include only parts of a specific skill, for example if a baseball pitcher wants to work specifically on his accuracy he needs to target that skill by trying to hit a specific target. If he wants to work on his speed he needs to target the throwing phase of the pitch and somehow measure the speed of his pitch. The possibilities and variations are endless but these principles make up a framework to work around when trying to achieve a specific goal.

**OVERLOAD**

This principle states that in order to achieve adaptation (improvement) a greater than normal load needs to be applied. The body will adapt increased stimulus over time whether this increase comes in the form of added weight such as in strength training or added difficulty in any other form depends on the specific activity we want to improve on as well as our goals. When the body has adapted once again we need to apply further overload in order to improve further which leads us to the third principle of progression.

**PROGRESSION**

The principle of progression refers to the rate at which the overload is applied. In theory an optimal rate at which to apply overload exists for all skills and activities. However, this rate might be very different between different people. If overload is applied to rapidly it will result in poor improvement and demotivation and in sports this may lead to injury. As a general example, an athlete that only exercises sporadically and adds overload too fast violates both the principle of overload as well as the principle of progression and as a result will not achieve good progression.

These principles are highly interconnected and are reciprocally dependent on each other. They also have a strong relation to additional principles like the ones of adaptation, rest, and recovery, and individual differences. The good thing about using these principles as a framework to reach your goals is that they can be applied to virtually any kill or activity you can think of, not only within sports and fitness.
CIRCUIT TRAINING

BASICS OF CIRCUIT TRAINING
- A series of exercises in which a person moves from one station to another.
- Each exercise is performed for a set number of repetitions or period of time before moving to the next exercise.
- Depending on the type of circuit or your fitness level, you might complete one circuit or several circuits during each workout.
- A warm-up or cool-down should be incorporated into your exercise session. These can be done as part of your circuit (at a low intensity) or as additional exercises before/after your circuit.

BENEFITS OF CIRCUIT TRAINING
- Versatility
  - You can exercise different muscle groups, components of fitness or sport specific skills during one exercise session.
- Availability
  - You can do circuit training at home or at a gym with little or no equipment.
- Time Efficient
  - It is good for people who have little time to exercise. Workouts can be completed in as little as 20 minutes.
- Engaging
  - You are less likely to become bored with your workout routine since you are doing a variety of exercises.
- Easily Modified
  - You can make your workouts as hard or as easy as you like by modifying the intensity, resistance, time, rest intervals, etc.

TYPES OF CIRCUIT TRAINING
- Circle
- Zig Zag
- Multiple Line
- 4 Corner / Square
- Line
The muscular system is responsible for movement. It is obvious that muscles are responsible for movements like walking, jumping and throwing, but muscles also assist in breathing and digestion. Building a strong muscular system provides long-term health benefits, enhances performance in activities, and provides improvements in appearance. Understanding the location and function of the muscles allows a person to design a strengthening plan to meet his/her goals for health, performance and appearance. To support the development of the muscular system, resistance training and a healthy diet must be included in a person's fitness plan.

The function of muscles is to produce movement, all skeletal muscles contract, or shorten, pulling on the bone where the muscle is attached. There are 650 muscles all shortening and pulling from many attachment points and angles to produce every movement possible. Many times these muscles work in opposition and/or cooperation. Examples include the biceps and triceps. The biceps, located on the front of the upper arm, are responsible for bending (flexing) the arm at the elbow joint. The triceps, located on the back of the upper arm, are responsible for straightening (extending) the elbow joint. As the biceps relax, the triceps pull from the opposite direction to straighten the elbow joint. Muscles work together to produce all movements.

Building a strong muscular system provides long-term health benefits for everyone including allowing a person to perform daily activities with greater ease. Additional strength and muscular endurance will provide an enhanced quality of life, allowing a person to accomplish more. Exercises, which add stress to where the muscles attach to the bones increase bone density. As a result, there is a decreased risk of osteoporosis. A strong, balanced muscular system will also improve posture and alignment to reduce low back problems. A well developed muscular system can help decrease the risk of injury caused by everyday mishaps such as stepping off of a curb or slipping and falling. With a stronger muscular system, people are more likely to catch themselves or find their balance before they are injured.

Performance is enhanced through a well developed and balanced muscular system. Muscles get stronger according to the amount of stress or work that is placed on them. Through the building of muscle, the nervous system has better ability to coordinate and refine movements involved in activities. For example, squats develop muscular strength in the leg muscle. This added strength to the muscular system increases a person’s ability to run faster and jump higher. Training the muscular system translates to a higher level of performance for any activity a person chooses.

A well-developed muscular system improves body composition, which, in turn, enhances self-esteem. Body composition is maintained or improved through the development of the muscular system. Muscle tissue acts as a furnace which burns calories. As muscle mass is increased, calories used per day are also increased, which helps control body fat. Increasing muscle mass lowers fat percentage and increases fat-free mass.

When developing a balanced muscular system, it is important to consider the types of activities being performed. An activity that should be incorporated into a fitness plan is resistance training that stresses or works the muscles. During resistance training, the principles of progression and overload should be used to ensure that improvements are made. Resistance training provides the muscular system with the tools it needs to develop strength to function at its best.
The bones and joints of the skeletal system and the more than 600 skeletal muscles of the muscular system function together as the **musculoskeletal system** to produce movements such as sitting up straight, walking, running, jumping and throwing. Because movement is basic to life, building and maintaining these systems provide long-term health benefits, enhance performance and improve appearance.

Building a strong musculoskeletal system provides long-term health benefits, including allowing a person to perform daily activities with greater ease and less risk of injury. Leading a lifestyle that includes a diet rich in calcium, avoiding behaviors such as smoking or drinking, and engaging in weight-bearing activities will increase bone density. Weight-bearing activities, such as walking, running, jumping, stair climbing, dancing and resistance training add stress to the bones. This added stress causes the bones to adapt and become more dense and therefore stronger.

As a result of increased bone density, there will be a decreased risk of osteoporosis and a decreased risk of broken bones. Stronger bones will also result in improved posture, a reduction in low back problems and increased protection for organs in the body. Increased bone density will also improve the muscular system's ability to work with the 206 bones of the average adult skeleton to produce coordinated and refined movements to enhance performance in any activity.

For any movement to occur, skeletal muscles, which are attached to a different bone at each end by **tendons**, must contract or shorten. As the muscle contracts, it pulls on a bone resulting in the bending of a **joint**, or where two or more bones meet. Reversing the direction in which a joint bends is a result of contracting or shortening an opposite group of muscles. For example, bending or flexing the elbow, is caused by contracting the biceps, which are the muscles located on the front of the upper arm. Conversely, straightening or extending the elbow is a result of contracting the opposite muscles or triceps, located on the back of the upper arm.

**Ligaments**, which attach bone to bone and hold them in position, stabilize, strengthen and help to determine the amount of movement or the **range of motion** in joints. Other factors in determining range of motion of a joint, are the type of joint, the shape and function of the bones making up the joint, and any issues that might occur in the joint.

There are three types of joints in the body; immovable joints such as those in the cranium, slightly movable joints such as the discs between certain vertebrae, and freely movable joints such as the hip, shoulder, knee and elbow joints.

The **freely movable joints** permit the greatest range of motion and this makes them especially important in enhancing quality of life. There are six types of freely movable joints in the body, but three play a greater role in large movements necessary for a physically active lifestyle. These three are the ball and socket, gliding, and hinge joints.

**Ball and socket joints** allow for a great deal of movement in many directions and are made up of one bone that has a smooth round head that fits into a cup-like socket in the other bone. The shoulder joint is one example of a ball and socket joint. The head of the humerus fits into a cup-like socket in the scapula.

**Gliding joints** are made up of bones with flat or almost flat surfaces that slide over each other. These joints are found between the **carpal** bones in the wrist, the **tarsal** bones in the ankles, and some vertebrae in the spine. While these joints by themselves offer only limited movement, the combined action of the many joints in the wrists, ankles and spine allow for a significant amount of movement.
Hinge joints, like the elbow and knee joints and the joints in the fingers and toes, allow for movement in one direction and its reverse, such as bending and straightening.

Movements in the freely movable joints have specific names that help to describe muscle actions. For example, bending a joint, or reducing the joint angle, is referred to as flexion; straightening a joint or increasing a joint angle is referred to as extension; extending a joint beyond straight is called hyperextension; moving a body part away from the body to the side, such as raising an arm to one side of the body, is called abduction; moving a body part back toward the body from the side is called adduction; and turning any bone around an axis, such as when a person performs arm circles, rotating the arm around the shoulder joint, refers to rotation.

The shape and function of bones also determine movement and range of motion. Therefore, the bones can be classified into two general categories; those that move and those that mostly support movement and provide protection, those that move are called long and short bones, and those that mostly support movement and provide protection are flat and irregular bones.

Long bones, which are longer than they are wide, allow us to create large movements and provide support. The clavicle, humerus, radius, ulna, femur, tibia, and fibula are all long bones.

Short bones, such as the carpals and tarsals of the hands and feet, also allow for movement, while providing elasticity, flexibility and shock absorption.

The ribs, sternum, and scapula are all flat bones that protect organs and provide attachment sites for muscles.

Irregular bones support weight, dissipate loads, protect the spinal cord, contribute to movement and provide sites for muscle attachment. The cranium, vertebrae and pelvis are examples of irregular bones.

Sometimes, these bones can become displaced or moved from their normal position at a joint. This is called a dislocation and is one joint issue that can affect movement and range of motion. Other joint issues include osteoarthritis, strains, sprains, or tendonitis.

Osteoarthritis is also called “wear-and-tear arthritis.” It is a result of years of wear on the joint in which the cartilage that covers and protects the end of bones softens and breaks down. When this occurs, bone tissue becomes exposed. As a result swelling occurs in the joint which restricts movement and causes pain.

Strains are a result of over stretching a tendon or a muscle and sprains are torn tendons or ligaments. These issues are often a result of an inadequate warm-up before activity. Tendonitis occurs when a tendon is inflamed or swollen and can result from over using a joint.

When one of these joint issues occur, it is important to rest, ice, compress (wrap) and elevate the injured area above the heart to reduce swelling, reduce pain, and begin the healing process. This method of treatment is known as RICE.

The development of a strong and balanced musculoskeletal system will improve health and performance by preventing injuries to muscles, tendons, ligaments, and bones. It can also help improve appearance by providing a strong structure for good posture.

Developing and keeping the more than 200 bones and 600 muscles in the body strong and healthy is important for a person’s health, performance and appearance.
The R.I.C.E. procedure is used for injuries to bones, joints, and muscles. Though this treatment can be used for anyone it is popular in sports injuries. The steps to this procedure are so simple that anyone can do them and it makes for a quick treatment on the side of the court or field when an athlete does get injured.

**A Description Of R.I.C.E.**

R.I.C.E. is actually an acronym. It stands for Rest, Ice, Compression, Elevation. You will see examples of R.I.C.E. When watching sports live or on television. Using this technique at home, or if you suffer any injuries from fitness, jogging or running, can be greatly helpful also. The idea behind each step of R.I.C.E. Is as follows:

Rest- It is believed that people can heal from injuries much faster if they take time to rest. Rest also means resting the injured area. If you hurt a joint, muscle or bone in your leg you should stay off your leg, or use something like crutches or a wheelchair to give that area a rest.

Ice- Immediately apply an ice pack to the injured area. Ice the area for about twenty to thirty minutes at a time, giving the skin time to warm back up to normal temperature in between. Repeat for about two hours. Crushed ice can be placed in a plastic baggie (doubled) or in a wet wash cloth, if you do not have an actual ice pack.

Compression- Adding compression to the injured area can help keep swelling down. This is done by wrapping an elastic bandage around the area. This also can help prevent, or stop, internal bleeding. Be sure not to apply the bandage too tightly, as it can cut off circulation.

Elevation- Elevate your injured area so that your blood has a chance to run back to the heart and out of the injury. Legs are easy to prop up, just grab a foot stool. Add a stack of pillows next to you to prop up an arm. The injured area needs to be sitting higher than the heart, so laying down is ideal.

**Types Of Injuries R.I.C.E. Is Used For**

Implement the R.I.C.E. Procedures for injuries of the feet, ankles, knees, thighs, hands and elbows. These types of injuries are common in athletes and people who get a lot of physical activity. Athletes of all kinds are susceptible, both professionals and students.

**What R.I.C.E. Does And What To Do After**

Immediate application of R.I.C.E. can keep down swelling, but it is not a cure for the injury. If you have an injury that continues to hurt it is important to see a doctor. You may have suffered from just a sprain, or it could be worse, like a fracture or a break.

**Dangers Related To Using R.I.C.E. Procedures**

Never apply ice for more than twenty to thirty minutes at a time, as it can cause frostbite. Do not apply ice to the back of the knee area, as it can cause nerve damage. If the injury comes with an open wound R.I.C.E. Should be bypassed and the injured person should be taken directly to the hospital (especially if bone is showing).

Resource: First Aid And CPR, 2001
Activity, nutrition, hydration and sleep are the everyday behaviors that affect long-term health. These behaviors strongly influence the health, performance and appearance of an individual. A person can determine if his/her habits are producing the desired health benefits by logging activity, nutrition, hydration and sleep patterns.

Logs can help a person see how choices regarding activity, nutrition, hydration and sleep affect fitness and health. An individual can make a plan to improve fitness and health through lifestyle choices based on the information received from these types of logs. The improvement of health, performance and appearance will never fully be achieved without first understanding how activity nutrition, hydration and sleep work together.

**ACTIVITY**

Health, performance and appearance are greatly affected by the type and duration of activities engaged in over a lifetime. People who live an active life have a lower risk of suffering from preventable diseases such as heart disease, stroke, cancer, and obesity. They maintain their muscular, skeletal and cardiorespiratory systems, have more energy and vitality, and improve their performance. They also improve their body composition, therefore enhancing their appearance.

The Five for Life recommendation to maintain a fit and healthy life is to perform 60 minutes of Heart Health or Base activity per day, five days per week. Because time spent on activity to enhance health, performance, and appearance depends on intensity, a person participating in lower intensity activities would have to spend more time than a person participating in higher intensity activities to receive the same benefits.

Using an activity log can help a person evaluate personal activity patterns in an average day and can help determine if he or she is meeting the recommendation to maintain a fit and healthy lifestyle. If a person's activity level is too low, he/she can see this at a glance and begin to plan how to increase daily activity.

**NUTRITION**

What a person eats and drinks affects his/her health, performance and appearance. A healthy diet provides the body with the correct amount of nutrients (carbohydrates, proteins, fats, vitamins, and minerals) it needs to function properly and reduces the risk of obesity, heart disease, Type 2 diabetes, high blood pressure, stroke, breathing problems, arthritis, gall bladder disease, sleep apnea, osteoarthritis and some cancers.

When consumed in the correct daily amounts, these nutrients also provide energy for the body to perform at its highest level. Not consuming the correct amount of nutrients daily can lead to being overweight or underweight, and can affect appearance and body image in a negative way. People that engage in fad diets, or that have an eating disorder such as anorexia nervosa or bulimia, do not consume all of the nutrients the body needs in the correct amounts to be healthy, to perform at its highest level, and to look its best.

For example, a fad diet that restricts certain food groups, such as one that restricts breads and pasta, will not provide vitamins the body needs in the correct amounts to function properly. Many refined grains, which are used to make breads and pasta, are enriched with sources of B vitamins like thiamin, riboflavin,
niacin, and folate which are essential for a healthy nervous system. They are also important in metabolism by helping with the release of energy from protein, fat, and carbohydrates. Folate helps the body form red blood cells. Whole grains, which can also be found in breads, are a good source of dietary fiber, which helps reduce cholesterol, may reduce the risk of heart diseases, and helps with proper bowel function.

People who have anorexia nervosa develop unusual eating habits, often times skipping meals, picking out a few foods and eating them in small quantities, weighting their food, and/or counting every calorie they consume. They may even exercise excessively to burn more calories. As a result of not having enough nutrients in the body, anorexia can cause the heart rate to slow down and the blood pressure to lower, increasing the risk of heart failure. It can also lead to brittle hair, nails and bones, dry and yellow skin, mild anemia, swollen joints, reduced muscles mass, and brain damage.

People who have bulimia engage in a binge and purge cycle in which they eat an excessive amount of food and then almost immediately either vomit or use a laxative to get rid of it. As a result of the vomiting, acid can damage the lining of the esophagus and the outer layer of the teeth. Bulimia can also cause ulcers, pancreatitis, and constipation, as well as an irregular heart beat, heart failure, and death due to chemical imbalances in the body and the loss of minerals such as potassium.

To build the habit of eating a healthy diet to reduce the risk of disease, to improve performance, and to improve appearance, it is necessary to understand the food pyramid and the daily amounts needed from each food group (grains, meats and beans, vegetables, fruits, milk, and oils).

A Nutrition log is a system used to monitor a person's nutritional habits. Keeping a nutrition log can provide information about a person's daily diet and provide insight into eating patterns by showing how much food (cups, ounces, and calories) from each food group is consumed daily. This allows a person to monitor and adjust food choices so a healthy diet can be managed and maintained for a lifetime of good health, performance, and appearance.

SLEEP

Sleep is important for health; performance, and appearance. It is the time when the body repairs itself, grows, builds memories, and releases hormones that regulate appetite and affect BMI. Sleep also contributes to a healthy immune system.

Most teenagers need between 8 ½ and 9 ¼ hours of sleep per night. If the body does not get enough sleep and is unable to repair itself, the overall health of an individual will be compromised. Increased risks of obesity and heart disease have been linked to a lack of sleep, as have a lack of energy and slower reaction times. The lack of energy and slower reaction times will ultimately affect performance, and have been linked to an increased risk of car accidents.

A lack of sleep, known as sleep deprivation, can also affect a person's appearance, causing a person to look and feel depressed, irritable, angry, and tired.

Having a period of uninterrupted sleep gives the body the time it needs to revitalize and repair itself for improved health, performance and appearance. To increase the changes of uninterrupted sleep, it is important to follow the recommendations below:

Things to Avoid:
- Consuming caffeinated coffee, tea, soda/pop, and chocolate late in the day
- Nicotine and alcohol
- Eating, drinking, or exercising within a few hours of bedtime
• Heavy reading, studying, and computer games within one hour of going to bed
• TV, computer, and telephone
• Stress
• Bright light in the evening

Things to Do:
• Make sleep a priority
• Understand the body’s needs
• If naps are going to be taken, make them short and not too close to bedtime
• Establish consistent bedtimes and wake times
• Stick to quiet and calm activities the hour before going to bed
• Create a bedtime habit by doing the same things every night before you go to sleep
• Relax
• Keep a sleep log

Through the use of a **sleep log**, a system used to monitor a person’s sleep habits, it is possible to evaluate total length and patterns of sleep. This valuable information can be used to adjust sleep patterns and help students recognize how sleep can improve and maintain the health of an individual.

**HYDRATION**

Water is an important nutrient for health, performance and appearance. The body is made up, on average, of 60% water. Water helps regulate body temperature, provides a means for nutrients to travel to organs, transports oxygen to cells, removes wastes from the body, moistens skin, helps muscles move, cushions joints, and protects organs.

It is recommended that a person drink one ounce of water for every two pounds of body weight daily. For example, a person who weighs 160 pounds should drink at least 80 ounces of water per day. Physical activity increases the amount of water needed to stay properly hydrated, and it is recommended that an additional eight ounces of water be consumed for every 20 minutes of activity that is performed.

**Dehydration**, when there is not enough water in the tissues of the body, is a problem because by the time a person feels thirsty he/she is already dehydrated. Signs of dehydration include dry lips, nausea, dark yellow, strong-smelling urine, not urinating as often, and constipation. Dehydration has been linked to many health concerns such as low energy levels, elevated blood pressure, circulation problems and decreased kidney function. Performance is affected through the loss of coordination and strength. Dry skin is a sign of dehydration and can have an effect on appearance.

While water can be consumed through other food, such as fruits and vegetables like watermelon and cucumbers that are nearly 100% water by weight, using a hydration log allows a person to see the minimum amount of water intake in an average day. A **hydration log**, a system used to monitor a person’s hydration habits, will give insight into drinking patterns, such as how much water is consumed and whether or not hydration needs are met. This information will allow a person to monitor and adjust water intake.

The benefits of drinking water are immeasurable, and staying hydrated improves health, performance and appearance.